EOHS

Department of
Environmental and Occupational
Health and Safety

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GENERIC CHEMICAL HYGIENE PLAN

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Introduction

This Chemical Hygiene Plan (CHP) is a generic CHP. In general, the CHP is a key mechanism to ensure the protection and safety of the environment, principal investigators, and all other associated University of Akron personnel. It complements the Health and Safety Manual. This CHP complies with the safety requirements mandated by OSHA under 29 CFR 1910.1450 (Laboratory Standard).

General Principles

The goal of this CHP is to maintain the Permissible Exposure Limits (PEL) or the Threshold Limit Values (TLV) of all chemicals in the designated research area.

All investigators must not underestimate the exposure risk associated with all chemicals involved in this research project regardless of the quantity.

All chemical operations must utilize existing properly functioning and adequate engineering controls devices (fume hoods, glove boxes).

Researchers will be required to wear adequate personal protective equipment.

A process Standard Operating Procedure (SOP) covering all procedures and all phases of the project will be reviewed by a select safety committee.

Definitions

MSDS

Material Safety Data Sheets. Compilation of information required under the OSHA Communication Standard on the identity of hazardous chemicals, health, and physical hazards, exposure limits, and precautions. These are supplied by the chemical manufacturers. It must be requested for each ordered chemical. It must be kept in or near the laboratory.

Odor Threshold

Concentration at which a chemical can be detected by smell.

Warning Properties

For example: odor. Note: some chemicals, such as vinyl chloride, have poor warning properties.

Threshold Limit Value (TLV)

This is the concentration to which an investigator can be exposed during an 8-hour workday without adverse effect as determined by the American Conference of Governmental Industrial Hygienists (ACGIH).

Permissible Exposure Limit (PEL)

This is a concentration to which a researcher can be exposed during a time weighed average (TWA) of eight hours or an action level (AL) or short term exposure limit (STEL) not exceeding 15 minutes as established by OSHA.

Chemical Hygiene Officer (CHO)

The Director of Environmental and Occupational Health and Safety (EOHS) is the Chemical Hygiene Officer responsible for the implementation of the CHP.

Employee

Anyone on the payroll of The University of Akron. This includes faculty, visiting scientists, graduate students, postdoctoral fellows, and staff.

Workplace Exposure to Chemicals

Personal exposure must be avoided through the use of engineering controls and personal protective clothing.

Regulated Areas

Laboratory area where chemicals will be stored and reacted, handled, or used and in which concentrations could exceed 1 ppm be restricted to authorized personnel only directly involved in this project. Doors to the corridor and from room 810 (into the students' office area) will be off-keyed.

Hazardous Operation

Procedure or operation capable of releasing liquid or gaseous compounds with concentrations above the exposure limit.

Employees performing these functions must wear respiratory and dermal protective equipment.

Medical Consultation

Consultation between a licensed physician and the employee for a medical evaluation related to a significant hazardous exposure to Chemical compounds and other chemicals at the discretion of the CHO.

Exposure Reporting

Every employee must report all evidence of possible chemical exposure to the departmental safety committee coordinator or departmental chair. This is not limited to:

- Direct skin and eye contact.
- Noticeable odors.
- Manifestation of health hazard symptoms such as headache, nausea, coughing, eye or skin irritation, dizziness, loss of motor dexterity.

Effects of Acute (Short-Term) Exposure to Chemicals

- Inhalation.
- Skin contact.
- Eye contact.

Effects of Chronic (Long-Term) Exposure to Chemicals

- Risk of cancer, and other diseases and medical conditions.

Initial and Periodic Monitoring

The select safety committee shall recommend the initial monitoring of all researchers directly involved in the process or project and, depending on the background of the researcher and the nature of their project, possibly periodic monitoring also.

Physician Information

If any signs or symptoms of exposure are experienced, the information will be provided to a physician recommended by The University of Akron through University Health Services. Upon examination, the physician will provide a written opinion including test results and recommendations for future medical follow-ups. The CHO will authorize medical consultation in non-emergency cases.

Principal investigators will complement this section with specifications on procedures, equipment safeguarding, personal protective equipment, and research practices that are capable of protecting investigators and nearby personnel as part of the SOP.

Select Safety Committee

This committee will include, at a minimum, principal investigators, experts in the specific field, and a representative from EOHS (Health and Safety).

Responsibilities

Laboratory safety and chemical hygiene are the responsibility of all employees. While the CHO manages or implements the CHP, principal investigators have the primary responsibility for safety. They must ensure that their researchers meet the requirements of the CHP and adhere to the SOP guidelines. Additional responsibilities include:

Chief Executive Officer:
The President of The University of Akron has ultimate responsibility for chemical hygiene and laboratory safety by providing the needed support for the plan and reports to the Board of Trustees.

Vice President and General Counsel:
Will coordinate efforts between CHO and the department, and report to the President.

Chemical Hygiene Officer:
The Director of EOHS is the acting Chemical Hygiene Officer. The CHO will work with other university staff members to develop and implement the CHP policies and practices, monitor the procurement, use, and disposal of laboratory chemicals, maintain proper audits, assist the department to know the current legal requirements regarding chemicals, and seek ways to improve the CHP.

Principal Investigator (PI):
Have the overall responsibility of the CHP in the laboratory. The faculty members will ensure that students involved in the project know and follow the CHP rules. They will provide regular safety and housekeeping inspections, determine the level of required protective equipment, and ensure adequate general safety in the laboratory area. They are responsible for developing the SOP.

Researchers:
Are responsible for following guidelines and safety procedures included in

the CHP and developing good personal chemical hygiene habits. They must fully know and understand the SOP and the MSDS information.

Laboratory Hazards

It is the responsibility of each person to become familiar with the hazards and safety precautions appropriate for this research project. Many of the techniques, instruments, or materials used in the research labs and department teaching labs are potentially hazardous and require specialized knowledge before safe work is possible.

Our science buildings have a large number of potential hazards, e.g.:

- Toxic, poisonous, flammable materials, reproductive toxins and selected carcinogens.
- High vacuum techniques and handling of glass.
- Corrosive chemicals.
- High pressures (hydrogenator; reverse-osmosis equipment).
- Strong light (ultraviolet; laser sources).
- Electrical instruments; high voltages.
- Radioactive materials (labeled reagents: Cobalt, 60 Source).
- X-ray equipment.
- Reactive metals and compounds.

Other Laboratory Hazards

- No laboratory module should contain more than the amount of flammable solvents approved by the State Fire Marshal.
- All equipments and tools should be used only with commonly adopted safety guards.
- Any compressed gas cylinders must be properly secured and sufficient personal protection provided at all times.
- All general electrical equipment will be grounded and in proper working condition.
- Know the safety operating procedure (SOP) for each activity and review it before performing the procedure.
- Chemical acquisition must be done through the Purchasing Department to ensure that proper University procedures are followed.

Chemical Storage

- All containers of chemicals must be labeled to show the chemical, owner, and the date of purchase. The shelf life of all chemicals must be respected.

- Indicate the room where the chemicals will be stored.
- A limit of flammable liquids will be established for each laboratory. Larger volumes of chemicals should be kept in the chemical storage room of the department.
- Shelves holding chemicals should have a raised edge to prevent bottles from falling.
- Incompatible chemicals must be segregated from each other during storage.
- Chemicals must not be stored in the hallway storage rooms.
- Flammable Chemicals must be stored in appropriately labeled cabinets.
- Refrigerators used to store chemicals must be “explosion proof”.
- When in doubt as to the proper procedure for disposal of any material, contact EOHS (x-6866).

Safe Laboratory Practices

Because very few laboratory chemicals are harmless, it is prudent to minimize all chemical exposures in the laboratory. Avoidance of skin contact and breathing is the primary rule. Even for substances with no known adverse effect, exposure risk must not be underestimated. A major factor in preventing exposure is through adequate ventilation and proper use of hoods. Hoods are to be used as a standard practice and not as the exception. Regulations require that everyone in the area be notified of all hazards.

The professor in charge, or the project supervisor, i.e., (1) the student’s advisor or supervisor, or (2) the project scientist’s (or technician’s) supervisor, has the primary responsibility for observing correct procedures. Included are research associates, post-docs, visiting scientists, applied research managers, and other designated responsible individuals.

Students and project workers should be trained and reminded of the hazards involved in their work area, and the degree of caution one needs to observe. This warning should be in written form, with a copy submitted to the CHO.

Transportation of Hazardous Substances

The University has available approved carriers and carts for transporting materials and gas cylinders. Safety glasses with side shields, or face shields, must be worn when handling, filling or transporting liquid nitrogen.

Security

- Keep doors locked when not in your office or laboratory.
- Do not prop stairwell doors open.
- Report any suspicious persons or activities to University Police by calling

911 (i.e., campus phones only; for cellular phones, use: 330-972-7123).
- Only personnel with “magnetic cards” will be authorized in the laboratory area.

Personal Protection

- **Goggles:** Must have covered vents and should be worn whenever handling chemicals. Safety glasses alone may not be enough in some cases.
- **Clothing:** No shorts. No sandals. Legs and feet are to be fully covered**.**
- **Contact Lenses:** Should be approved by the CHO and your personal physician.
- **Safety Glasses:** Must have side shields.
- **Gloves:** Wear appropriate gloves based on chemical and physical substance.
- **Respiratory Protection**: Coordinate with the CHO.
- **Lab Coat:** Must be suitable and disposed (or properly and safely cleaned) when badly contaminated.
- **Accidence and Spills: *REPORT ALL ACCIDENTS AND INCIDENTS, AND DOCUMENT ALL OCCURRENCES*.**
- **Eye Contact:** Wash promptly with water for 15 minutes. Seek medical attention afterwards.
- **Skin Contact:** Wash thoroughly affected area and remove all contaminated clothing. Seek medical attention afterwards.
- **Spills:** Use proper protective clothing and disposal methods to clean all spills. Contact EOHS (x-6866) or University Police (x-7123 or 911). (From campus phones only; otherwise, i.e., using cellular phones, call: 330-972-7123 [***NOT*** 911].)

Avoidance of Routine Exposure

- Do not smell or taste chemicals.
- Inspect lab coats and gloves before using them.
- Open toxic or noxious chemicals ***ONLY*** in the hood.
- Do not store or consume beverages and food in areas, refrigerators, or utensils used for chemicals.
- Avoid eating, gum chewing, smoking, or applying cosmetics in the presence of chemicals.
- Do not use your mouth to open samples or start siphons.
- Wash your exposed skin area before leaving the laboratory.
- Practice good housekeeping and personal hygiene.
- Separate paper trash from broken glassware.
- Contact the CHO before disposing of needles and sharps.

Vigilance

- Seek information about potential hazards through MSDS.
- Do not handle dangerous chemicals alone.
- Do not leave operations unattended.
- Seek permission before working late in the lab.
- Store a minimum amount of Flammables in the lab.
- Keep toxic or noxious chemicals in the hood.
- Store Flammables in fire cabinets.
- Use proper waste disposal methods.
- Properly label all containers.

Chemical Procurement

- Chemicals are ordered through the University Purchasing Department.
- No container should be received without a proper label.
- When ordering chemicals, request MSDS from the manufacturer.
- Be familiar with information on proper handing before using any substance.
- Maintain a desk copy of MSDS of your chemicals. If in doubt, call EOHS.

Stockroom and Storerooms

- Stored Chemicals should be examined annually for replacement, container integrity, and probable deterioration.
- Do not use storerooms or stockrooms to package chemicals.
- Practice adequate chemical segregation during storage.
- Periodic inventories should be conducted to discard aged chemicals. Store small amounts only. Do not hoard chemicals.
- Place container inside a bucket during transport. Use a cart if possible.
- Drums containing Flammables must be grounded.
- Post a copy of the NFPA fire protection for laboratories in each lab.

Environmental Monitoring

Airborne concentrations of selected chemicals will be monitored in the laboratory at the discretion of the safety committee. Personal badges will be used when be used if necessary.

The safety committee will initiate monitoring assisted by outside contractors. The goal will be to comply with existing PEL’s and TLV’s.

Housekeeping, Maintenance, and Inspection

- Floors should be cleaned regularly.
- Conduct chemical hygiene inspections periodically.
- Eyewash kits must be inspected weekly.
- Safety equipment should be in good working order.
- Do not block hallways, exits, and other passageways.
- Emergency equipment must have free access.

Medical Program

- Proper medical surveillance will be carried out as recommended by the safety committee.
- University Police officers are available to assist victims during emergencies.
- The University Health Services will provide first aid with the cooperation of the University Police and local hospitals.
- Each employee potentially exposed to a potentially hazardous chemical will be examined by a licensed physician.
- The initial examination will cover a general physical with a focus on kidneys, liver, spleen, skin, connective tissues, and pulmonary functions.
- The employee medical history in reference to alcohol intake, hepatitis, exposure to hepatotoxins, and past blood transfusions will be reviewed.
- Employees will be examined annually at least.
- The physician will issue a statement of each employee's ability to work with a particular chemical or suite of chemicals.
- The University of Akron will be responsible for additional examinations caused by chemical exposure at the recommendation of the designated physician.

Protective Equipment

- All laboratories have fire extinguishers, safety showers, eyewash kits, fire blankets, and individualized hoods.
- Safety goggles and gloves are issued to all laboratory workers.
- Respiratory protection equipment is stored in adjacent cabinets. This includes SCBA's, spill containment, and respirators. ***PROPER TRAINING*** is required prior to using any of these devices.

Record Keeping

- All incidents in laboratories must be reported to EOHS and the University Police. A permanent record of all incidents must be maintained.
- All roof inspections or work are documented in our "Roof Access Form".
- The Department of Human Services will keep all medical records with the assistance of Health Services.
- Monitoring and medical records will have the employee's name, social security, date of examination, test, and test results.
- A copy will be given to the employee.
- Records will be kept for at least 30 years of the course of the employee's employment plus 20 years whichever is longer.
- Employees must be notified within 10 days after testing of their sampling results and of the steps taken to reduce exposure.
- A permanent record of all departmental safety training must be maintained.

Signs and Labels

- Emergency response and notification signs are posted in buildings and in some cases inside the laboratory.
- Information on MSDS location is also posted.
- All chemicals must and will carry labels.
- Location signs for eyewash and safety showers are in every laboratory.
- For additional signs, call EOHS at x-6866.
- Signs for chemicals will be posted.
- For entrances to the restricted area. For example:

"**CANCER-SUSPECT AGENT AREA**
AUTHORIZED PERSONNEL ONLY"

(For hazardous operations:)
"CANCER-SUSPECT AGENT AREA
PERSONAL PROTECTIVE EQUIPMENT
REQUIRED"

(For example, for containers of vinyl chloride:)
"VINYL CHLORIDE
EXTREMELY FLAMMABLE
GAS UNDER PRESSURE
CANCER-SUSPECT AGENT"

(**For example, for vinyl chloride contaminated containers:)**
"CONTAINS VINYL CHLORIDE
CANCER-SUSPECT AGENT"

Spills and Accidents

- A written emergency plan has been included in the Health and Safety Manual. A copy of this compliance document is in your departmental office.
- Evacuation routes have been prepared for the building.
- Additional information is included in the Emergency Notification section of the Health and Safety Manual.
- Notify EOHS (or the University Police after hours and on weekends) of ***ALL*** major or potentially dangerous spills. Contact EOHS (x-6866) or University Police (x-7123 or 911). (From campus phones only; otherwise, i.e., using cellular phones, call: 330-972-7123 [***NOT*** 911].)
- All ***REPORTABLE*** accidents and emergency spills must be reported to OSHA and the Ohio Environmental Protection Agency (OEPA) (within 24 hours and 30 minutes, respectively). (Note: If at all possible, consult with the departmental chair [and/or departmental safety committee coordinator] and EOHS ***IMMEDIATELY AFTER*** such an incident and ***PRIOR TO*** making notification to OSHA or OEPA. Consult with the departmental chair, departmental safety committee coordinator, and/or EOHS with regard to what constitutes a reportable incident.)
- All spills and accidents must be documented, and the records of such maintained.

List of Chemicals

The research group should provide a chemical inventory to the CHO.

Special Provisions

This is dependent on the specifics of each individual research project, and should be discussed between the researcher and their advisor at the initiation of the project.

Performance of Safety Devices

- Laboratory fume hoods are inspected once a year. They must comply with the 100 fpm (feet per minute) face velocity and pass the required smoke test. The sash must be positioned at the required height and not be obstructed by equipment or other apparatus. Hoods will not be used

as storage devices. Vigilance must be exercised with regard to good housekeeping for effective operation of the hood, as well as for general safety purposes.

- Glove boxes must be tested and its performance written into the SOP. A record of safety inspections must be kept.
- Emergency eyewash equipment and safety showers shall be tested monthly for proper performance.
- Respirators will only be issued by the CHO after successful completion of respiratory training.
- Selection, procurement and maintenance of glasses, goggles, face shields, lab coats, aprons, gloves, and suitable clothing will be the responsibility of investigators.

Training

Safety training must be provided by knowledgeable and experienced individuals ***TO ALL APPROPRIATE FACULTY, STAFF, AND GRADUATE AND UNDERGRADUATE STUDENTS UPON INITIATION INTO THE DEPARTMENT AND ROUTINELY AND PERIODICALLY THEREAFTER***. This training must be documented. In addition, EOHS can provide general safety training to cover the following topics:

- General laboratory and chemical fume hood safety.
- Emergency (including spill response) and evacuation procedures.
- Fire safety. Please note the following-
    - In case of fire or explosion, activate the nearest fire alarm pull station ***(KNOW THE NEAREST LOCATIONS)*** or, if necessary, from campus phones: call the University Police (x-7123 or 911; or from cellular phones call: 330-972-7123, ***NOT*** 911).
    - ***ONLY PROPERLY TRAINED***/competent and confident individuals may use fire extinguishers.
    - Do ***NOT*** use more than one extinguisher on a fire; if unsuccessful, evacuate the area to a safe location and wait to coordinate with emergency personnel.
- OSHA hazard communication standard-
    - Hazard recognition.
    - Medical surveillance.
    - Monitoring program.
- Acute and chronic health hazards.
- Respiratory protection.
- Radiation safety.
- Hazardous waste disposal.

Safety Inspections

The principal investigator will conduct frequent safety inspections at the discretion of the safety committee. Standard safety inspection forms (which are available from EOHS) will be utilized.