ENVIRONMENT, HEALTH, & SAFETY

Laboratory Standard Operating Procedure for:

Environmental Rooms

Description

This standard operating procedure outlines the potential hazards and controls necessary when working in environmental rooms. Review this document and supply the information required in order to make it specific to your laboratory. In accordance with this document, laboratories should use appropriate controls, personal protective equipment, and disposal techniques when working in environmental rooms.

Environmental Rooms are designed and engineered to provide temperatures and/or humidity levels at controlled and set conditions, typically to within specified and narrow tolerances, regardless of the activity within the room. They are generally built for the growth of cells or organisms and for reliable storage to validated, precisely-controlled temperature/humidity levels for laboratory applications, research, and industrial testing. They are usually designed with limited or no mechanical ventilation, and are often closed air circulation systems that rely on the opening and closing of the room's door in order to bring fresh air into the room, as compared to laboratories, which may receive 10 air exchanges per hour through the building ventilation system.

Potential Hazards

Evaluate the possible hazards of the materials and processes you intend to use or store within an environmental room, with particular attention to inhalation hazards, before you begin your work or storage of any materials. For example, state the potential route(s) of exposure, e.g., skin, inhalation, ingestion, injection, etc. Include when/how exposure might occur, e.g., inhalation of gases/vapors, inhalation during weighing and mixing, splashes, cleaning up spills, etc.

General guidelines and recommendations for the safe handling, use and control of hazardous chemicals and particularly hazardous substances can be found in a chemical's SDS and in other Chemical Hazard references. Pay particular attention for information on certain chemical properties, e.g., flammable, corrosive, toxic, carcinogenic, pyrophoric, an irritant, etc., as well as any incompatibilities, in order to determine if a material can be stored or worked with, within an environmental room. Be sure to indicate the physical state(s) of all materials stored. **Follow other applicable SOPs as well.**

Environmental Room Door Markings

The storage of certain hazardous materials in an inappropriate location may present a safety or health hazard to occupants of the space. Improper ventilation in rooms where chemicals or gases are located may present a hazard from the toxic or ignitable properties of the material, or from their ability to displace oxygen.

Many environmental rooms are designed like a large refrigerator or oven in that they just recirculate air; they do not have a fresh air supply and exhaust ducts to remove the hazardous conditions. As an aide to remind individuals of this design feature and potential hazard in environmental rooms, EHS now has available stickers that can be placed on the door to the room (shown below). If you are interested in obtaining the sticker please contact EHS at (810) 766-6763.

Engineering Controls

Because environmental rooms have limited or no mechanical ventilation, the release of any toxic substance into an environmental room presents greater hazards to occupants, and could result in the potential cross-contamination of research projects.

Because hazardous vapors and fumes are not actively removed from the environmental room environment, ***work involving any hazardous materials should be done only in closed systems.***

Take great care to control hazards and ensure a safe working environment:

- Prevent the release of gases, fumes or aerosols at all times.
- Use a less hazardous product that can perform the same task, if possible.
- Use the smallest possible quantities.

If no engineering controls are needed, please note this fact. Consider if liquid form would be less hazardous than powder and, if so, purchase in liquid form. If possible, indicate that the chemical will be purchased in small quantities or dilute solutions to reduce the risk of exposure and minimize waste. If weighing powder and balance cannot be located in a fume hood or BSC, tare a container then add powder in the hood and cover before returning to the balance to weigh the powder.

Work Practice Controls

Unabated mold growth within an environmental room may lead to mycological contamination of storage areas and materials, research projects and pose potential health problems from the inhalation of mold spores. Spores can also be tracked out of the room and around the entire floor of the building. Minimizing mold growth requires the control of moisture, e.g., standing/leaking water and/or high humidity, in the environmental room:

- Keep doors firmly shut – if left open, water condensation on surfaces increases due to high relative humidity, promoting mold growth.
- Immediately clean up spilled laboratory liquids, e.g., buffers and media. Moisture may lead to rust, corrosion or degradation of environmental room integrity, e.g., shelves.
- Promptly dispose of wet or damp organic materials, e.g., paper products, cardboard, miscellaneous trash, etc.
- Store paper & porous materials, e.g., Kimwipes, cardboard, blotting paper, etc., in closed, air-tight, plastic containers. Do not use cardboard boxes or other absorptive materials as storage containers in environmental rooms, unless relative humidity (RH) levels are maintained at very low levels, e.g., <20%.

NOTE: Because molds grow best in a humid environment ≥ 60% relative humidity (RH) and at temperatures between 77°F and 86°F, it is best to maintain the air as cool (65°F – 75°F) and dry (< 20% RH) as possible, so as to minimize conditions for mold growth.

Also refer to OSEH's Mold webpage.

Personal Protective Equipment (PPE)

Employee protection from occupational diseases caused by breathing air contaminated with harmful dusts, fumes, sprays, mists, fogs, smokes, vapors, gases, or radioactive material is best achieved by prevention of atmospheric contamination through the use of engineering control measures, e.g., enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials. Respiratory Protection ***may*** be necessary when engineering controls are not feasible.

The reliability of any respirator is dependent on proper selection, training, medical screening, and respirator maintenance. Therefore, University employees **must** obtain all respiratory devices through EHS. Filtering facepieces, i.e., "Dust Masks", used for nuisance dust activities can be obtained through EHS or purchased through the M-marketsite website.

Contact EHS at (810) 766-6763 for a determination of the need for a respirator.

Transportation and Storage

Due to limited or no mechanical ventilation, **do not conduct work with or store** the following materials and equipment in environmental rooms:

- **Particularly Hazardous Chemicals**, i.e., highly acutely toxic chemicals, carcinogens, reproductive toxins: Can result in personnel exposure due to the lack of exhaust ventilation.
- **Volatile Flammable Solvents**: Exposed circulation fan motors and electrical lab equipment are potential ignition sources.
- **Volatile Acids:** Can corrode coiling coils in refrigeration systems.
- **Asphyxiants,** e.g., compressed gases such as nitrogen or carbon dioxide: May displace oxygen due to limited ventilation rate, resulting in an oxygen-deficient environment.
- **Dry Ice**: An oxygen-deficient environment can occur from the release of carbon dioxide gas.
- **Open Flame,** e.g., Bunsen burners.
- **Food or Beverage:** They can become contaminated by chemicals or biological organisms.
- **Corrosives**

Waste Disposal

Most spent, unused and expired materials are considered hazardous wastes. Contact Environment, Health and Safety (EHS) at (810) 766-6763 for waste containers, labels, manifests, waste collection and for any questions regarding proper waste disposal. Also refer to UM-Flint Hazardous Waste Management Program and EHS webpage http://www.umflint.edu/ehs/environment-health-and-safety for more information.

Exposures/Unintended Contact

If the employee is in need of emergency medical attention, call 911 immediately.

For an actual chemical exposure/injury:

- Remove contaminated clothing. Flush exposed eyes or skin with water for at least 15 minutes. Seek medical attention (see below).
- For inhalation exposure, remove all persons from the contaminated area. **Get medical aid**.
- If an ambulance is needed, call UM-Flint DPS at 911 from any university telephone or (810) 762-3333 from any cell phone or non-university telephone to request assistance.

Contact EHS for advice on symptoms of chemical exposure, or assistance in performing an exposure assessment.

Report all work related accidents, injuries, illnesses or exposures to UM-Flint DPS. Additionally, employees and supervisors must be sure to report the injury to EHS and complete and submit the Illness and Injury Report Form to WorkConnections within 24 hours. Follow the directions on the WorkConnections website Forms Instructions to obtain proper medical treatment and follow-up.

If you were involved in or observed an incident or near miss, please complete the EHS Laboratory Incident and Near-Miss Report Form. This will be valuable in improving laboratory safety on UM-Flint campus.

TREATMENT FACILITIES:

MAJOR INJURIES	MINOR INJURIES –During Business Hours	MINOR INJURIES –After Business Hours
Genesys Hospital One Genesys Parkway Grand Blanc, MI 48439 (810) 606-5710 **Hurley Medical Center** One Hurley Plaza Flint, MI 48503 (810) 262-9000 **McLaren Hospital Flint** 401 South Ballenger Hwy Flint, MI 48532 (810) 342-2000	**Genesys Occupational Health Network** 1460 Center Rd. Burton, MI 48509 (810) 715-4620 Mon. to Fri. 7:30 am to 10 pm Sat. & Sun. Noon to 8 pm **McLaren Flint-Burton OCC Center** 1459 S. Center Rd. Burton, MI 48509 (810) 496-0900 Mon. - Fri. 8 am to 8 pm Sat & Sun 10 am to 2 pm	**Downtown Flint** 420 S. Saginaw St. Flint, MI 48502 (810) 762-1550 **Genesys East** 1096 S. Belsay Rd, Suite F Burton, MI 48509 (810) 743-3351 **Genesys North** 4154 W. Vienna Rd Clio, MI 48420 (810) 686-7397 **Genesys South** 8447 N. Holly Rd Grand Blanc, MI 48439 (810) 603-0856 Mon. - Fri. 6 to 10pm / Sat. & Sun. 1-10pm

Click here for more information on the UM – Flint Emergency Preparedness and Response Plan.

Spill Procedure

- When a spill occurs, ***personal safety should always come first***.
- Alert and clear everyone in the immediate area where the spill occurred.

A **minor (small) chemical spill** is one of a known chemical that the laboratory staff is capable of handling safely without the assistance of safety and emergency personnel, i.e., less than 1 gallon or 3.5 liters. A **major/large chemical spill** requires active assistance from emergency personnel.

MINOR CHEMICAL SPILLS

- Alert people in immediate area of spill.
- If spilled material is flammable, turn off ignition and heat sources.
- Open outside doors and windows, if possible.
- Wear protective equipment, including safety goggles, gloves and long-sleeve lab coat.
- Avoid breathing vapors from spill. If vapors are excessive, seek outside help.
- Confine spill to as small an area as possible.
- **Do not wash spill down the drain**.
- Use appropriate spill kits/sorbents to neutralize corrosives and/or absorb spill. Collect contaminated materials and residues and place in container. For powdered chemicals sweep carefully to avoid generation of dust or, if

appropriate, use moist sorbent pads or wet the powder with a suitable solvent and then wipe with a dry cloth. Contact EHS at (810) 766-6763 for proper disposal.

- Clean spill area with water.

MAJOR CHEMICAL SPILLS

- Attend to injured or contaminated persons and remove them from exposure.
- Alert people in the laboratory to evacuate.
- If spilled material is flammable, turn off ignition and heat sources. Don't light Bunsen burners or turn on other switches.
- **Call UM-Flint DPS at *911* from any university telephone or (810) 762-3333 from any cell phone or non-university telephone immediately for assistance.**
- Close doors to affected area.
- Post warnings to keep people from entering the area.
- Have person available that has knowledge of incident and laboratory to assist emergency personnel.

Additional Spill Links:

- www.oseh.umich.edu/pdf/chemspil.pdf
- http://www.oseh.umich.edu/emer-chemical.shtml

Report all emergencies, suspicious activity, injuries, spills, and fires to the UM-Flint Department of Public Safety (DPS) at 911 from any university telephone or (810) 762-3333 from cell phone or non-university telephone. Register with the University of Michigan-Flint Emergency Alert System via Wolverine Access. Also, preprogram the UM-Flint DPS telephone number (810) 762-3333 into your cell phone for quick, easy use.

Training of Personnel

All personnel are required to complete Laboratory Safety Training. Documentation of the training is required. This training can be accomplished by completing the ***Comprehensive Laboratory Safety*** session (**BLS009** *or equivalent*) via MyLINC, or UM-Flint EHS on-line training or other equivalent approved by EHS. Furthermore, all personnel shall read and fully adhere to this SOP when working in environmental rooms.

Certification

I have read and understand the above SOP. I agree to contact my Supervisor or Lab Manager if I plan to modify this procedure.

Name	Signature	UM ID #	Date

Prior Approval required – Is this procedure hazardous enough to warrant prior approval from the Principal Investigator? ☐ **YES** ☐ **NO**

Principal Investigator _____ **Revision Date** _____