The University of Texas at El Paso

Chemical Hygiene Plan

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Revision Date:	05/04/2026

Contents

Definitions

AED- Automated External Defibrillator
ANSI- American National Standards Institute
CHO- Chemical Hygiene Officer
CHP- Chemical Hygiene Plan
CSB- Chemical Safety Board
Dry Lab- Laboratory with no chemical reagents, only equipment, machinery or computers.
Hierarchy of Controls- Method for identifying safeguards to protect workers from hazards
NIOSH- National Institute for Occupational Safety and Health
NFPA-National Fire Protection Association
OPIM- Other Potentially Infectious Material
OSHA- Occupational Safety and Health Administration
PEL- Permissible Exposure Limit
PHS- Particularly Hazardous Substance
PI- Principal Investigator
PPE- Personal Protective Equipment

RSO- Radiation Safety Officer
SCA- Sudden Cardiac Arrest
SDS- Safety Data Sheets
SOP- Standard Operating Procedure
THCA- Texas Hazard Communication Act
VOC- Volatile Organic Chemical
Wet Lab- A laboratory that uses liquid chemicals, generates liquid chemical waste.

Preface

The University of Texas at El Paso (UTEP) is committed to establishing guidelines, practices and procedures for the safe handling of toxic/hazardous substances within laboratories and adjacent spaces on campus. In accordance with OSHA standards (Code of Federal Regulations, 29 CFR 1910.1450) and state regulations (Chapter 502 of Texas Health and Safety Code, Texas Hazard Communication Act), the following document has been prepared in an effort to safeguard UTEP personnel, comply with federal and state safety regulations, and provide a chemical handling guide for students, faculty, and staff. This document applies to all personnel on campus, including but not limited to faculty, staff, students, and visitors and contract employees.

Introduction

A Chemical Hygiene Plan (CHP) is a "written program developed and implemented by the employer which sets forth procedures, equipment, personal protective equipment and work practices that are capable of protecting employees from the health hazards presented by hazardous chemicals used in a particular workplace" (Code of Federal Regulations, 29 CFR 1910.1450b, Definitions). This document must be readily available to all employees and employee representatives, it should be capable of protecting employees from health hazards associated with the chemicals in use, and capable of keeping exposures below established Permissible Exposure Limits (PEL). (Code of Federal Regulations, 29 CFR 1910.1450e)

The CHP includes criteria that UTEP will use to determine and implement protective measures including engineering controls, the use of personal protective equipment (PPE), and general hygiene practices. Special care will be taken to note the protective equipment and engineering controls necessary to minimize risks when working with chemicals considered to be **extreme hazards**.

OSHA defines a laboratory as "a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis". This extends to various workspaces on campus that may not consider themselves laboratories, such as shops and art studios. Adhering to this

definition, any unit or facility that handles hazardous chemicals or equipment, even if on an irregular basis, must follow the laboratory guidelines established in this CHP. Hazardous chemicals are defined by OSHA as chemicals for which there is statistically significant evidence (based on at least one study conducted in accordance with established scientific principle) that results in acute or chronic health effects. To determine if you work with chemicals that are considered hazardous, consult the manufacturer-specific Safety Data Sheets (SDS) for the products used.

Laboratory personnel are responsible for familiarizing themselves with this Chemical Hygiene Plan and fostering a safe, healthy work environment at a local scale. This CHP will be reviewed annually by environmental health and safety personnel and updated in accordance with changing regulations and university policy. For questions concerning these guidelines or applications, please contact EH&S at eh&s@utep.edu.

Regulations

Regulations established by federal and state governments assume the highest adherence priority, followed by references cited within said codified law, and lastly peer reviewed sources and published documents that highlight best practices and standards.

Regulatory codes maintain the force of law and compliance is mandatory. For a list of federal and state requirements for laboratory spaces, see the following codes:

- OSHA Code of Federal Regulations, 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories
- Texas Health and Safety Code, Chapter 502, Texas Hazard Communication Act (THCA)

Texas Hazard Communication Act, Chapter 502 of the Texas Health and Safety Code requires public employers to provide employees with specific information regarding the chemicals to which employees may be exposed to in the workplace. This is accomplished at minimum via a chemical inventory uploaded to the respective EHS software by each principal investigator (PI). If a laboratory fails to upload an annual inventory for all chemicals stored and used (including compressed gas cylinders), the unit as a whole will be considered non-compliant and at risk of disciplinary action.

Professional associations, government agencies, and industry bodies provide recommendations that are not intrinsically enforced by law, however they are referenced as best practice. Units that provide highly respected and reputable standards are listed below:

- National Fire Protection Association (NFPA) 45: Standard on Fire Protection for Laboratories Using Chemicals

- American National Standards Institute (ANSI)
- National Institute for Occupational Safety and Health (NIOSH) Guide to Chemical Hazards
- Official American Chemical Society (ACS) publications
- National Research Counsil (NSF)

Peer reviewed articles are available for safety concerns that are niche or otherwise unaddressed by the above associations and regulatory bodies. It is important to keep in mind that journals are hierarchical in their reputability—the most reliable of the available sources should be selected.

Responsibilities

The Environmental Health and Safety department is responsible for the following:

- Provide technical assistance to laboratory supervisors and staff regarding appropriate storage, handling and disposal of chemicals
- Provide safety training
- Conduct both routine and requested safety assessments
- Provide technical assistance for engineering controls, protective equipment, and installation consultations
- Inspect safety equipment such as chemical fume hoods, eyewash stations, safety showers and fire extinguishers.
- Maintain access to each laboratory's chemical inventory and Safety Data Sheets (SDS)
- Monitor training and compliance associated with each laboratory and its personnel
- Monitor changes in codes and regulations concerning the chemicals used on campus
- Provide spill kits, hazard identification information and means of proper waste disposal

Laboratory managers and principal investigators are responsible for the following:

PIs and lab managers are responsible for avoiding unreasonable risks. Failure to establish a safe work environment leaves the community at risk and supervisors vulnerable to litigation.

- Inform and train personnel on chemical hygiene and safety
- Implement and enforce EH&S standards
- Provide emergency procedures and contact information for key personnel, campus police and EH&S
- Report spills, fires, security incidents, injuries, exposures and near misses to EH&S as they are found

- Report particularly hazardous or controlled substances (PHSs) and with EH&S, namely those that are carcinogenic, teratogenic, pyrophoric, peroxide forming, explosive, radioactive or highly toxic
- Report hazardous or loud equipment
- Report outgoing shipments that contain chemical or biological agents or other regulated goods such as dry ice
- Inform students and staff of locations for safety equipment, spill kits, fire extinguishers, and fire exits
- Prepare SOPs for hazardous procedures or PHSs (for a list see **Table 3**)
- Upload a complete annual inventory to EHS software for all chemicals present, such that they are accessible to personnel and compliant with THCA.
- Ensure that students and staff have access to personal protective equipment and are dressed properly before entering the lab space.
- Dispose of unused or expired chemicals
- Perform internal inspections
- Consult EH&S as needed
- Escort visitors and facilities services when entering laboratory premises
- Report job-related injuries or illnesses to UTEP's Workers Compensation Officer, (915) 747-7197 or eh&s@utep.edu

Deans, Directors and Administrative Heads are responsible for:

- Collaboration with faculty and staff to ensure that the CHP provided is feasible and implemented in a timely manner
- Making necessary budget adjustments to ensure that health and safety requirements are met

Students and Laboratory Staff are responsible for:

- Completion of initial and refresher training. At a minimum, general laboratory safety training must be completed before lab entry
- Follow all health and safety policies and procedures, including SOPs and safety regulations
- Become familiar with egress routes and fire extinguisher locations
- Know the locations of eye wash stations, safety showers, first aid kits, fire alarm pull stations and gas shut-off valves
- Perform and document routine weekly flushing of eyewash stations

- Report spills, fires, near misses and security incidents to EH&S as well as UTEP police when after hours
- Dress appropriately in the lab (see **Section 5**) and wear proper PPE before entry
- Report all hazardous conditions to the respective PI or manager
- Report job-related injuries or illnesses to UTEP's designated Workers Compensation Officer, at (915)-747-7197, eh&s@utep.edu
- Do not use equipment or machinery without authorization or training
- Consult SDS for any chemical to be used **before** handling
- Request information and training when unsure of the proper procedures, whether that be from a PI, manager, or EH&S
- Do not wear PPE outside of the laboratory

Laboratory Rules

- **No Food, Drink, Cosmetics or Medication:** All water bottles, cups and food or drink items (including gum) must be left outside the laboratory. Cosmetics including chapstick and moisturizers will not be applied in the laboratory. Any form of consumption in lab spaces is strictly prohibited. Items used for research purposes must be labeled as "for lab/research use only".
- **No Smoking or Vaping:** UTEP is a tobacco-free campus. Nicotine products of any sort are not permitted.
- **Wear Appropriate PPE** at all times in the laboratory. Appropriate PPE varies based on the chemicals and procedures employed. Consult SDS or eh&s@utep.edu for PPE guidance.
- **Wear Proper Attire:** No open-toed or mesh shoes, or any clothing that exposes the midriff, legs, shoulders or chest. Skin-tight clothing such as leggings are not recommended; spills will have extended contact with the skin and the contaminated articles will be more difficult to remove safely.
- **Wash Hands Thoroughly** after any chemical handling and after laboratory exit.
- **Safety Equipment:** Know the location and proper use of all safety equipment in or adjacent to the laboratory.
- **Ventilation:** Use appropriate ventilation when working with hazardous or volatile chemicals. Consult SDS for information on specific ventilation requirements.
- **Follow Assigned Work Schedules**
- **No Hazardous Unattended Experiments:** Laboratory experiments should be reduced to a minimal hazard before being left unattended. If you are unsure whether an experiment is safe to leave unattended, consult your PI.
- **No Unauthorized Personnel or Experiments**

- **Maintain Situational Awareness:** Do not wear earbuds or headphones in both ears, especially if they are noise cancelling. This is dangerous in general, especially during emergency situations.
- **Report** any ventilation, temperature or chemical fume hood issues to EH&S and facilities.
- **Follow SOPs** at all times.
- **Always Consult SDS** before working with or ordering any chemical.
- **Plan Safety Procedures** before beginning work with any chemical.
- **Wash Hands** with soap immediately after removing gloves and before exiting the lab,.
- **No Horseplay:** Engaging in any activity or behavior that might pose a distraction, startle, or confuse surrounding lab members is prohibited.
- **No Expired Chemicals or Equipment:** Equipment and chemicals that are not in good condition with functional safety controls should not be used.
- **No Mouth Pipetting**
- **No Consumable Storage or Food Preparation** inside laboratory refrigerators, freezers, ice chests or ovens unless the food product has been labeled for research-use only.
- **Chemical Spills:** Spills of any hazardous or toxic chemical, even if considered harmless should be reported to EH&S such that spill kit replacements can be arranged.
- **Waste Minimization:** A waste minimization program has/has not been implemented at UTEP, if has: a chemical redistribution program is in place such that unused chemicals may be relocated to a laboratory that will make use of the excess. If hasn't: purchases should be cognizant, calculated and minimized to the reduce the amount of waste disposal required.
- **Chemical Spills and Accident Response:** In the event of a chemical spill or incident during general work hours (8a-5p M-F) contact EH&S at (915)-886-8218. For chemical spills after hours, contact UTEP PD at (915)-747-5611. Ensure that any reports filed contain the full chemical name(s) with no abbreviations.
- **Drain Disposal:** Disposal of chemicals down the drain is prohibited unless explicitly permitted by SDS or EH&S.
- **Chemical Disposal:** To dispose of chemicals, biological hazards and miscellaneous waste, submit a waste pickup request to EH&S. See **Waste Management** for more information.
- **Extreme Hazards:** Asbestos, mercaptans, perchloric acid, hydrofluoric acid, combustible dust, dichloromethane, and formaldehyde are to be registered with EH&S such that proper accommodations and SOPs can be made to minimize their risks ***before*** handling begins.
- **Contact EH&S** with safety questions or concerns. Report unsafe conditions as well as injuries, incidents and near misses. These can be anonymously reported on SciShield with the 'ObservNow' function.

- **Report Unsafe Conditions** to laboratory supervisors and EH&S.
- **Disclose Hazards** to surrounding laboratory groups, particularly for PHS'.
- **Notify Supervisors and EH&S** of chemical sensitivities or allergies

Training

General laboratory safety training is required for all personnel before lab entry. All other training courses are assigned as needed. Training is available to all personnel independent of assignment status.

General Laboratory Safety Training is required for all personnel entering lab spaces.

Compressed Gas Cylinder Training is required for all personnel entering lab spaces that contain compressed cylinders of any volume or state (liquid, gas).

Hearing Protection Training is required for laboratory personnel who work in environments at or exceeding 90 dB 8-hour time weighted average. If you suspect an environment to exceed this threshold, contact EH&S at eh&s@utep.edu.

Respiratory Protection Training is required for all personnel storing or using respirators. Respirators differ from dust/surgical masks as they can strain the lungs; they should only be used when approved by EH&S. Respirators are assigned to personnel exposed to VOC's (Volatile Organic Compounds) or particulates based on a risk assessment specific to the procedure and space. **The use of a respirator without notifying EH&S for health evaluations, training and fit-testing is prohibited.**

Bloodborne Pathogen Training is required for personnel working with tissues, blood and other potentially infectious materials (OPIM) consisting of any bodily fluid. Any work with animals, certain cells, viruses and infectious bacteria will also warrant this training.

Radiation Safety Training is required for all personnel working in laboratory spaces that use or store radioactive materials, as well as for machinery that emits radiation.

Laser Safety Training is required for all personnel working in laboratory spaces that contain lasers of any class.

For questions regarding training and general upkeep, contact EH&S at eh&s@utep.edu.

PPE and Apparel

Personal Protective Equipment (PPE) and chemical hygiene are basic yet imperative aspects of laboratory safety. Though PPE is the last line of defense for protection against chemical hazards,

it is necessary for risk mitigation in the event of engineering and administrative control malfunction or failure. General PPE is as follows:

- **Goggles or face shields**: For manipulations or activities that may result in splashes or sprays of hazardous materials, especially if contact lenses are used. Eye and face protection are to be decontaminated after use.
- **Safety glasses:** For procedures involving open lasers (must have the appropriate wavelength filter) or procedures that can generate projectile risk.
- **Lab coat**: For any chemical handling. Ensure that it is fully buttoned. **Do not wash labcoats at home or wear them outside of laboratory spaces.** To locate your nearest washing machine contact eh&s@utep.edu or your building manager.
- **Gloves**: For any chemical handling or laboratory surface contact. Ensure that gloves are compatible with the chemicals being used before assuming protection. **Do not wear gloves outside of the laboratory, or for computer/door handle use.**
- **Closed toed, non-mesh footwear:** Shoes that expose any part of the foot are prohibited, i.e. crocs and sandals. Refrain from footwear that will absorb liquids readily.
- **Pants**: Must extend past the ankle. Avoid wearing excessively tight or loose clothing.
- **Shirts:** Must not expose chest, shoulders or midriff. Crop tops and spaghetti straps are prohibited.
- **Skirts and dresses:** are permissible in laboratory spaces **if and only if:** legs, shoulders, chest and midriff are covered.
- **Pantyhose and leggings:** are not considered adequate coverings for laboratory settings. Attire of this sort can absorb chemicals, dissolve, and exacerbate chemical burns.

Additional PPE may be required by SDS depending on the chemicals and hazards used in the scope of work. Always adhere to the general guidelines above while also consulting the appropriate safety data sheets.

If a chemical or procedure requires respirator use: A risk assessment, health evaluation, fit test, and respiratory protection training are required. Engaging in work that begets respirator use without these prerequisites is prohibited. For more information, contact your safety consultant or health&safety@utep.edu.

Compressed Gas Safety

Compressed gases expose laboratory personnel to both chemical and physical hazards. It is essential that they are monitored for leaks, secured and are labeled properly. Leaking gas cylinders can cause serious hazards that may require an immediate evacuation of the area and activation of the emergency response system. Only appropriately trained hazmat responders may respond in the event of a hazardous gas cylinder leak.

NFPA 1 requires that cylinders be secured at all times, such that each maintains three points of contact with fixed objects. This ensures that cylinders do not budge when shaken or tipped. Gages and other monitors shall be removed when cylinders are not in use, and gas caps must be replaced to ensure outlet protection. This provides that outlet stressors do not result in breakage and subsequent high-energy projectile formation. Ensure care when removing caps. Do not use tools that are not intended for this purpose such as pliers, as leaks are often caused by this type of stress.

All compressed gas cylinders, lecture bottles and cryogenic liquids including nitrogen and argon liquid tanks must be reported as chemical inventory. Storage of compressed gases shall comply with the International Fire Code (IFC) and NFPA 55. Liquid tanks must comply with NFPA 52 and NFPA 59A.

Transportation: Use carts or dollies designated for cylinder transportation. Do not roll cylinders on their sides, or rock them back and forth to ‘walk’ them. Do not drag cylinders on the ground. If you have issues transferring a cylinder, contact your PI, supervisor or EH&S.

Storage: Nesting of cylinders is only allowed in gas facilities, filling stations and seller’s warehouses according to NFPA 1. This means that the second and third point of contact for one cylinder may not be another cylinder, though they can be stored together when separated by anchoring straps and chains.

Procurement: To acquire or return gas cylinders, contact local natural gas facilities, who will deliver the cylinders directly to the laboratory. If renting cylinders, ensure that the vessel is in good condition and arrives with the appropriate gas cap.

For questions regarding compressed gas cylinders, lecture bottles or compressed cryogenic liquids, contact EH&S at eh&s@utep.edu.

Safety Recommendations—Physical Hazards

Physical hazards in the laboratory include combustible liquids, compressed gases, reactives, explosives and flammable chemicals, as well as high pressure/energy procedures, sharp objects

and moving equipment. Injuries can result from bodily contact with rotating or moving objects, including mechanical equipment, parts, and devices. Personnel should not wear loose-fitting clothing, jewelry, or unrestrained long hair around machinery with moving parts.

The Chemical Safety Board has identified the following key lessons for laboratories that address both physical and other hazards:

1. Ensure that research-specific hazards are evaluated and controlled by developing specific written protocols and training.
2. Expand existing laboratory safety plans to ensure that all safety hazards, including physical hazards of chemicals, are addressed.
3. Ensure that the organization's EH&S office reports directly to an identified individual/office with organizational authority to implement safety improvements.
4. Develop a verification program that ensures that the safety provisions of the CHP are communicated, followed, and enforced at all levels within the organization.
5. Document and communicate all laboratory near-misses and previous incidents to track safety, provide opportunities for education and improvement to drive safety changes at the university.
6. Manage the hazards unique to laboratory chemical research in the academic environment. Utilize available practice guidance that identifies and describes methodologies to assess and control hazards.
7. Written safety protocols and training are necessary to manage laboratory risk.

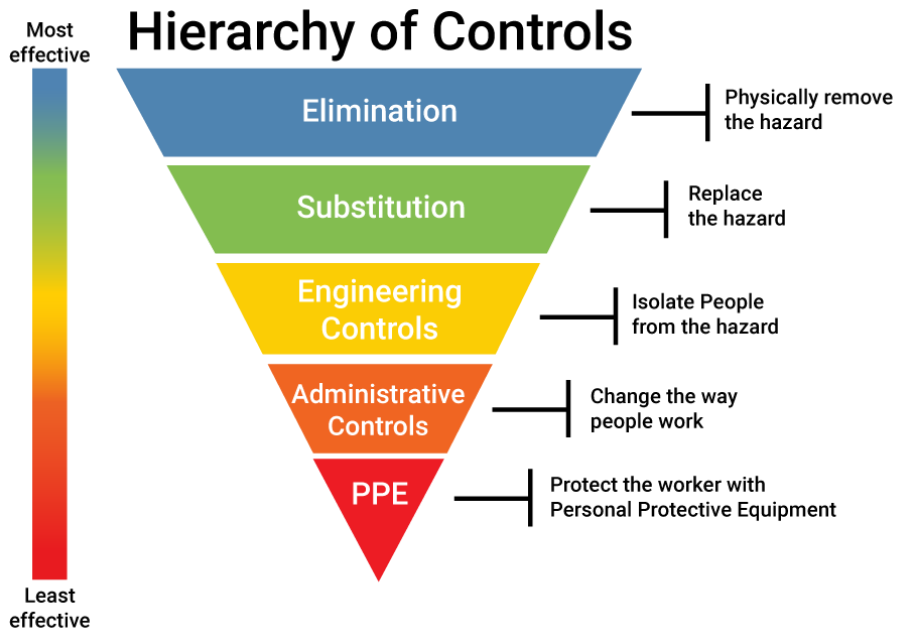
Hazard and Exposure Minimization

The Hierarchy of Controls is employed to mitigate exposures in the workplace. The following methods are listed in order of most to least effective:

1. **Elimination-** The hazard is removed entirely. This is the most effective method for hazard minimization.
2. **Substitution-** The original hazard is replaced with a less dangerous alternative.
3. **Engineering Controls-** Chemical fume hoods, snorkels, biological safety cabinets and enclosures are used to separate the worker from the hazard.
4. **Administrative Controls-** Guidelines and training such as SOPs, reduced working times, and regulated areas are employed.

5. **PPE-** Personal protective equipment such as goggles, labcoats, respirators, and earplugs are used to prevent accidents if engineering controls stop functioning. This is the least effective method for hazard minimization.

A visual of the Hierarchy of Controls can be seen as follows:



Lab Equipment and Engineering Controls

Engineering controls, as defined by OSHA, are “modifications or interventions in the work environment designed to reduce or eliminate workers’ exposure to hazards.” As the tertiary line of defense for protection against chemical and physical hazards, these controls are designed to isolate the potentially exposed person from the hazard. **Do not modify engineering controls or safety equipment**. **Consult with EHS prior to making modifications that are necessary.**

Chemical fume hoods are used for substances and procedures that are volatile and harmful to inhale. These controls are designed to protect the user, not the product or chemicals being used. Fume hoods undergo annual inspections to ensure their functionality and compliance with regulations.

Each chemical fume hood must have a tag indicating its most recent inspection date. If this tag is missing or out of date, discontinue use of the chemical fume hood and contact EH&S at eh&s@utep.edu to have it inspected and updated.

Chemical fume hoods should be equipped with an airflow monitor, ideally with digital readout. If a laboratory has a fume hood without an airflow monitor, contact EH&S to be provided with an anemometer.

Digital monitors are designed to detect improper ventilation and generally measure velocity in Cubic Feet per Minute (CFM) or linear Feet Per Minute (FPM). When airflow falls below or above a set threshold of 80-120 FPM, the monitor will alert surrounding users. Alarms sound for several reasons, including blockages, improper sash height, dust/debris buildup, and mechanical issues (fan or duct failures). If airflow monitors alarm for reasons unrealated to sash positioning, discontinue use of the chemical fume hood and contact Facilities Services and EH&S. **Do not unplug or disconnect the alarm in an effort to continue its use**. The alarm may be silenced, provided that the engineering control be labeled as out of order.

Other requirements for chemical fume hood use:

- **Do not raise the sash above half-height** unless necessary for transport of large glassware (distillation setups and Schlenk lines). Ensure no toxic or hazardous substances are present when this occurs. Raising the sash too high compromises ventilation. A sticker designating the appropriate sash height can be found on each hood.
- **Do not write on sashes** even if you can see through the writing. This is considered defacing of safety equipment.

Snorkels are used as a moderate ventilation enhancement for benchtop procedures and are inspected upon request. Snorkels are susceptible to cross-drafts and are not recommended for particularly volatile or harmful substances. The ideal range for snorkel ventilation is 150-200 FPM.

Gloveboxes are used for air and water-sensitive materials. They are inspected by EH&S upon request. Gloveboxes that contain HEPA filters are inspected and certified by a third-party consultation group. Filter and pump maintenance is performed internally by research personnel. For HEPA filter concerns and removal assistance, contact EH&S at eh&s@utep.edu.

Laminar Flow Hoods are used to maintain sample cleanliness. These hoods do not function as chemical fume hoods and are not recommended for volatile substances. This type of hood undergoes third-party inspection and certification upon request.

Biological safety cabinets are designated for the use of biological materials only. Please refer to the **biological safety manual.**

Safety Equipment

Laboratory safety equipment must be compliant with EH&S policy and OSHA standards. Adequate placement and frequency of safety showers, eyewash units and fire extinguishers must be provided for each laboratory that handles chemical hazards. OSHA requires that eyewash stations and safety showers be provided in workspaces where the eyes or body of any person may be exposed to corrosive materials (29 CFR 1910.151(c)).

While federal regulations only mandate safety showers and eyewash stations when working with corrosive materials, ANSI Standard Z358.1-2004 recommends their availability whenever any hazardous substances are used—regardless of whether they are corrosive. According to ANSI, 'hazardous materials' include caustics and other substances that may pose risks to human health and safety. Consequently, most wet lab spaces on campus are equipped with safety showers and eyewash stations.

- **Safety Showers** are inspected annually by EH&S. Showers must have **32 inches of clearance,** must supply a minimum of 20 gallons per minute (gpm) and dispense water between the temperatures of 60-100 °F. Showers are tagged with their most recent inspection date. If one year has elapsed, the shower is due for reinspection; please notify EH&S if a shower is missing a tag or if the inspection is expired.

- **Eyewash Stations** must be activated and logged weekly by lab users, and inspected annually by EH&S. Eyewash stations should deliver at least 0.4 gallons per minute of flushing fluid at 30 pounds per square inch, for 15 minutes. Stations must have **6 inches of clearance** to ensure accessibility, and the flushing water must be between 33 and 53 inches above ground level.

- **Fire Extinguishers** shall be located inside laboratories, or within 75 feet of the lab space or classroom. Extinguishers are inspected on an annual basis (and after discharge) and maintained by EH&S' Fire and Life Safety team. Each extinguisher is equipped with a tag indicating its last inspection date. If this tag is missing or out of date, contact EH&S at eh&s@utep.edu. Please report all uses of fire extinguishers such that they can be inspected and replaced.

- **Emergency Gas Shutoff Valves** are required for spaces with two or more gas outlets. The valve should be labeled and located within the lab and adjacent to its exits, as stated by the International Fuel Gas Code (IFGC). A *single* dedicated shutoff valve through which all gas outlets are supplied should be present in these spaces, and engaged when leaks

are suspected or in the event of a fire incident. These valves can be red, green or yellow. It is important to identify the valves and label them when present.

- **Automated External Defibrillators (AEDs)** are inspected monthly by EH&S. See **Table 1** for their locations. AEDs can be used when a person is experiencing Sudden Cardiac Arrest (SCA), if they are unresponsive and not breathing normally, if their heart has stopped, or if their heart rhythm is dangerously irregular. Follow the voice instructions to deliver a cardiac shock to the person experiencing symptoms.

  In the event that an AED is needed, call 911 immediately and designate someone to retrieve the nearest defibrillator. Do not use an AED when a person is wet (remove shirt and dry the skin on the chest thoroughly first), if they are unconscious but breathing normally, or if they have a bracelet or tattoo on their chest, wrist or forearm that reads 'DNR'. This stands for Do Not Resuscitate, and it is best in these instances to respect their wishes.

  If a person has a pacemaker or medication patch do not place the defibrillator over it. Pacemakers can be palpated through the skin and are generally located in the upper left portion of the chest, below the collarbone. For more information on AED usage, consult the 'Automated External Defibrillator Guidelines' provided by EH&S. To view AED locations on campus, visit the following link: https://www.utep.edu/ehs/emergency%20managment/aed.html

- **Evacuation Chairs** are inspected annually and are equipped with a tag indicating their most recent inspection date. If a tag is missing or out of date, contact EH&S to have it updated at eh&s@utep.edu. To understand when and how to use an evacuation chair, refer to EH&S Operating Instructions for Evacu-Trac CD-7 and Evac+Chair 300H models. These are located at www.utep/ehs under the Emergency Management tab. The following link shows the evacuation chair locations on campus: https://www.utep.edu/ehs/emergency%20managment/evacuation-chairs.html

Chemical Management

The following information was extracted and adapted from appendix A of CFR § 1910.1450:

Chemical Storage:

All chemicals should be separated and stored according to hazard category and compatibility. The combined storage of oxidizers, flammables and corrosives is prohibited. All chemicals shall be labeled appropriately, with a full chemical name and concentration.

Existing labels on incoming containers of chemicals and other materials shall be maintained, and labels on containers used for storing hazardous chemicals should include the chemical identification number and appropriate hazard warnings. The contents of all other chemical containers and transfer vessels including beakers, flasks, reaction vessels, and process equipment should be fully identified.

Chemical Procurement:

Information on the proper handling, storage and disposal of each chemical should be known to all of those involved ***before*** a substance is received. Only containers with adequate identification information should be accepted. All chemical shipments should be sent to UTEP's central receiving office, save for those that are radioactive, which must receive prior approval from the respective radiation safety officer and be mailed directly to EH&S for inspection upon receipt. Shipments with breakage or leakage will not be accepted.

To ensure minimization of waste, only the minimum amount of a chemical needed to perform the planned task(s) should be ordered, and proper protective equipment, handling and storage procedures should be in place before receiving a shipment.

Chemical Handling

Before beginning work with any hazardous chemical for the first time, a risk assessment should be conducted internally. All SDS and label information should be read before using a chemical for the first time, and trained laboratory workers should ensure that proper engineering controls and PPE are in place.

Chemical Inventory:

An updated and accurate chemical inventory is an annual requirement for each laboratory, and is to be uploaded to SciShield. Gas cylinders and liquid nitrogen tanks must be included in this inventory. Chemicals that are not needed should be discarded or redistributed.

Transfer and Transport of Chemicals:

Chemical fume hoods or other adequate ventilation (snorkel device, outdoor location) are to be employed when transferring even small aliquots of a particularly volatile or hazardous substance (PHS). For guidance on proper ventilation and chemical handling, consult EH&S and SDS information.

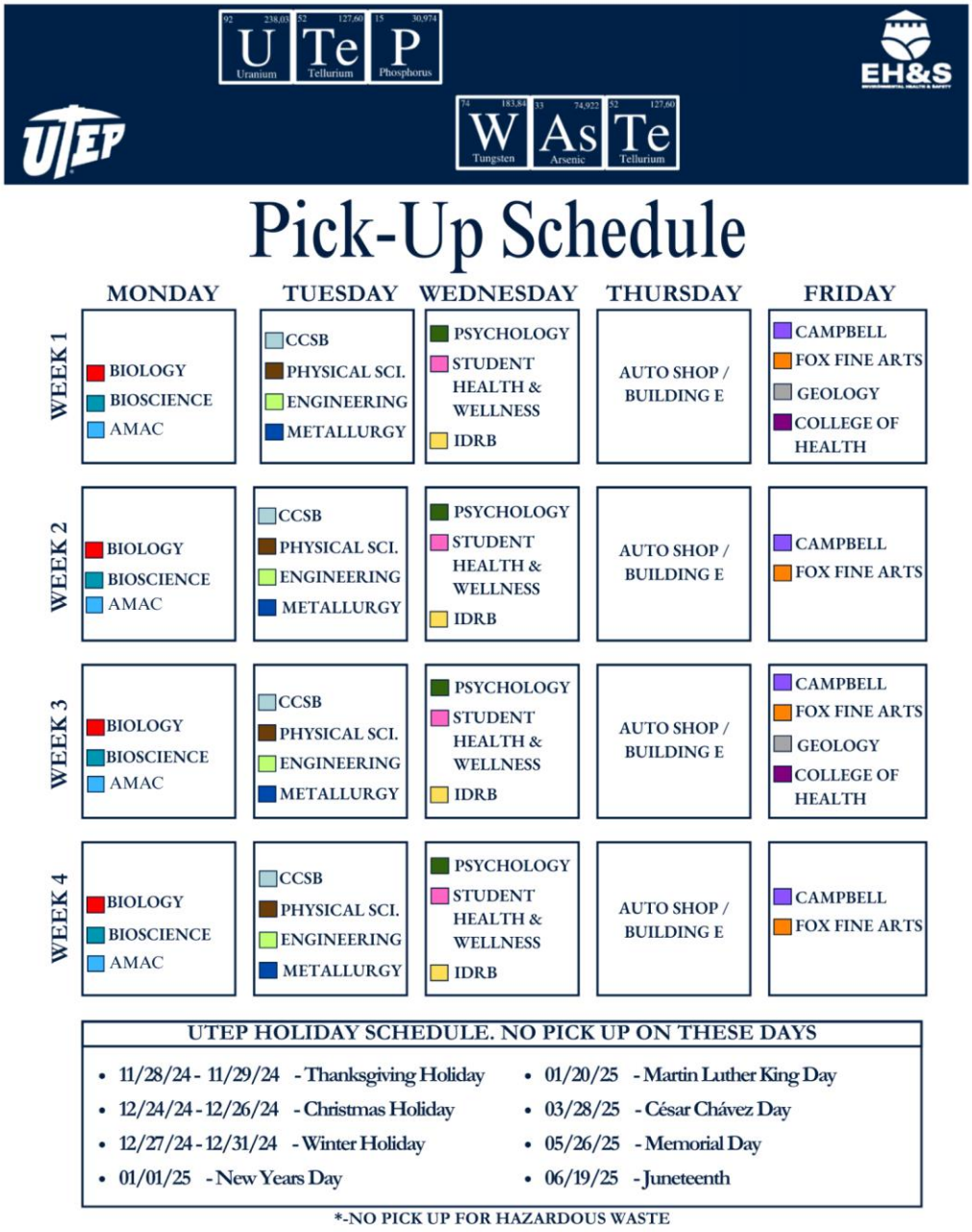
If chemicals from commercial sources are transferred for storage, the new containers should be labeled with all essential information from the original container. Secondary containment devices that are break-resistant should be used when transporting chemicals from one lab to another. One clean glove at a maximum is allowed to be worn outside of the lab, such that no gloves contact doorknobs or other shared surfaces. **High traffic areas should be avoided.** Transport of chemicals between buildings without a vehicle or cart is prohibited.

Sharps should be placed in a secondary containment vessel before their transfer or transport. Do not attempt to recap a sharp, as most exposure occurs as a result of this action.

Outgoing chemical shipments must meet all applicable Department of Transportation (DOT) regulations. All dangerous goods should be authorized and handled by the institutional shipper at EH&S.

Waste Management

Wastes are removed from laboratories on a weekly schedule, as pictured below.



To submit a request for pickup, scan the QR code on the waste container or visit www.utep.edu/waste and select the appropriate waste stream. Descriptions of each waste stream can be found at the top of each form, and is reiterated below:

- **Chemical waste**: Liquid and solid chemical waste ***excluding ethidium bromide*.** Liquid wastes with bacteria/tissues must receive a 20% by volume bleach additive before they can be accepted from this waste stream.
- **Biological waste**: Solid wastes in biohazard bins and sharps with bio contamination.

- **Radiological waste:** Wastes containing radioactive isotopes or contamination.
- **Miscellaneous:** Glass boxes, ethidium bromide, lighbulbs, etc.

Please add a full description of the waste on both the bottle (sharpie) and the waste pickup form. This ensures hazardous waste personnel are not injured/harmed in the bulking process. Avoid abbreviations unless they are present on the original label from the manufacturer.

Collection and Storage of Waste

1. **Chemical waste should be accumulated at or near the point of generation, under the control of laboratory workers:**

   This is accomplished via 'satellite accumulation areas', which are black trays labeled for hazardous waste collection. Each satellite is the favored area of collection for all hazardous and non-hazardous waste, such that EH&S staff can adequately find, collect and pool wastes accordingly.

2. **Each waste type should be stored in a compatible container pending transfer or disposal. Waste containers should be clearly labeled and kept sealed when not in use:**

   UTEP EH&S provides 1-gallon and 1-liter polypropylene containers for liquids, and 1-gallon polypropylene jars for solids. Larger containers (2.5 gal) can be made available upon request. Maintain that all containers remain closed when not in use.

   Solid wastes consist of powders, 70% saturated kim wipes, napkins and paper towels, as well as contaminated pipette tips and other contaminated disposables. Glass vials and other glassware should not be put in solid waste containers, they should be emptied in the appropriate waste container and rinsed before disposing in a glass disposal box.

3. **Incompatible waste types should be kept separate to ensure that heat generation, gas evolution, or another reaction does not occur:**

   Separation of oxidizers, flammables, corrosives and halogens is required. Do not mix inorganic with organic waste. Radioactive and biological wastes are disposed of uniquely. Refer to the Radiation Safety Manual and the Biological Safety Manual

4. **Waste containers should be segregated by how they will be managed. Waste containers should be stored in a designated location that does not interfere with normal laboratory operations. Ventilated storage and secondary containment may be appropriate for certain waste types:**

   Wastes must be stored in a secondary containment device. This can be as simple as a plastic tray or box, such that spills are contained within a localized area, or are hindered

from spreading to the rest of the lab in some way. Ventilated storage is ideal for wastes that are particularly volatile.

5. **Waste containers should be clearly labeled and kept sealed when not in use. Labels should include the accumulation start date and hazard warnings as appropriate:**

   EH&S provides hazardous waste stickers for logging and tracking purposes. In addition to the sticker, please label each container with its contents before submitting a pickup request.

   In the event of unknown waste generation or inheritance, contact a safety specialist or hazardous waste specialist for further information at eh&s@utep.edu. These pickup requests should be refused to ensure the safety of waste management staff. If the unknown waste was generated by personnel that remains on campus or is otherwise reachable, contact them to elucidate its contents. **Do not attempt to guess the contents of unknown waste on a pickup request.**

Housekeeping

"Housekeeping can help reduce or eliminate a number of laboratory hazards. Proper housekeeping includes appropriate labeling and storage of chemicals, safe and regular cleaning of the facility, and proper arrangement of laboratory equipment." (CFR § 1910.1450 app A)

Clutter, egress blockage, fire loading, high ceiling storage or any other potentially hazardous environment modifications are considered poor housekeeping.

Exit pathways (egress) require 36 inches minimum clearance for spaces with less than 50 people, and 44 inches minimum clearance for spaces that can hold 50 people or more.

Electrical breaker boxes and emergency shutoff switches require 3 feet of clearance in front and beneath their place point.

Sprinkler heads require 18 inches of clearance from their lowest point, extending across the entire room.

Fire extinguishers necessitate full clearance below their place point, and an 18-inch radius of clearance on all sides. For assistance on fire with extinguisher placement or procurement, contact the Fire and Life safety Team at EH&S: (915)-747-7124.

Chemical spills must be cleaned immediately. If unsure of the containment method for a spill, contact EH&S or the UTEP police department if the spill occurs after hours. Once a spill kit has been used or taken from, be sure to report the spill to EH&S to have it replaced.

Maintain eyewash stations by activating them weekly. This activation removes dust and debris buildup that can damage the eyes when used. Weekly activations are performed internally by assigned group member(s). Activations should be documented and posted adjacent to the station.

Custodial staff are not responsible for cleaning lab benches due to potential health risks. Sweeping, mopping and cleaning of floors must be coordinated between EH&S and the custodial contractor.

Working Alone or With Music

"Working alone in a laboratory is dangerous and should be avoided. There have been many tragic accidents that illustrate this danger. Accidents are unexpected by definition, which is why coworkers should always be present. Workers should coordinate schedules to avoid working alone." (CFR § 1910.1450 app A)

When working in the laboratory with a peer, make sure they are situationally aware. This means they are nearby, have been briefed on the work being done, and do not have headphones in both ears. In the event of emergency, they must be available to respond and offer aid. If working alone, notify your professor or a lab member upon entry and exit.

Working with headphones on, especially ones that enable noise cancellation, is particularly dangerous in lab settings. When audio is played, ensure that the volume remains low enough such that communication is not hindered. **When working alone, lab members must allow one ear to be open to the environment at all times.**

Music and other audio played out loud in laboratory settings can be distracting. If used, it shall be kept to a minimum volume (less than 80 dB) to ensure proper communication between lab members. When working in a laboratory setting with loud machinery or background environments where hearing protection must be worn, external audio is prohibited.

Hazard Signs

Signs with hazard information, emergency contacts, safety equipment locations and warning areas for special equipment or unusual hazards are required for lab spaces, both externally and internally.

Prominent signs of the following types should be posted:

1. Emergency telephone numbers of emergency personnel/facilities, supervisors, and laboratory workers.

2. Location signs for safety showers, eyewash stations, other safety and first aid equipment, and exits.
3. Warnings outside of areas where chemical, biological or radiological hazards exist.
4. NFPA 704 diamond for use by firefighters and safety personnel during emergency situations.

Laboratories that work with hazardous substances or equipment will require additional signs:

Labs with class I, II and III lasers require appropriate warning signs. Class I and all subsequent classes require disclosure of the laser's wavelength and the maximum power/energy output. Class II lasers require CAUTION signs in addition to wavelength and power output. Class III and III-B lasers require WARNING signs. Class IV lasers require DANGER signs as well as signs that indicate when the laser is active and not in-use, active and in-use, as well as when the laser is inactive. For class III, III-B and IV lasers, signs that also delineate the Laser Controlled Area (LCA), the nominal hazard zone and the direct possible exposure area (where eye protection is required) must be marked and maintained.

Laboratories with radioactive substances require additional disclosure to surrounding lab areas, designated fume hoods, analytical balances and enclosed workspaces, all of which must be labeled appropriately before usage. The use of radioactive materials without prior consultation with EH&S's Radiation Safety Officer is prohibited. For questions regarding radioactive materials, contact eh&s@utep.edu.

Dichloromethane

In light of new the EPA's risk determination in November of 2022, Methylene Chloride now requires a Workplace Chemical Protection Program (WCPP), an exposure control plan (ECP) as well as a full 8-hour initial exposure assay followed by monitoring every 5 years. The monitoring will be at the cost of the individual laboratory. DCM use will require additional monitoring (every 6 months, 3 months or 5 years, depending on initial monitoring results) and protective controls if exposure reaches an action level of 1 ppm for an 8-hour Time Weighted Average (TWA) or 16 ppm for 15 minute Short Term Exposure Limit (STEL). For more information regarding dichloromethane use, contact EH&S at eh&s@utep.edu or visit https://www.utep.edu/ehs/epa%20regulations/main_epa_regulations.html.

Emergency Planning and Procedures

It is prudent that laboratory personnel are trained in how to respond to short-term, long-term and large-scale emergencies. Laboratory security can play a role in reducing the likelihood of

certain emergencies and assisting in preparation and response for others. Every institution, department, and individual laboratory should consider having an emergency preparedness plan. The level of detail of the plan will vary depending on the function of the group and institutional planning efforts already in place.

Emergency planning is a dynamic process. As personnel, operations, and events change, plans will need to be updated and modified. To determine the type and level of emergency planning needed, laboratory personnel need to perform a vulnerability assessment. Periodic drills to assist in training and evaluation of the emergency plan are recommended as part of the training program. In the event of an emergency, call UTEP PD, EH&S and consult the Emergency Action Guide and Emergency Management Plan provided by EH&S. To access these guides, visit https://www.utep.edu/ehs/emergency-management.html.

Laboratory personnel should be familiar with established facility policies and procedures regarding emergency situations. Topics include:

1. Evacuation procedures—when it is appropriate and alternate routes;
2. Emergency shutdown procedures—equipment shutdown and materials that should be stored safely.
3. Communications during an emergency—what to expect, how to report, where to call or look for information;
4. How and when to use a fire extinguisher;
5. Security issues—preventing tailgating and unauthorized access;
6. Protocol for absences due to travel restrictions or illness;
7. Safe practices for power outage;
8. Shelter in place—when it is appropriate;
9. Handling suspicious mail or phone calls;
10. Laboratory-specific protocols relating to emergency planning and response;
11. Handling violent behavior in the workplace; and
12. First-aid and CPR training, including automated external defibrillator training if available.

Procedures

Fire alarm policy: When a fire alarm sounds in the facility, evacuate immediately. Check on and assist others who may require help evacuating.

Emergency safety equipment. The following safety elements should be met:

1. A written emergency action plan has been provided to workers;
2. Fire extinguishers, eyewash units, and safety showers are available and tested on a regular basis; and
3. Fire blankets, first-aid equipment, fire alarms, and telephones are available and accessible.

Chemical Spills: Workers should contact EH&S for instructions before cleaning up a chemical spill. All SDS and label instructions should be followed, and appropriate PPE should be worn during spill cleanup.

Accident Procedures: In the event of an accident, immediately notify appropriate personnel and local emergency responders. Provide an SDS of any chemical involved to the attending physician. Complete an incident report and submit it to the appropriate office or individual within 24 hours.

Employee Safety Training Program: New workers must attend safety training before they begin any potentially hazardous activities. Additional training should be provided when they advance in their duties or are required to perform a task for the first time. Training documents should be recorded and maintained. Training should include hands-on instruction of how to use safety equipment appropriately.

Conduct Drills: Practice building evacuations, including the use of alternate routes. Practice shelter-in-place, including plans for extended stays. Walk the fastest route from your work area to the nearest fire alarm, emergency eye wash and emergency shower. Learn how each is activated. In the excitement of an actual emergency, people rely on what they learned from drills, practice and training.

Contingency Plans: All laboratories should have long-term contingency plans in place (e.g., for pandemics). Scheduling, workload, utilities and alternate work sites may need to be considered.

Emergency Procedures for Accidents and Spills

Before beginning an experiment, know your UTEPs policies and procedures for how to handle an accidental release of a hazardous substance, a spill or a fire:

In the event of a spill: if non-hazardous, contain the spill with a spill kit. Inform surrounding personnel and file a spill report to EH&S. If a PHS is spilled, report the spill immediately to eh&s@utep.edu; especially if it is radioactive, toxic, infectious, pyrophoric, contains recombinant DNA, or is comprised of nanomaterials. **DO NOT attempt to clean the spill yourself.** If a spill occurs after hours, call UTEP PD at (915)-747-5611.

In the event of a fire: Immediately notify surrounding lab personnel and acquire the nearest fire extinguisher. Extinguish the fire if possible, and do not touch the scene when the fire has gone out. Report the fire to EH&S immediately. If the fire is not containable, locate the nearest fire alarm and pull it. Evacuate the building immediately and provide aid to those who will have trouble evacuating. Call UTEP police and EH&S.

In the event of an aerosolized toxin: leave the room immediately upon notifying surrounding personnel. Call UTEP PD and evacuate the building. Inform campus police and EH&S of the substance released for further investigation and mitigation efforts.

In the event of an exposure: Notify EH&S at eh&s@utep.edu for an exposure consultation. Seek medical attention.

In the event of a near-miss: Notify EH&S at eh&s@utep.edu for a near-miss consultation.

Lab Design and Ventilation

Adequate laboratory ventilation is crucial for the prevention of occupational exposures and general atmospheric contamination. Spaces that are designed as wet laboratories have differing ventilation requirements and capabilities than those of dry laboratories and offices. The conversion of an office space or dry laboratory into a wetlab is prohibited unless it can be verified with EHS and Facilities that the space can accommodate the prospective work *without resupplying the air from this room to other spaces in the building*, i.e. being equipped with "single pass" ventilation.

Before installation of engineering controls, ventilated equipment, lasers and 3-D printers, EH&S and facilities should be contacted for ventilation layout examination. This provides that systems do not exhaust into surrounding rooms or office spaces.

3-D printing and laser cutters can generate hazardous fumes depending on filament type, printer type and frequency of use. Regardless of the printer's status as open or closed, these devices generally beget registration with EH&S and ventilation consultations before they are approved for setup in a given location.

Biological safety cabinets filter contaminated air and resupply it within the room, while **Chemical fume hoods** filter and release exhaust into the atmosphere outside of the building. Before installation of this equipment, consult with EH&S.

Chemicals such as hydrofluoric and perchloric acid require specific fume hoods that allow for flushing of condensed acids within the vents, which can become explosive when left unfettered. These hoods require planning facilities to ensure that the ventilation is either already equipped and angled properly for washdown capabilities, or to establish planning and funds to do so.

In the event that fumes can be smelled inside or outside of the laboratory, inadequate ventilation or inappropriate practices are immediately suspected. If you can smell the fumes outside of the fume hood, it is more than likely that the hood is not working, or the sash is raised too high. It is of the utmost importance to maintain proper ventilation in any lab space that handles chemicals or nanomaterials of any kind. Report all smells and ventilation issues as soon as they are found.

When spray painting, welding, laser cutting, or engaging in activities that generate aerosols and fumes, it is important to assess the safest practice possible to minimize pulmonary risk. Most buildings are not equipped to handle this level of fumigation and require specific controls to be considered safe. If engineering controls are not present, perform volatile or odorous activities outdoors.

Several of the buildings at UTEP have asbestos containing materials. Before attempting to install or mount any sort of in-wall equipment, it is important to consult with EH&S' and facilities to ensure the space in question has tested negative for asbestos.

Exposure Monitoring and Medical Consultations

Records of all accidents, fatalities, illnesses, injuries, medical records and exposure monitoring are retained by UTEP in accordance with the requirements of state and federal regulations (see 29 CFR part 1904 and § 1910.1450(j)). Any exposure monitoring results must be provided to affected laboratory staff within 15 working days after receipt of the results (29 CFR 1910.1450(d)(4)).

Exposure monitoring is available to any requesting parties, particularly those who work with regulated chemicals, or in loud/dusty environments. Formaldehyde and DCM are the most common chemical monitoring programs offered on campus. Monitoring is performed via Time Weighted Average (TWA) with real-time monitoring systems or dosimeters.

Medical consultations are provided under the following circumstances: When an employee develops any symptoms thought to arise from chemical overexposure, after a major event such as a large spill, leak or explosion, or if respiratory protection is requested. For consultations due to overexposure, contact eh&s@utep.edu.

Inspection Program

"Inspection Program Maintenance and regular inspection of laboratory equipment are essential parts of the laboratory safety program. Management should participate in the design of a laboratory inspection program to ensure that the facility is safe and healthy, workers are

adequately trained, and proper procedures are being followed. Types of inspections: The program should include an appropriate combination of routine inspections, self-audits, program audits, peer inspections, EHS inspections, and inspections by external entities." (CFR § 1910.1450 app. A)

Elements of an inspection:

1. Inspectors arrive with a checklist to ensure that all requirements are covered, and a camera to document issues that require correction: This checklist is always available to laboratory personnel, including when preparing for the inspection.
2. Conversations with workers should occur during the inspection, as they can provide valuable information and allow inspectors an opportunity to show workers how to fix problems: UTEPs lab inspector will generally question lab personnel about fire extinguisher, spill kit, safety shower, and eyewash station locations.
3. Issues resolved during the inspection will be noted: A follow-up will be conducted by the respective safety specialist within two weeks of the inspection date to ensure that the issues have been adequately resolved.
4. An inspection report containing all findings and recommendations should be prepared for management and other appropriate workers: Once the two-week period has elapsed, it will be sent to laboratory faculty and staff along with an overall score.

UTEP performs laboratory inspections on level 1 laboratories annually, as these laboratories are considered to contain the most hazards. Laboratories at levels 2 and 3 are inspected every other year on an alternating basis. This ensures that the most hazardous lab spaces are consulted with most frequently, while the spaces with less risk remain monitored to a non-excessive degree.

Engineering controls and safety equipment inspections are performed on the following bases:

Equipment	Basis
Fire Extinguishers	Monthly
Eyewash Stations	Weekly (internal), Annually (EH&S)
Safety Showers	Annually
AEDs	Monthly
Chemical Fume Hoods	Annually
Biological Safety Cabinets	Annually
Evacuation Chairs	Annually

Laboratory Security

Risks to laboratory security include, but are not limited to:

1. Theft or diversion of chemicals, biologicals, and radioactive or proprietary materials, mission-critical or high-value equipment;
2. Threats from activist groups;
3. Intentional release of, or exposure to, hazardous materials;
4. Sabotage or vandalism of chemicals or high-value equipment;
5. Loss or release of sensitive information; and
6. Rogue work or unauthorized laboratory experimentation.

To mitigate the above risks, **all laboratory spaces are required to have functional entryways that are self-closing and locking. Laboratory doors should be kept closed at all times.** This prevents entry of unauthorized personnel, who are more likely to become perpetrators of equipment sabotage, chemical warfare and activist threats. All PHSs should be stored under lock and key, and dangerous equipment/machinery should be monitored under a lockout-tagout system. If a laboratory door is not functioning as described, contact EH&S and submit a work order to facilities for maintenance.

Suspicious behavior and possible insider threats are to be reported to EH&S (eh&s@utep.edu), UTEP PD (915-747-5611) and Human Resources Office at (915)-747-5815. Reporting these threats will reduce the likelihood of aggravated sabotage, rogue work and the potential loss of sensitive information. Reporting instances of verbal and physical altercations is crucial for maintaining safety culture on campus.

Laboratory materials are not to be removed from lab spaces unless transfer of the materials has been authorized by the respective supervisors. Consult EH&S when transporting chemicals off campus or between buildings. The transport of DEA controlled materials is federally prohibited and will result in litigation. PHSs may not be transported or transferred to different lab spaces or any offsite location without prior approval from EH&S.

Highly Toxic and Explosive or Reactive Chemicals

It is required that each facility keep a detailed inventory of all chemicals, especially those that handle explosive/reactive materials. There should be a record of the date of receipt, amount, location, and responsible individual for all acquisitions, syntheses, and disposal of these chemicals. A physical inventory should be performed annually to verify active inventory records. There should be a procedure in place to report security breaches, inventory discrepancies, losses, diversions, or suspected thefts.

Procedures for disposal of highly toxic materials should be established before any experiments begin, **before the chemicals are ordered**. The procedures should address methods for decontamination of any laboratory equipment that contacts highly toxic chemicals, as well as an exposure control plan. All waste should be accumulated in clearly labeled impervious containers stored in unbreakable secondary containment.

Highly reactive and explosive materials that may be used in the laboratory necessitate appropriate procedures and training. An explosion can occur when a material undergoes a rapid reaction that results in a violent release of energy. Such reactions can happen spontaneously and can produce pressures, gases, and fumes that are hazardous. Some reagents pose a risk upon contact with atmospheric conditions. It is prudent laboratory practice to use safer alternatives whenever possible.

If at all possible, substitutes for highly acute, chronic, explosive, or reactive chemicals should be considered prior to beginning work and used whenever possible.

In the event that a PHS is used, registration with EH&S and prior approval is ideal and always available. Approval necessitates an in-person meeting to assess the laboratory ventilation and available engineering controls, as well as subsequent visits to ensure that changes and labeling have been implemented to ensure a safe working environment. Standard operating procedures that are specific and detailed with regard to decontamination, exposure monitoring and emergency procedures are often requested, as well as internal log systems to ensure that the material used and disposed of has been tracked properly.

General Procedure for PHS Approval:

1. Email your assigned safety specialist at EH&S to request a hazard evaluation for the desired chemical.
2. Create and submit any requested SOPs and tracking logs for the intended procedures and hazard areas.
3. Coordinate an in-person meeting with the respective EH&S officers.
4. Adhere to requirements set by EH&S and adjust if necessary.
5. Coordinate a subsequent meeting to confirm that SOPs, administrative controls, engineering controls and signs are within specifications and ready for work.
6. Submit an order request for the desired chemical
7. Begin work!

Table 3. Appendix A to 1910.119- List of Highly Hazardous Chemicals, Toxics and Reactives

Chemical Name	CAS	Chemical Name	CAS
Acetaldehyde	75-07-0	Acrolein (2-Propenal)	107-02-8

Acryloyl Chloride	814-68-6	Allyl Chloride	107-05-1
Allylamine	107-11-9	Alkylaluminums	Varies
Ammonia, Anhydrous	7664-41-7	Ammonia solutions (>44% by weight)	7664-41-7
Ammonium Perchlorate	7790-98-9	Ammonium Permanganate	7787-36-2
Arsine (Arsenic Hydride)	7784-42-1	Bis(Chloromethyl) Ether	542-88-1
Boron Trichloride	10294-34-5	Boron Trifluoride	7637-07-2
Bromine	7726-95-6	Bromine Chloride	13863-41-7
Bromine Pentafluoride	7789-30-2	Bromine Trifluoride	7787-71-5
3-Bromopropyne (Propargyl Bromide)	106-96-7	Butyl Hydroperoxide (Tertiary)	75-91-2
Butyl Perbenzoate (Tertiary)	614-45-9	Carbonyl Chloride (see Phosgene)	75-44-5
Carbonyl Fluoride	353-50-4	Cellulose Nitrate (>12.6% N)	9004-70-0
Chlorine	7782-50-5	Chlorine Dioxide	10049-04-4
Chlorine Pentafluoride	13637-63-3	Chlorine Trifluoride	7790-91-2
Chlorodiethylaluminum (Diethylaluminum Chloride)	96-10-6	1-Chloro-2,4-Dinitrobenzene	97-00-7
Chloromethyl Methyl Ether	107-30-2	Chloropicrin	76-06-2
Chloropicrin and Methyl Bromide Mix	None	Chloropicrin and Methyl Chloride Mix	None
Cumene Hydroperoxide	80-15-9	Cyanogen	460-19-5
Cyanogen Chloride	506-77-4	Cyanuric Fluoride	675-14-9
Diacetyl Peroxide (conc. >70%)	110-22-5	Diazomethane	334-88-3
Dibenzoyl Peroxide	94-36-0	Diborane	19287-45-7
Dibutyl Peroxide (Tertiary)	110-05-4	Dichloro Acetylene	7572-29-4
Dichlorosilane	4109-96-0	Dichloromethane	75-09-2
Diethylzinc	557-20-0	Diisopropyl Peroxydicarbonate	105-64-6
Dialuroyl Peroxide	105-74-8	Dimethyldichlorosilane	75-78-5
1,1-Dimethylhydrazine	57-14-7	Dimethylamine (Anhydrous)	124-40-3
2,4-Dinitroaniline	97-02-9	Ethyl Methyl Ketone Peroxide (conc. >60%)	1338-23-4
Ethyl Nitrite	109-95-5	Ethylamine	75-04-7
Ethylene Fluorohydrin	371-62-0	Ethylene Oxide	75-21-8
Ethyleneimine	151-56-4	Fluorine	7782-41-4
Formaldehyde (Formalin)	50-00-0	Furan	110-00-9
Hexafluoroacetone	684-16-2	Hydrochloric Acid (Anhydrous)	7647-01-0
Hydrofluoric acid (Anhydrous)	7664-39-3	Hydrogen Bromide	10035-10-6
Hydrogen Chloride	7647-01-0	Hydrogen Cyanide (Anhydrous)	74-90-8
Hydrogen Fluoride	7664-39-3	Hydrogen Peroxide (>52% by weight)	7722-84-1
Hydrogen Selenide	7783-07-5	Hydrogen Sulfide	7783-06-4
Hydroxylamine	7803-49-8	Iron, Pentacarbonyl	13463-40-6
Isopropylamine	75-31-0	Ketene	463-51-4
Methacrylaldehyde	78-85-3	Methacryloyl Chloride	920-46-7

Methacryloyloxyethyl Isocyanate	30674-80-7	Methyl Acrylonitrile	126-98-7
Methylamine (Anhydrous)	74-89-5	Methyl Bromide	74-83-9
Methyl Chloride	74-87-3	Methyl Chloroformate	79-22-1
Methyl Ethyl Ketone Peroxide (conc. >60%)	1338-23-4	Methyl Fluoroacetate	453-18-9
Methyl Fluorosulfate	421-20-5	Methyl Hydrazine	60-34-4
Methyl Iodide	78-88-4	Methyl Isocyanate	624-83-9
Methyl Mercaptan	74-93-1	Methyl Vinyl Ketone	78-94-4
Methyltrichlorosilane	75-79-6	Nickel Carbonyl (Nickel Tetracarbonyl)	13463-39-3
Nitric Acid (94.5% by weight)	7697-37-2	Nitric Oxide	10102-43-9
Nitroaniline (Includes Para)	100-01-6	Nitromethane	75-52-5
Nitrogen Dioxide	10102-44-0	Nitrogen Oxides (NO, NO2, N2O4, N2O3)	10102-44-0
Nitrogen Tetroxide (Nitrogen Peroxide)	10544-72-6	Nitrogen Trifluoride	7783-54-2
Nitrogen Trioxide	10544-73-7	Oleum (65-85% by weight, Fuming Sulfuric)	8014-95-7
Osmium Tetraoxide	20816-12-0	Oxygen Difluoride (Fluorine Monoxide)	7783-41-7
Ozone	10028-15-6	Pentaborane	19624-22-7
Paracetic Acid (conc. >60%, Peroxyacetic)	79-21-0	Perchloric Acid (conc. >60% by weight)	7601-90-3
Perchloromethyl Mercaptan	594-42-3	Perchloryl Fluoride	7616-94-6
Peroxyacetic Acid (conc. >60% Acetic Acid, Peracetic Acid)	79-21-0	Phosgene (Carbonyl Chloride)	75-44-5
Phosphine (Hydrogen Phosphide)	7803-51-2	Phosphorus Oxychloride (Phosphoryl Chloride)	10025-87-3
Phosphorus Trichloride	7719-12-2	Phosphoryl Chloride (Phosphorus Oxychloride)	10025-87-3
Propargyl Bromide	106-96-7	Propyl Nitrate	627-3-4
Sarin	107-44-8	Selenium Hexafluoride	7783-79-1
Stibine (Antimony Hydride)	7803-52-3	Sulfur Dioxide (liquid)	7746-09-5
Sulfur Pentafluoride	5714-22-7	Sulfur Tetrafluoride	7783-60-0
Sulfur Trioxide (Sulfuric Anhydride)	7746-11-9	Sulfuric Anhydride (Sulfur Trioxide)	7746-11-9
Tellurium Hexafluoride	7783-80-4	Tetrafluoroethylene	116-14-3
Tetrafluorohydrazine	10036-47-2	Tetramethyl Lead	75-74-1
Thionyl Chloride	7719-09-7	Tichloro (chloromethyl) Silane	1558-25-4
Trichloro (dichlorophenyl) Silane	27137-85-5	Trichlorosilane	10025-78-2
Trifluorochloroethylene	79-38-9	Trimethoxysilane	2487-90-3

Substances that are not listed above may be subject to regulation by EH&S if they produce ionizing radiation, if they are toxic, pyrophoric, or extremely hazardous. If a chemical is not

listed above yet it poses a significant health risk, please contact EH&S for a hazard evaluation.