WEST VIRGINIA UNIVERSITY
HEALTH SCIENCES CENTER CAMPUS

2015

Chemical Hygiene Plan

West Virginia University
Health Sciences Center Campus
CHEMICAL HYGIENE PLAN

Appendices

Foreword

Protecting the safety and health of its employees, students and environment is a high priority of the West Virginia University Robert C. Byrd Health Sciences Center Campus. On January 31, 1990, the Occupational Safety and Health Administration (OSHA) promulgated a rule related to occupational exposures to hazardous chemicals in laboratories. This rule is designed to help protect laboratory workers from the hazards of the chemicals they use.

Included in the standard is a requirement that all laboratories covered by the standard have a Chemical Hygiene Plan (CHP). A CHP is a written program which sets forth work practices, equipment use, maintenance procedures, and personal protective equipment requirements that protect employees from the hazards presented by chemicals used in the lab.

According to OSHA, the CHP must include:

- standard operating procedures
- criteria for the implementation of chemical control measures
- measures to ensure proper operation of engineering controls
- provisions for the training of workers
- provisions for medical consultation in the case of exposure
- designation of responsible people in the lab
- identification of procedures for the use of particularly hazardous substances or procedures

This document satisfies this requirement, but each laboratory on the Health Sciences Center Campus must customize this plan or one that meets the requirements under the law to meet the needs of their individual laboratory.

It is up to each Principal Investigator (P.I.) and/or laboratory manager to supplement this plan or develop their own with more detailed information about the proper use of the particular chemicals and safety procedures used in their lab. These supplements may be in the form of written procedures, literature, libraries, video presentations, and/or group or individual training. **Chemical hygiene plans must be reviewed or updated (as necessary) annually**, then re-signed by the P.I. and dated. A record of this annual review will be kept with the CHP for inspection. The lab manger or P.I. is responsible for the interpretation and enforcement of policies described in this CHP. The HSC Safety Office is available to provide technical assistance with this effort. The HSC Safety Office is available at 293-0952 or online at http://www.hsc.wvu.edu/safety/

This HSC CHP Plan should not be used for a lab without editing. Each lab is different and its customized CHP will require additions of specific hazards, standard operating procedures and information. Each lab is required to have its own CHP or a more general one for the entire Department, followed by supplements that contain information specific to the individual Principal Investigators. The CHP must include a page listing Responsible Parties as shown below:

Name, Office Room number, Office Phone number for each of the following**:**

- Principal Investigator or Director
- Chemical Hygiene Officer (CHO)
- Lab Manager (where applicable)
- Lab Personnel

The CHP must also include Standard Operating Procedures and specific hazards or precautions for that lab and documentation of training.

Each lab must have a chemical inventory updated annually which lists:

- Chemical Name
- Amount
- Manufacturer and CAS number
- Room number
- Location (shelf, freezer, etc.)
- NFPA ratings
- Principal Investigator
- Department
- Other special hazardous chemical information
- Date inventory was prepared or updated

This inventory is to be completed in the EXCEL format provided by the HSC Safety Office and can be found here: http://www.hsc.wvu.edu/safety/Laboratory-Safety/Chemical-Safety.aspx

The inventory should be updated when new items are added or removed and must be submitted annually to the Departmental CHO, who will then forward all plans from their Department to the HSC Safety office by a specified date annually so that it can be forwarded to the appropriate state and federal regulatory agencies and local emergency responders.

There should be a Safety Data Sheet (SDS), formerly named Material Safety Data Sheets (MSDS), for each chemical in the lab and maintained as a hard copy in the lab for the use of lab personnel. All personnel should be trained on how to read and interpret SDSs and where they are located. All training should be documented. A training sign-in sheet can be found in Appendix D.

A folder or notebook must be available for inspection of records for training of all lab personnel.

These four items:

- Lab Chemical Hygiene Plan (CHP)
- Chemical Inventory
- Safety Data Sheets
- Training records

- Each laboratory must have a folder/notebook available for inspection when the Safety Office or state/federal regulators conduct laboratory inspections. All lab workers will be trained to know precisely where these four items are located in the event they are asked to provide them by an inspector or if they are needed in the event of an emergency.

DEFINITIONS

- By OSHA definition, a **hazardous chemical** is 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. This standard does not apply to laboratory chemicals that have no potential threat upon employee exposure (i.e., dip-and-read tests).
- A **laboratory** is defined as a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.
- **Principal Investigator or Project Director** is defined as an academic staff member whose project is being sponsored and who is responsible for directing the research and for ensuring that all terms and conditions of a sponsored agreement are met.
- **Laboratory Supervisor** is defined as the person who oversees the day-to-day operation of the research laboratory.
- **Chemical Hygiene Officer** is defined as an employee designated by the Departmental chairperson who is qualified by training and experience, to provide technical guidance in the development and implementation of the written Chemical Hygiene Plan.
- A **laboratory worker** is defined as an individual employed in a laboratory workplace that may be exposed to hazardous chemicals in the course of his or her assignments.
- **Hazardous waste** is a waste that is dangerous or potentially harmful to our health or the environment. Hazardous wastes can be liquids, solids, gases, or sludge. They can be discarded commercial products, like cleaning fluids or pesticides, or the by-products of manufacturing processes. If a waste is considered solid waste, it must then be determined if it is hazardous waste (§262.11). Wastes are defined as hazardous by EPA if they are specifically named on one of four lists of hazardous wastes located in Subpart D of Part 261 (F, K, P, U) or if they exhibit one of four characteristics located in Subpart C of Part 261 (characteristic wastes).

    - **Listed Wastes**
      Wastes are listed as hazardous because they are known to be harmful to human health and the environment when not managed properly, regardless of their concentrations. EPA has studied and listed as hazardous hundreds of specific industrial wastestreams. These wastes are described or listed on four different lists that are found in the regulations at Part 261, Subpart D. These lists include:

        - **The F list** - The F list designates as hazardous particular wastes from certain common industrial or manufacturing processes. Because the processes producing these wastes can occur in different sectors of industry, the F-listed wastes are

known as wastes from non-specific sources. The F list is codified in the regulations at 40 CFR §261.31.

- **The K list** - The K list designates as hazardous particular wastestreams from certain specific industries. K-listed wastes are known as wastes from specific sources. The K list is found at 40 CFR §261.32.

- **The P list and the U list (Discarded Commercial Chemical Products)** - These two lists are similar in that both list pure or commercial grade formulations of certain specific unused chemicals as hazardous. Both the P list and U list are codified in 40 CFR §261.33. P or U waste codes may be applicable, provided that the material is an unused commercial chemical product (CCP). A CCP is a substance that consists of the commercially pure grade of the chemical, any technical grades of the chemical, and all formulations in which the chemical is the sole active ingredient (§261.33(d)).

Characteristic Wastes

Even if the wastestream does not meet any of the four listings explained above, it may still be considered a hazardous waste if it exhibits a characteristic. In Part 261, Subpart C, EPA has designated the following four characteristics: ignitability (D001), corrosivity (D002), reactivity (D003) and toxicity (D004-D043).

Ignitability - Ignitable wastes create fires under certain conditions or are spontaneously combustible, or have a flash point less than 60 °C (140 °F). The characteristic of ignitability is found at 40 CFR §261.21.

Corrosivity - Corrosive wastes are acids or bases (pH less than or equal to 2 or greater than or equal to 12.5) that are capable of corroding metal containers, such as storage tanks, drums, and barrels. The characteristic of corrosivity is found at 40 CFR §261.22.

Reactivity - Reactive wastes are unstable under "normal" conditions. They can cause explosions, toxic fumes, gases, or vapors when mixed with water. The characteristic of reactivity is found at 40 CFR §261.23.

Toxicity - Toxic wastes are harmful or fatal when ingested or absorbed (e.g., containing mercury, lead, etc.). When toxic wastes are disposed of on land, contaminated liquid may drain (leach) from the waste and pollute ground water. Toxicity is defined through a laboratory procedure called the Toxicity Characteristic Leaching Procedure (TCLP). The toxicity characteristic is found at 40 CFR §261.24.

Generators are responsible for characterizing their waste as hazardous and must

determine whether a waste exhibits a characteristic by either testing or applying knowledge of the hazardous waste characteristic of the waste (§262.11).

Roles and Responsibilities

President

The President of West Virginia University and Vice President of the Health Sciences Center are ultimately responsible for the implementation, enforcement, and support of the West Virginia University Chemical Hygiene Plan and Safety Program.

Vice Presidents, Associate/Assistant Vice Presidents, Dean, Directors, Chairs

- Communicate performance expectations so that the practices and policies set forth in chemical hygiene plans and other compliance requirements are to be adhered to in all laboratories.
- Work with Departments and Administration to provide appropriate facilities, infrastructure and resources to support safe conduct of research within their school/division.
- Establish lines of authority for safety, ensure safety policy is developed that incudes laboratory safety responsibilities in job descriptions and performance plans of employees.
- Facilitate building a culture of laboratory safety in the departments and provide individuals under their management with the authority and support to implement effective safety and health programs.
- Provide budgetary arrangements to support health and safety practices.
- Assume responsibility for Departments engaged in the laboratory use of hazardous chemicals and appoints one or more competent and qualified Chemical Hygiene Officer(s) (CHO) for each Department or unit.
- It is the responsibility of the departments to ensure all of their personnel, who are required to participate in RCRA training, have in fact completed the annual training.
- Provides the CHO and PI's with the support necessary to implement and maintain their Chemical Hygiene Programs.
- Ensure that Principal Investigators fulfill their administrative safety obligations.
- Collaborate with HSC Safety to facilitate timely resolutions to unsafe conditions when reported.
- Notify HSC Safety when new researchers are beginning or ending employment so proper lab set up and close out can occur. Notification will also occur when moves, transfers or remodels occur.
- Support disciplinary action when employees do not follow standard operating procedures and follow rules and regulations.

Principal Investigator (P.I.s) and Laboratory Managers

- Ensure that the laboratory has and maintains an up-to-date chemical hygiene plan.
- Ensure employees comply with the CHP and do not operate equipment or handle hazardous chemicals without proper training and authorization.
- Ensure employees attend or take all required training.

- Ensure that employees receive appropriate training and information regarding the hazards in their work area and procedure specific training. Training and information shall be provided at the time of an employee's initial assignment to a work area and prior to assignments involving new exposure situations.
- Provide and require all employees working in the lab wear required personal protective equipment that is compatible to the degree of hazard of the chemical.
- Follow all pertinent safety rules when working in the laboratory to set an example for his or her supervisees.
- Develop and update laboratory standard operating procedures and ensure staff understand them prior to conducting procedures.
- Ensure that visitors follow the laboratory rules and assume responsibility for the laboratory visitors.
- Keep informed of current regulations and changes regarding the OSHA Laboratory Standard, Biosafety, Radiation Safety, Laboratory Safety and Hazardous Waste.
- Ensure that personal protective equipment is available and properly used by the laboratory employee.
- Maintain and implement safe laboratory practices and standard operating procedures.
- Monitor the facilities and the hoods to ensure that they are maintained and function properly.
- Contact the appropriate person, as designated by the Department Chairperson, to report problems with the facilities or equipment.
- Ensure all employees know how to locate and use the labs' CHP, safety data sheets, spill kits, and emergency information.
- Notify HSC Safety Office immediately if regulatory inspectors arrive at the HSC campus for inspection.
- Ensure employees receive appropriate medical monitoring when necessary.
- Ensure that violations are corrected immediately, or as soon as possible.
- Ensure training documentation is maintained.
- Provide staff with chemical, process, and equipment information as needed.
- Ensure personnel protective equipment is provided and used.

Chemical Hygiene Officer (CHO)

- Designated by the employer, and is qualified by training or experience, to provide technical guidance in the development and implementation of the provisions of the Departmental Chemical Hygiene Plan.
- Maintain a Departmental Chemical Hygiene Plan (CHP) or individual lab CHPs within the departments and updates at least annually. Support departmental labs in the development and implementation of lab CHPs. Maintain records of updates.
- Review and approve use of particularly hazardous substances.
- Responsible for compiling a list of employees RCRA training status. Provide the list with the HSC Safety Office monthly. Notify employees when they are overdue for training and work with the Chair or Dean when non-compliant employees need disciplinary action for not complying with the training requirements.
- Act as a liaison between the department and HSC Safety on safety issues.

- Encourage CHP compliance of employees with support from PIs and Laboratory Managers.
- Monitor procurement, use, storage, and disposal of chemicals.
- Conduct regular inspections of the laboratories and prep rooms.
- Maintain inspection, personnel training, and inventory records and forward to HSC Safety Office upon request and on time.
- Ensure all labs complete the annual chemical inventories. Collect all the inventories and provide them to HSC Safety Office on time.
- Provide HSC Safety Office with up-to-date list of lab employees routinely and ensure employees attend/take required training. Encourages laboratory employees to attend specialized training that is provided by the institution (i.e., first-aid training, fire extinguisher training, liquid nitrogen and gas cylinder training).
- Assist Laboratory Managers in developing and maintaining adequate facilities.
- Supports PIs and Laboratory Managers in ensuring employees receive appropriate training and information regarding the chemical hazards in their work area. Training and information shall be provided at the time of an employee's initial assignment to a work area and prior to assignments involving new exposure situations. The frequency of refresher information and training shall be determined by the employee's supervisor.
- Request monitoring when necessary from HSC Safety Office.
- Provide guidance, updates and information to all departmental laboratory personnel.
- Attend CHO training when provided by institution.
- Notify HSC Safety Office immediately if accidents, spills or emergencies occur.
- Notify the HSC Safety Office immediately when regulatory inspectors arrive at the HSC campus for inspection.

Laboratory Employee

- Read, understand, and follow all safety rules and regulations that apply to the work area.
- Plan and conduct each operation, laboratory class or research project in accordance with the Departmental and Institutional CHP and standard operating procedures (SOPs).
- Promote good housekeeping practices in the laboratory or work area.
- Communicate appropriate portions of the CHP to students in the work area.
- Notify the supervisor of any hazardous conditions or unsafe work practices in the work area.
- Use personal protective equipment as appropriate for each procedure that involves hazardous chemicals.
- Report any job-related illness, exposure or injury to the supervisor immediately. All accident reports must be submitted within 24 hours of the accident.
- Attend or take all required safety and health training.
- Attend medical monitoring appointments when in medical monitoring program.

HSC Safety Office/Environmental Health and Safety

- Monitor and assist in the implementation of the WVU HSC Chemical Hygiene Plan.
- Review the HSC CHP annually and revise as necessary.
- Advise lab staff regarding required laboratory safety training to employees.

- Provide technical assistance to laboratory employees regarding chemical handling, storage, use, and disposal.
- Conduct monitoring and exposure assessments upon request.
- Maintain environmental monitoring and employee exposure records. Submit monitoring results to the Chemical Hygiene Officer and the Dean/Director.
- Audit the Chemical Hygiene Plan, chemical inventory, SDS records and training in each Department on an annual basis.
- Provide annual laboratory inspections to support compliance with the WVU HSC Chemical Hygiene Plan. Submits detailed inspection reports to the Department Deans, Directors, Chairs and the Principal Investigator. Assist in development of corrective action.
- Accompany regulatory inspectors on laboratory inspections.
- Provide technical assistance regarding personal protective equipment and safety equipment.
- Provide technical assistance to employees to ensure code compliance.
- Maintain a comprehensive website of safety reference materials at: http://www.hsc.wvu.edu/safety/
- Assist in emergency planning and response.
- Coordinate Chemical Hygiene Officer training for the HSC campus.

Training and Information

It is essential that laboratory employees have access to information on the hazards of chemicals and procedures for working safely. Supervisors must ensure that laboratory employees are informed about and have access to the following information sources:

- The contents of the OSHA lab standard, **Occupational Exposure to Hazardous Chemicals in Laboratories**, and its appendices (29 CFR 1910.1450). This is available at http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10106
- The Chemical Hygiene Plan for the Department or for the individual laboratory which includes standard operating procedures.
- The Permissible Exposure Limits (PEL) for OSHA regulated substances if used in the laboratory.
- Safety Data Sheets **(**SDS) for laboratory chemicals. (M)SDSs should be located in a known and accessible location within the laboratory. Departments that receive SDSs directly with chemical shipments will make such information available to the employees using the chemicals. A copy of all new chemical (M)SDS should also be forwarded to the HSC Safety Office. SDS collections can also be located online through the "LINKS" selection on the EH&S home Web page at http://www.wvu.edu/%7Eehs/
- Specific safety rules, policies and procedures and regulations that apply to their individual labs.
- Training will take place upon initial employment and when work processes change.
- Training will be documented and maintained by the Laboratory Manager or CHO. This should include for each laboratory worker:
    - A record of any training completed by lab workers such as workshops, hazardous waste, laboratory safety, fire safety, gas cylinder usage, liquid nitrogen, laser safety etc.
- Annual Hazardous Waste Training: This training is for **ALL** WVU lab personnel in research and using chemicals. Personnel includes: Faculty, Staff, Post-Doctoral Fellow, Interns, Researchers, Technicians, Lab Managers, Principal Investigators, Chemical Hygiene Officers, and Student Lab Workers (paid or receiving stipend). (This training excludes students from academic labs.)

Bloodborne Pathogens Training: Contact the Biosafety Office at 304-293-7157 at aaelliott@hsc.wvu.edu.

Laser Safety Training: Available on SOLE**.** To register for the training alemmon@hsc.wvu.edu

WVU Mandatory Hazardous Waste Online Training. Available on SOLE**.** To register for the training alemmon@hsc.wvu.edu

Liquid Nitrogen Training: Any employee and student utilizing Liquid Nitrogen must take the online Liquid Nitrogen Safety Training through SOLE. To register for the training contact alemmon@hsc.wvu.edu

CITI Training Portal: https://www.citiprogram.org/index.cfm?pageID=86

Topics are:
• Animal Care and Use (ACU)
• Biosafety and Biosecurity (BSS)
• Good Clinical Practice (GCP)
• Human Subjects Research (HSR)
• Information Privacy and Security (IPS)
• Responsible Conduct of Research (RCR)

Criteria for Implementation of Control Measures

General Criteria

This Chemical Hygiene Plan is intended to limit laboratory workers' exposure to OSHA-regulated substances. Laboratory workers must not be exposed to substances in excess of the permissible exposure limits (PEL) specified in OSHA rule 29 CFR 1910, Subpart Z, Toxic and Hazardous Substances or Threshold Limits Values (TLVs) set by the American Conference of Governmental Industrial Hygienists. PELs refer to airborne concentrations of substances and are averaged over an eight-hour day. A few substances also have "action levels." Action levels are air concentrations below the PEL which nevertheless require that certain actions such as medical surveillance and workplace monitoring take place.

Guidance: ***Pay particular attention to the following paragraph.*** If you, as a Laboratory Manager or Chemical Hygiene Officer, suspect exposure concentrations exceeding allowable levels**,** please contact the HSC Safety Office for technical assistance.

The HSC Safety Office has provided Hazard Evaluation Sheets for acutely toxic substances commonly utilized in HSC research in the appendix list. These sheets are not all encompassing. If a laboratory would like a hazard evaluation on an additional substance, the HSC Safety Office may be contacted for assistance.

An employee's workplace exposure to any regulated substance must be monitored if there is reason to believe that the exposure will exceed an action level or a PEL. If exposures to any regulated substance routinely exceed an action level or permissible exposure level, control measures must be implemented.

A. Professional Judgment

The lab supervisor can use professional judgment to assess the nature of chemical exposure resulting from a lab procedure and prescribe engineering controls and personal protective equipment to be used during the procedure. This judgment will be documented through use of Standard Operating Procedures and Laboratory Chemical Safety Rules written for the chemicals in use.

B. Air Sampling

Air sampling for evaluating employee exposure to chemical substances shall be conducted on an as needed basis (to be determined by the lab supervisor). Conduct air sampling if there is reason to believe that exposure levels for regulated substances that require sampling routinely exceed the action level, or in the absence of an action level, the PEL.

Air sampling will be conducted according to established industrial hygiene practices. It may be conducted by HSC Safety Office, WVU Environmental Health or Outside Consultants. The results of air sampling studies performed in the laboratory should be sent to the HSC Safety Office for records maintenance.

Criteria for Implementation of Specific Control Measures

Engineering controls, personal protective equipment, hygiene practices, and administrative work practice controls each play a role in a comprehensive laboratory safety program. Implementation of specific measures must be carried out on a case-by-case basis, using the following criteria for guidance in making decisions.

A. When to Use Fume Hoods

The laboratory fume hood is the major protective device available to laboratory workers. It is designed to capture chemicals that escape from their containers or apparatus and to remove them from the laboratory environment before they can be inhaled. Characteristics to be considered in requiring fume hood use are physical state, volatility, toxicity, flammability, eye and skin irritation, odor, and the potential for producing aerosols. A fume hood should be used if a proposed chemical procedure exhibits any one of these characteristics to a degree that:

(1) airborne concentrations might approach the action level (or permissible exposure limit),
(2) flammable vapors might approach one tenth of the lower explosion limit,
(3) materials of unknown toxicity are used or generated, or
(4) the odor produced is annoying to laboratory occupants or adjacent units.

Procedures that can generally be carried out safely outside the fume hood (depending on the capacity of the general ventilation system to remove any airborne contaminants) include those involving:

(1) water-based solutions of salts, dilute acids, bases, or other reagents,
(2) very low volatility liquids or solids,
(3) closed systems that do not allow significant escape to the laboratory environment, and
(4) extremely small quantities of otherwise problematic chemicals.

The procedure itself must be evaluated for its potential to increase volatility or produce aerosols.

B. When to Use Safety Shields or Other Containment Devices

Safety shields, such as the sliding sash of a fume hood, are appropriate when working with highly concentrated acids, bases, oxidizers or reducing agents, all of which have the potential for causing sudden spattering or even explosive release of material. Reactions carried out at non-ambient pressures (vacuum or high pressure) also require safety shields, as do reactions that are carried out for the first time or are significantly scaled up from normal conditions.

Other containment devices, such as glove boxes or vented gas cabinets, may be required when it is necessary to provide an inert atmosphere for the chemical procedure taking place, when capture of any chemical emission is desirable, or when the standard laboratory fume hood does not provide adequate assurance that overexposure to a hazardous chemical will not occur. The presence of biological or radioactive materials will also mandate certain special containment devices.

Local exhaust ventilation may be required for equipment that exhausts toxic or irritating materials to the laboratory environment.

Ventilated chemical storage cabinets or rooms should be used when the chemicals in storage may generate toxic, flammable or irritating levels of airborne contamination.

C. When to Use Personal Protective Equipment

Laboratory supervisors or CHOs shall designate areas, activities, and tasks requiring specific types of personal protective equipment. Protective equipment (especially masks and gloves) shall not be worn in public areas, in order to prevent the spread of chemical or biological contamination from laboratory areas, and to avoid alarming other personnel in the facility when using public areas within the facility, such as elevators or restrooms.

Eye Protection is required for all personnel and any visitors whose eyes may be exposed to chemical or physical hazards. Side shields on safety spectacles provide some protection against splashed chemicals or flying particles, but goggles or face shields are necessary when there is a greater than average danger of eye contact. A higher than average risk exists when working with highly reactive chemicals, concentrated corrosives, or with vacuum or pressurized glassware systems.

Protective Clothing such as lab coats or other similar clothing protectors are strongly recommended for all laboratory personnel. Lab coats are required when working with select carcinogens, reproductive toxins, substances which have a high degree of acute toxicity, strong acids and bases, and any substance on the OSHA PEL list carrying a "skin" notation. Flame retardant lab coats must be provided when working with flammables.

Bare feet, sandals, open-toed shoes cloth shoes, and clogs are not allowed in any laboratory and are not permitted in any situation where lab coats or gloves are required.

Gloves made of appropriate material are required to protect the hands and arms from thermal burns, cuts, or chemical exposure that may result in absorption through the skin or reaction on the surface of the skin. Gloves are also required when working with particularly hazardous substances where possible transfer from hand to mouth must be avoided. Gloves should be carefully selected using guides from the manufacturers. General selection guides are available; however, glove resistance to chemicals will vary with the manufacturer, model and thickness. Therefore, review a glove-resistance chart from the manufacturer you intend to buy from, before purchasing gloves. Special gloves (usually orange in color) are needed when handling hot material, such as autoclaved items. Under no circumstances should household ‘oven mitts’ be used for this purpose, or any glove which is damaged to the point of having holes that expose skin. Special gloves are also needed when handling cryogenic material such as dry ice or liquid nitrogen. These thick gloves are usually blue in color, and MUST BE DRY to avoid having the gloves adhere to skin once they become cold.

Respiratory Protection is generally not necessary in the laboratory setting and must not be used as a substitute for adequate engineering controls. Availability of respiratory protection for emergency situations may be required when working with chemicals that are highly toxic and highly volatile or gaseous. If an experimental protocol requires exposure above the action level that cannot be reduced, respiratory protection will be required. All use of respiratory protective equipment is covered under the

WVU Respiratory Protection Program. Medical monitoring, fit testing approval and training is required from WVU Occupational Medicine and EH&S before respiratory protection can be utilized. Dust masks and N-95s can be utilized on a voluntary use basis without medical monitoring, when the job does not require their use.

Management of Engineering Controls

The engineering controls installed in the laboratory are intended to minimize employee exposure to chemical and physical hazards in the workplace. These controls must be maintained in proper working order for this goal to be realized.

No modification of engineering controls will occur unless testing of the modification indicates that worker protection will continue to be adequate. Improper function of engineering controls must be reported to the lab supervisor immediately. The system shall be taken out of service until proper repairs have been executed.

Local Exhaust Ventilation

The following procedures shall apply to the use of local exhaust ventilation:

- Openings of local exhaust will be as close as possible to the source of the contaminants.
- Local exhaust fans shall be turned on when exhaust hoods are being used.
- After using local exhaust, operate the fan for an additional period of time sufficient to clear residual contaminants from the ductwork.
- The ventilation system shall be inspected annually by the Facilities Management department.
- Prior to a change in chemicals or procedures, the adequacy of the available ventilation systems shall be determined by the lab supervisor.

Laboratory Hoods

- Laboratory hoods will be inspected on a regular basis by the Safety Office. Hood face velocity should be 60-150 linear feet per minute. Always check that the hood is functioning before use. If there is doubt about the flow in the hood, call the HSC Safety office (304-293-0952), for measurement of the flow. Work orders for hoods that are not functioning correctly should be submitted to the Maintenance Engineering Department; this is the responsibility of the Department or the P.I. of the laboratory.
- Prior to the introduction of new chemicals, the adequacy of hood systems available shall be determined by the lab supervisor.
- Ductless fume hoods recirculate exhaust air through filters back into the room. Therefore, they cannot be used for volatile toxic materials and should be posted as "Not for use with toxic materials."
- Laboratory procedures involving hazardous chemicals must not be started if there is a possibility that the ventilation system cannot handle the gas or vapor emissions from the procedure.
- General ventilation provides a source of breathing air and a source for make-up air for local ventilation devices.
- The laboratory ventilation should have a performance level of 10-20 room changes per hour. An inadequate ventilation system can cause an increased risk by creating a false sense of security in the laboratory.

- There should be 2.5 linear feet of hood space for each worker who spends the majority of his or her time working with hazardous chemicals.
- General ventilation in the laboratory must be consistent with the ANSI Standard, Z9.5-1992, *Laboratory Ventilation*. Laboratory air must not be re-circulated.

Chemical Storage Cabinets

Storage cabinets for flammable and corrosive chemicals will be ventilated as needed. They will contain a spill containment system appropriate to the chemicals stored in them.

Biosafety Cabinets, Glove Boxes and Isolation Rooms

The exhaust air from a biosafety cabinet, glove box or isolation room will pass through scrubbers, HEPA filters, or other treatment before release into the regular exhaust system. Biosafety cabinets must be certified annually and each time they are moved. This certification is arranged by the Department, CHO or Principal Investigator through any accredited field certifiers for biological safety cabinets.

Two vendors that often do this certification for West Virginia University are:

- Filtech, Inc., West Homested, PA 412-461-1400
- ENV Services, Inc. Hatfield, PA 1-800-883-3681

The vendor information is provided for your convenience, and does not constitute an endorsement by West Virginia University.

Laser Safety

The laser safety program and registration information can be found on the HSC Safety Office webpage. In addition, Laser Safety Training must be taken from SOLE prior to use.

Cold Rooms and Warm Rooms

Temperature control rooms (cold or warm rooms) generally do not have fresh air ventilation. Do not use volatile chemicals in them. Also note that liquid nitrogen stored in these rooms can displace oxygen and cause oxygen deficient conditions.

Flammable Liquid Use and Storage

The use and storage of flammable and combustible liquids may be necessary for some research laboratory operations. The National Fire Protection Association's NFPA 45-*Standard on Fire Protection for Laboratories Using Chemicals* sets limits on the use and storage of flammable and combustible liquids.

- Flammable Liquid Storage Cabinets shall NOT be located near exit doorways, stairways, or in a location that would impede egress.
- Flammable Liquid Storage Cabinets must NOT be wall mounted.
- Laboratory design must ensure that Flammable Liquid Storage Cabinets are NOT

located near an open flame or other ignition source. An open flame or other ignition source could start a fire or cause an explosion if an accident or natural disaster brought the ignition source and flammable liquids or vapors together.

Class	Maximum Quantity per 100 sq. ft.	Maximum Quantity per Laboratory Unit	Maximum Quantity per 100 sq. ft.	Maximum Quantity per Laboratory Unit
	Without Flammable Cabinet		With Flammable Cabinet	
I*	7.5L (2 gal)	570 L (150 gal)	15 L (4 gal)	1136 L (300 gal)
I*, II and III	15 L (4 gal)	757 L (200 gal)	30 L (8 gal)	1515 L (400 gal)

Emergency Equipment

Eye washes must be flushed **weekly for three minutes by lab personnel**. This will ensure that the eye wash is working, and that the water is clean, should emergency use become necessary. A record of the testing, including date and certifier's initials, must be maintained and made available for review during lab audits. A sample of the test log can be found here: http://www.hsc.wvu.edu/safety/MediaLibraries/Safety/Media/PDF/Lab-Safety/Eyewash-Maintenance-Log.pdf

Fire extinguishers are inspected by WVU HSC Facilities Management. Safety Showers are inspected yearly by Facilities Management and a record of the inspection is attached to the shower. If the shower has not been tested within a year of last inspection, contact Facilities Management at 3-4394 for inspection.

Laboratory Start up, Moves, Renovations or Close Outs

- Ensure the HSC Safety Office is notified immediately of any of the above listed scenarios
- HSC Safety will facilitate compliance matters that will expedite the process and assist the researcher
- Laboratory close out policy and check list can be found here: http://www.hsc.wvu.edu/safety/MediaLibraries/Safety/Media/PDF/Policies-Procedures-Program/Laboratory-Closeout-Policy.pdf

Standard Operating Procedures for Laboratory Chemicals

Standard Operating Procedures are generally accepted practices for use of chemicals in particular situations. These SOPs can be overridden in specific instances when appropriate. It is advisable to document the reasons for such modifications. When SOPs are not available for a specific lab situation, the lab supervisor and Principal Investigator/director will develop them, in consultation with the references cited at the end of this document and the HSC Safety Office Staff.

A. CONTROLLING CHEMICAL EXPOSURE

Each laboratory employee shall minimize personal and coworker exposure to the chemicals in the laboratory. General precautions which shall be followed to achieve this goal during the handling and use of all chemicals are as follows:

- A chemical mixture shall be assumed to be as toxic as its most toxic component. Possibilities for substitution will be investigated.
- Laboratory employees shall be familiar with the symptoms of exposure for the chemicals with which they work and the precautions necessary to prevent exposure.
- Eating, drinking, smoking, application of makeup, and handling of contact lenses are prohibited in laboratories where chemicals are present. Hands shall be thoroughly washed after working with chemicals. Storage, handling and consumption of food or beverages shall not occur in chemical storage areas, nor refrigerators, nor with glassware or utensils also used for laboratory operations.
- All chemicals must be labeled with exact name (no abbreviations).
- Lids must be on tight at all times (spill proof). Secondary containment is used when needed.
- Safety Data Sheets (SDS) will be available for all chemicals and quickly and easily found.
- Each employee shall keep the work area clean and uncluttered. All chemicals and equipment shall be labeled with appropriate hazard warnings. At the completion of each work day or operation, the work area shall be cleaned.
- Mouth suction for pipetting or starting a siphon is prohibited.
- Skin contact with all chemicals shall be avoided. Employees shall wash exposed skin prior to leaving the laboratory.
- Additional specific precautions based on the toxicological characteristics of individual chemicals shall be implemented as deemed necessary by the lab supervisor.
- HSC provides hazard assessments and precautions for acutely toxic chemicals that are generally used in HSC research. These sheets can be located on the HSC Safety Office webpage and have been provided to the laboratories utilizing the chemicals.
- Cell phones and earphones should not be used in the lab unless hands are ungloved and washed.
- Gloves should not be worn outside of the laboratory.
- No mercury containing equipment shall be used in the laboratory unless approval from the HSC Safety Office is obtained.

B. LABORATORY EQUIPMENT

The following rules shall apply to the use of laboratory equipment:

- All laboratory equipment shall be used only for its intended purpose.
- All glassware will be handled and stored to minimize breakage; all broken glassware will be immediately disposed of in a broken glass container.
- All evacuated glass apparatus shall be shielded to contain chemicals and glass fragments should implosion occur.
- Waste receptacles shall be identified as such by signs attached to the receptacle.
- All laboratory equipment shall be inspected on a periodic basis and replaced or repaired as necessary.

C. PLANNING FOR EMERGENCIES

Before work with laboratory chemicals begins, plans for various emergencies will be developed. The circumstances to be covered include fire, chemical spill, and personnel exposure. In addition, the following work practices will be observed:

- Spill containment will be established around areas in which more than one liter of liquid is used.
- Emergency equipment will be checked on a daily basis for unusual conditions.
- Spill kits will be maintained
- WVU HSC Emergency Response Plan and CHPs will be followed in the event of an emergency

Laboratory Specific Chemical Hygiene Procedures

Each laboratory should create and maintain specific lab Standard Operating Procedures (SOPs), protocols, etc. that will be attached to this document as Appendix C.

Housekeeping

Housekeeping can have a large impact on the result of inspections by OSHA or EPA. A lab that is clear of slip/trip/fall hazards, has accessible aisles, correctly labeled containers, and cleared benches where materials are kept in workman-like condition makes a favorable first impression that may influence the inspector as they assess compliance in other areas.

- Formal housekeeping and chemical hygiene inspections by the HSC Safety Office will be held semi-annually. (Informal inspections by lab personnel should be continual).
- Hallways and stairways will not be used as storage areas.
- Access to exits, emergency equipment and utilities, including electrical panels, should never be blocked.
- No materials shall be stored within the area eighteen inches below the plane of the laboratory sprinklers. Combustible material such as boxes shall be kept to a minimum in the laboratory.
- Each lab will have a spill kit to handle small spills of chemicals which are not “highly hazardous.”
- Lab coats, eye protection, face shields, gloves (including autoclave gloves and cryoprotective gloves), hearing protection, and other protective equipment shall be kept readily available for all lab personnel. Lab coats should not be laundered with household apparel.
- Label all containers, including waste receptacles, with the contents and its approximate composition. Tops will be of a screw type and be resistant to the chemicals within. Dates will indicate when material was added to the container and the approximate amount added.
- Have designated location(s) for safety shower, eye wash, fire equipment, first aid station and emergency telephone.
- Post warning signs for areas of special or unusual hazards. These include, but are not limited to, acid storage, compressed gases, carcinogens and highly toxic or volatile materials.

Other HSC Policies for Safe Practices in Laboratories

Follow safe and prudent laboratory practices on a daily basis. This is not a short-term activity, but a continual, sincere effort.

The Federal Standard for Chemical Hygiene Plans does not address the use of BIOLOGICAL OR RADIOLOGICAL hazards; however, any hazardous chemicals used in conjunction with a BIOLOGICAL or RADIOLOGICAL substance SHALL be covered under the CHEMICAL HYGIENE PLAN.

NOTE:

- WVU's Radiation Safety Office at 304-293-3413
- WVU's Biohazard Safety Office at 304-293-7157

All laboratory operations requiring special precautions over and above normal laboratory precautions shall be reviewed by the HSC Safety Office (304-293-0952) and must be approved by the appropriate committee.

ACUC – WVU's Animal Care and Use Committee

IRB – WVU's Institutional Review Board (Human Subjects)

IBC – Institutional Biosafety Committee

The OSHA Lab Standard requires that special consideration be given to use of chemicals or procedures with particular hazards. The definition of "particularly hazardous chemicals" is given in the OSHA lab standard. Examples of such chemicals are given in Chapter 3 of *Prudent Practices*. This consideration requires either the development of special operating procedures or prior approval of the laboratory supervisor as indicated by a written permit describing the conditions for the work to be done.

Work with Particularly Hazardous Substances

When laboratory procedures include the use of highly hazardous chemicals, special precautions shall be implemented as deemed necessary by the lab supervisor. These precautions will be developed for work with select carcinogens, reproductive toxins and substances which have a high degree of acute toxicity. Development of these precautions will consider including the following provisions in the special procedures:

- Establishment of a designated area for the use of the high hazard chemicals.
- Signage and access control to the work area where the chemical is used.

- Special precautions employing containment devices such as glove boxes, isolation of contaminated equipment, practicing good laboratory hygiene, and prudent transportation of very toxic chemicals.
- Planning for accidents and spills.
- Special storage and waste disposal practices.

The HSC Safety Office has provided Hazard Evaluation Sheets for acutely toxic substances commonly utilized in HSC research in the appendix. These sheets are not all encompassing. If a laboratory would like a hazard evaluation on an additional substance, the HSC Safety Office may be contacted for assistance

Prudent Practices provides detailed recommendations for work with particularly hazardous substances.

Pre-approval of Particularly Hazardous Work

Preapproval by the laboratory manager or Principal Investigator must be obtained before laboratory activities which do not follow standard or special operating procedures can occur. These activities include off-hours work, sole occupancy of lab and unattended operations. The toxicity of the chemicals used, the hazards of the procedures to be done, and the knowledge and experience of the laboratory workers must be considered in deciding which work will be allowed with pre-approval.

Off-Hours Work Procedures: Laboratory personnel are not permitted to work after hours in the lab, except when permit conditions are met.

Working Alone: Work shall not be performed in the laboratory when the only person in the room is the laboratory person performing the work. Unless crosschecks, periodic security guard checks, or other communication measures are taken.

Unattended Operations: When laboratory operations are performed which will be unattended by laboratory personnel (continuous operations, overnight reactions, etc.), the following procedures will be employed:

- An appropriate permit will be written and posted.
- A sign will be posted at all entrances to the laboratory.
- The overhead lights in the laboratory will be left on.
- Precautions shall be made for the interruption of utility service during the unattended operation (loss of water pressure, electricity, etc.).
- The person responsible for the operation will return to the laboratory at the conclusion of the operation to assist in the dismantling of the apparatus.

Work with Specific Environmental Requirements

Some experiments require specific conditions in order to run properly. If a particular procedure could be disrupted by an environmental factor (e.g. light exposure, sound exposure, etc.), the PI must use

appropriate signage (e.g. “Do Not Enter, Light Sensitive Experiment in Progress”) outside of all areas where the procedure is occurring, notifying others that the experiment must not be interrupted.

If a PI is performing a long term experiment and cannot be interrupted, contact the HSC Safety Office so that the procedure will not be disturbed by facilities workers, housekeepers, etc.

Chemical Procurement

All substances should be received in a central departmental location, when possible.

Stockrooms/Storerooms

- Rooms specifically designated for chemical storage, handling and/or utilization areas such as preparation rooms, storerooms, waste collection rooms, storage bunkers, or chemical laboratories are controlled access areas. They are not to be entered by the general public. These rooms will not be used as meeting areas, lecture halls (except for pre lab lectures which outline procedures and safety precautions before a laboratory class) or public group demonstrations, displays and/or gatherings. (Appropriate lecture demonstration classrooms are available for that purpose). Tour groups are not to enter these areas. Children are not to enter these areas.
- Access keys to these areas should be carefully monitored.
- Toxic chemicals will be segregated in a well-identified area with adequate local exhaust ventilation.
- Chemicals that are highly toxic or liquid containers that have been opened will be in unbreakable secondary containers.

Distribution

- If chemicals are to be hand carried, the chemicals should be placed in secondary containment (another container) that is large enough to hold the chemical contents or a bucket.

- Chemicals may be transported on carts. Liquid chemicals should be transported on carts made of non-reactive plastic. These carts should have trays of single piece construction at least 2" deep. These trays will contain any spill that may occur. Liquid bottles will be kept separated or insulated by plastic foam or cardboard that will be placed between the bottles. Liquids should never be transported in basket type carts or in carts whose shelves would allow leakage of spilled liquid.

- Do not over fill carts.

- Solids may be transported in any type cart, except the oven basket type.

- Gas cylinders
    - Must be installed and leak tested by lab personnel who are trained to connect the cylinder properly.
    - Must be secured in an upright position at all times.
    - Must be capped when not in use.

- Must be fully labeled including cylinder content and status (full, empty, or in-service).
- Must be used with a compatible regulator and other auxiliary equipment. Assure all threads match those on the cylinder valve outlet.
- Must be moved in special carts that secure them from falling during transport.

- When transporting chemicals to or from a separate outdoor storage facility, there will be appropriate ramps installed to provide proper access. Carts are NEVER to be carried over obstructions.

- Liquid Nitrogen
  - All employees/students using liquid nitrogen must take Liquid Nitrogen training on SOLE and utilize personal protective equipment.

Storage

- Long term storage of chemicals on bench tops or inside hoods is NOT PERMISSIBLE. Temporary storage is just that --Temporary.
- Amounts of materials on hand will be kept to the minimum commensurate with their usage. All chemicals should be dated upon receipt.

Equipment and Glassware

- Chemical containers must be labeled at all times with proper name. (No abbreviations)
- Lids must be on tight (spill proof) at all times unless pouring or filling.
- Handle and store laboratory glassware with care. DISCARD BROKEN OR DAMAGED GLASSWARE in a rated broken glass disposal box.
- Take extra precautions when using Dewar flasks; shield or wrap them to contain implosions.
- Use the laboratory equipment for its intended use only.

Exiting the Laboratory

- Wash exposed areas of skin thoroughly before leaving the laboratory.
- Do not wear lab gloves and coats outside of the laboratory.

Horseplay

- Practical jokes or other behaviors that might confuse or distract another laboratory worker are prohibited.

Mouth Suction

- Do not use mouth suction for pipetting or starting a siphon.

Personal Apparel

- Confine long hair and loose clothing. Jewelry should be kept to the minimum and not dangle.
- Wear closed toed shoes made of a non-woven material with non-slip soles. Do not wear perforated shoes or sandals.
- Shorts are prohibited; lab workers should wear clothing that covers exposed arms and legs while working in the lab.

Housekeeping/Chemical Hygiene

- Keep work areas clean and uncluttered. Properly label chemicals and equipment for use and storage. Repair or replace any damaged labels immediately.
- Clean-up work areas at the end of the operation or day.
- Chemicals will be stored compatibly.
- Flammables and acids will be stored in appropriate cabinets
- Store flammables with a very low flashpoint in an explosion proof refrigerator.
- *Peroxidizables* (ethers, tetrahydrofuran, dioxanes) Mark on bottle: Date received, Date opened, 6 month test result. Peroxides must be disposed of and a waste slip submitted less than 1 year from receive date year from receive date. Mandatory!

Personal Protection

- Ensure that appropriate (ANSI approved) eye protection is worn by all persons (including visitors) where chemicals are used or stored. NOTE: Supervisor may help employees choose the appropriate eye protection such as using goggles for liquid hazards, etc. Standard prescription eyeglasses are not sufficient.
- Wear appropriate gloves when handling toxic materials. Inspect gloves upon usage. NOTE: Supervisor may help employees choose their gloves based on chemical incompatibilities.
- Contact lenses are strongly discouraged, because they absorb fumes and make washing the eye area after chemical exposure difficult.

Planning for Laboratory Operations

- Plan appropriate protective procedures, and plan the positioning of all equipment before beginning any operation.
- Seek information and advice about the hazards of the chemicals to be used (read the SDS).

Unattended Operations

- Leave lights on and post a sign on the door announcing an unattended operation.
- Provide for containment of toxic substance release in case of equipment or utility failure.
- Notify the laboratory supervisor about the unattended operation.
- Doors should be posted with emergency numbers.
- Use the hood when working with any volatile substance.
- Keep hoods closed except when apparatus adjustments are being made.
- Be alert to unsafe conditions anywhere in the HSC and report them to the Chemical

Hygiene Officer or designee when detected.

WORKING ALONE IN THE LABORATORY SHOULD BE AVOIDED IF AT ALL POSSIBLE. Communication and check procedures should be in place when necessary.

Chemical Hazardous Waste Disposal

- Contact Environmental Health and Safety for Hazardous Waste Management and Disposal Procedures (293-3792), submit Hazardous Waste Pickup Forms here: http://ehs.wvu.edu/environmental/waste-management/hazardous-waste-disposal-form
- Deposit chemical waste in an appropriately labeled receptacle which is labeled with the percentage of each component and with any special precautions to use with that container, e.g., "open only in hood." Containers must be in good condition, have the cap tightly closed, and be kept in the area of generation. It is not recommended to fill containers up completely in the event there is a leak. If possible, have the waste removed when it is ~90% full.
- Do not pour chemicals down any drain. Do not pour any substance down the drain which might interfere with the biological activity of waste water treatment.
- Do not throw empty containers of chemicals in the regular trash unless they have been rinsed of any contamination. If the chemical is highly hazardous, dispose of empty container in hazardous waste.

Note: No chemical can go down the drain unless a hazard assessment has been conducted and written approval has been provided by Environmental Health and Safety.

Chemical Spills, Releases and Accidents

The lab workers' response will depend on the size of the spill and its hazards. Spill kits are provided by WVU Environmental Health and Safety. Summit a request here: http://wvu.qualtrics.com/jfe/form/SV_0kNXsb0SVc8NXr7

Small Spills

In general, the laboratory shall be held responsible for cleaning up small chemical spills (one liter or less) **IF** the material is not "Extremely Hazardous," using spill kits provided by the laboratory.

Large Spills

For large spills or spills of highly hazardous material, evacuate the area and call 293-4394 (HSC Radio Dispatch Room, 24/7) to report the spill. This will allow them to alert the Fire Department to send the Morgantown HAZMAT team. Wait in a safe area for the HAZMAT team to arrive to provide specific information about the spill.

Material used in a chemical spill cleanup shall be disposed of through the Hazardous Waste Disposal policy (call 293-3792, EH&S).

For small or large spills, complete the **Environmental Health and Safety Spill Response**

Notification Form located in Appendix B and return to Environmental Health and Safety.

Note that proper emergency response depends upon knowledge of the hazards present in the lab. For this reason, all chemical inventories of the hazardous chemicals in HSC labs must be updated and provided to the HSC Safety Office annually.

Emergency Response

Emergency Phone Numbers

- **HSC Radio Dispatch, Facilities Management 293-4394**
- **WVU HSC University Police –293-3136 – (HSC) 293-4332**

In a MEDICAL EMERGENCY call 9-911.

Information on lab doors (704 Postings)

1.) Emergency contact signs shall be posted on the doors of all laboratories with hazardous materials with the following information:

- Department of Public Safety (HSC Security) - 293-3136
- Principal Investigator, Office phone and Home phone numbers
- Chemical Hygiene Officer, Office and Home phone numbers.
- Emergency contact (Radio Dispatch Room, 24/7) 293-4394.

Contact information for the Radiation Safety Office, if the laboratory is using radioactive material.

2.) 704 Diamond with appropriate warning numbers.

These signs will be checked quarterly for accuracy.

In Case of Fire

The first reaction to a fire is to evacuate the occupants of the building. From a safe place, call **293-4394** and report the fire location. Wait in a safe place to provide specific information to Firefighters. Fire extinguishers are available in labs and are inspected monthly. They may be used by trained personnel to fight small fires. Fire extinguisher training is available through the HSC Safety Office.

In Case of Personnel Exposures

All employees shall be instructed in the location and proper usage of emergency showers and eyewashes by the lab supervisor or Principal Investigator.

ACCIDENTS AND SPILLS

Eye Contact: Flush eyes with water for 15 minutes and seek medical attention.

Ingestion: Drink large amounts of water. DO NOT ENCOURAGE VOMITING. Seek medical attention.

Skin Contact: Flush affected area with water and remove contaminated clothing. IF SYMPTOMS PERSIST, SEEK MEDICAL ATTENTION.

AVOIDANCE OF "ROUTINE" EXPOSURE

- Do not smell or taste chemicals.
- Vent apparatus which may discharge chemicals (vacuum pumps, distillation columns, etc.) into local exhaust or hoods.
- Inspect gloves and glove boxes before use.
- Do not allow release of toxic substances into cold rooms, since these rooms re-circulate the air.
- Wash gloves and then hands after chemical usage. Never wear used gloves out of the laboratory.

Safety showers will be inspected on a regular basis by Facilities Management, and a record of the inspections will be attached to the shower.

Eyewash stations will be checked (activated for three minutes) on a weekly basis by lab personnel, and a written record of this inspection will be maintained in the lab for review.

Medical Management Consultations and Examinations

Availability

All employees who work with hazardous chemicals will have an opportunity to receive medical attention, including any follow-up examinations which the examining physician determines to be necessary, under the following circumstances:

- Whenever an employee develops symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory.
- Where exposure monitoring reveals an exposure level routinely above the action level or PEL for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements.
- Whenever an event takes place in the work area such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure.

The HSC Safety Office will be notified whenever the need for medical consultation or examination occurs, or when there is uncertainty as to whether any of the above criteria have been met.

Arranging for Exams

All medical examinations and consultations will be performed by or under the direct supervision of a licensed physician and will be provided through the WVU HSC Occupational Medicine Program, without loss of pay and at a reasonable time and place. In the event of a life-threatening illness or injury, dial 911 and request an ambulance.

The HSC will provide the examining physician with the following information:

- The identity of the hazardous chemical(s) to which the employee may have been exposed.
- A description of the conditions under which the exposure occurred including quantitative exposure data, if available.
- A description of the symptoms of exposure that the employee is experiencing, if any.

The above information will be collected and transmitted by the lab supervisor and will be submitted to the Medical Management as well as to the examining physician.

Report

The examining physician will provide to the lab supervisor and HSC Safety Office a written report including the following HIP approved (Health Information Privacy and Accountability) information:

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

The written opinion will not reveal specific findings of diagnoses unrelated to occupational exposure.

Recordkeeping

WVU HSC policy is to maintain safety records as required by OSHA at a minimum.

Injury and Incident Reports

Accident reports must be completed and emailed within 24 hours of injury or illness. Injury and Illness reports will be written and retained for 5 years. Accident investigations will be conducted by the lab supervisor with assistance from the HSC Safety Office as deemed necessary. If hospitalization or death occur, the HSC Safety Office must be notified immediately at 304-293-7953 or 304-293-4394. Injury report forms can be accessed on the following link: http://ehs.wvu.edu/r/download/197501

The Student/Visitor Accident Report can be found here: http://ehs.wvu.edu/r/download/170588

Exposure Evaluations

Any records of exposure evaluation carried out by individual Departments will be kept within the Department and also sent to the HSC Safety Office. Raw data will be kept for one year and summary data for the term of employment plus 30 years.

Medical Consultation and Examinations

Results of medical consultations and examinations will be kept by the HSC Safety Office for a length of time specified by the appropriate medical records standard. This time will be at least the term of employment plus 30 years as required by OSHA.

Training

Individual employee training should be recorded kept in the individual's Department or college file for five years. Training records may also be forward to the HSC Safety Office.

Equipment Inspection

Records of inspections of equipment will be maintained for 5 years. Data on annual fume hood monitoring will be kept in the HSC Safety Office. Fume hood monitoring data are considered maintenance records and as such the raw data will be kept for one year and summary data for 5 years.

Shipping Hazardous Materials

Laboratory personnel shipping hazardous materials are required to complete DOT & IATA training. Please contact the Health Science Center Safety Office at (304) 293-0952 to for more information.

Annual Chemical Hygiene Plan Review

The Principal Investigator (P.I.) and the Chemical Hygiene Officer (CHO) will review the laboratory's Chemical Hygiene Plan (CHP) every January. Each Principal Investigator will sign a statement that the CHP has been reviewed or updated at that time. This statement will be kept with the CHP and copies will be provided to the HSC Safety Office and the Departmental CHO. Laboratory supervisors or Principal Investigators are responsible for assigning responsibility for taking corrective action for any deficiency noted.

References

Code of Federal Regulations, 29 CFR part 1910 subpart Z section 1910.1450, **Occupational Exposure to Hazardous Chemicals in Laboratories**, 1990.

Code of Federal Regulations, 29 CFR part 1910 section 1200, Appendices A and B of the H**azard Communication Standard**, 1990.

American Chemical Society, **Safety in Academy Chemistry Laboratories**, 5th ed., Washington, D.C., 1991.

Department of Risk Management, **UVM Fume hood Operation & Safety Guidelines**, and **Chemical Hygiene Plan,** University of Vermont, Burlington, VT, 1991.

West Virginia University Department of Chemistry, **Chemical Hygiene Plan.**

Princeton University **Chemical Hygiene Plan.**

West Virginia University, **Environmental Health and Safety Manual**, 1986, 1989.

Hazardous Chemical Waste Management, West Virginia University Environmental Health and Safety "**A Guide for Laboratory Personnel**", 1986.

Hazard Communication Program Manual, West Virginia University Environmental Health and Safety, 1989.

West Virginia University Medical Monitoring Program, 1989.

- Prudent Practices in the Laboratory:
  Handling and Management of Chemical Hazards, Updated Version (2011
  http://www.nap.edu/catalog.php?record_id=12654
- Chemical Safety Practices & Recommendations Publications

  http://www.acs.org/content/acs/en/about/governance/committees/chemicalsafety/safetypractices.html
- OSHA Laboratory Standard - Occupational exposure to hazardous chemicals in laboratories

  https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=10106&p_table=STANDARDS
- Identifying and Evaluating Hazards in Research Laboratories, American Chemical Society

  https://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/identifying-and-evaluating-hazards-in-research-laboratories-draft.pd

Appendix A

West Virginia University Spill Response Notification Form

http://www.hsc.wvu.edu/safety/MediaLibraries/Safety/Media/PDF/Lab-Safety/Spill_Response_Notification_Form_1.pdf

Spill Response Notification Form

Name:	Position:		
Day time phone:	Evening phone:		
Department:	PO Box:		
Date of Incident:	Time of Incident :		AM/PM
Exact location of spill:			
	YES	**NO**	**Comments**
Were materials discharged into drains, sumps, or water courses?			
Source and/or cause of incident:_____			
_____			
_____			

Type of Material Spilled	Quantity

Additional comments: Once the spill is cleaned up, label the container hazardous waste and date it with the date the material was placed in the container. Fill out a Hazardous Waste Disposal Form on the HSC Safety Website. Forward the Spill Response Notification Form to the address below.

Return completed form to: **HSC Safety Office** **Room G-139-E** **P.O. Box 9004** **Morgantown, WV 26506-9004**	**Telephone: 304-293-6924** **Fax: 304-293-8611**

Appendix B

Attach your specific lab Standard Operating Procedures (SOPs), protocols, etc. here.

Appendix C

Training Records

Sample training sing-in sheet can be found here:

TRAINING				
Date/Time of Training	**Date:**		**Time:**	
Locations	**Building:**		**Room No:**	
Instructor(s)			**Title/Dept**	

(Please Print)

LAST, FIRST NAME	DEPARTMENT	Job Title	e-mail	Signature
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

Page _____ of _____

Appendix D