

Department of Environmental Health & Safety

Chemical Hygiene Plan

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principles that acute or chronic health effects may occur in exposed employees. The term health hazard includes chemicals which are carcinogens, toxic or highly toxic

4.0 RESPONSIBILITIES

- 4.1 Department Chairman The Department Chair has ultimate responsibility for chemical hygiene, the chemical hygiene program, and shall provide continuing support for the overall departmental chemical hygiene plan.
- 4.2 Principal Investigator (Faculty Research Director) The Principal Investigator is responsible for chemical hygiene in the laboratory. The Principal Investigator shall ensure:
 - 4.2.1 Laboratory employees know and follow the chemical hygiene rules.
 - 4.2.2 Protective equipment is available, in working order, and used by personnel.
 - 4.2.3 Appropriate training has been provided and records are kept.
 - 4.2.4 Facilities and training for use of any material being ordered are adequate.
 - 4.2.5 Inspections are conducted of emergency equipment, chemical hygiene, and housekeeping.
 - 4.2.6 Adequate health and safety provisions are made for any new initiatives, on a continuing basis with appropriate updates made to the CHP.
- 4.3 Laboratory Worker Each laboratory worker is responsible for planning and conducting all operations in accordance with the departments chemical hygiene plan, and developing good personal chemical hygiene habits.
- 4.4 Chemical Hygiene Officer The Chemical Hygiene Office (CHO) responsible for:
 - 4.4.1 The development and implementation of chemical hygiene policies and practices in the laboratories or department.
 - 4.4.2 He/she monitors the procurement, use and disposal of chemicals used in the laboratories.
 - 4.4.3 Conduct and maintain appropriate audits.
 - 4.4.3 Help the director develop precautions and adequate facilities.
 - 4.4.4 Know the current legal requirements concerning regulated substances.
 - 4.4.5 Seek ways to improve the Chemical Hygiene Plan.
 - 4.4.6 Develop and implement the Chemical Hygiene Plan.
 - 4.4.7 The EHS staff member designated as the overall campus CHO will coordinate the institutional effort and serve as a resource to all departments.
- 4.5 Departmental Laboratory Inspection Team These individuals provide laboratory inspections as described in the Chemical Hygiene Plan. The lab self-audit found in Appendix E could be used.

(EHS) before any radiation source or radiation-producing instrument is brought into the laboratory.

- 5.1.11 Any experiments involving materials covered under the OHIO University Biosafety Program shall follow the Policies and Procedures of the Institutional Biosafety Committee (IBC). These include etiologic

5.3.5 Long hair and loose clothing shall be restrained to prevent it from

6.0 CHEMICAL ACQUISITION, DISTRIBUTION, AND STORAGE

6.1 ACQUISITION OF CHEMICALS

- 6.1.1 All chemicals not on the existing inventory for the laboratory must have approval (*specify person, i.e. a responsible person who would review health effects and unusual use conditions*) prior to purchase.
- 6.1.2 Prior to purchasing approval the following must be considered:
 - 6.1.2.1 Obtain and review the products MSDS or view the MSDS on [ChemWatch](#),
 - 6.1.2.2 Proper storage and handling procedures,
 - 6.1.2.3 Proper disposal procedures,
 - 6.1.2.4 Are facilities adequate to safely handle the material, and
 - 6.1.2.5 Are personnel adequately trained to handle the material?
 - 6.1.2.6 Do the hazards of the chemical, procedure, or material warrant a more significant review by a Laboratory Risk Assessment Team?
- 6.1.3 Before a substance is received, information on proper handling, storage, and disposal should be known to those who will be involved. A Material Safety Data Sheet (MSDS) shall be requested for all hazardous chemicals if the MSDS is not already on file and added to the department chemical inventory and MSDS file.
- 6.1.4 A copy of each new MSDS should be sent to EHS.
- 6.1.5 No container should be accepted without an adequate identifying label. The label should include as a minimum the substance name, an appropriate hazard warning, and manufacturer address.
- 6.1.6

- Emergency lighting, illuminated exit signs

written PPE assessment, employee training, etc., in addition to the Chemical Hygiene Standard. Call EHS for consultation, if needed.

11.1 EYE PROTECTION

- 11.1.1 Safety glasses must meet the requirements of ANSI Z87.1 (latest edition).
- 11.1.2 Chemical Safety Goggles are required for employees who enter a laboratory and are exposed to an eye hazard.
- 11.1.3 Face shields with safety glasses underneath or chemical splash goggles are required when transferring or pouring acids

Access to the eyewash should be checked at the beginning of each shift.

B. Monthly

Adequate eyewash and shower (if applicable) flow should be observed and documented by operating the device. Inspection sheets are available from EHS and should be posted near the eyewash and/or shower. An employee should be assigned this task and given safety shower test equipment.

12.3 FIRE EXTINGUISHERS

12.3.1 It is the responsibility of the EHS Department to oversee, and Facilities Management Life Safety Shop to select, maintain, and properly locate the fire extinguisher(s) in each laboratory.

12.3.2 Fire extinguishers should be provided within 30 feet of travel and located along normal paths of travel.

12.3.3 Access must be maintained and the location should be conspicuously marked in an appropriate manner.

12.3.4 The fire extinguisher type and size must be selected for the appropriate hazards.

12.3.5 Each laboratory is responsible to notify the chemical hygiene officer and EHS if changes within the laboratory require movement of the extinguisher or the need for a different type of fire extinguisher or if extinguisher is discharged or otherwise needs service.

12.3.6 The following items shall be included in fire extinguisher inspections conducted by the Facilities Management Life Safety Shop.

- Monthly Inspections (conducted by CHO):
- Extinguisher(s) are in designated locations.
- Clear unobstructed access is maintained.
- The pin should be in place 33(i)38(c)4(e)4sher7(a)4(i)38()20(e)4(c)4(k(wi)40(t)-21

- 12.9.1 Emergency lighting must be adequate to provide lighting for egress during an emergency situation or power failure.
- 12.9.2 Periodic Inspections (Will be performed by Facilities Management, Life Safety Shop)
 - 1. Emergency lighting must be activated to assure it is operational.
 - 2. Document inspections.

13.0 EMERGENCY PROCEDURES

- 13.1 Prevention is necessary to ensure that emergencies do not occur. No emergency plan will cover all emergency situations. Preventive measures include: employee training, facility inspection programs, and engineering design of hazardous materials processes. Laboratory risks include accidents or injuries, chemical releases, release of radioactive or infectious aerosols, fires, explosions or other emergency situations. Therefore, risk assessment of laboratory processes and activities is key to emergency prevention. See the Laboratory Risk Assessment Program or contact EHS for more information.
- 13.2 An emergency response team has not been established for Ohio University. Ohio University is relying upon the local Athens fire authority for any emergency response action.

(Insert your departmental or lab SOP's here.)

15.0 INCIDENT REPORTING

- 15.1 All incidents and near misses (significant incidents which could have easily resulted in serious injury), should be reported to the EHS Department immediately on the [employee incident report form](#).

16.0 RECORDKEEPING

- 16.1 All incident, injury, and illness records shall be kept by the EHS Department. The department copy should be kept and accidents reviewed for contributing factors. Each department shall review total accident experience periodically.

17.0 EMPLOYEE TRAINING

17.1 TRAINING

- 17.1.1 All laboratory employees shall be trained on the hazards of chemicals present in their work area.
- 17.1.2 The aim of the training program is to assure that all individuals at risk are adequately informed about the work in the laboratory, its risks, and what to do if an accident occurs. The requirements of the OSHA Chemical Hygiene Standard is also required.
- 17.1.3 This training shall be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present. It shall also be provided prior to assignments involving new exposure situations. The training shall be arranged by the Chemical Hygiene Officer or designee. Orientation training the first week of fall quarter is recommended for new graduate assistants and technicians.

The training should include:

- a. The OSHA Chemical Hygiene Standard.
- b. Handling hazardous chemical acquisition to disposal.
- c. Fire training prevention and response.
- d. Emergency response and evacuation.
- e. Sample handling procedures.
- f. Interpretation of a MSDS.
- g. First aid.
- h. Engineering controls.
- i. Personal hygiene.
- j. Protective clothing.
- k. Any special hazards or precautions.

l. An explanation of department CHP, its location, and where to go for information and, the MSDS book, and [ChemWatch](#).

17.1.4 All employees receiving general Chemical Hygiene training must also be trained and oriented by the PI in the individual lab and lab procedures.

17.1.5

18.3.1

- 19.1.2 All laboratory doors must remain closed, except when being used for entrance and egress.
- 19.1.3 Local exhaust ventilation must not be located near doors, windows, air diffusers, fans and other sources of cross drafts.
- 19.1.4 All reactions that produce unpleasant and/or potentially hazardous fumes, vapors, or gases must be run with local exhaust ventilation, i.e. in fume hoods.
- 19.1.5 Reactions with corrosive vapors should be conducted in a hood lined with corrosion resistant material.
- 19.1.6 The sash of the hood is to be lowered to within 6" of the floor of the hood when the hood is in use. It should be lowered to maintain effectiveness of the ventilation system and to provide personnel protection.
- 19.1.7 Installation of local exhaust ventilation must be in accordance with local air emission regulations and Ohio University Facilities Management requirements. Technical assistance is available from EHS.
- 19.1.8 No devices or ducts are to be self-installed into existing exhaust or HVAC systems without the approval of appropriate OHIO University departments (EHS, University Planning and Implementation, and Facilities Management).
- 19.1.9 Do not install unsafe devices in hoods, such as extension cords of

- 19.2.7 Exhaust hoods should be smoke tested for fume containment per SEFA 1-2002 Laboratory Fume Hoods Recommended Practices.
- 19.2.8 Hoods and their alarms should be checked for proper function.
- 19.2.9 The tests listed above will be conducted annually

20.2.1 HAZARDS

- 20.2.1.1 Vapor can form an ignitable mixture in air.
- 20.2.1.2 Many flammable liquids are solvents and are potentially hazardous by inhalation.
- 20.2.1.3 Skin contact should be avoided, irritation or skin absorption are possible with some chemicals in this group.
- 20.2.1.4 Damage to the eye's range from irritation to severe damage.

20.2.2 STORAGE

- 20.2.2.1 Amounts stored in the laboratory 0(o)-19 1 180(30)JTJ(20.)-9(2.)-9(2.)-

Isopropyl alcohol
Toluene

20.3 CORROSIVE CHEMICALS

20.3.1 Hazards

20.3.1.1 Contact with the skin, eyes, respiratory, or digestive tract causes severe irritation, tissue damage, or burns.

20.3.2 Storage

20.3.2.2 Always store concentrated acids and bases in appropriate drip trays or plastic carrier if used frequently.

20.3.2.3 Always transport concentrated acids and bases in a plastic carrier.

20.3.2.4 Always store oxidizing acids (nitric, sulfuric, perchloric) away from organic chemicals, paper, wood, or other flammables.

20.3.2.5 Drip

- properly labeled cylinders
- cylinders must be properly secured during transport and stationary use
- cylinder delivery issues (like left free standing in a hallway) must be established
- static testing of cylinders

20.5.3 Controls

- 20.5.3.1 Transport only with cap in place on suitable carrier.
- 20.5.3.2 Use only appropriate fittings and regulators.
- 20.5.3.3 Each gas type has special fittings.
- 20.5.3.4 Do not permit gases of one type to contaminate another type.
- 20.5.3.5 Use check valves and/or regulators.
- 20.5.3.6 Always open valves slowly and cautiously.
- 20.5.3.7 Do not let cylinder go completely empty.
- 20.5.3.8 Return "empty" cylinders to storage, clearly marked.

20.5.4 Examples

Hydrogen
Argon
Acetylene

20.6 CARCINOGENS, MUTAGENS, TERATOGENS, AND REPRODUCTIVE TOXINS

20.6.1 Exposures

- 20.6.1.1 Exposures can potentially induce carcinogenesis, mutagenesis, and adverse reproductive outcomes.

20.6.2 Storage

- 20.6.2.1 Store these chemicals in the hood.
- 20.6.2.2 Maintain the minimum quantity necessary.

20.6.3 Controls

- 20.6.3.1 Work in a designated and labeled area required by Chemical Hygiene Standard.
- 20.6.3.2 Wear protective clothing.
- 20.6.3.3 Work only with adequate engineering controls, such as hoods, glove boxes, etc.
- 20.6.3.4 Primary research on known carcinogens is regulated by the O.U. IBC. Contact the I.B.C. chair or the Biosafety

21.1 USE OF DESIGNATED AREAS

- 21.1.1 A designated area must be established for work with "select carcinogens", reproductive toxins, and substances, which have a high degree of chronic or acute toxicity.
- 21.1.2 The following procedures must be developed for all work with "select carcinogens", reproductive toxins, and substances of high acute toxicity.
- 21.1.3 The establishment of a "designated area". This may be an entire laboratory, an area of a laboratory or a device in the laboratory, such as a hood. This area must be clearly marked.
- 21.1.4 Required approvals for conducting the project. i.e. Work with known carcinogens is regulated by the O.U. I.B.C. Contact the I.B.C. chair or the Biosafety Office at EHS for requirements. Others may be:
 - Radiation safety committee
 - Animal care committee
 - Human subjects committee
- 21.1.5 Control equipment required, glove box, hood, etc.
- 21.1.6 Proper storage procedures.
- 21.1.7 The personal protection required.
- 21.1.8 The procedures for retention of records on amounts of these materials on hand and used, and the names of the workers involved.
- 21.1.9 Procedures for the prevention of spills and accidents, and emergency response.
- 21.1.10 Procedures for decontamination and the disposal of wastes.
- 21.1.11 (*Specify the designated area in your lab and procedures for the laboratory*).
- 21.1.12 A select few toxins are regulated by the "Anti-Terrorism and Effective Death Penalty Act" (also called the Agents Transfer Law), See EHS for list and consultation. O.U is not currently licensed for this.

21.2 OPERATIONS REQUIRING PRIOR APPROVAL

- 21.2.1 Certain laboratory operations are of special concern because of the potential hazards associated with them. In these instances laboratory personnel are instructed to obtain prior approval from (specify *person*) prior to commencing the operation. This is to assure that safeguards are in place and that personnel are adequately trained in the procedure.
- 21.2.2 A departmental proposal review system is established as follows: *List specific activities, procedures, or chemicals requiring prior approval from the department.*
- 21.2.3 All proposals regulated by O.U.Radiation Safety Committee or Institutional Biosafety Committee (IBC) should be submitted as required.
- 21.2.4 All toxins regulated by the "Anti-Terrorism and Effective Death Penalty Act" (Agent Transfer Law). O.U. is not currently licensed for this.

Committee on Hazardous Substances in the Laboratory, Prudent Practices for Handling Hazardous Chemicals in the Laboratory, National Academy Press, Washington, D.C. 1981.

24.0 APPENDICES

- APPENDIX A Laboratory Chemical Inventory
- APPENDIX B Material Safety Data Sheets (MSDS)
- APPENDIX C Web-Based Resources
- APPENDIX D
 Health & Safety Procedures
- APPENDIX E Lab Safety Self-Audit Checklist

APPENDIX A

LABORATORY CHEMICAL INVENTORY

DEPARTMENT _____

The Inventory Form is provided as an Excel file

APPENDIX B

MATERIAL SAFETY DATA SHEETS (MSDS)

Department can insert the MSDSs for all their chemicals used here. These should correspond to the chemical inventory in Appendix A.

Web Resources

O.U Environmental Health & Safety

www.ohio.edu/ehs

O.U Office of Research

<http://www.ohio.edu/research/>

Ohio EPA

www.epa.ohio.gov

Ohio Hazardous Waste Disposal Regulations

<http://www.epa.ohio.gov/Default.aspx?alias=www.epa.ohio.gov/dhwm>

OSHA

<http://www.osha.gov/>

APPENDIX D

HEALTH & SAFETY PROCEDURES

IN THIS APPENDIX, INDIVIDUAL RESEARCHERS SHOULD OUTLINE THEIR OWN LABORATORY RESEARCH FOCUS, HEALTH & SAFETY HAZARDS OR CONCERNS ASSOCIATED WITH THEIR OPERATIONS, AND THE SAFETY PROCEDURES, TRAINING, AND OTHER CONTROLS IN PLACE IN THEIR LABORATORIES.

INSERT EACH RESEARCHERS OUTLINE HERE IN ALPHABETICAL ORDER

APPENDIX E

Self-Audit Checklist