

ARIZONA STATE UNIVERSITY

Office of Knowledge and Enterprise Development

Goldwater Environmental Laboratory CHEMICAL HYGIENE PLAN & GENERAL LABORATORY SAFETY

(Rev. D; 08Jan2019)

Purpose

The Chemical Hygiene Plan (CHP) is a lab specific document that has been prepared to describe the conduct, policies, and procedures for managing the use, storage, and disposal of hazardous materials within the Goldwater Environmental Laboratory (GEL). Also discussed is general information concerning other important safety issues.

Please review the [Arizona State University Chemical Hygiene Plan](https://www.asu.edu/ehs/documents/asu-chp.pdf) (<https://www.asu.edu/ehs/documents/asu-chp.pdf>) as it has been designed to meet the requirements set by the federal Occupational Health and Safety Administration (OSHA) Standard, Occupational Exposure to Hazardous Chemicals in Laboratories (29 CFR 1910.1450). In addition, the [ASU Exposure Control Plan](https://www.asu.edu/ehs/documents/asu-bloodborne-pathogens-fact-sheet.pdf) for Blood borne Pathogens (<https://www.asu.edu/ehs/documents/asu-bloodborne-pathogens-fact-sheet.pdf>) is designed to protect the health of employees determined to have potential exposure to human blood and other potentially infectious materials as mandated by OSHA. Recommended safety standards have been established to ensure a safe work environment. This CHP discusses strategies designed to protect employees from the health hazards presented by hazardous materials used in the GEL. Hazard identification, record keeping, and user training and information are among the items addressed.

Scope and Application

OSHA has established permissible exposure limits for hazardous chemicals that must not be exceeded within the laboratory. Since ASU has academic/research and clinical laboratories that use hazardous materials, resources and personnel are available to provide an effective program to prevent, reduce, and control hazards where necessary.

Goldwater Environmental Lab Contacts

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Lab Manager's Responsibilities

- ❑ Ensure that all lab personnel are aware of the dangers involved in the handling and use of hazardous materials.
- ❑ Communicate hazards of blood borne pathogens in laboratory to personnel. Labels, signs, and information and training intended to provide adequate warning to eliminate or minimize exposure.
- ❑ Ensure that users receive appropriate Lab Chemical Safety and Fire Safety Training through Environmental Health and Safety (EH&S). Safety training records are tracked thru iLab registration and access.
- ❑ Maintain users' training records.
- ❑ Notify EH&S if there is reason to believe that a user's exposure level to a hazardous chemical routinely exceeds the action level (or in the absence of an action level, the permissible exposure limit).
- ❑ Ensure that all material safety data sheets (SDS) are available for users in the work area or electronically.
- ❑ Provide training in the use and comprehension of SDS sheets.
- ❑ Forward copies of any non-standard SDS sheets to EH&S.
- ❑ Inform any visitor, contractor, or vendor of the hazards of the materials used in the lab area where they are working in or visiting.
- ❑ Provide proper Personal Protective Equipment (PPE) for lab users and visitors as necessary.
- ❑ Ensure that all lab equipment is operating properly.

Users' Responsibilities

- ❑ Receive appropriate Lab Chemical Safety and Fire Safety Training through EH&S. Make sure training is up to date.
- ❑ Understand the hazards involved with any hazardous material they use.
- ❑ Follow all laboratory safety policies.
- ❑ Be familiar with the location and use of Personal Protective Equipment.
- ❑ Be familiar with the location and the contents of the work area's SDS sheets.
- ❑ Be familiar with emergency systems and equipment and emergency evacuation procedures.

- ❑ Cooperate in maintaining a complete chemical inventory and SDS collection.
- ❑ Consult the Lab Manager if unsure of the safe handling, use, storage, or disposal of hazardous materials.

SDS Sheets

All SDS sheets are stored in red binders within each lab. SDS information is also located on Dropbox in the GEL safety folder SDS. Each GWC number contains specific SDS documents. All new chemicals coming into the lab must have an accompanying SDS sheet. SDS should be shipped with chemical or can be obtained directly from the chemical manufacturer/supplier. Alternatively, websites such as that of the Vermont Safety Information Resources (<http://hazard.com/msds/>) are a good source.

Chemical Inventory

Inventories as well as SDS's are located within the red SDS binder stored in each lab. Included with each chemical is the quantity stored, the manufacturer, and the storage location in the work area. A chemical not currently listed in inventory must receive prior approval by Lab Manager before it is used the lab. Once approved, add it to the appropriate Chemical Inventory and an SDS must be filed.

Personal Protective Equipment (PPE)

All personnel will use appropriate personal protective equipment (PPE) while working in the laboratory this includes, but may not necessarily be limited to:

- Safety glasses, goggles, or face shield (which to use depends on circumstances)
- Laboratory coats, aprons, or other suitable clothing (shirt and long pants)
- Shoes (**no open-toed shoes** e.g., sandals, flip-flops)

PPE is required at all times when handling particularly hazardous chemicals, reproductive toxins, carcinogens, and sensitizers in the laboratory includes, but is not limited to:

- Appropriate gloves
- Approved respirators in the absence of fume hoods

If you are unsure which PPE is necessary for the work you are performing, consult the SDS and/or Lab Manager.

Designated Areas

Safe Area

GWC 637A has been set up to provide a safe area away from laboratory hazards. Since this room is separate from the laboratory work area, the same safety rules do not apply.

Food and beverages are a in this designated area and the equipment described above (Personal Protective Equipment) is not needed. *Outside of these designated areas, everyone is expected to follow appropriate safety guidelines and wear all necessary PPE.*

Hazardous Waste

Any laboratory operations that produces waste chemicals produces hazardous waste regulated by The Arizona Department of Environmental Quality (ADEQ). All waste is to be labeled and tagged for proper disposal. All laboratory personnel who produce hazardous waste are required to manage their waste according to the [guidelines \(https://cfo.asu.edu/hazmat-compliance\)](https://cfo.asu.edu/hazmat-compliance) established by EH&S. State and federal law require the management of hazardous waste and failure to manage waste properly may result in criminal prosecution. See Lab Manager for proper collection, storage, identification, and disposal procedures as these will vary depending on the waste type. Clean glass can be recycled in blue Glass buckets. Sharps and biohazard waste are stored and handled separately from chemical waste.

Highly Dangerous Materials

The following is a list of highly dangerous materials that will need **prior approval** (see below/ **and attached SOP's for these materials**) by the lab manager before they can be used:

Biohazards (Bloodborne Pathogen training required)

Hydrofluoric Acid (highly corrosive liquid)

Methyl-ethyl ketone (extremely flammable)

Mercuric chloride (extremely poisonous)

Mercuric thiocyanate (highly toxic)

Phenol (extremely corrosive and poisonous)

Sodium arsenate (extremely poisonous)

Sodium nitroprusside, a.k.a. sodium nitroferricyanide (extremely poisonous)

Prior Approval

This systematic process involves the identification of hazards, management of risk, and evaluation of pollution prevention / waste minimization. A [Laboratory Activity Prior Approval form](#) is required in certain cases.

Ventilation and Fume Hoods

Laboratory personnel must conduct fume hood monitoring prior to usage. Monitor hoods to be sure airflow evident prior to working in a hood. Users must also check hoods to ensure that exhaust slots, pressure alarms, and other features are set properly and are in good working order. Operators must report all problems with fume hoods to the Laboratory Manager immediately.

- Face velocity must be greater than 80 feet per minute (FPM) and less than 120 FPM.
- Keep fume hoods neat and not overloaded. Long-term storage of bottles requiring ventilation should be in cabinet under hood, **NOT IN HOOD**. Only store bottles in hood while in use.
- The fume hood sash is to be open to 18 inches when in use and closed to 1 inch when not in use.

Employee Information and Training

Arizona Department of Occupational Safety and Health (ADOSH) has mandated that all laboratory workers attend a laboratory training session. It is therefore mandatory that all laboratory staff and students working in any laboratory at ASU attend the **Laboratory Chemical Safety** training session and the **Fire Safety and Prevention** training class presented by EH&S. Lab personnel are strongly encouraged to attend refresher courses annually. The **Laboratory Chemical Safety** training session presents the university's chemical hygiene plan for academic and research laboratories using hazardous chemicals. Safety Data Sheets (SDS), labelling, chemical inventory, general lab safety, personal protective equipment (PPE), and reporting accidents are some of the topics presented. The Laboratory Manager must give further training relative to the specific hazardous materials used in each specific laboratory

Labeling

Clearly label all chemicals and sample storage vessels. This includes non-hazardous as well as hazardous materials. The label must include the name of the container's contents in English using IUPAC chemical

names (i.e.: sodium chloride). Also included on the label must be the date, name of contact person, concentration, and any applicable hazard warning. A list of acceptable abbreviations for common chemicals and solutions is posted in each laboratory.

Chemicals that are time sensitive or produce peroxides must be dated indicating when storage began.

Cold Room and General Sample Storage

- All samples must be stored in an organized manner (within a box, etc.) and clearly labeled with the date, owner's name, and telephone number.
- GEL storage facilities are only available for users while samples are processed. Long-term storage is not available in the Environmental Facility. Users must remove samples when all analyses is completed. Unclaimed samples will be disposed of 30 days after notification.
- Refrigerated samples are to be stored on metal shelving units. Room temp samples are to be stored in cabinets or on shelves, NOT on bench top.

Emergency Procedures

All lab personnel must understand the following emergency procedures:

- Evacuations due to fires or chemical spills.
- Location of exits and exit routes
- Location and use of emergency equipment (showers, eyewashes, fire extinguisher, fire alarm).
- Location of First Aid Station.

See the GEL Emergency Evacuation Plan and Emergency Equipment Locator in each lab for details on locations and evacuation procedures. Documents are also included at the end of this protocol.

Accident Reporting

Supervisors must submit accident reports to the Dean, Safety Committee, and to EH&S for any accident or near-miss situations. All employees will be free from any reprisals for reporting accidents.

Audits

Safety committees and supervisors must conduct regular periodic audits of the work areas to evaluate work practices and identify potential hazards. Audits are required whenever new substances, processes, procedures, or equipment presenting additional considerations for health and safety are introduced into the work area.

Audit reports must include dates, who conducted the inspections, unsafe conditions found, and corrective actions taken.

General Lab Safety

There are a number of hazardous chemicals and gases stored throughout the lab. Lab Certification placards are located outside the entrance to each lab. These provide information about the hazards found in each lab, emergency contacts, and location of SDS collection and electrical circuit box. Please review the SDS for the chemicals you will be using and follow all recommended safety precautions. Solvents, acids, and caustic chemicals are stored in specially designated locations. Always return the supply container to the storage area after using.

Common Sense

The following are a few examples of common sense and courtesy that maintain a good work environment:

- When dispensing or weighing chemicals, please be careful and clean up any mess that you make.
- If you must work after normal lab hours, please try to have someone with you. You should never work alone in any laboratory.
- Take off gloves when using a computer, answering the phone or **opening laboratory doors.**
- Food or drink allowed only in the designated safe area.
- If you see anyone doing something that is unsafe or not following safety rules, please make him/her aware of the issue. Contact **Gwyneth Gordon** if the problem persists.
- NO smoking in any building or on general campus at ASU.

General Safety Information About Specific Classes of Compounds:

See SOP documents for all Special usage items included in this binder

Organic Compounds

- Most are flammable because they have relatively low specific heats and ignition temperatures.
- Water is not appropriate to extinguish this type of fire since most organic compounds are insoluble in water. Use a type ABC fire extinguisher.
- They tend to react easily with oxidizing agents (ex: potassium dichromate, ammonium nitrate).

Phenol

In concentrated form, phenol causes severe burns. It can be absorbed through the skin even in dilute form. If phenol remains on the skin for any length of time, gangrene is likely to be induced. Phenol is also a poison.

Cyanide Compounds

Certain cyanide salts poison both through inhalation of the gas or by its absorption through the skin. When mixed with acids, forming hydrogen cyanide. This gas is extremely toxic.

Sulfide Compounds

Sulfide compounds form hydrogen sulfide gas when mixed with acids. This gas is extremely toxic.

Mercury Compounds

Extremely poisonous! Symptoms of mercury poisoning range from mild gastritis to severe pain and vomiting.

Ammonium Nitrate

This is a strong oxidizing agent and can be explosive when mixed with organic material.

Arsenic Compounds

These compounds are extremely poisonous. A lethal dose of arsenic trioxide is 0.1 grams.

Hydrofluoric Acid

Hydrofluoric acid (HF) is a highly corrosive liquid and is a contact poison.

GEL CHP & General Lab Safety Agreement

By checking the box in the iLab agreement form, I have read and understood all aspects of the Goldwater Environmental Lab Chemical Hygiene Plan & General laboratory Safety documentation. I hereby agree to abide by those safety policies and guidelines set forth while working in the GEL facility.

This documentation is now available with iLab registration and the agreement form needs to be in place prior to allowing card access to GEL.