Laboratory Safety Manual

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Foreword

This Laboratory Safety Manual has been provided by the University Environmental Health and Safety (EH&S) Office to establish basic procedures and promote safe practices in UTEP's laboratories. This manual is not intended to cover every procedure and only touches on certain generic subjects. Separate manuals covering special hazards and situations are available through the EH&S office. Other references are noted in the text and the bibliography.

This manual provides information to faculty, researchers, and students which will assist them in meeting their goals in an environmentally-sound and safe manner.

Information has been included concerning the use and storage of chemicals; use of personal protective equipment; safety practices; and the proper method of waste disposal. This information is intended to minimize physical and health hazards to researchers and the University community while preventing pollution of our environment.

Laboratory users should use this information to supplement their Safety Plan for their specific operations and to correlate those operations with this manual. Assistance in developing specific safety plans is available from the EH&S office.

This Laboratory Safety Manual is intended to meet the requirements of the Federal Laboratory Safety Standard. It describes policies, procedures, equipment, personal protective equipment, and work practices that are capable of protecting employees from the health hazards in laboratories. All laboratory workers must be made aware of this plan. New employees must review the plan and receive safety training before beginning work in the laboratory. The plan must be available to all laboratory workers at all times.

Every University faculty member, researcher, and laboratory user should review this manual, be familiar with its contents, and keep it handy for reference.

For questions or other information, please contact EH&S at the following:

Environmental Health and Safety Department
El Paso Natural Gas Building Room 010
500 West University Avenue
El Paso, Texas 79968-0648
(915) 747-7124
eh&s@utep.edu
https://www.utep.edu/ehs/

Laboratory Safety Manual

Introduction

Everyone in the lab is responsible for his or her own safety and the safety of others. As part of your introduction to the laboratory, before starting experiments in any lab, become familiar with the procedures, chemicals, and safety equipment in each area that you will be using. If you don't understand something, ask! It is much better to ask 100 questions on safety than to cause one accident.

The following guidance on personal practices and housekeeping is recommended for your safety.

Personal Practices

- To help prevent skin contact with corrosive, toxic, or hot liquids, laboratory protective clothing should cover your arms, main torso, legs, and feet. Do not wear tank tops, crop tops, shorts, ripped jeans, sandals, or open-toe shoes in the lab.
- Do not allow children or pets in laboratories.
- Never mouth pipette anything.
- Be aware of dangling jewelry, loose clothing, or long hair that might get caught in equipment.
- Designate and use non-lab areas for eating and drinking.
- Chemical/biological refrigerators and storage areas are not to be used to hold or consume food and drinks.
- Use lab coats, gloves, and other personal protective clothing safely in the lab.
- Never work alone in the lab if avoidable. If you must, make someone aware of your location so they can check on you periodically.
- Wash your hands frequently for at least 15-30 seconds throughout the day and before leaving the lab.
- Caution is always advised when wearing contact lenses in a lab. Chemical liquids and vapors can get behind or penetrate the plastic lens where water cannot wash the eye, causing severe damage. It is recommended to wear eye protection when working with liquid chemicals and wearing contact lenses.

Housekeeping

- Clean your work area throughout the day and before you leave at the end of the day. It is necessary a minimum of 15-minute contact time of a disinfectant with the surface to properly decontaminate the working area.

- Clean (if necessary) equipment after use to avoid contaminating the next person who needs to use it. The use of an equipment log can help to monitor the proper cleaning and maintenance of equipment.

- Keep all aisles and walkways in the lab clear to provide a safe walking surface and an unobstructed exit.

- Any laboratory equipment that needs to be surplused or sent for calibration/maintenance, must be properly decontaminated and have a decontamination form signed by EH&S. The form can be found in the link https://www.utep.edu/ehs/_Files/docs/Forms/Equipment-Decontamination-Form.pdf

Lab Techniques and Procedures

This section deals with procedures and operating techniques and equipment commonly found within a laboratory setting. It is beyond the scope of this manual to describe all techniques and equipment, which may be used in a lab. For further information on this topic, refer to *Safety in Academic Chemistry Laboratories* published by the American Chemical Society.

Glassware

1. Inspect all glassware before use. Repair or discard any broken, cracked, or chipped glassware in labeled-appropriate containers provided by EH&S.
2. Tape or shield glass vacuum vessels to prevent flying glass in the case of an implosion. Also, tape or shield glass vacuum desiccators.
3. Do not use household Thermos bottles as a substitute for laboratory Dewar flasks; the walls are too thin.
4. Transport all glass chemical containers in secondary containers such as rubber or polyethylene bottle carriers.
5. Fire polish all cut glass tubing and rods before use.
6. Practice the following when inserting glass tubes or rods into stoppers:
    a. the diameter of the tube must be compatible with the diameter of the stopper,
    b. fire polish the end of the glass tube,
    c. lubricate the glass with water or glycerol,
    d. wear heavy gloves and hold the glass no more than two inches from the end to be inserted,
    e. insert the glass carefully with a twisting motion, and
    f. remove stuck tubes by slitting the stopper with a sharp knife.

Assembling Apparatus

1. Keep work surfaces as uncluttered as possible.
2. Setup clean, dry apparatus, firmly clamped and away from the edge of the lab bench.
3. Use only equipment free from cracks, chips, or other defects.
4. Place a pan if possible under a reaction vessel or other container to contain liquid if the glassware breaks.
5. Do not use burners or any other ignition sources nearby when working with flammable liquids.
6. Lubricate glass stopcocks.
7. Support and secure condensers and water hoses with clamps and wires. Be sure to direct the water hoses so that any drips from the hoses do not splash onto electrical wires or apparatus.
8. Position items that are attached to a ring stand so that the center of gravity is over the base and not to one side.
9. Assemble apparatus so burners or baths can be removed quickly.
10. Use a vapor trap and confine the setup to a fumehood if there is a possibility of hazardous vapors being released.

11. Put the setup inside a fumehood whenever conducting a reaction that could result in an implosion or explosion. Keep the sash pulled down. If it is not possible to use a fumehood, use a standing Lexon shield which is stabilized and secured.
12. Always wear a lab coat, gloves, and proper eye and face protection.

Centrifuges

1. Anchor tabletop centrifuges and place them where the vibration will not cause bottles to fall off the bench.

2. Always close the centrifuge lid while operating and stay with the centrifuge until it is running safely without vibration.

3. If vibration occurs, stop the centrifuge and check the load balances.

4. Regularly clean rotors and buckets with a non-corrosive cleaning solution.

5. Use sealed safety cups while centrifuging hazardous materials.

Ultraviolet Lamps

1. Wear ultraviolet-absorbing protective safety glasses while working with ultraviolet light.

2. Protect skin from potential burns due to ultraviolet light.

3. Shield any experiment in which ultraviolet light is used to prevent the escape of the direct beam or scattered radiation.

Lasers

1. Always wear Laser safety-rated glasses that protect against the specific wavelength of the laser.

2. Never look directly at the beam.

3. Do not allow any reflective materials in or along the beam.

4. Post warning signs in laser areas. If possible, use a flashing light at the entrance to signal when the laser is in use.

Separator Funnels

1. Use caution when working with heated materials.

2. When a volatile solvent is used, swirl the unstoppered separator funnel first to allow some solvent to vaporize and release pressure.

3. Close the funnel and invert it with the stopper held in place, then immediately open the stopcock to release pressure.

4. Do not vent the separator funnel near a flame or other ignition source. It is best to vent a separator funnel into a fume hood. Do not point it at yourself, a co-worker, or other equipment.

5. Close the stopcock, swirl the funnel, then immediately open the stopcock with the funnel in an inverted position to vent the vapors again.

Cooling Baths and Cold Traps

1. Always use caution when working with cryogenic materials.
2. Use temperature-resistant gloves and a face shield while slowly immersing an object to be cooled.
3. Do not pour cold liquid onto the edge of a glass Dewar flask when filling because the flask may break and implode.
4. Do not lower your head into a dry ice chest; since oxygen is deficient.
5. Wear temperature-resistant gloves and eye protection while handling dry ice. If no protection is used, severe burns can result.

Vacuum Pumps

1. If at all possible, vent vacuum pump exhaust into a fume hood.
2. Guard all belt driven vacuum pumps to prevent hands, loose clothing or hair from getting caught in the belt or pulley.
3. Place a trap between the vacuum pump and the apparatus.

Odors in the Lab

At least once a month pour one liter of water into all floor drains and sinks in the lab, including cup sinks on lab benches and in fume hoods. If the traps are allowed to dry out, any odors present in the sanitary sewer system can come into the lab. If any odor is strong and persistent, please report it to EH&S.

Electrical

1. Adequate electrical outlets should be provided in the lab to prevent circuit overloading.
2. Examine all electrical cords periodically for signs of wear and damage. If damaged electrical cords are discovered, unplug the equipment and send it off for repair.
3. All equipment must be properly grounded.
4. If sparks are noticed while connecting electric equipment or if the cord feels hot, do not use this equipment until it can be serviced by an electrician.
5. Do not run electrical cords along the floor where they will be a tripping hazard and be subject to wear. If a cord must be run along the floor, protect it with a cord cover.

6. Do not run electrical cords above the ceiling. The cord must be visible at all times to ensure it is in good condition.
7. Do not plug too many items into a single outlet. Cords that enable you to plug more than one item in at a time should not be used. Multi-plug strips can be used if they are protected with a circuit breaker and if they are not over-used.
8. Do not use extension cords for permanent wiring. If you find that you must use extension cords all over the lab then it may be time to have additional outlets installed.

Food and Drink in the Lab

To avoid ingestion of hazardous chemicals follow these five guidelines to ensure your personal safety and that of the students as adopted from the National Research Council in Prudent Practices in the Laboratory: Handling and Management of Chemicals Hazards (6.C.2.3).

1. Eating, drinking, smoking, gum chewing, applying cosmetics, and taking medicine in laboratories where hazardous chemicals are used is NOT allowed.
2. Food, beverages, cups, and other drinking and eating utensils should not be stored in areas where hazardous chemicals are handled or stored. Also, cups, plates, and utensils for personal use should NOT be washed in sinks where chemical hazards can be found.
3. Glassware used for laboratory operations should never be used to prepare or consume food or beverages. Laboratory refrigerators, ice chests, cold rooms, ovens, and so forth should not be used for food storage or preparation and should be labeled appropriately.
4. Laboratory water sources and deionized laboratory water should NOT be used as drinking water.
5. Never wear gloves or laboratory coats outside the laboratory or into areas where food is stored and consumed, and always wash laboratory apparel separately from personal clothing.

Personal Protective Clothing

The most important thing to remember about protective clothing is that it only protects you if you wear it. Safety Data Sheets (SDS) or EH&S should be consulted for information on the type of protective clothing that is best for the particular work you are performing. Tank tops, shorts, ripped jeans, sleeveless shirts, crop tops, flip flops, sandals, and open-toed shoes are not appropriate for the lab and are not allowed.

Protective Eyewear

1. Goggles provide the best all-around protection against chemical splashes, vapors, specks of dust, and mist.
2. Goggles that have indirect vents or are non-vented provide the most protection, but an anti-fog agent may be needed.
3. Standard safety glasses provide some protection against impact.
4. **Note:** Prescription glasses do not provide adequate protection in a laboratory setting. Prescription safety glasses can be purchased from most opticians, but again, solely protect against impact.
5. Contact lenses are not allowed for use in a lab because they can trap contaminants under them and reduce or eliminate the effectiveness of flushing with water from an eyewash.

Contact lenses may also increase the amount of chemicals trapped on the surface of the eye which otherwise might be removed by tears. If it is necessary to wear contact lenses in a lab, wear protective goggles at all times when using contact lenses.

Protective Gloves

1. Any glove can be permeated by chemicals. The rate at which this occurs depends on the composition of the glove, the chemicals present, their concentration, and the exposure time to the glove. This is why it is important to replace your gloves frequently throughout the day. Also, wash your hands regularly and remove gloves before answering the telephone or opening the door to prevent the spread of contamination.
2. If you are not certain which type of glove provides you with the protection you need, contact the SDS or EH&S and get specifics on the required gloves.
3. Check gloves for cracks, tears, and holes before and during using them for lab work.
4. Butyl, neoprene, and nitrile gloves are resistant to most chemicals, e.g., alcohols, aldehydes, ketones, most inorganic acids, and most caustics.
5. Disposable latex and vinyl gloves protect against some chemicals, mostly aqueous solutions, and microorganisms as well as reduce the risk of product contamination.
6. Leather and other gloves will protect against cuts, abrasions, heat, and scratches, but do not protect against chemicals. These gloves are more appropriate for workshop use.
7. Temperature resistant gloves protect against cryogenic liquids, flames, and high temperatures.

Other Protective Clothing

1. There are many types of lab coats available. The primary purpose of a lab coat is to protect against splashes and spills. Lab coats should be nonflammable and be easily removed.
2. Lab coats must be worn in the laboratory when working with hazardous chemicals, infectious agents, radioactive materials, or other potentially hazardous materials.
3. Lab coats must not be worn in areas such as offices, lunch rooms, or other areas where potentially hazardous materials are not normally found.
4. Rubber coated aprons can be worn to protect against chemical splashes and may be worn over or under a lab coat for additional protection.
5. Face shields can protect against impact, dust, particulate, and chemical splashes on the face, eyes, and throat. However, always wear protective eyewear--such as goggles--underneath a face shield because a face shield only offers additional protection to the eyes. Chemical vapors and splashes can still travel under and around a face shield. If scratches or cracks are noticed in the face shield, replace the window.

Pregnancy and other health risks

Faculty, staff, and students who are pregnant or have other health concerns may voluntarily contact EH&S for consultation and evaluation in reference to laboratory risks.

Pregnant faculty, staff, and students should consult their physician for advice on whether or not to perform experiments in the laboratory. It is encouraged that treating physicians be provided with a list of the chemicals that might be a source of exposure while in the lab. One should also check the Safety Data Sheets to be aware of the hazards of the chemicals. Upon receiving questions of health risks for a particular laboratory or section, faculty and Teaching Assistants (TAs) should direct the student or other staff member to EH&S and shall provide the student with the appropriate Safety Data Sheets for the laboratory space(s) in question. EH&S will assist the student, staff, or faculty member in the review of the Safety Data Sheets and answer any questions regarding how they may reduce their personal health risks. Students, staff, or faculty requiring more detailed information regarding health risks will be referred to their personal physician. EH&S will respect the individual's privacy on all health matters discussed and thus, will not divulge such information to the faculty or TA.

If special accommodations are requested, EH&S will then conduct a meeting with the Center for Accommodations and Support Services (CASS). The CASS Office will determine if the student qualifies for accommodations. EH&S will work closely with the Faculty member to ensure accommodations are appropriate and implemented. The student is able to appeal the decision of the CASS Office to the University's ADA Coordinator.

Evacuation Procedures

The following procedures and information are important in the event it is necessary to evacuate a laboratory.

1. Building evacuation may be necessary if there is a chemical release, explosion, natural disaster, or medical emergency.
2. Be aware of the marked exits in your area and building.
3. The evacuation alarm is a loud continuous siren or horn.
4. To activate the building alarm system, pull the handle on one of the red boxes located in the hallway. If there is a fire, call Campus Police at (915) 747-5611. Remember to give your location and the location and size of the fire.

The Physical Science Building has an emergency fan/purge system covering individual floors in the Chemistry wing (south end). When the system is activated, an evacuation alarm sounds, the exit doors from the floor are magnetically released, and the fans begin to exhaust the air from the floor.

The doors can be pushed open to allow occupants to leave.

5. Whenever the building evacuation alarm is sounded or when you are told to leave by the campus police, EH&S, or emergency response personnel, walk quickly to the nearest marked exit and ask others to do the same.
6. Outside, proceed to a clear area that is at least 100 yards from the building. Keep walkways clear for emergency vehicles.
7. To the best of your ability and without re-entering the building, be available to assist EH&S and campus police in their attempts to determine that everyone has been evacuated safely.
8. An Emergency Command Post may be set up near the emergency site by emergency responders. Keep clear of the Post unless you have important information to render.
9. Do not return to the building until you are told to do so by the campus police or EH&S.

Emergency Equipment

Know the location and how to use the emergency equipment in the laboratory (fire extinguisher, safety shower, etc). In the event of an emergency asking someone to locate the emergency equipment or reading the instructions on how to use it may not be possible. Also, eye injuries may require finding emergency equipment without being able to see. To help locate and identify this equipment for emergencies, all emergency equipment should be marked with prominent signs. The following are recommendations on emergency equipment:

Emergency Showers

1. An emergency shower may be used to suppress a fire or more commonly to decontaminate a person who has been exposed to chemicals.
2. Remove all clothing, jewelry, and shoes while standing under the shower. If these items are not removed, they will hold the chemicals against the skin and increase the damage.

3. Remain under the shower for a least 15 minutes, then seek medical attention.
4. Always keep the area under an emergency shower unobstructed. You do not want to waste time moving boxes, tables, or other items. Electrical equipment in the area can also present an electrocution hazard.
5. Do not remove, tie, or secure the handle or ring of the shower if it will interfere with the operation of the shower.
6. Safety Showers are annually tested by EH&S only.

Eyewashes

1. To ensure a clean supply of water in the eyewash, it should be operated regularly (weekly) to flush any impurities that may accumulate. Flush the unit for 5 min every week and document it on the eyewash log for proper maintenance. If the unit has low pressure or hot water, please report it to EH&S.
2. Never hesitate to flush your eyes immediately if chemicals are splashed in them. A delay of seconds could cause damage.
3. If chemicals are splashed into the eye, hold the eyelids open and flush with water continuously for at least 15 minutes or until medical assistance arrives if needed
4. Hold the eyelid open and move the eye up and down and sideways to wash thoroughly behind the eyeball where chemicals could be trapped.
5. Seek medical attention.
6. A continuous flow eyewash is preferred over a portable or self-contained eyewash. Portable and self-contained eyewashes have several disadvantages: limited supply of water, they readily become contaminated with microorganisms, and they require the use of your hands which prevents you from holding the eyelids open.

Fire Extinguisher

1. Almost all lab areas are equipped with a carbon dioxide or an ABC dry chemical powder fire extinguisher.
    a. The ABC extinguishers work well on a paper, chemical, or electrical fire.
    b. The carbon dioxide extinguishers are good for a chemical or electrical fire.
    c. A carbon dioxide extinguisher is the one of choice for electrical equipment.
    d. Never use a water extinguisher on an electrical fire.
    e. Only a Class D combustible metal fire extinguisher can be used on a metal (magnesium, sodium, potassium, etc.) fire.
2. If you have been trained, only attempt to extinguish small fires and always fight a fire from a position that allows escape.
3. To use a fire extinguisher, follow these four steps,
    a. Pull the pin
    b. Aim the extinguisher nozzle at the base of the fire
    c. Squeeze the handle to release the extinguishing media
    d. Sweep the nozzle from side to side at the base of the fire starting at the front and working forward until it is out.
4. Remember the word PASS when using a fire extinguisher: **P**ull, **A**im, **S**queeze, and **S**weep.
5. If you cannot extinguish the fire in approximately 15-30 seconds, evacuate the area, close the door as you leave, and activate the fire alarm.

6. If you notice that a fire extinguisher has been used, found vandalized, or for any other reason needs service, call EH&S (915-747-7124) for replacement. All fires should be reported.
7. For training encompassing fire prevention, evacuation, responding, hands-on fire extinguisher use, or determining whether a fire extinguisher is needed in your work area, call the EH&S Office (915-747-7124) or email eh&s@utep.edu

Spill Equipment

1. Supplies for cleaning up a minor chemical or biological spill should be purchased and kept "on hand" in the laboratory.
2. Supplies to have for a chemical spill includes spill pillows, an inert absorbent such as vermiculite, a plastic (non-sparking) scoop, plastic bags to put the spilled material into, heavy gloves, goggles, and sodium bicarbonate or any other type of base to neutralize acids.
3. Supplies to have on hand for a biological spill includes paper towels or absorbent pads, plastic bags, gloves,and a container of 1:10 bleach solution.

Chemical Safety Equipment

Chemical safety equipment includes chemical fumehoods and canopy hoods. This equipment is provided in laboratories to enable you to work safely with chemicals. In order to use this equipment properly, you should have a general understanding of how it works.

Chemical Fumehood Description

There are basically five different types of chemical fumehoods: standard, bypass, auxiliary air, perchloric acid, and hoods used for radioisotopes.

1. Chemical Fumehoods:
    a. air is drawn through the front opening of the fumehood, across the work surface;
    b. through one or more baffles at the rear of the hood;
    c. air flows up through the ductwork and into the blower located on the roof;
    d. air flows out the exhaust stack and away from the building and any air intake.

2. Standard Fumehoods
    a. Consist of a vertically sliding sash or horizontally sliding sash, rear baffle(s), a blower, and the ductwork which connects the hood to the blower.
    b. The fan will draw air through the face of the hood at a certain rate, usually 80 -100 feet per minute (fpm) with the sash wide open. The velocity through the hood opening will vary depending on the position of the sash. As the sash is lowered, the velocity through the hood opening will increase.
    c. The air velocity may be so high that it can knock over graduated cylinders or pull paper up into the blower. This is a disadvantage for this type of hood.

3. Bypass Fumehoods

a. Consist of the same elements as a standard fumehood with the addition of a bypass. The bypass is a grille or set of louvers located at the upper front side of the hood.

b. The operation of the bypass depends on the position of the sash. When the sash is wide open, the bypass is blocked - when the sash is lowered, air will flow through the bypass as well as through the front opening of the hood.

c. This design keeps the velocity through the base of the hood fairly constant and eliminates the problem of having very high velocities at the hood opening.

4. Auxiliary Air Fumehoods

a. An auxiliary air fumehood consists of the same elements as a bypass hood with the addition of an outside air supply. An additional blower and ductwork are required to supply outside air to the hood opening.

b. This fumehood design is very efficient because a smaller volume of conditioned room air is exhausted through the hood.

c. Auxiliary air fumehoods also have disadvantages: cold or hot outside air may be blown onto the user of the hood and these hoods are difficult to design so that they perform properly.

5. Perchloric Acid Fumehoods

a. A perchloric acid fumehood is a special adaptation of a standard, bypass, or auxiliary air fume hood for the use of perchloric acid.

b. The hood is constructed of stainless steel and other non-reactive materials. It is equipped with water sprays along the length of the exhaust duct, including near the blower and inside the top of the fumehood.

c. The water sprays are activated to wash down any perchloric acid residues that may have been deposited within the system. The fumehood should be washed down after each use.

d. Perchloric acid residues are potentially explosive.

e. Ideally, perchloric acid fumehoods should be used for perchloric acid only. If organics must be used in a perchloric acid hood, thoroughly wash down the fumehood first. Never use perchloric acid and organics in the hood at the same time. Perchloric acid, in contact with organic materials, can ignite spontaneously.

6. Radioisotope Fumehoods

a. This type of hood is constructed and sealed to eliminate any cracks or crevices that may allow the accumulation of radioactive material. It may be a standard, bypass, or auxiliary air fumehood.

b. The interior of the radioisotope fumehood should be designed to be easy to clean and contain any spills that might occur within it.

Proper Use of Chemical Fumehoods

1. Equipment and other materials should be placed at least six inches behind the sash. This will prevent chemical vapors from escaping into the lab due to air turbulence.

2. When the hood is not in use, pull the sash all the way down. While personnel is working in the hood, pull down the sash as far as is practical. The sash is your protection against fire, explosions, chemical splashes, and projectiles.

3. Do not keep loose papers, paper towels, or tissue wipes in the hood. These materials can get drawn into the blower and affect the hood’s performance.

4. Do not use a fumehood as a storage cabinet for chemicals. Excessive storage of chemicals and other items will disrupt the airflow in the hood. In particular, do not store chemicals against the baffle at the back of the hood. This is where the majority of the air is exhausted.

5. If large equipment must be kept in a fumehood, set it on blocks about 1 ½ inches above the work surface to allow air to flow underneath. This reduces turbulence within the hood and increases its efficiency.

6. Do not place objects directly in front of a fumehood (such as refrigerators or lab coats hung on the controls). This will disrupt the air flow and draw contaminants out of the hood.

7. Keep in mind that modifications made to a fumehood system, e.g., adding on a snorkel, can render the entire system ineffective.

8. Minimize pedestrian traffic immediately in front of a hood. Walking past hoods causes turbulence which can draw contaminants out of the hood and into the room.

9. The EH&S office inspects chemical fumehoods annually to ensure they are working properly. If you suspect that your fumehood is not working properly or for any other questions regarding fumehoods, call the EH&S office at (915) 747-7124.

Canopy Hoods

1. Canopy hoods are generally suspended from the ceiling, usually overhanging an exhaust pod of some equipment.

2. The intake velocity quickly diminishes with distance from the canopy hood. This makes canopy hoods very limited in their effectiveness at removing contaminants.

3. To assist a canopy hood in capturing and exhausting chemical vapor, the canopy hood intake should be placed as close to the contaminant source as possible. An example where a canopy hood is useful is at an exhaust point of an Atomic Absorption unit.

Laboratory Safety Checklist:

Department _____ Building _____
EHS Inspector _____ Room_____
Date _____ Principal Investigator_____
Contact _____ Phone_____

S = Satisfactory N = Needs Improvement N/A = Not Applicable

Chemical Waste

Containment and Storage

1. All containers are closed unless actively receiving waste.
2. No containers are leaking.
3. All containers are compatible with their contents.
4. No waste is poured down the drain without prior approval by the Hazardous Materials Division of EH&S.
5. The location of waste pick-up is in the immediate vicinity of the point of generation and under the supervision of the person who generated it.
6. Less than one quart of acutely hazardous waste is present.
7. Less than 55 gallons of possibly hazardous waste is present. (If more than 55 gallons is present, has a request for disposal form been submitted? Yes____ No_____)

Labeling

1. All containers are labeled with the words “waste” or “spent” and their codes are identified.
2. No containers are labeled with the words “hazardous” or “non-hazardous”.

Disposal

1. Each waste container that is ready for disposal has a properly filled out waste pick-up request form attached to it, a waste sticker, and the proper information in the container as well
2. For hazardous waste containers ready for disposal, you can submit an electronic request for pick-up on our website link: https://www.utep.edu/ehs/waste/waste.html .
   A tutorial is available for your reference and the schedule for each building.

Special Waste

Sharps

1. All sharps are deposited into red sharps containers which will be picked up by EH&S. Please do not autoclave sharp containers.
2. There is no evidence of bent, capped, or clipped needles.

3. Do not overfilled the sharp containers. To request new sharps containers, please email eh&s@utep.edu

Animals

1. All animals and animal packs are kept frozen and double bagged until authorized disposal.
2. Bedding from animals intentionally exposed to pathogens is treated in the lab autoclave.

Pathological Waste and Blood or Blood Products

- All pathological waste and blood or blood products are either treated [autoclaved] in the lab or picked up by a licensed disposal company. All waste picked up by a licensed disposal company must be manifested and a copy furnished to EH&S.

Microbiological Waste

- All microbiological waste is treated in the lab or autoclaved.

Disposal of Special Waste in the Lab

1. A log is kept of all special waste treated in the lab.
2. A lab that generates more than 50 lbs. of special waste per month has a written procedure for the operation and testing of equipment and for the preparation of any chemicals used if waste is treated in the lab.
3. The bags or containers of special waste are labeled “treated” and are placed into another bag of a different color that is also opaque. This is done before the bag is thrown into the regular trash.

Radioactive Materials

Labeling

1. The area is posted with “Radiation” or “Radioactive Material” signs if radioactive materials are evident.
2. Radioactive sharps are deposited into puncture-resistant, marked containers.
3. Radioactive material storage units are posted with proper signage or pictograms.
4. Containers that do not hold radioactive materials are not labeled “Radioactive”.
5. Fumehoods or equipment used for radioactive work must be properly labeled.
6. The workbench area assigned for radioactive work must be properly labeled and demarcated for radioactive work only.
7. The Radioactive usage logs are readily available and maintained.
8. The Radioactive materials must be kept in a secured area.

Work Area

1. All materials containing isotopes are shielded.
2. Film badges are stored away from isotopes.
3. Isotopes are secured when not attended.
4. Food and drinks are not in the lab at anytime.

Records

1. Records of Disposition of isotopes are current.
2. Quarterly inventory is current and available.

Controlled Substances

Security

1. Security is adequate to prevent unauthorized use, access, and diversion of controlled substances.
2. Controlled substances are stored in a locked cabinet.
3. The disposal or removal of controlled substances from a laboratory must be coordinated with EH&S. Please call us at 915-747-7124 or email us at eh&s@utep.edu.

Records

- Records of purchases, acquisition, dispensations, and disposal of controlled substances are kept.

Hazard Communication Act

Safety Data Sheets (SDS), formerly MSDS.

1. SDSs are available and readily accessible for every hazardous chemical present. You can visit our website https://www.utep.edu/ehs/ to access our MSDSonline database
2. Lab personnel needs to know when and how to obtain SDSs.

Labels

1. The labels on incoming chemical containers are not removed or defaced.
2. Secondary containers, other than ones for immediate use, are labeled with the identity of their contents.

Training

- All lab personnel must be compliant with the Hazard Communication training. Please go to our website **https://www.utep.edu/ehs/training.html** to access the training opportunities we offer.

The items in this section represent well established safety and health guidelines that should be followed in all laboratories.

Personal Protective Clothing

1. The appropriate personal protective clothing for work being performed is present and in good condition.
2. Lab personnel wear appropriate personal protective clothing while working in the lab.
3. Lab personnel wear appropriate lab attire when working in the lab. Tank tops, shorts, ripped jeans, sleeveless shirts, crop tops, flip flops, sandals, and open-toed shoes are not appropriate for the lab and are not allowed.
4. Lab personnel is encouraged to bring or to have on hand in the laboratory an extra pair of closed-toed shoes, pants, and a sleeved shirt to change into during the warm summer months when working with hazardous materials in the lab.

Personal Protective Equipment

1. Fumehoods are working properly and only essential items are stored in them.
2. Fumehoods have been tested by EH&S within the past year.
3. The fumehood sash is pulled down as far as is practical.
4. Biological safety cabinets are used properly and are certified on an annual basis.
5. Every time a Biological safety cabinet or fume hood is moved, it needs to be recertified and inspected, respectively.

Emergency Equipment

1. Emergency showers are available and are unobstructed.
2. Emergency showers have been tested within the past year.
3. Eyewashes are available, are unobstructed, and are activated weekly by lab personnel to flush impurities through them.
4. Lab personnel is trained in the use of fire extinguishers.
5. Whenever a fire extinguisher has been used, the Campus Police (915-747-5611) and/or EH&S (915-747-7124) are notified.

Fire/Life Safety

1. All exits and walkways in the lab are clear and unobstructed.

2. Lab doors are kept closed to provide a fire and smoke barrier.
3. The storage of combustibles, e.g., cardboard boxes and paper towels is minimized.
4. Bunsen burner tubing is checked regularly and if found cracked or brittle, is replaced.
5. Vacuum pumps are properly maintained and are stored away from flammable chemicals and combustible material. If possible, vacuum pumps should be placed in a secondary container in case there is a leak.

Electrical Safety

1. All electrical cords are in good condition. None have cracked, brittle, or frayed insulation.
2. All electrical equipment is properly grounded.
3. No electrical extension cords are above the ceiling or behind walls.
4. The use of extension cords in the lab is minimized.
5. No electrical cords are on the floor where they could be a tripping hazard.

Chemical Storage

1. All chemicals are stored by hazard class, e.g., flammable, oxidizer, acid, base, reactive, and toxic.
2. No breakable chemical containers are stored on the floor unless placed in a secondary container.
3. All chemical containers are kept closed if not in use.
4. No hazardous chemicals are stored above eye level.
5. Flammables stored in the lab are minimized and are kept in flammable storage cabinets or refrigerators rated for flammable storage.
6. Flammables are never stored in standard household refrigerators.
7. Chemicals are dated when received and opened—particularly peroxide-forming chemicals such as ethers.
8. Compressed gas cylinders are safely and appropriately secured to the wall or a heavy surface and the safety cap is in place when not in use. Empty compressed gas cylinders must remained secure at all times as well.
9. Hazardous gases are used only in chemical fumehoods.

Physical Hazards

1. All belt-driven vacuum pumps are protected with belt guards.
2. All fans are guarded.
3. Glassware used at pressures other than ambient are taped or shielded.
4. Glassware for disposal is deposited into puncture resistant containers which are provided and collected by EH&S .

Radioactive Materials

1. Radioactive waste is kept in only one designated and marked area.
2. Radioactive material records are kept in a separate book.
3. Film badges are worn whenever using isotopes.

Spill Control

- Spill control materials are available in every laboratory via the EH&S provided Spill Kit bucket. Additional buckets or replacement items are available upon request from EH&S.
- For after hours spill assistance contact Campus Police at (915) 747-5611. Campus Police will notify the on-call EH&S personnel.

References

1. American Chemical Society. *Safety in Academic Chemistry Laboratories*, 7th Edition, 2003.

2. Chemical Rubber Company, *CRC Handbook of Laboratory Safety*, 5th Edition, 2000.

3. National Research Council. *Prudent Practices in the Laboratory - Handling and Management of Chemical Hazards*, 2011.

Summary of Changes

04-19-2017

1. Corrected grammatical and typographical errors throughout the document.
2. Added campus police phone number and instruction to call campus police for after hour spills.
3. Added Summary of Changes page.
4. 2023- updated link for hazardous waste electronic pick up request.