WORCESTER STATE UNIVERSITY

Chemical Hygiene Plan

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FOREWORD

This document describes the Chemical Hygiene Plan (CHP) for Worcester State University (WSU) consistent with the Federal Occupational Safety and Health Administration (OSHA) regulations, "Occupational Exposures in Laboratories" referred to as the "Laboratory Standard."

WSU has established and implemented this chemical hygiene plan, which describes the procedures, equipment, personal protective equipment and work practices that are required to protect employees and students from health hazards associated with hazardous materials in the laboratory and to ensure that exposures are kept below the permissible exposure

A copy of the CHP is available by contacting the University's Environmental Health & Safety/Chemical Hygiene Officer (EH&S/CHO) and/or the Department Chair of each Department using laboratory chemicals and/or generating hazardous wastes including Chemistry, Biology, Visual and Performing Arts, Communications, Publications & Printing, and Psychology.

WSU will maintain laboratories and/or other facilities and employ standard operating procedures compatible with current knowledge and regulations in laboratory safety. Faculty and staff involved in research projects in laboratories are responsible for conducting the research in a manner that follows the CHP. All affected faculty, staff, and students will have access to pertinent safety information through the EH&S/CHO, the department chairs, the faculty for the course, laboratory employees, or the faculty member responsible for the research.

1.0 PURPOSE AND APPLICABILITY

The purpose of this Chemical Hygiene Plan (CHP) is to ensure that:

- Employees and students are protected from health and physical hazards associated with hazardous materials in the laboratory;
- Exposures are kept below the permissible exposure limits specified; and
- Laboratory wastes are appropriately managed.

The CHP applies to all persons using laboratory chemicals and/or generating hazardous wastes on the Worcester State University (WSU) campus. A glossary of terms used in this CHP is presented as Appendix A.

1.1 OSHA Laboratory Standard

The OSHA Subpart Z (29 CFR 1910.1000 – 1450) – Toxic and Hazardous Substances regulations, establish requirements for the management of numerous hazardous substances to reduce employee and other exposure in the workplace. OSHA's Laboratory Standard, found at 29 CFR 1910.1450 and titled "Occupational Exposures in Laboratories," establishes criteria for the management of hazardous

laboratory chemicals.

A hazardous chemical is defined as a substance for which there is statistically significant evidence, based on at least one scientific study, showing that acute or chronic harm may result from exposure to that chemical. OSHA's broad definition of hazardous chemical applies to nearly all chemicals typically used in the laboratories at WSU.
Additional OSHA standards for specific hazardous chemicals, such as arsenic, lead, and formaldehyde, that may be applicable are also found in OSHA 29 CFR 1910, Subpart Z. In addition, the Hazard Communication Standard, 29 CFR 1910.1200(c), and requirements for Access to Employee Exposure and Medical Records, 29 CFR 1910.1020 are also applicable.

1.2 WSU Policies and Procedures

It is the policy of WSU to:

- Provide a safe environment for faculty, students and staff;
- Comply with environmental and safety requirements;
- Reduce the amounts of toxic chemicals used in chemistry laboratory experiments, and
- Substitute non-toxic or less toxic chemicals throughout the University campus when possible.

2.0 ROLES AND RESPONSIBILITIES

2.1 College President and The Board of Trustees

The University President and The Board of Trustees have responsibility for compliance with any and every applicable federal or state statute to provide for the health and safety of its employees, students, and the WSU community, and with any such rules and regulations as may be promulgated there under. The University may promulgate and enforce rules and regulations to implement this CHP from time to time. In accordance with Article III C of the collective bargaining agreement between the Board of Higher Education and the MTA/NEA/MSCA prior to the promulgation of any such rules or regulations by the University, the University President shall first consult with the MSCA Chapter President regarding such rules and regulations and their enforcement.

2.2 Vice President of Academic Affairs

The Vice President of Academic Affairs shall:

1. Ensure that the Academic Curriculum complies with all applicable laws and regulations.
2. Enforce disciplinary procedures to ensure compliance with all applicable local, state and federal regulations, and with WSU policy.
3. Has the direct responsibility for chemical hygiene within the University and provides continuing support for efforts to improve the campus health and safety.

2.3 Environmental Health & Safety/Chemical Hygiene Officer

The Environmental Health & Safety Chemical Hygiene Officer (EH&S/CHO) shall exercise the authority to

identify and minimize dangers to persons working in laboratories, photographic darkrooms and studios, to the community, and to the environment. The EH&S/CHO has the authority to suspend operations that do not conform to health and safety practices required by this CHP. The EH&S/CHO shall:

1. Review and approve the operation, acquisition, and maintenance of fume hoods, biosafety cabinets, emergency safety (drench) showers, eyewashes, and fire extinguishers in all laboratories where chemicals are used and handled.
2. Provide technical expertise to the University community about chemical and laboratory safety and health issues and direct inquiries to appropriate resources.
3. Work with departments to develop and implement standard operating procedures for the handling and storage of hazardous materials and hazardous waste as applicable.
4. Work with departments to have them appropriately label, store and dispose of hazardous materials and hazardous waste as required in the CHP.
5. Work with departments, employees and students engaged in the use of hazardous materials to provide appropriate safety training as required in the CHP.
6. Conduct regular inspections of laboratories and chemical storage areas and communicate to Department Chairs and Laboratory Employees the results of inspections along with recommendations and follow-up actions, as necessary.
7. Coordinate and conduct department health and safety training sessions. These shall include hazardous material, hazardous waste and laboratory safety topics.
8. Maintain documentation of health and safety training for all University employees and students.
9. Maintain the master file of SDSs for all hazardous substances used or stored on campus.
10. Review and approve department procedures for the use, disposal, spill prevention, cleanup, and decontamination of extremely hazardous chemicals and substances.
11. Investigate all reports of laboratory hazard incidents and chemical spills to help prevent reoccurrence and report results of investigations to EH&S Officer, Chief of UP and Dean and Department Chair
12. Ensure that hazardous waste generated on campus is handled and disposed of in accordance with applicable provisions of the Department of Transportation (DOT), the Occupational Health and Safety Administration (OSHA), the Commonwealth of Massachusetts Department of Environmental Protection (DEP), the Massachusetts Department of Public Health and the Environmental Protection Agency (EPA) requirements.

13. Maintain a master chemical inventory for all chemicals used at the University.
14. Review and evaluate the effectiveness of the CHP at least annually and update it as necessary.

2.4 WSU Safety Committee

The WSU Safety Committee will be established as a Special Committee according to Article VII.D.2.d, page 84, of the 2001-2003 collective bargaining agreement between the Board of Higher Education and the MTA/NEA/MSCA.

The Committee shall:

Review the CHP at least annually and recommend any necessary updates to the EH&S Officer, Chief of University Police, Dean and Department Chairs.

1. Report to the VP of Academic Affairs, all unresolved chemical safety issues.
2. The Chair of the WSU Safety committee shall be the CHO

2.5 Chairpersons of Departments That Operate Laboratories

The Department Chair is responsible for chemical safety in his/her department and should understand the Chemical Hygiene Plan. The Department Chair (or designee) (hereinafter, the "Department") shall:

1. Notify the EH&S/CHO when a laboratory, new equipment, photographic darkroom or studio will be opened for operation or taken out of operation or when faculty or lab techs leave or are hired.
2. Submit a Clearance Form for Departing Personnel (in Appendix E) when personnel who work in laboratories, photographic darkrooms, or studios end their employment at the University.
3. Work with the EH&S/CHO to develop and implement procedures for the handling and storage of hazardous materials and hazardous waste as necessary.
4. Ensure that all laboratory, photographic darkroom or studio users in his/her department attend the hazardous materials training as required in the CHP.
5. The Chair or designee will establish a record-keeping system that will consist of a Student Laboratory Safety Agreement signed in triplicate by students in acknowledgement that they have received training and agree to abide by all applicable policies and procedures. Students shall keep one copy of the signed Student Laboratory Safety Agreement. The Department Chair will retain one copy of the Student Laboratory Safety Agreement and will forward one copy of the Student Laboratory Safety Agreement to the EH&S/CHO.
6. Work with the EH&S/CHO to make recommendations to the Provost/VPAA for the

purchase of safety equipment required by the CHP.

7. Supervise department employees to ensure that they use the required safety equipment in his/her department.
8. Be responsible for the routine identification of expired and unusable chemicals and their proper disposal.
9. Work with faculty and the EH&S/CHO to identify Principal Investigators and Designated Users with responsibility for specific laboratory, photographic darkroom and studio spaces.
10. Notify the EH&S/CHO when the Principal Investigator's designated research space will be opened for operation or taken out of operation, or when procedures or Designated Users are changed.
11. Submit a Clearance Form for Departing Personnel, as shown in Appendix E, when personnel who work in the Principal Investigator's designated research space end their employment at the University.

2.6 Faculty Member Conducting Scholarly Research

The Faculty member will be assigned designated research space in which to conduct research and will be responsible for chemical safety in his/her designated research space. "Designated research space" includes laboratories, photographic darkrooms, and studios. The Principal Investigator shall:

1. Work with the EH&S/CHO to develop and implement standard operating procedures for the handling and storage of hazardous materials and hazardous waste in the Principal Investigator's designated research space.
2. Ensure that all personnel, including students, working in the Principal Investigator's designated research space attend the hazardous materials training as required in this CHP.
3. Maintain training records of employees (including students) working in the Principal Investigator's designated research space, and forward documentation of training to the EH&S/CHO and Department Chair.
4. Work with the EH&S/CHO to make recommendations to the Department Chair for the purchase of safety equipment required by the CHP.
5. Supervise employees to ensure they use the required safety equipment in the Principal Investigator's designated research space.
6. Be responsible for the routine identification of expired and unusable chemicals and their proper disposal.

7. Be responsible for accessing SDS files at the chemical's point of use.
8. Comply with the procedures and requirements of the CHP.
9. Report any possibly unsafe or noncompliant conditions in the Principal Investigator's designated research space to the EH&S/CHO.
10. Work with Department Chairs and the EH&S/CHO to develop and implement the standard operating procedures for handling and storage of hazardous materials and hazardous waste.
11. Include compliance with the CHP in grant proposals.

2.7 Designated Laboratory Users

Faculty members who are designated laboratory, photographic darkroom and studio users (hereinafter "Designated Users") have the primary responsibility for chemical hygiene in laboratories, photographic darkrooms and studios used for teaching. A Designated User is responsible for a space for a specified period (time of day, by semester, for Academic Year, etc.) during which his/her classes are in session or he/she is otherwise providing instruction within the designated space. The Designated User for a space as identified on the lab/photo darkroom/studio ID card will also be a contact for the designated space. Designated Laboratory, Photographic Darkroom and Studio Users shall:

1. Follow the procedures and requirements of the CHP.
2. Ensure that all WSU employees and students under their direction or instruction have completed the required training prior to performing duties or attending laboratory classes and forward two copies of signed Student Laboratory Safety Agreements or equivalent as approved by the EH&S/CHO to the Department Chair.
3. Complete routine laboratory, photographic darkroom and studio inspections as outlined in the CHP and forward documentation of completed inspections to the EH&S/CHO, and a copy of the documentation to the Department Chair.
4. Report any possibly unsafe or noncompliant laboratory, photographic darkroom, or studio conditions to the EH&S/CHO.
5. Maintain accurate chemical inventories with use of University chemical inventory program.
6. Work with their Department Chair and the EH&S/CHO to develop and implement standard operating procedures for the handling and storage of hazardous materials and hazardous waste as needed.

2.8 Laboratory Employees (Technicians and Postdocs)

All laboratory, photographic darkroom, and studio employees and student workers shall:

1. Follow procedures and guidelines of the CHP and any applicable department or WSU

standard operating procedure or policy.

2. Use direct observation, checklists and incident reports, to identify and report any unsafe working conditions, faulty fume hoods or defective emergency or safety equipment to the Designated User or Principal Investigator and the EH&S/CHO.
3. Prepare and provide to the Designated Users, Principal Investigators, the Department Chairs, and the EH&S/CHO documentation for chemicals used in their departments, and the hazardous waste the chemicals produced, by keeping an accurate and current chemical storage area and Satellite Accumulation Area inventory. This cradle-to-grave documentation will be submitted as requested/needed.
4. Discharge such other duties as are assigned from time to time by the EH&S/CHO.

2.9 Students, Student Workers, Visitors and Outside Contractors

Students, Visitors and Outside Contractors shall:

1. Follow procedures and guidelines of the CHP and any applicable department or WSU standard operating procedure or policy.
2. Attend, understand, and sign off on the Student Laboratory Safety Agreement or Hazard Communications/Safety Training before beginning work or study at WSU.
3. Report any unsafe or noncompliant conditions in laboratories, photographic darkrooms, or studios to the Designated Users or WSU employee directing his/her work or study

3.0 GENERAL PRINCIPLES

WSU will maintain all laboratories and equipment in accordance with applicable standards, such as the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Handbook of Fundamental Guidelines, prudent laboratory practices, state building codes, and other mechanical codes. Details of facility standards applicable to WSU's laboratories are presented in **Appendix C**.

3.1 Minimize All Chemical Exposures

Each laboratory employee and student will be instructed on measures that can be taken to protect themselves from hazards of laboratory chemicals, such as practicing appropriate work techniques, emergency procedures, and use of personal protective equipment (PPE). Each person will be required to develop and implement work habits consistent with this CHP to minimize personal, coworker, and student exposure to the chemicals in the laboratory. Each student/employee will be trained according to this plan.

Laboratory safety rules and general precautions must be followed when handling and using chemicals. These rules and precautions, summarized in Appendix B, WSU and EH&S Office Laboratory Safety Rules,

must be read, observed and signed by each student participating in laboratory activities.

3.2 Avoid Underestimation of Risk

Always follow the Laboratory Safety Rules and never underestimate the physical and health risks of working with chemicals. Minimize exposure to chemicals with unknown hazards. Always use special precautions when working with chemicals with special hazards. Assume any chemical mixture to be as toxic as its most toxic component. Assume substances of unknown toxicity are toxic.

3.3 Provide Adequate Ventilation

Adequate ventilation is essential for maintaining safe levels of exposure. The best way to avoid exposure to hazardous vapors when working with chemicals with a high volatility is to prevent their release to the working atmosphere by use of laboratory hoods.

3.4 Chemical Hygiene Program

Ensuring the continued safety of the University and of the environment requires that the CHP be implemented on a regular, continuing effort, not merely as a standby or short-term activity.

3.5 PELs and TLVs

In experiment design and laboratory use, precautions and equipment will be used so that neither the Permissible Exposure Limits (PELs) of OSHA or the Threshold Limit Values® (TLVs®) of the American Conference of Governmental Industrial Hygienists (ACGIH) will be exceeded for any chemical in use.
This and more information on hazards of chemicals can be found on the SDS for each chemical.
The SDS for chemicals used in the laboratories can be obtained in hard copy format in room 423D or electronically on the school network though the web-based chemical inventory program: UNHCEMS.
The EH&S/CHO is responsible for granting access to this inventory system. All faculty and staff may correspond directly with the EH&S/CHO to gain access to this system
SDS information can also be obtained free of charge at various websites including:
www.SDS.com

www.SDSsearch.com

4.0 CHEMICAL PROCUREMENT, DISTRIBUTION AND STORAGE

The following sections discuss WSU's requirements for procurement, distribution and storage of all chemicals and hazardous substances. Adhering to these requirements helps WSU to reduce excessive and wasteful ordering, to meet legal requirements for the storage and use of all substances, to aid in monitoring hazardous waste generation, and to eliminate excessive amounts of outdated chemicals.

4.1 Chemical Inventory

The EH&S Office maintains the chemical inventory program.
The inventory system tracks each chemical and toxic or hazardous substance container from the time of purchase and arrival on campus until it is used. The inventory contains valuable information including the Chemical Abstract Service (CAS) number, synonyms, particular hazards, whether or not the chemical

is on the Massachusetts Substance List (MSL), the National Fire Protection Association (NFPA) hazard rating numbers, the Registry of Toxic Effects of Chemical Substances (RTECS) number, chemical formula, chemical grade, the Environmental Protection Agency (EPA) hazardous waste number, special storage requirements, and chemical storage color code. Development of a computerized chemical inventory system which includes use of bar codes is ongoing.

The Department Chair or designee (a staff or faculty member in each affected department) will be designated to maintain the inventory for that department. The inventory will contain the common chemical name of the substance, the location, the vendor, and catalog number, if available. Any chemical purchases by department members must be added to the chemical inventory, including all compressed gas cylinders.

4.2 Procurement

The decision to purchase a chemical is a commitment by the faculty member or staff to handle and use the chemical properly from initial receipt to ultimate disposal. It is the responsibility of the person requesting the purchase to obtain information on proper handling, storage, and disposal of any chemical prior to placing the order. The faculty member or staff person requesting the purchase of a specific chemical should be aware of the potential hazards of the substance. He/she should evaluate the availability of a substitute that is less hazardous.

Minimum amounts of chemicals necessary for the year should be purchased. Larger quantities may seem cost effective at purchase but are much less cost effective when waste disposal for hazardous chemicals with an expired shelf life are considered.

Chemical containers will NOT be accepted without accompanying labels, and packaging in accordance with all appropriate regulations.

Special requirements apply to all chemicals which might form peroxides, such as perchlorates. Order chemicals in small containers and only for an anticipated 6 months use. The CHO must test peroxide formers for the presence of peroxides at appropriate intervals.

4.3 Chemical Storage Areas

Bulk quantities of chemicals (typically five-gallon containers of flammables such as acetone) are kept in the first floor Flammable Storage Room of the Science and Technology Building (ST123).

Chemicals will be delivered to Central Receiving on arrival. Compressed gases will be delivered to the Science and Technology building loading dock. Chemical storage areas are accessible only to those individuals that have been assigned a campus master key (and who have had proper training in the use of chemicals.)

Chemical storage areas meet all building and fire codes for chemical storage. This hazardous waste storage area is equipped with spill controls, fire extinguisher, eyewash, first aid kit and a sprinkler system.

Fire safety cabinets will be used in each laboratory for storage of small quantities (less than 5 gallons) of

flammable materials. Not more than 60 gallons of Class I or Class II liquids, nor more than 120 gallons of Class III liquids may be stored in a storage cabinet. No combustible packaging material will be stored inside the cabinet.

Corrosive and toxic chemicals on shelving will be stored below eye level in all the laboratories as well as the chemical storage room. Highly toxic chemicals will be stored in unbreakable secondary containers or placed in a tray that will contain any spill if the primary container is broken.

Chemical storage areas are under the control of the EH&S/CHO and/or the laboratory employees and are NOT to be used for preparation or repackaging of chemicals.

Refrigerators constitute a unique hazard because explosions may occur when they are used for storage of volatile or unstable chemicals.

4.4 Distribution

Distribution of chemicals shall be performed by only those faculty and students who have received appropriate orientation of chemical storage areas and practices.

4.5 Laboratory Storage

Storage of chemicals at the laboratory bench or in the laboratory is limited to the amounts necessary for one cycle of experiments per course. The container size will be the minimum convenient size. The amounts of chemicals at the laboratory bench will be as small as is practical. These minimal inventories will be stored in a safe manner. Hoods in the laboratory CANNOT be used for chemical storage unless one hood per laboratory is designated as a dispensing hood and the previous requirements for size and quantity are maintained.

5.0 ENVIRONMENTAL MONITORING

WSU may conduct monitoring to detect the presence or release of a hazardous chemical, to ensure engineering controls are functioning properly, or upon modification of a ventilation system. The results of air sampling studies performed in the laboratory will be documented and the records will be maintained and recorded by the EH&S/CHO in accordance with Section 9 of this CHP.

5.1 Routine Monitoring

Regular instrumental monitoring of airborne concentrations is not usually justified or practical in laboratories. Air sampling for evaluating employee exposure to chemical substances will be conducted if there is reason to believe those exposure levels for regulated substances routinely exceed the action level. It may also be appropriate to conduct air monitoring when testing or redesigning hoods or other ventilation devices or when a highly toxic substance is stored or used regularly (e.g., three times per week). If air sampling is performed, employees/students will be informed of the sampling results within 15 working days after the receipt of the results.

5.2 Testing or Redesigning Hoods

Fume hoods and other protective equipment will be maintained in a properly functioning manner. The

hood face velocity will be maintained between 75 and 125 linear feet per minute as tested with a velometer. A record of each inspection will be maintained. For certain chemicals higher face velocities may be required. In all cases, the user should consult published studies and the most current literature to determine the appropriate face velocity for exceptions outside this standard. Additional information of fume hoods is contained in Appendix C. The inspection frequency is provided in Table 6.2 of this CHP. Some instrumentation, e.g., AAs or ICPs, require individual ventilation ducts be placed directly over the exhaust of the instrument. Follow the manufacturer's directions for the requirements.

Any person who is purchasing a chemical new to the inventory or that necessitates a change in procedure must evaluate the adequacy of hood ventilation systems, in consultation with the EH&S/CHO, prior to the use of the chemical or change in procedure. Alteration or modification to the ventilation system should be made only if testing indicates workers and students will still be protected from airborne exposures.

5.3 Highly Toxic Substances

Highly toxic chemicals are to be stored properly and triple rinsed before discarding empty containers.

5.4 Biological Hazards

Monitoring for biological hazards is not normally performed. Permission of the appropriate Department Chair and the EH&S/CHO must be obtained prior to the use of any substances which may present a biological hazard. Any monitoring requirements would be identified at that time.

6.0 HOUSEKEEPING, MAINTENANCE, AND INSPECTIONS

6.1 Cleaning

Each laboratory worker and student are directly responsible for the cleanliness of his or her work space, and jointly responsible for common areas of the laboratory.

The following guidelines apply to the housekeeping standards of the laboratory:

- Each employee or student will keep all work areas clean and uncluttered;
- Chemicals and equipment will be properly labeled in accordance with Section 10 of the CHP;
- The work area will be cleaned at the end of each day;
- All apparatus will be thoroughly cleaned and returned to storage upon completion of usage;
- All spills on laboratory benches or floors will be immediately cleaned and properly disposed of. Large spills will necessitate the implementation of the Emergency Action Plan or Emergency Guide;
- Laboratory benches will be kept clear of equipment and chemicals except for chemicals necessary for the work currently being performed;
- Glassware will be rinsed immediately after use with an appropriate solvent other than water if necessary, then with water, and rinsed with distilled water. Chromic acid and its solutions should NOT be used for the cleaning of glassware.

- All floors, aisles, exits, fire extinguishing equipment, eyewashes, showers, and other emergency equipment will remain unobstructed;
- Chemical containers will be clean, properly labeled and returned to storage upon completion of usage; and
- All chemical wastes will be disposed of in accordance with this CHP.

6.2 **Inspections (Housekeeping and Chemical Hygiene**)

SU conducts inspections of various parameters at specified frequencies to ensure a safe environment is maintained where laboratory chemicals are used including:

- Periodic, e.g., weekly, monthly inspections;
- General, an inspection of the University campus;
- Intermittent, e.g., walkthrough inspection at irregular intervals targeting a specific area or department;
- Special, e.g., inspections of potentially imminent danger actions resulting from new and/or potentially hazardous equipment;
- Agency inspections – inspections conducted by representatives of a regulatory agency including EPA, MA DEP, OSHA; and
- Compliance-based inspections, e.g., inspections conducted because of reported conditions, violations and/or deficiencies.

Table 6.2 identifies typical items to be inspected and maintained, frequency of such and responsibility for ensuring the inspections have been appropriately conducted.

Table 6.2

Housekeeping and Chemical Hygiene Inspection and Maintenance Frequency

Item	Inspection Frequency	Maintenance Frequency	Responsibility
Housekeeping	At least quarterly	Not applicable	Facilities
Passageways	At least quarterly	As needed to ensure free passage always.	Facilities
Cleanup of small Spills	Ongoing and at conclusion	Not applicable	Lab Employee
PPE	Before each use	Not applicable. Items are disposed of if defective	Lab Employee
Eyewash	At least monthly	Flushed at least quarterly	Facilities

Inspections			
Safety Shower Inspection	At least yearly	As needed.	Facilities
Hoods	At least annually upon introduction of high hazard chemical or new procedure	As needed	Facilities
Fire Extinguishers	annually	As needed	Facilities
Telephones	At least quarterly.	As needed	Facilities
Fire Alarms	At least annually	As needed	Facilities
First-aid Kits	At least annually	As needed	Facilities
Flammable Storage cabinets	At least annually	As needed	EH&S/CHO
Laboratories and storage	At the end of each semester and summer session	As needed	EH&S/CHO Principal Investigators Designated Laboratory Users

6.3 Maintenance

WSU performs any needed repairs or service to safety equipment at the frequency stated in Table 6.2

6.3.1 Eyewash

Refer to Table 6.2.

6.3.2 Respirators

Respirators are not utilized and/or provided at WSU so are not inspected.

6.3.3 Safety Showers

Refer to Table 6.2.

6.3.4 Passageways

Passageways are not to be used for the storage of any materials.

7.0 MEDICAL PROGRAM

The opportunity for medical attention, including follow-up examinations that the physician deems necessary will be made available to employees and students under the following circumstances:

- A hazardous chemical leaked or was spilled or was otherwise rapidly released in an uncontrolled manner;
- A laboratory employee or student had direct eye contact with a hazardous chemical;
- A laboratory employee or student had direct skin contact that apparently resulted in skin damage;
- A laboratory employee or student manifests signs or symptoms, such as headache, rash, nausea, coughing, tearing, irritation or redness of eyes, irritation of nose or throat, dizziness, loss of motor dexterity or judgment, etc., and some or all the signs or symptoms disappear when person is taken away from the exposure area and breathes fresh air, and the signs or symptoms reappear soon after the person returns to work with the same hazardous chemicals;
- 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);
- Two or more persons in the same laboratory work area have similar complaints.

7.1 Compliance with Regulations

It is the policy of WSU to promptly investigate all employee-reported or student-reported incidents in which there is a possibility of overexposure to a hazardous substance. If the circumstances suggest an exposure may have occurred, the person believed to have been exposed is entitled to a medical consultation, and if so determined in the consultation, is also entitled to a medical examination at the expense of the University.

Employees and students shall have access to their individual medical records in accordance with OSHA 29 CFR 1910.

7.2 Routine Surveillance

It is the intent of this plan that no employee or student will be routinely exposed above the action level or permissible exposure level for any OSHA-regulated substances. Therefore, routine medical surveillance is not warranted.

7.3 First Aid

First aid kits are in each laboratory. Campus Police Officers are certified in CPR and First Aid and are equipped with automated external defibrillators. Campus Police can be reached at 508-929-8044, 508-929-8911 or internally at extension 8044/ 8911. Student Health Services may also be contacted for medical assistance (508-929-8875) but University Police should be contacted first.

7.4 Consultations and Examinations

Any medical consultations and examinations will be administered by, or under the direct supervision, of a licensed physician. The EH&S/CHO, or designee, will provide the following information to the physician:

- Identity of the hazardous chemical to which the employee or student may have been exposed;

- Description of the conditions of the exposure;
- Description of the signs and symptoms of exposure that the employee is experiencing, if any;
- Exposure date, if known, and
- Copy of the relevant SDS.

The physician's written opinion for an examination or consultation will include recommendations for future medical follow-up, results of the examination and associated tests, and any medical condition that may place the employee or student at increased risk as the result of exposure to hazardous chemicals in the workplace. The physician must inform the employee or student about the results of the consultation or examination and any medical conditions that may require additional treatment or examination. The medical results returned by the physician to the EH&S/CHO or designee, shall not include specific findings and diagnoses that are unrelated to the chemical exposure.

8.0 PERSONAL PROTECTIVE APPAREL AND EQUIPMENT

WSU provides appropriate personal protective equipment consisting of eye, face and skin protection, as required, to all employees working with hazardous chemicals. The EH&S/CHO in consultation with laboratory employees will ensure that appropriate PPE, that is compatible and suitable for work with the hazardous chemicals being used, are provided as well as suitable.

8.1 PPE

Contact lenses are allowed in the laboratory if the employee has any potential contact with chemicals. If a person is wearing non-safety prescription glasses, chemical goggles are required to be worn over the glasses and contact lenses. Wipes and spray available, clean before putting on

Appropriate chemical resistant gloves will be available in each laboratory and must be worn always when there may be skin contact with hazardous chemicals. Glove permeability charts will be available for employee or student review. Use nitrile, or other as necessary.

For concentrated acids and alkalis, and aliphatic non-halogenated organic solvents, neoprene or nitrile gloves are recommended. Do not use neoprene gloves for handling of aromatic hydrocarbons, halogenated hydrocarbons, ketones, and many other solvents.

Thermal resistant gloves will be worn for operations involving the handling of heated materials and exothermic reaction vessels when beaker tongs and/or hot hand grips are not sufficient. Thermal resistant gloves may not be asbestos.

Employees and students will inspect personal protective equipment prior to use and wear appropriate protective equipment as procedures dictate.

8.2 Drench-Type Safety Shower

A drench-type emergency shower capable of saturating a person is in each laboratory. Note their locations and know how to properly use them.

8.3 Eyewash Fountains

Each laboratory is equipped with an eyewash fountain. All employees and students who might be

exposed to chemical splashes will be instructed in the location and proper usage of emergency eyewashes

8.4 Fire Extinguisher

All laboratories will have at least one fire extinguisher. All extinguishers must be easily accessible from the work area.

8.5 Emergency Equipment

Provisions for emergency equipment are described below.

8.5.1 Respiratory Protection

As students and employees are not routinely exposed to chemicals above the PEL or TLV, the use of respirators will not be required. Therefore, WSU does not have a respirator program established in accordance with OSHA 29 CFR 1910.134. If anyone suspects that an emergency requires respirator use, evacuate the laboratory and call emergency personnel. Follow the Emergency Response Plan.

8.5.2 Fire Alarm

When alarm sounds, you must evacuate the building and proceed to the designated safe meeting place.

8.5.3 Telephones

A telephone will be in each laboratory. Telephone numbers of emergency personnel, supervisors, and other workers as deemed appropriate will be posted in the laboratories and storage areas.

8.5.4 First Aid Kits

First aid kits for minor cuts and burns will be available in each laboratory.

9.0 RECORDS

WSU maintains records required and in support of this CHP as described in the following Table.

TABLE 9.0

Records Retention

Record	Description	Retention	Responsibility/Location
Accident/ Incidents	Incident and exposure records for hazardous chemicals and harmful physical agents will be maintained per 29 CFR 1910.20.	30 years	EH&S/CHO
Chemical Inventory	Biology Inventory Chemistry Inventory	Ongoing	EH&S/CHO Principal Investigators Department Chairs Designated Users
Chemical Usage Records	Records of chemicals in storage and chemicals disposed including purchase orders, shipping papers, bills of lading, manifests	3 years	EH&S/CHO Lab Employees
Environmental Monitoring,	Records of air concentration or other monitoring, analytical or instrument monitoring test results	30 years	EH&S/CHO Facilities
Inspections	Records of items listed in Table 6.2	1 year	Facilities EH&S/CHO Principal Investigators Department Chairs
Medical	Results of all medical examinations and tests of employees/students exposed to hazardous chemicals and harmful physical agents	Duration of employment plus 30 years	Medical Dept.
SDS	SDSs of all chemicals in use.	Ongoing for	EH&S/CHO

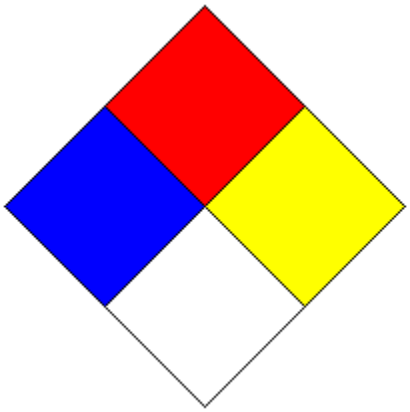
Record	Description	Retention	Responsibility/Location
		current SDSs. 30 years for all chemicals no longer in use.	
Safety Records	WSU Student Laboratory Safety Agreement	1 year	EH&S/CHO Principal Investigators Department Chairs Designated Users
Spills	Spill Reports Records of Agency Contacts Emergency Response Actions Analytical Data	5 years	EH&S/CHO
Testing of Equipment	Fume Hoods and other items listed in Table 6.2.	1 year	Facilities EH&S/CHO
Training	Employee sign-in sheets, electronic databases, training agendas	3 years	EH&S/CHO Lab Employees Department Chairs Principal Investigators Designated Users

10. SIGNS AND LABELS

WSU requires that all containers be labeled in accordance with regulatory requirements and with the National Fire Protection Association (NFPA) hazard rating system. Refer any questions on the proper labeling of chemicals and wastes, or requests for labels, to the Laboratory Employee and/or the EH&S/CHO.

10.1 Identity Labels

NFPA's hazard rating system provides basic information of the severity of chemical hazards to firefighting, emergency, and other personnel whom may have acute (short-term) exposure while responding to fires, spills, or similar emergencies. This rating system however, is not applicable to chronic exposure (long term) or to non-emergency occupational exposure. It identifies the hazards of chemicals in three primary categories: health, flammability, and reactivity (instability).
The order of severity is indicated by numbers from zero "0" to four "4" with zero "0" representing no hazard and four "4" representing the highest hazard. NFPA labels are in the form of a diamond with "health" indicated in the blue area on the left, "flammability" indicated in the red area at the top, and "reactivity" indicated in the yellow area on the right. The bottom space is white and is used for indicating any specific hazard such as "oxidizer," "acid," "alkali," "corrosive," "use no water," and "radiation hazard" (which requires additional radiation warning labels/signs). An example NFPA label is as follows:



Additional information should be included on containers of chemicals including:

- Identify of the contents of the waste or mixture. (Chemical formulas and structural diagrams are not legally acceptable and must not be used.);
- Cautions including "HANDLE WITH CARE" and all specific health and physical hazards (ignitable, oxidizer, corrosive [acid or base], reactive, toxic, etc.);
- Course, experiment, professor, initials of the person who dispensed the substance and the date

and room number;

- Contact the EH&S/CHO at ext. 8099 If you find an unlabeled container and are unsure of its contents. Unlabeled containers of any sort or for any reason may NOT be stored.

Any unknowns developed for student use by a laboratory employee must have a key (what does this mean? Does this mean a key to a locked cabinet?) that is available to the EH&S/CHO or laboratory employee. The unknowns must be identified by course and experiment number, in addition to whatever codes the employee designates. In storing these unknowns for use in a subsequent semester, a label identifying the contents must replace the numerical unknown code.

Exemptions for labeling requirements will be made for chemical transfers from a labeled container into a container that is intended only for the immediate use of the employee or student who performed the transfer.

Containers of waste require yet additional labeling. Infectious, universal and hazardous wastes must also be labeled in accordance with federal and state regulations including Massachusetts Hazardous Waste regulations (310 CMR 30.00) and Massachusetts Department of Public Health regulations (105 CMR 480.00). Refer to Section 12 for more details on the proper labeling and management of these wastes. Examples of waste labels are shown below.

10.2 Location Signs for Showers, Eyewash Stations, Other Safety and First Aid Equipment, Exits

Location signs are in use at WSU for shower, eyewash stations, first aid kits and exits and areas where food and beverage consumption and storage are not permitted.

10.3 Warning

Warnings at areas or equipment or where special or unusual hazards exist will also be posted. Examples of warning signs are shown below.

11. SPILLS AND ACCIDENTS

The following guidelines and instructions must be followed for accidents and spills of hazardous chemicals. In the event of any emergency, call Campus Police immediately at 508.929.8044 or on campus extension 8044. Campus Police Officers are certified in CPR and First Aid and are equipped with automated external defibrillators.

If a building needs to be evacuated, occupants should report to the and remain there until otherwise directed during the incident.

11.1 Written Emergency Plan

Roles, responsibilities and response actions are specified in the University's written Emergency Plan. Follow the instructions below in the event of an accident or emergency.

11.2 Alarm System

In the event of a fire or other emergency, the alarm system will be activated. If the alarm is activated, immediately leave the building. Drills will be conducted at the discretion of the EH&S/CHO or designee. Follow the general guidelines below:

- Immediately leave the building in an orderly fashion by the designated route;
- Use Nearest Unobstructed Exit;
- Remain calm and quiet;
- Shut all doors, especially fire doors;
- Do not use elevators;
- Do not re-enter the building until officially notified; and
- Notify the EH&S/CHO of the incident upon reaching the safe area.

11.3 Spill Control Policy/Plan

In the event of a chemical spill, release or other incident, adhere to the procedures outlined in the WSU Emergency Response Plan, WSU Emergency Guide and WSU Spill Prevention and Countermeasure Control Plan (SPCC) as applicable. Follow the general guidelines below:

- Remain calm;
- Notify (or have someone else notify) your instructor;
- Use the appropriate emergency equipment (i.e., eye wash, emergency shower, or first aid kit); and
- Determine if the spill is an emergency or a minor spill. In the event of an emergency, evacuate the area.

Use the appropriate spill control material for minor spills. Mercury spills require special handling. When the spill is controlled, the material must be cleaned up, properly labeled, and evaluated to determine whether it is a hazardous waste

Refer to the U.S. Department of Transportation, Office of Hazardous Materials Safety, Emergency Response Guidebook for details on chemical spills.

11.4 Incident Analysis

Incidents with personal injury, including accidental ingestion, inhalation, burns, cuts, and reactions must be reported. The laboratory employee will complete an incident report and give a copy to the EH&S/CHO and University Police. The Chemical Incident Report Form is included as **Appendix F**
The EH&S/CHO will make the incident report form available to all laboratory Employees and principal investigators. The EH&S/CHO will work with each department to annually review their records of all incidents and develop an action plan, if needed) to provide a safer place in which to work.

12. WASTE DISPOSAL PROGRAM

Classification of wastes is based on federal and state regulations and, for wastes not regulated by law, on hazardous properties which could present a potential human or environmental danger, or create legal liability issues for WSU, should they be disposed of improperly. A crucial element in the identification of wastes is a complete knowledge of the chemicals used and the processes or activities involved in generating the wastes. Many wastes require basic testing to determine their properties, including the presence of specific chemicals or groups of chemicals that would identify them as hazardous wastes. Therefore, it is imperative for those who generate chemical wastes to provide all information regarding the chemicals used and the processes or activities involved in producing the wastes.
The EH&S Office determines whether a waste is one of four main categories:

- Solid Waste (may be placed in trash bins);

- Chemical Waste (wastes pending hazard classification);
- Hazardous Waste (wastes that are listed hazardous wastes or are hazardous due to one of the characteristics of ignitibility, corrosivity, reactivity or toxicity); or
- Universal Waste (certain batteries, mercury containing articles, such as thermostats and gauges, mercury lamps and pesticides).

Wastes must be placed in the proper container based on its classification. Consult with the EH&S/CHO if you have any questions on the proper management of laboratory wastes.

12.1 Aim

The aim of the program is to effectively manage the generation, identification, collection, labeling, handling, accumulation, transportation, and disposal of all hazardous wastes, including universal wastes and biological and biomedical wastes (biohazard wastes) as required by law. The program includes a system of documentation and record keeping that exceeds legal requirements, thus effectively reducing any liability that Worcester State University may have in this area.

For amounts of hazardous waste generated, follow the general guidelines:

- Do not fill waste containers to the top.
- Keep containers closed always except when waste is being added or removed.
- Cap waste containers tightly, especially if any volatile organic chemicals are present.
- Segregate hazardous wastes according to chemical compatibility. Incompatible wastes should never be mixed or placed next to each other.
- Use containers that are in good condition and compatible with the chemical contents.
- Label waste containers clearly and completely according to the appropriate waste: “CHEMICAL WASTE,” “HAZARDOUS WASTE,” or “UNIVERSAL WASTE.”
- Store waste in secondary containment
- Ensure there is a sign designating the SAA location.

12.2 Content

The Waste Disposal Program covers identification, collection, labeling, handling, accumulating, and transporting for disposal all hazardous and universal wastes and all biological and biomedical (biohazard) wastes.

12.3 Discarding Chemical Stocks

Generally, waste chemicals are discarded into properly labeled chemical waste/hazardous waste containers. The mixing of incompatible wastes, different waste streams, and types of wastes is prohibited as well as disposal of chemicals down the sink drains.

Before a designated user or student's employment or studies end, chemicals for which that person was responsible should be discarded or returned to storage.

Most buildings have satellite points for universal waste (primarily spent fluorescent lamps for recycling). There are several satellite accumulation areas (satellite points) for hazardous wastes generated at specific locations at WSU. One container is used per waste stream at each satellite point. When containers of waste at satellite areas become full, they are moved within three days to a central hazardous waste storage area. Contact the EH&S/CHO for more information.

Unlabeled containers of chemicals and solutions should be promptly reported to EH&S.

12.4 Frequency of Disposal

Some hazardous wastes are transported in bulk drums, while most hazardous wastes are lab-packed into open head drums for transportation and eventual disposal. The EH&S/CHO arranges for pickup of hazardous wastes from these areas by licensed transporters.

Hazardous waste manifests are prepared at the time the hazardous wastes are lab-packed and transported from WSU to the hazardous waste facility. An inventory list, waste profiles, manifests, and other records as required by law become the final element of documentation and are maintained by the EH&S/CHO.

12.5 Method of Disposal

Incineration of laboratory hazardous wastes is an environmentally acceptable manner in most cases. This is done off-site at licensed Treatment Storage Disposal Facilities (TSDFs). Indiscriminate disposal by pouring waste chemicals down drains or adding them to mixed refuse for landfill burial is unacceptable, as is the use of hoods as a means of disposal for volatile chemicals.

12.5.1 Treatment

Treatment, including neutralization, of wastes identified as hazardous wastes under 310 CMR 30 is prohibited. Neutralization of non-hazardous waste between pH 2.0 and pH 12.5 is allowed.

12.5.2 Incineration

Incineration of hazardous wastes on the University campus is prohibited.

12.5.3 Drains and Landfills

12.45.4 The hood will not be used as a means of disposal for volatile chemicals.

12.5.5 Recycling and/or Chemical Decontamination

Disposal by recycling or chemical decontamination should be used when possible and done at an off-site TSDF.

12.5.6 Infectious Wastes

Infectious wastes are managed under the Massachusetts Department of Public Health regulations 105 CMR 480 (State Sanitary Code Chapter VIII: Storage and Disposal of Infectious or Physically Dangerous Medical or Biological Waste). If you generate any "biohazard" waste, you should notify the EH&S Office of this activity and to coordinate the disposal of the waste.

- Place all biohazard waste in an approved red bag with an approved biohazard label.
- Clearly identify the contents of the waste.
- Place all sharps in approved sharps containers with an approved biohazard label.
- Notify the EH&S Office (Ext. 8099) that the waste is ready to be collected.
-

13. CRITERIA FOR IMPLEMENTATION OF CONTROL MEASURES

It is the Policy of WSU to utilize laboratory hoods and storage cabinets when working with volatile chemicals unless other controls have been adopted to control the exposure. Appendix C, The Laboratory Facility contains additional information on ventilation and hoods.

13.1 Engineering Controls

In experiment design and laboratory use, precautions and equipment will be used so that neither the Permissible Exposure Limits (PELs) of OSHA or the Threshold Limit Values® (TLVs®) of the American Conference of Governmental Industrial Hygienists (ACGIH) will be exceeded for any chemical in use. Specific precautions based on the toxicological characteristics of individual chemicals will be implemented as deemed necessary. Special precautions for allergens, embryo toxins, chemicals having moderate or high chronic toxicity, or high acute toxicity will be developed by the faculty member in charge of the course or the researcher.

13.1.1 Hoods

The primary purpose of a laboratory hood is to keep toxic or irritating vapors and fumes out of the general laboratory working area. As a rule, the hood will be used for all chemical procedures involving substances that might result in release of hazardous chemical fumes, gases, solvent vapors, or dust. Always be sure the hood is on and operating before initiating an experiment.

Temporary storage of chemicals and equipment inside laboratory hoods will be kept to a minimum. In all cases, storage of chemicals cannot interfere with the operation and effectiveness of the hoods. Never use perchloric acid in any hood other than the hood designated for perchloric acid.

13.1.2 Glove Boxes

Glove boxes are not normally used at WSU. However, in the event a glove box was to be used when working with hazardous chemicals, the exhaust air from the box would be passed through scrubbers or other treatment before release into the regular exhaust system.

13.1.3 Storage Cabinets

Storage cabinets for flammable and hazardous chemicals will be ventilated as needed. Only compatible

materials can be stored inside the cabinet.

13.2 Personal Protective Equipment

Appropriate eye, face and body PPE are provided to faculty and staff by WSU. This includes safety glasses, goggles, gloves and aprons. Safety glasses meeting ANSI Z87.1 are required for employees (faculty, staff and student employees), students, and visitors to the laboratory, and must be worn always when necessary.

13.3 Hygiene Practices

Follow the general guidelines for proper hygiene in laboratories or when working with chemicals as specified in **Appendix B**. Laboratory Safety Rules.

14. QA/QC OF ENGINEERING CONTROLS

The University CH/EH&S is responsible for ensuring that all engineering controls are operating properly and are maintained in good working order. Refer to **Appendix C**. The Laboratory Facility for additional details.

14.1 Hoods

The ventilation and hood system will be inspected annually by the maintenance department, the EH&S/CHO or designee.

1.5 EMPLOYEE INFORMATION AND TRAINING

WSU is committed to maintaining the safety of all persons that may be exposed to potential physical and health hazards in connection with laboratory operations. The faculty and laboratory employees are responsible for providing adequate and appropriate training for the students for the safe performance of experiments scheduled for the laboratory. All operations that require students to use hazardous materials will begin with adequate instruction in the safe use of the materials.
Custodians who work in laboratory areas will be provided training by EH&S/CHO, or designee, under the employee Right-to-Know laws.

15.1 Employee Safety

Employees and students will be trained in measures that can be taken to protect the safety of all those using the laboratory.

15.1.1 Presence or Release of Chemicals

Employees and students will be trained in the method and observations that may be used to detect the presence of hazardous chemicals in the work area. This will include use of labels and physical properties of a chemical such as appearance and odor. Information will also be provided on the use, if any, of monitoring equipment.

15.1.2 Physical and Health Hazards of Chemicals (HAZCOM Program) and Measures Employees Take

to Protect Themselves

Information on the physical and health hazards of commonly used laboratory chemicals and their routes of exposure will be provided. Use of safety data sheets (SDSs) as a valuable source of information for chemicals and hazardous and toxic substances will be emphasized. Locations and access to SDS files will be identified. Information on 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, will be provided.

Any outside contractors or University employees from the maintenance or physical plant areas will be informed of the hazards to which they might be exposed while working in the laboratory. The EH&S/CHO, or designee, is responsible for providing this information.

15.1.3 Protection from Hazards

Employees and students will receive training in recognizing the signs and symptoms associated with exposures to hazardous chemicals. OSHA's PEL and the ACGIH TLV® will be covered. Instruction on who to contact, if it is believed that someone has been exposed above the PEL or TLV, will be provided.

15.1.4 Requirements of Chemical Hygiene Plan (CHP)

The following topics will be discussed during training on the CHP:

- Contents of the OSHA laboratory standard;
- Location and availability of the CHP;
- Hazards of chemicals which are present in the laboratory, including recommended exposure limits;
- Signs and symptoms associated with exposure to the chemicals present in the laboratory;
- Location and availability of reference material on chemical safety, including the hazards, safe handling, storage and disposal of wastes and use SDSs for each chemical;
- Location of emergency and fire aid equipment; and
- How to access emergency services.

15.2 Emergency and PPE

Guidance on what to do in an emergency is addressed as well as the use of PPE. Generally, safety glasses or goggles and gloves are required when using laboratory chemicals.

15.3 Receiving and Handling of Chemicals

Students and employees receiving, handling and storing laboratory chemicals are provided information on the health and physical hazards of the pertinent chemicals. The use of PPE will also be covered.

15.4 Frequency of Training

The frequency of training in the CHP is shown in Table 15.4.

TABLE 15.4

Frequency of Training in the CHP

Position	Frequency of Training
Department Chairs Principal Investigators Designated Users EHS/CHO Laboratory Employees	Initial training on CHP
Students	Initial training on CHP in the first semester that they will be working with laboratory chemicals. Sign Safety Rules.
Student employees	Initial training on CHP in the first semester in which they are hired. Sign Safety Rules
Visitors and Outside Contractors	Follow Laboratory Safety Rules

15.5 Literature/Consultation

The locations of reference materials relating to physical and health hazards of laboratory chemicals will be identified. Any person having questions regarding this CHP or environmental and safety matters, should address their questions to the EH&S/CHO. Access to numerous sources of literature can be arranged as well as consultations with subject experts if needed.

16. UNUSUAL CONDITIONS

16.1 Working with Select Carcinogens, Reproductive Toxins, and Chemicals with High Acute Toxicity

WSU does not normally work with Select Carcinogens, Reproductive Toxins, and Chemicals with High Acute Toxicity. No laboratory sections of students will use any chemicals that are sufficiently hazardous that they require prior approval before they are used.

Independent projects involving the study of a biological problem, a chemistry problem and faculty research may be conducted at WSU. Work with select carcinogens, reproductive hazards, and neurotoxins require the prior approval of the Department Chair and the CHO.

When laboratory procedures require the use of additional classifications of chemicals (allergens, embryo toxins, teratogens, carcinogens, etc.), additional special precautions will be implemented, including adherence to the substance specific standards in OSHA regulations 1910.1001 to 1910.1048. At a minimum, the following procedures will be employed:

Designated work areas will be established;
Containment devices such as fume hoods or glove boxes must be used; and
Procedures for safe removal of contaminated waste and decontamination will be utilized.

16.2 Working with Allergens and Embryo toxins

Chemicals in this category include any chemical described in the SDS as a reproductive toxin (such as organomercurials, lead compounds and formamide or allergens such as diazomethanes, isocyanates and bichromates). Substances in this category are not to be used in the laboratory for sections of students within a course. They may be used for independent projects and research by Principal Investigators if the following precautions are used:
Suitable gloves to prevent hand contact will be worn when exposed to allergens or substances of unknown allergen activity.
The laboratory employee and EH&S/CHO will be notified of spills and other exposure incidents. A physician will be consulted when appropriate.

16.3 Working with Chemicals of Moderate Chronic or High Acute Toxicity

Chemicals in this category include any substance for which the LD50 data described in the SDS cause the substance to be classified as "Highly toxic chemical" as defined by ANSI Z129.1, Hazardous Industrial Chemicals – Precautionary Labeling, such as hydrofluoric acid and hydrogen cyanide
Areas where these chemicals are stored and used will have restricted access and have special warning signs. A hood with a minimum face velocity of 120 linear feet per minute or other containment device will be used. Other chemicals having moderate, chronic or high acute toxicity which might be used in the laboratory include the following:

16.4 Working with Chemicals of High Chronic Toxicity

Chemicals in this category include select carcinogens as defined in 29 CFR 1910.1450 and any other substance described as such on the SDS for the substance: All transfer and work with these substances will be in a designated area, in a restricted access hood, glove box or a restricted portion of laboratory. CHO. In any disputes, the University EH&S/CHO will be the decision-maker. Vacuum pumps in use in these areas must have scrubbers or high-efficiency particulate absolute (HEPA) filters.
Any contaminated equipment or glassware will be decontaminated before removing it from the designated area. For powders, a wet mop or vacuum with a HEPA filter will be used for cleanup. The designated area will be marked with warning and restricted access signs. Containers will be stored in a ventilated, limited access area in labeled, unbreakable, chemically resistant, primary and secondary containers.

16.5 Special Precautions (Work with Chemicals with High Toxicity)

When laboratory procedures require the use of Select Carcinogens, Reproductive Toxins, and Chemicals with High Acute Toxicity, additional special precautions will be implemented. Refer to the previous sections for specific precautions.
These chemicals may be involved in independent projects and faculty research only. No laboratory

sections of students will use any chemicals that are sufficiently hazardous that they require prior approval before they are used.

APPENDIX A

GLOSSARY OF TERMS

ACGIH - American Conference of Governmental Industrial Hygienists

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

Acute Toxicity - A substance that can cause damage because of a single or short- duration exposure.

Allergen - A substance that can cause an allergic reaction. Allergens are substances that, in some people, the immune system recognizes as "foreign" or "dangerous" but cause no response for most people. Severe allergens may cause anaphylaxis, a severe and sometimes life-threatening allergic reaction that occurs within minutes of exposure to an offending substance

ANSI - American National Standards Institute

ASHRAE- American Society of Heating, Refrigeration and Air Conditioning Engineers)

ASTM - American Society of Testing Materials

Biological Waste - Includes any infectious, physically dangerous medical or biological waste which because of its characteristics may pose a hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed. These include blood and blood products, pathological waste and cultures and stocks of infectious agents and associated biologicals and biotechnological byproduct effluents (genetically altered living organisms and their products) and cultures, animal carcasses and sharps (discarded medical articles that may cause puncture or cuts).

Carcinogen - A substance that has been shown to cause malignant (cancerous) tumors.

Chemical Hygiene Plan (CHP) - A written program developed and implemented by the employer which sets forth procedures, equipment, personal protective equipment and work practices that can protect employees from the health hazards presented by hazardous chemicals used in that workplace.

Chemical Waste - A chemical or chemical mixture that needs waste characterization.

Chronic Toxicity - A substance that causes damage after repeated or long-duration exposure or becomes evident only after a long latency period.

Combustible liquid - Any liquid having a flash point at or above 100° (37.8°), but below 200°F (93.3°C), except any mixture having components with flashpoints of 200°F, or higher, the total volume of which make up 99% or more of the total volume of the mixture.

Compressed Gas - Liquefied, pressurized gas typically stored in meal containers.

Corrosive - A chemical that causes visible destruction of or irreversible alterations in living tissue by chemical action at the site of contact.

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

Designated Laboratory User - Any faculty member, who has primary responsibility for laboratories, photographic darkroom or studio used for teaching.
DOT - Department of Transportation

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 hazardous chemical into the workplace.

Environmental Health & Safety/Chemical Hygiene Officer (EH&S/CHO) - 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 CHP.

EPA - Environmental Protection Agency

Explosive - A compound or mixture susceptible (by heat, shock, friction or other impulse) to a rapid chemical reaction, decomposition or combustion with the rapid generation of heat and gases with a combined volume much larger than the original substance.

Flammable - A chemical or agent with a flashpoint below 100^{o}F.

Hazard - "Hazard" is the general term for anything which can cause injury or for the potential to cause injury. The hazard associated with a potentially toxic substance is a function of its toxicity and the potential for exposure to the substance. The probability of exposure to the substance is a risk factor.

Hazard Class - The nine groupings used to categorize hazardous materials in accordance with the DOT. These Hazard Classes can be used in the establishment of practices and procedures. They include 1) explosives, 2) compressed gas, 3) flammable liquids, 4) flammable solids, 5) oxidizers/organic peroxides, 6) toxic/infectious substances, 7) radioactive materials, 8) corrosives, and 9) miscellaneous dangerous goods.

Hazardous Chemical - 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. Some examples include chemicals that are toxic, corrosive, flammable, highly reactive or explosive.

Hazardous Waste - A waste with properties that make it dangerous, or capable of having a harmful effect on human health and the environment. Under the RCRA program, hazardous wastes are specifically defined as wastes that meet a listing description or that exhibit a characteristic of hazardous wastes.

Health Hazard - Includes chemicals that are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on hematopoietic systems, and agents that 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 a chemical is to be considered hazardous for the purposes of this standard.

Heavy Metals - Refers to any metallic chemical element that has a relatively high density and is toxic, highly toxic or poisonous at low concentrations. Examples of heavy metals include mercury (Hg), cadmium (Cd), arsenic (As), chromium (Cr), thallium (Tl), and lead (Pb).

IACUC - Industrial Animal Care and Use Committee

Laboratory - A facility where "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 employee - Any employee assigned to work in the laboratory, photographic darkroom, or studio including technicians and postdoctoral fellows.

Laboratory 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 any portion of the employee's body other than hands and arms.

Laboratory scale - Means work with substances in which the containers used for reactions, transfers, and other handling of hazardous substances are designed to be easily and safely manipulated by one person.

MA DEP - Massachusetts Department of Environmental Protection

MA DPH - Massachusetts Department of Public Health

SDS - Safety Data Sheet

Mutagen - A substance that causes changes in the genetic material in cells. Some mutagens may also be carcinogens.

Neurotoxin - A toxic agent or substance that inhibits, damages or destroys the tissues of the nervous system, especially neurons, the conducting cells of your body's central nervous system

NFPA - National Fire Protection Association Flammable and Combustibles Liquids Code,

OSHA - Occupational Safety & Health Administration

Oxidizer - A chemical other than a blasting agent or explosive as defined in 29 CFR §1910.109(a), that initiates or promotes combustion in other materials, thus causing a fire either of itself or through the release of oxygen or other gases.

Permissible Exposure Limit (PEL) - A time-weighted average (TWA) or absolute value setting of the maximum regulatory permitted exposure to a hazardous chemical as determined by OSHA.

Peroxide or Peroxide Forming Compound - A peroxide is a chemical substance that contains a peroxo unit. Peroxides and hydroperoxides are highly reactive materials and may be extremely shock-sensitive explosives. Certain organic or inorganic compounds may undergo auto-oxidation to form peroxides

Personal protective equipment (PPE) - Protective items such as safety glasses, goggles, gloves and aprons.

Physical Hazard - A chemical for which there is scientifically valid evidence that it is a combustible liquid.

Reactive (unstable) - A chemical which in the pure state, or as produced or transported, will vigorously

polymerize, decompose, condense, or will become self-reactive under the conditions of shocks, pressure or temperature.

Reproductive toxin - Any chemical which affects the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis).

Principle Investigator (PI) - Any faculty member who is assigned a designated research space in which to conduct scholarly research.

Pyrophoric - Material that is capable of spontaneous combustion in the presence of air. Spontaneous ignition or combustion takes place when these substances reach ignition temperature without application of external heat.

Sensitizer - A sensitizer is defined by OSHA as "a chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure to the chemical.

Solid Waste - Any useless, unwanted or discarded solid, liquid or contained gaseous material resulting from industrial, commercial, mining, agricultural, municipal, household activities that is abandoned by being disposed or incinerated or is stored, treated or transferred pending ultimate disposal.

Threshold Limit Values (**TLVs**) - Guideline value defined by the American Conference of Governmental Industrial Hygienists (ACGIH) to establish the airborne concentration of a potentially toxic substance to which it is believed that healthy working adults may be exposed safely through a 40-hour working week and a full working life. This concentration is measured as a time weighted average concentration. They are developed only as guidelines to assist in the control of health hazards and are not developed for use as legal standards.

Toxicity - Ability to damage or interfere with the metabolism of living tissue.

Toxin - A substance that is produced by living organisms that is poisonous or causes disease. Toxins can

be categorized based on lethality (median lethal dose) when tested in rats. Toxin categories are defined by OSHA 29 CFR 1910.1200 App A.

Universal Waste - Any of the following hazardous wastes managed under the universal waste requirements of the Massachusetts laws 310CMR 30.1000: batteries, pesticides, thermostats, mercury-containing devices and mercury-containing lamps.

Unstable - Any compound is one that will spontaneously decompose or transform into other compounds over a relatively short period of time.

Waste Characterization - The determination of the physical, chemical, radiological and specific hazard properties to establish its suitability for further handling, storage or disposal.

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

APPENDIX B

WORCESTER UNIVERSITY

DEPARTMENT OF CHEMISTRY and the ENVIRONMENTAL HEALTH AND SAFETY OFFICE

LABORATORY SAFETY RULES

1. Note locations of eye wash fountain and emergency shower and be familiar with their use. Note locations of fire extinguisher, glass disposal box, first aid and spill kits.

2. Wear approved eye protection. If a chemical gets in your eye(s), immediately notify the instructor and rinse in an eye wash for 10-15 minutes. Wear gloves, lab coats and/or other appropriate personal protective equipment when instructed.

3. Shoes must be worn. No sandals or open-toed shoes are allowed.

4. In case of fire or accident, notify your instructor immediately.

5. In the event of cuts, burns, or inhalation of fumes, immediately notify your instructor.

6. Read all labels on chemical reagent containers, noting all hazards and precautionary measures to be taken to avoid injury or damage.

7. Do not taste, eat or drink anything in the laboratory. Do not bring food or beverage or chew gum in the laboratory.

8. Avoid breathing fumes of any kind unless instructed to do so by using the wafting method. Report any allergies, medical or physical conditions that may affect lab performance. If you have a medical condition that affects your ability to conduct the experiments safely, we ask that you contact the Office of Disability Services to request appropriate accommodations.

10. For a chemical exposure to the skin, immediately inform the instructor, and rinse in either the sink faucet or shower for 10-15 minutes.

11. Wear clothing that covers most of the body. Confine long hair and do not wear loose clothing or jewelry.

12. Immediately report chemical spills to your instructor, who will determine the appropriate response to the spill.

13. Do not perform unauthorized experiments. Act responsibly.

14. Students are not permitted to work in the laboratory except under the immediate, personal supervision of a faculty member.

NEVER WORK ALONE IN THE LABORATORY.

15. Laboratory stations should be kept neat and clean. Clothing other than that worn in the laboratory and books other than laboratory manuals and notebooks should not be brought to your laboratory station.

16. Read all the safety information in your lab manual and make note of all safety information your instructor gives you.

17. Use appropriate Safety Equipment as instructed.

18. Never leave chemical reactions unattended.

19. Discard all waste chemicals into the appropriate Hazardous Waste container as instructed.

NO CHEMICALS ARE TO BE DISCARDED INTO SINK DRAINS.

20. Used matches should be rinsed with water before being discarded.

21. Label all containers, regardless of size, with the name of the substance (chemical formulas and structural diagrams are not legally acceptable).

22. At the end of each laboratory period, wash the bench top, be sure gas and water are turned off, return all special equipment to the proper place, and wash your hands before leaving.

I have read the above rules and will observe them in my chemistry course.

Return the white copy to your instructor. Retain the yellow copy for your reference.

Name: (Please Print)

Signature: _ _

Date: _ Course:

Instructor: _ __ _

APPENDIX C

THE LABORATORY FACILITY

1. Design

The laboratory facility should have:

- An appropriate general ventilation system with air intakes and exhausts located to avoid intake of contaminated air;
- Adequate, well-ventilated stockrooms/prep rooms;
- Laboratory hoods and sinks;
- Safety equipment including eyewash fountains and drench showers;
- Designated Satellite Accumulation Area for wastes generated in the laboratory or prep room;
- Spill kit (5-gallon bucket containing absorbent/encapsulation materials, goggles, and gloves)
- Arrangements for waste disposal.

2. Maintenance

Chemical-hygiene-related equipment (hoods, safety showers, etc.) should undergo continuing appraisal and be modified if inadequate.

3. Usage

The work conducted, and its scale must be appropriate to the physical facilities available and, especially, to the quality of ventilation.

4. Ventilation

A. General laboratory ventilation.

1. General laboratory ventilation shall comply with the American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) Handbook of Fundamental Guidelines, prudent laboratory practices, state building codes, and other mechanical codes.
2. General laboratory ventilation shall operate continuously to provide a source of air input to

local ventilation devices. In general, a change of room air four to times per hour is adequate.

3. Doors to laboratories shall be kept closed as containment of hazardous materials is partially dependent on proper balance of air flow. Disruption of positive pressure in the corridor by a laboratory door open for an extended period may result in transmission of airborne materials from the laboratory to the corridor. Laboratory fume hoods will also function more efficiently when the door is kept closed.
4. General laboratory ventilation shall not be relied on for protection from toxic substances. The ventilation system shall direct air flow into the laboratory from non-laboratory areas and out to the exterior of the building.

B. Local Exhaust Ventilation

1. Local exhaust ventilation systems shall be used after every effort has been made control the contaminant by isolation, a change in the process, or by substitution of a less harmful material.
2. At a minimum, all work involving hazardous materials must be conducted in a laboratory fume hood.
3. The following activities must have approved local ventilation:

a. Vacuum pump exhausts
b. Gas chromatography exit ports
c. Liquid chromatography
d. Distillation columns
e. Photographic film development

C. Fume Hoods

1. Fume Hood Classification System for Authorized Use

a. Category A

i. Chemicals or process reactions byproducts which are carcinogens, reproductive toxins, allergens, or highly toxic and the breathing zone air concentration (if no hood is present) exceeds the substance's PEL, TLV or other safe limit.

ii. The ventilation flow rate must be at least 100 feet per minute (fpm), but no greater than 125 fpm with sash wide open.

b. Category B

i. Chemicals or process reaction byproducts which are carcinogens, reproductive toxins,

allergens, highly toxic and breathing zone air concentrations (if no hood is present) does not exceed the substances PEL, TLV, or other safe limit.

ii. Chemicals or process reaction byproducts which are not considered to be carcinogens, reproductive toxins, or highly toxic, but the PEL, TLV, or another safe limit, is less than 100 ppm.

iii. The ventilation flow rate must be at least 80 fpm, but no greater than 125 fpm with the sash wide open.

c. Category C

i. Not suitable for use with carcinogens, reproductive toxins, allergens, or highly toxic materials.

ii. The ventilation flow rate is at least 60 fpm but not greater than 125 fpm with sash wide open.

2. Work Practices

a. The Department shall establish work practices that minimize emissions and user exposure.

b. The following list concerns only those work practices related directly to hood performance and applies only when the hood is used in low, medium or high hazard operations, as each is defined above:

i. The worker shall not lean into the hood so that his/her head is inside the plane of the hood face without adequate respiratory and personal protection, except for setup work or hood maintenance.

ii. Equipment in the hood shall not block airflow to slots in the baffle.

iii. Equipment that might be a source of emission (including in case of breakage) shall not be placed closer than 6 inches from the plane of the hood face.

iv. Nothing shall be stored in the hood.

v. Flammable liquids shall not be stored permanently in the hood unless the hood meets the requirements of ANSI/NFPA 30 and 45 for flammable liquid storage. Storage of flammable or otherwise hazardous materials (including compressed gas cylinders) in the active work areas of the laboratory shall be kept to a minimum.

Normally, a one or two-day supply shall be sufficient.

vi. The hood sash or panels shall be closed to the maximum position possible while still allowing comfortable working conditions.

vii. The hood sash or panels shall not be removed except for setup without hazardous chemicals on the hood.

viii. A hood that is more than 10% below standard in exhaust volume shall not be used unless its condition is labeled and the maximum sash opening marked clearly. All deficiencies or suspected deficiencies with fume hood performance shall be reported to the EH&S/CHO and the Facilities Division by the user.

c. Each hood shall be posted with a notice giving the date of the last periodic field test. If the hood failed the performance test, it shall be taken out of service until repaired, or posted with a restricted use notice. The notice shall state the partially closed sash position necessary and any other requisite precautions concerning the type of work and materials permitted or prohibited.

d. Each laboratory hood shall be evaluated for catastrophe potential in terms of the maximum credible accident, involving the properties and quantities of the chemicals used and the nature of the operations. Examples of such a catastrophe would be:

(1) Explosion

(2) Violent ejection of life threatening chemicals into the room

(3) Overheating of the exhaust duct

e. If the potential for a catastrophe is present, special designs to prevent the event or limit the consequences should be implemented. Examples of such provisions would be:

- Special hood design
- Fire or explosion suppressing systems
- Redundant installed spare exhaust blowers
- Emergency power supply

3. Fume Hood Failure Procedures

a. Users suspecting that their fume hood is not drawing enough air shall:

(1) Immediately stop all work in the hood.

(2) Report the problem to one of the followings:

i. The Department
ii. Facilities Division
iii. EH&S/CHO.

(3) Notify others in the area and on additional shifts that the fume hood is not operating and cannot be used. This may be done by posting the hood with a sign. This must be strictly adhered to.

(4) Seal off any open/exposed containers of chemical or radioactive materials currently under the hood or remove any supplies or equipment which may be required as access to the hood may be denied due to repair.

(5) Work with other users and departments to either arrange for the use of other fume hoods which are operating properly or postpone work until the repairs are made.

(6) The fume hood must not be returned to use until retested and approved for use by the EH&S/CHO.

(7) The EH&S/CHO maintains documentation on fume hood failures, repairs and retesting.

APPENDIX D

LIST OF WORKS CONSULTED AND WEB LINKS

American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Handbook of Fundamental Guidelines

ANSI Z129.1, Hazardous Industrial Chemicals – Precautionary Labeling

Cornell University Environmental and Safety SDS Resource: http://msdsmsds.ehs.cornell.edu/SDSsrch.asp

Department of Chemistry, Iowa State University, SDSs: http://avogadro.chem.iastate.edu/MSDSMSDS/

Department of Transportation, Hazardous Materials Regulations, 49 CFR 170 - 172

Environmental Protection Agency, Hazardous Waste Regulations 40 CFR 260 - 266

Federal Occupational Safety and Health Administration, 29 CFR 1910.1018, Inorganic Arsenic

Federal Occupational Safety and Health Administration, 29 CFR 1020, Access to Employee Exposure and Medical Records

Federal Occupational Safety and Health Administration, 29 CFR 1025. Lead

Federal Occupational Safety and Health Administration, 29 CFR 1048, Formaldehyde

Federal Occupational Safety and Health Administration, 29 CFR 1910.1200, Hazard Communication Standard

Federal Occupational Safety and Health Administration, 29 CFR 1910.1450, Occupational Exposures to Hazardous Chemicals in Laboratories (Lab Standard Regulations)

Federal Occupational Safety and Health Administration, 29 Code of Federal Regulations Part 1910, Subpart Z,

Federal Occupational Safety and Health Administration, Flammable and Combustible Liquids Regulations, 29 CFR 1910.106

Fitchburg State University, Draft Chemical Hygiene Plan, March 8, 2006

Laboratory Waste Management Guide, Publication Number SQG-Labs-1 (9/94) Rev. 7/05, Dave Waddell, Seattle, WA, Local Hazardous Waste Management Program in King County, 2005

Massachusetts Department of Environmental Protection, 310 CMR 30, Hazardous Waste Regulations

Massachusetts Department of Environmental Protection, 310 CMR 40, Massachusetts Contingency Plan Regulations

Massachusetts Department of Public Health, 105 CMR 480, State Sanitary Code Chapter VIII: Storage and Disposal of Infectious or Physically Dangerous Medical or Biological Waste

National Fire Protection Association, Flammable and Combustibles Liquids Code, NFPA 30

National Fire Protection Association,

Prudent Practices for Disposal of Chemicals from Laboratories, National Research Council, 2101 Constitution Avenue, N.W., Washington, DC 20418, 1983.
Prudent Practices for Handling Hazardous Chemicals in the Laboratory, National Research Council, 2101 Constitution Avenue, N.W., Washington, DC 20418, 1981.

Tulane Office of Environmental Health & Safety, Chemical Hygiene Plan

U.S. Department of Transportation, Office of Hazardous Materials Safety, Emergency Response Guidebook, http://hazmat.dot.gov/pubs/erg/gydebook.htm

U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Hazardous Materials Regulations, Subchapter C, 49 CFR 171 - 180

WSU Emergency Guide

WSU Emergency Response Plan for the University Community, September 2006

WSU Sampling of Unknowns, I:\Chemists\2003 SOP's and binder Chemist Binder Lab Pack\Information UNKNOWNS PROCEDURE2.doc

APPENDIX E

CLEARANCE FORM

FOR DEPARTING LABORATORY PERSONNEL

Worcester State University will not clear laboratory, [studio, darkroom or facilities] personnel for departure unless this form is completed and returned to the Environmental Safety Office (ESO). The clearance process should be initiated at least one month prior to the separation date. Principal users that have active protocols in their name should notify the ESO at least 60 days prior to separation.

Name:_____

Department:_____

Date:_____

Department Chairperson:_____

Are you a principal user for any protocols? Yes No

All hazardous waste generated during my work or research has been disposed of properly via WSU hazardous waste policies. Research samples, chemical solutions, and unused chemicals that are to be retained in the laboratory have been properly labeled with compound name, amount, and date (include isotope and activity for radioactive material). These materials have been turned over to the following individual(s):

_____

_____

who will serve as custodian(s). The custodian(s) is responsible for the care and the disposal of all transferred materials.

_____

Departing Personnel Signature

_____

Custodian's Signature (s)

Appendix F

Worcester State University

LABORATORY INCIDENT REPORT

Form must be submitted to University Police and EH&S within 48 hours

List the Name of Person and Location of the Incident: (Building and room number or other location)

Date and Time Incident Occurred:

Describe WHAT was being done at the time of the incident, HOW the incident occurred, and what PPE was used (name and amount of chemical if incident involved a spill/exposure.

What:_____

_____

_____

_____

How:_____

_____

_____

_____

PPE:_____

Was there an injury? ___Yes ___ No Name of injured person_____

Phone Number: _____

Was anyone exposed to a hazardous material? _____ If so, identify material and amount_____

_____

Was person exposed to blood, saliva or vomit? ___ Yes ___ No If so, explain._____

_____

Select the person's affiliation with WSU

Student_____Staff_____ Faculty_____ Other (explain)_____

OVER

Reporting Person's Name and Title_____

Personal Phone #:_____ University Phone #: _____

Department _____ Supervisor _____

Description of ANY action taken in response to the incident when it occurred:

University Police contacted? ____Health Services contacted? _____Facilities contacted? _____

University Police 508-928-8911 or x 8911 * Health Services 508-929-8875 * Facilities 508-929-8099

**********DO NOT WRITE BELOW THIS LINE**********

This section is reserved for the person who conducts the follow-up investigation.

FOLLOW-UP RESULTS:

_____

_____

_____

_____

_____

_____

_____

_____

Name of Person who conducted follow-up:_____

Date this final follow up documentation is submitted for archives: _____

(Final follow up documentation should be submitted to the person(s) or department(s) to whom the original Incident Report Form was submitted.)

Name of person to whom this was submitted: _____

Appendix G

CHEMICAL MANAGEMENT SYSTEM: PROCEDURES AND PROTOCOLS

The purpose of the Chemical Management System is to facilitate the laboratory chemical inventory through centralization and use of barcoding technology. It also ensures that health and safety information related to chemicals are properly identified and readily accessible. Finally, it provides the means to minimize chemical purchasing and waste disposal costs. A major component of the Chemical Management System is the web-based chemical inventory program, CEMS. It is a program designed to maintain an accurate and up-to-date chemical inventory from entry point to elimination via barcode analysis. The inventory program also has an extensive Safety Data Sheet database that is accessible to anyone via computer. The chemical data base with location, amount and hazard data is only available to those assigned with a password to protect the University's privacy and reduce risk of theft. Additional modules include inventory reports, hazardous waste data, and surplus sites for chemical adoption, lab safety training, and notification of expired chemicals and alerts when preselected chemicals or hazardous substances are added to the inventory.

An accurate chemical inventory reduces or eliminates the number of redundant chemical containers purchased. Many chemicals may degrade over time, so careful consideration of quantity is required. Investigating the appropriate quantities of chemicals needed can reduce costs to the laboratory and reduce waste volumes. Although it may seem less expensive to buy chemicals in larger quantities, it is in fact more expensive if the cost for disposal is taken into consideration. When disposal costs are considered, it is more economical to purchase only the quantities of chemicals that will be used with more frequency than to stock up to avoid delay in ordering. For these reasons, the following guidelines are being used in conjunction with the chemical inventory program, CEMS.

PURCHASE OF CHEMICALS

Prior to requesting the purchase of a chemical one should check the Chemical Inventory Program, CEMS, to ensure the material is not already on site. Every attempt should be made to use existing chemicals rather than purchase "new" materials. The decision to purchase a chemical will be a commitment to handle and use the chemical properly from initial acceptance to final disposal.

Requests for purchase of new chemicals will be initiated by emailing the Laboratory Technicians and providing the following information:

Identity of the chemical including the concentration and/or purity
Name of laboratory course and the desired chemical quantity

The lab techs will obtain and review the request. Lab technicians will review CEMS and purchase chemicals if there are no existing containers or insufficient amount in the department. The lab techs will receive incoming chemicals. If a chemical cannot be delivered to lab technician, the person who receives these chemical shipments, should be knowledgeable of the proper procedures for receipt. It is important that chemicals are not delivered to an office area where support staff and visitors who do not have the required training be exposed to chemicals. Chemical containers will not be accepted without accompanying labels and packaging in accordance with all appropriate regulations.
Once a package arrives the lab technician will:
Unpack the chemical
Apply barcode label
Enter the data into CEMS

The chemical data includes the following information: date, barcode number, name of chemical, CAS number, GHS symbol, manufacturer, product number, quantity, purity and/or concentration, type of container, storage building and room number, inner location, and owner's name.

CHEMICAL STORAGE

Proper chemical storage controls health or physical hazards posed by chemical compounds during storage in the lab. It is designed to protect flammables from ignition, minimize the potential of exposure to poisons, segregate incompatible compounds to prevent their accidental mixing. The storage containers include: flammable cabinets, explosion or flammable proof refrigerators, oxidizer cabinets, etc. The lab technician will place the chemical in the appropriate location according to the hazard and compatibility. The CHO will make recommendations and conduct periodic inspections of chemical storage areas.

CHEMICAL USE AND RETURN TO THE STOCKROOM

As much as possible, chemical containers are to remain in the storage areas. If small amounts of the chemicals are needed, secondary containers can be labelled, transported, and used in other locations. If the entire container is needed in another location, the item bar code number, name of chemical, new location,

person moving the chemical, and the return date must be documented. A sign out sheet will remain in the stockroom for this purpose. If the container is empty after being in the new location, the empty container will be returned to the stockroom, the bar code label removed, and placed on the Empty Container Bar Code Sheet.

DISPOSAL OF CHEMICAL WASTE

Hazardous waste must be collected, labeled, packaged, and disposed of according to federal and state hazardous waste regulations. Hazardous waste is any solid, liquid, sludge, or containerized gas that is discarded, has served its intended use, or is manufacturing by-product, and exhibits any of the characteristics identified as Flammable, Corrosive, Reactive or Toxic. Under no circumstances should hazardous wastes be discharged into the environment in an effort to “save money,” as a matter of “convenience,” or due to carelessness in planning, preparation, operations or design. When planning experiments or demonstrations, examine all wastes generated and ask if they could be minimized and how. Reducing the scale of processes so that less waste is generated should be considered. See the Chemical Hygiene Plan for specific hazardous waste disposal information.

EMPTY CHEMICAL CONTAINERS

Once a chemical is depleted the container will be rinsed prior to disposal (for P-listed acutely toxic chemicals the container must be triple rinsed) with the rinsate being added to the hazardous waste container. The following will be followed before a container is discarded:

Barcode label will be removed from container

Barcode label will be placed on a form “Place Barcodes from Empty Containers Here”.

The empty container can be discarded in the Glass Only containers if glass and in the trash if metal or plastic. At least monthly, the lab techs will scan the barcodes into CEMS to mark as empty. This will allow the University to maintain an up-to-date chemical inventory.