

NEW MEXICO HIGHLANDS UNIVERSITY

Hazardous Materials Handling and Storage Guidelines



Ivan Hilton Science Technology Building

2017



New Mexico Highlands University Emergency Contact Information

Emergency Response

Emergency (Fire, Law Enforcement, EMS) 911

When reporting an emergency, provide the following:

- *Your Name and Phone Number*
- *Exact location of the incident (example- Ivan Hilton Rm. 237)*
- *Details of the emergency (what happened, equipment involved, chemicals involved, etc.)*
- *# of people involved*
- *Stay on the phone with the 911 Dispatcher until first responders arrive*

Internal (NMHU) Resources

NMHU Police/Security Dispatch	454-3278
NMHU University Safety Officer (EHS Director)	Office: 426-2059 Cell: 429-1266
Chemical Safety Specialist	454-3550
Chemical Stockroom & Laboratory Manager	454-3550
Facilities Department	454-3260

External Resources

New Mexico State Police	505-425-6771
NM State Police Hazardous Materials Bureau	505-476-9620
Las Vegas City Police	505-425-7504
Las Vegas Fire Department	505-425-6321
Las Vegas/San Miguel County Emergency Management	505-425-6190
Alta Vista Regional Hospital	505-426-3500
New Mexico Poison Control	1-800-222-1222
NIOSH (Technical Information Source)	1-800-232-4636
CHEMTREC (Emergency Chemical Response Information)	1-800-424-9300
Substance Identification (CAS number/name)	1-800-848-6538
National Response Center	1-800-424-8802



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1.0 PURPOSE AND SCOPE

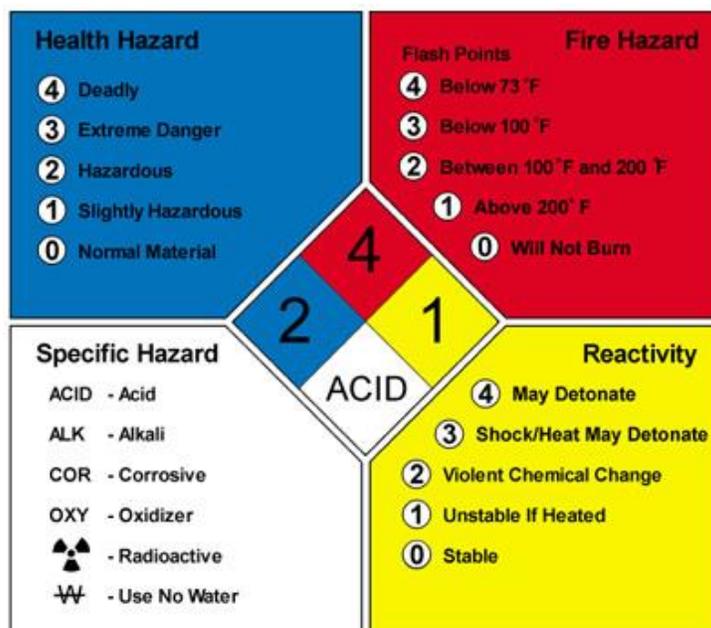
The purpose of the *Ivan Hilton Hazardous Materials Handling and Storage Guidelines* is to guide New Mexico Highlands University personnel in safe practices within laboratory areas. The procedures should be understood and followed by all faculty and students participating in laboratory activities. The ability to identify and respond to hazardous chemicals in work areas is crucial to the safety of students, faculty, and the public. Laboratory supervisors, departmental staff, and Environmental Health and Safety Department (EHS) are responsible for distributing and enforcing these procedures within the Ivan Hilton Science Building areas. This document outlines procedures for identifying, labeling, storing, handling, working with, and disposing of hazardous chemicals.

2.0 CHEMICAL FAMILIES AND HAZARD CLASSES

Lab users should always be aware of the chemical properties and hazards of substances they encounter in the lab or storage area. One way to identify the risk associated with a chemical is knowing the family it belongs to. Common chemical families include flammable/combustibles, corrosive acids & bases, highly reactive & unstable materials, compressed gases, cryogenics, toxins, and irritants. Each class is associated with unique hazards and risks that users should be aware of. It is important to note that any given chemical can belong to multiple families, and thus all chemical properties must be considered when handling and storing.

The NFPA system of rating hazards is implemented in chemical storage labeling. The diamond shape lets a user know at a glance how dangerous a substance is, and what precautions should be taken.

Figure 1: NFPA 704 Identification of the Hazards of Materials for Emergency Response



An appropriate warning label should appear on all chemical storage containers and lab spaces where permanent hazards exist.



2.1 Flammable and Combustible Substances

Fire hazards are easily ignited chemicals along a broad spectrum of substances. Combustible liquids have a flash point at or above 100°F (37.8°C), while flammable liquids have a flash point at or below 100°F. Flammable solids are defined by the ability to cause fire through friction, absorption of moisture, spontaneous chemical change, can be ignited readily, or when ignited can burn so vigorously and persistently as to create a serious hazard. Flammable gases are substances which exist under normal atmospheric conditions and are capable of being ignited or burning when mixed with air, oxygen, or other oxidizing agents. *For information about storage and handling limitations, see section 5.3.1.*

2.2 Corrosive Materials

The corrosive materials class is predominately comprised of acids and bases. These substances can destroy human tissue and metals. Acids and bases are incompatible with one another and may react with other hazard classes. Tight fitting gloves, goggles, and closed-toe shoes should be used while handling corrosives. These materials should never be stored above eye level. Spill pillows or neutralizing agents should be available when using large amounts or high concentrations of corrosives. *For more information about storage and handling limitations, see section 5.3.2.*

2.3 Highly Reactive and Unstable Materials

Highly reactive and unstable chemicals are those that could rapidly decompose, condense, polymerize, or become self-reactive under common conditions such as shock, pressure changes, temperature, light exposure, or contact with other materials. Included in this class are explosives, peroxides, peroxide forming materials, water-reactive materials, self-reactive materials, and pyrophoric materials. *For information about storing and handling each type of highly reactive/unstable material, see section 5.3.3.*

2.4 Compressed Gases and Cryogenic Liquids

Compressed gases and cryogenic liquids share similar properties that can create hazardous conditions. These materials can create pressure hazards and flammable atmospheres if handled incorrectly. Many compressed gases and cryogenic liquids also pose health hazards, and containers should be routinely examined by a staff member for leaks and threats. A unique property of this class is a rapid volume expansion when released to air, which can deplete the workspace oxygen content to hazardous levels. *For more information about storing and handling compressed gases and cryogenic liquids, see section 5.3.4.*

2.5 Toxins

Exposure to toxic chemicals may cause injury or death. A chemical is defined as toxic if the lethal dose (LD₅₀) is between 50 and 500 milligrams per kilogram of body mass OR the lethal concentration (LC₅₀) in air is between 200 and 1000 parts per million (ppm). HIGHLY TOXIC Chemicals have a LD₅₀ of less than 50 milligrams per kilogram of body mass OR a LC₅₀ of less than 200 ppm. Toxic chemicals include carcinogens, reproductive toxins, and biological toxins. Toxic chemicals should only be used in designated areas. If a toxic material is capable of producing toxic gases or fumes, it should always be handled within an appropriate chemical fume hood. *For more information about the storage and handling of toxic substances, see section 5.3.5.*



2.6 Irritants

An irritant is a substance that induces temporary or reversible effects (i.e. swelling, inflammation, itching, etc.) at the site of contact with eyes, skin, and respiratory tissue. Care should be taken to avoid direct contact with eyes, mouth, skin, or inhalation of fumes of all laboratory chemicals. *For more information about safe storage and handling of irritating chemicals, see section 5.3.6.*

3.0 REDUCING RISK AND EXPOSURE

3.1 Engineering Controls

General lab ventilation may not be sufficient for protection against localized exposure to hazardous levels of airborne chemicals. Users shall employ engineering controls such as fume hoods, glove boxes, snorkels, etc., to provide additional exposure control. Fume hoods should be used whenever the following hazards are present:

- Substances with a high degree of acute toxicity, carcinogens, reproductive toxins, except in cases of very low risk of exposure (e.g., minimal quantities in a CLOSED SYSTEM).
- Substances with a permissible exposure limit of less than 50 ppm.
- Substances that are significantly volatile or easily dispersible in air.

Users should be trained in proper fume hood use before engaging in potentially hazardous lab activities. Operation of chemical fume hoods is as follows:

- Ensure the fume hood is labeled with a certification date within 1-year prior to current date.
- Verify inward airflow by checking the hood's airflow indicator PRIOR to use.
- Maintain hood sash at or below the maximum height (indicated by an arrow on the side of hood). Close the hood sash when not working in the hood.
- Avoid rapid movements at the face of the hood. This can create competing air currents and reduce the effectiveness of the hood.
- Equipment in hoods should be properly placed and secured to allow air flow beneath and around the equipment.
- Keep chemical sources and equipment at least six inches away from the face and the rear of the hood.
- Minimize equipment and chemical storage within the hood to avoid dead air spaces or eddies; and prevent blockage of back baffles.
- Only use substances allowable by the rating of any fume hood (e.g., perchloric acid can only be used in approved hoods, certain substances cannot be recirculated).

3.2 Administrative Controls

Administrative controls for minimizing risk of exposure to hazardous chemicals include:

- Substitution of less hazardous chemicals where allowable.
- Isolating or enclosing an experiment within a closed system.
- Micro-scaling experiments to reduce the amount of hazardous chemical usage.
- Establish a designated area for procedures involving hazardous materials.
- Procedures for safe disposal of contaminated waste.
- Decontamination procedures.



3.3 Personal Protection Equipment

Personal protective equipment (PPE) may be necessary to ensure an adequate margin of safety in case of incidental/accidental chemical release or contact. The following PPE should be worn by ALL users participating in ANY lab activity:

- Safety goggles
- Long pants
- Closed-toe shoes

Additional PPE for users such as gloves, coats, face shields, etc., shall be determined by the Laboratory Supervisor, and be reported in the Standard Operating Procedures for the experiment.

4.0 STANDARD OPERATING PROCEDURES

In addition to basic laboratory safety protocols for general lab use, a standard operating procedure (SOP) should be developed by laboratory supervisor or autonomous researchers responsible for overseeing lab activities involving hazardous substances.

Standard Operating Procedures shall provide a comprehensive over-view of the planned activity. SOPs should be given to all parties involved in the process of performing a lab exercise; including University Safety Officers, Head of Department, Chemical Stockroom Manager, and students/researchers partaking in the exercise. For example, a Laboratory Instruction Manual used for teaching labs is a standard operating procedure developed by the lab supervisors and provided to the students. Information should be readily available to provide to emergency personnel if needed. A comprehensive SOP should contain at minimum the following items:

- List of chemicals used.
- Description of hazards present in the lab space for the duration of the experiment or exercise (can be in the form of SDS's of each chemical).
- Description of preventative measures to reduce risk of hazardous processes.
- Personal protective equipment needed to prevent exposure to hazards.
- Emergency protocols for dealing with spills, fire, contamination, or any other undesirable outcome.
- Description of the procedure that will take place, including reactants, products, intermediate substances, use of laboratory equipment, anticipated time/scheduling, and storage or handling requirements outside of the chemical stock room.

In the case of advanced research that may change over the course of a project, the appropriate parties should be provided with a proposal and scope of work to be done in the laboratory. Individual reactions, syntheses, or experiments should be labeled by the researcher. Labels should contain information about the chemicals involved, hazards present, and emergency contact information. Experiments should be approved by primary investigator before being conducted.



5.0 CHEMICAL INVENTORY, LABELING, AND STORAGE

5.1 Inventory

The chemical inventory of any area where chemicals are stored should be kept up to date. All incoming and outgoing transactions from the chemical storeroom or a laboratory storage area should be recorded in a log at the time of the event. Waste materials should be tracked in the same way, until disposed of by an approved authority.

5.2 Labeling

All storage containers should contain an informative label indicating the contents. Manufacturer containers should contain the original labeling including contents, physical and health hazard information, and emergency contact information. These original manufacturer's labels may not be removed or defaced. Damaged labels should be replaced by legible and complete labels.

Chemicals that are not in the manufacturer's original containers (i.e. working solutions) should be labeled with the contents and concentration of the substance. If a health or physical hazard is present, an additional label indicating the hazard must be placed on the container to alert others of the risk.

Chemical waste should be labeled with the type of waste, the safety hazards, and precautions associated with the reagents used in the laboratory. Care must be taken not to mix incompatible wastes, which could result in toxic, explosive, or otherwise dangerous reactions.

5.3 Storage Requirements

The basis of chemical storage is to minimize the amount of health and safety risks. In order to safely store a diverse array of hazardous substances, many precautions must be taken. All staff responsible for chemical storage areas must be familiar with the different chemical families and the dangerous incompatibilities possible. NFPA 45 code mandates that flammable and combustible liquids be separated from other chemical families by an approved non-combustible partition or a distance of 20 feet. It is standard practice to separate other chemical families in the same manner. Some substances belong to multiple chemical families or may be incompatible with other substances within its own chemical family. In these cases, all storage rules and manufacturer instructions must be observed. Following this section is a compatibility chart detailing the degree of incompatibility between chemical families, as well as detailed instructions for the storage of recognized hazard classes.



Figure 2: Chemical Families Storage Separation Chart

	flammable gases	non-toxic non flammable gases	toxic gases	oxidizing gases	flammable & combustible liquids	flammable solids	spontaneous combustion	dangerous when wet	oxidizing agent	organic peroxide	toxic substances	corrosive materials
flammable gases	OKAY TO STORE TOGETHER	OKAY TO STORE TOGETHER	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 10 FEET	ISOLATE	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 20 FEET
non-toxic non flammable gases	OKAY TO STORE TOGETHER	OKAY TO STORE TOGETHER	OKAY TO STORE TOGETHER	OKAY TO STORE TOGETHER	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 10 FEET	ISOLATE	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 20 FEET
toxic gases	SEPARATE BY AT LEAST 10 FEET	OKAY TO STORE TOGETHER	MAYBE COMPATIBLE CHECK SDS & NOTES	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 10 FEET	ISOLATE	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 20 FEET
oxidizing gas	SEPARATE BY AT LEAST 10 FEET	OKAY TO STORE TOGETHER	SEPARATE BY AT LEAST 10 FEET	OKAY TO STORE TOGETHER	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 10 FEET	ISOLATE	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 20 FEET
flammable & combustible liquids	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	OKAY TO STORE TOGETHER	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	ISOLATE	MAYBE COMPATIBLE CHECK SDS & NOTES	SEPARATE BY AT LEAST 10 FEET
flammable solids	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 10 FEET	OKAY TO STORE TOGETHER	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 10 FEET	ISOLATE	SEPARATE BY AT LEAST 10 FEET	MAYBE COMPATIBLE CHECK SDS & NOTES
spontaneous combustion	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 10 FEET	OKAY TO STORE TOGETHER	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	ISOLATE	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 10 FEET
dangerous when wet	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	OKAY TO STORE TOGETHER	SEPARATE BY AT LEAST 20 FEET	ISOLATE	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 20 FEET
oxidizing agent	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	MAYBE COMPATIBLE CHECK SDS & NOTES	ISOLATE	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 10 FEET
organic peroxide	ISOLATE	ISOLATE	ISOLATE	ISOLATE	ISOLATE	ISOLATE	ISOLATE	ISOLATE	ISOLATE	OKAY TO STORE TOGETHER	ISOLATE	SEPARATE BY AT LEAST 10 FEET
toxic substances	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 10 FEET	ISOLATE	OKAY TO STORE TOGETHER	SEPARATE BY AT LEAST 20 FEET
corrosive material	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 10 FEET	MAYBE COMPATIBLE CHECK SDS & NOTES	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 20 FEET	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 10 FEET	SEPARATE BY AT LEAST 20 FEET	MAYBE COMPATIBLE CHECK SDS & NOTES



5.3.1 Storage & Handling of Flammable and Combustible Materials

Areas in which flammable and combustible materials are stored need to comply to NFPA 45 safety standards in order to reduce fire hazards. Volumes of flammable or combustible liquids in any laboratory should not exceed 60 gallons. Glass containers can only contain 1 gallon of flammable substance, and all other containers may contain up to 2 gallons. The following list of precautions must be followed by any person storing or handling flammable and combustible materials:

- Keep away from ignition sources such as open flames, hot surfaces, direct sunlight, and sparking hazards.
- Segregate from other chemical families, ESPECIALLY oxidizers and toxic substances.
- Segregate flammable gases from oxidizing gases using an approved non-combustible partition OR a distance of 20 feet.
- Store flammable/combustible liquids in NFPA 30 approved containers and cabinets.
- Label flammable storage cabinets with the appropriate hazards and list of chemicals.
- If static electricity is able to accumulate, igniting flammable vapors, ground and bond containers of flammable liquids.
- Keep a hazard-appropriate fire extinguisher in an obvious and accessible location and train relevant instructors or staff in its proper use.
- If a material requires cold storage, use a laboratory-safe flammable material refrigerator or freezer. Modifying a non-laboratory safe refrigerator could provide a source of ignition via sparks or static electricity.
- Segregate oxidizers from reducing agents.
- Segregate oxidizers from organic peroxides – avoid contaminating oxidizers, as some (perchloric acid) can become explosive with trace amounts of organic materials.
- Do not store oxidizing agents on wooden shelves or in cardboard boxes.

5.3.2 Storage & Handling of Corrosive Materials

Corrosive materials consist of acids and bases. These materials are highly reactive and can destroy human tissue or corrode metals. Acids and bases are incompatible with one another, and may react negatively with many other hazard classes (see compatibility chart). The list of precautions below must be followed by anyone responsible for handling or storing corrosive materials:

- Segregate acids from bases.
- Segregate inorganic oxidizing acids from organic acids, flammables, and combustibles.
- Segregate acids from water reactive metals.
- Tight fitting goggles, gloves, and close-toed shoes must be worn when handling corrosives.
- Inorganic hydroxides must be stored in polyethylene containers.
- Corrosives should be stored as low on a shelving unit as possible and never above eye-level.
- Corrosives should be stored in compatible secondary containers in case of leaks or spills.
- Do not store corrosive materials on metal shelves.
- Do not handle corrosive materials if powder deposits, discoloration, or crystallization around the cap of the container are observed. The material could be potentially explosive.



- Have spill control pillows or neutralizing agents available in storage and working spaces in case of a spill.

5.3.3 Storage & Handling of Highly Reactive and Unstable Materials

Highly reactive and unstable materials include pyrophoric chemicals, water reactive chemicals, explosive materials, potentially explosive materials, and peroxide forming materials. Many chemicals in this hazard class belong to multiple families. For example, most pyrophoric chemicals are also water reactive. The following precautions must be followed by any person responsible for handling or storing highly reactive and unstable materials:

Pyrophoric Materials

- Store in a cool, dry place.
- Prevent contact with air.
- Prevent containers from leaking, cracking or breaking. Regular inspections should be performed.
- Use corrosion- and shatter-resistant secondary containers for the storage and transportation of reagent bottles.
- Be mindful of pyrophoric materials that are also water reactive.

Water Reactive Materials

- Store in a cool, dry place.
- Keep away from water.
- Have a dry chemical extinguisher available in case of fire.

Explosive and Potentially Explosive Chemicals

- Be aware of what chemicals can become contaminated or degrade to form explosives
- Identify and label all explosive and potentially explosive chemicals.
- For potentially explosive chemicals that degrade over time, record the date opened and the discard-by date on the container OR a chemical warning label describing the risk.
- Keep explosives away from all ignition sources (open flame, hot surfaces, direct sunlight, spark sources).
- Store explosives in an explosive magazine and inspect regularly.
- Ensure all personnel who handle explosive or potentially explosive chemicals are familiar with proper handling procedure, safe storage procedure, conditions to avoid, hazards of the material, and disposal procedures; all of which can be found on the material's SDS.
- If you suspect a material may have become explosive, contact EHS immediately and post warnings to others not to handle or disturb the material.

Peroxide Forming Chemicals

- Store in airtight containers in a dark, cool, and dry place.
- Never store in freezers – phase change may cause detonation.
- Record ON THE CONTAINER the date the chemical arrives in the laboratory, when it is opened, when it should be tested for peroxide concentration, and when it should be discarded.
- Before the expiration date on the container, either test or dispose of the chemical.



- Dispose of any chemical with a peroxide concentration of more than 100 parts per million. Materials that have lasted beyond recommended shelf life without developing detectable concentrations of peroxides OR concentrations less than 100 ppm may be retained but must be tested frequently.
- If visual inspection reveals a precipitate, crystals, or an oily layer, **do not move** the container, contact EHS immediately, and post warnings to others not to disturb the container.
- **Test ALL peroxide forming chemicals prior to distillation, regardless of age.**
- **Never test a peroxide forming chemical of unknown age or origin. Do not open old or mysterious bottles. Contact EHS for help disposing of old containers.**

5.3.4 Storage & Handling of Compressed Gases and Cryogenics

Compressed Gases and Cryogenics possess similar hazard characteristics. Both can result in high-pressure situations, explosive situations, oxygen enrichment, and asphyxiation. A pressurized cylinder that is knocked over or dropped will rapidly release energy, possibly being propelled like a rocket. Contact with cryogenic liquids can cause living tissue to freeze and shatter. The following precautions must be followed by anyone responsible for storing or handling compressed gases or cryogenics:

Gas Cylinder Storage & Handling Precautions

- Segregate incompatible gases according to compatibility chart.
- Limit the quantity of cylinders to what might be used in a reasonable time frame.
- Store cylinders upright and secured so they will not fall.
- Keep cylinders away from heat sources.
- Leave the valve protection cap on the cylinder when not in use.
- If a leak is suspected, apply a soap solution to the cylinder and locate the leak based on where bubbles form; **DO NOT** attempt to locate the leak by sense of smell or hearing.

Cryogenics

- Store and handle in well ventilated areas.
- Do not use cryogenics in small, enclosed spaces. The conversion to the gaseous phase may cause an oxygen deficiency.
- Only approved storage containers with pressure relief mechanisms may be used. Insufficient containers could explode.
- Secure containers so they will not fall or obstruct path of egress.
- Liquid Nitrogen and Helium can liquefy oxygen out of the air, producing a high fire or explosion hazard.
- Use approved PPE when handling cryogenics: insulated holders, eye protection, goggles, face shields, and aprons depending on the substance.
- Always use cryogenic or leather gloves when handling supercool surfaces.



5.3.5 Storage & Handling of Toxic Substances

Toxic substances can lead to serious injury, sickness, or even death. Parties working with or handling toxic substances should always be mindful of the risk associated with materials, symptoms of exposure, and lethal dosage. The following precautions should always be followed by anyone responsible for handling or storing toxic substances:

- Segregate from other hazard classes in a cool, well ventilated area, away from light and heat sources.
- Ensure containers are tightly sealed to minimize personnel exposure and contamination of other chemicals.
- Maintain the lowest quantities needed.
- If fumes or dust may be produced from a toxic material, chemical fume hoods should be utilized while working with the chemical.
- Never eat, drink, or apply cosmetics where toxic chemicals are stored or handled.

5.3.6 Storage & Handling of Irritants

Irritants are substances that cause reversible effects such as swelling, itching, redness, and pain. Some of these effects can be damaging if left untreated. People responsible for handling and storing irritating chemicals should follow the protocol listed below.

- Handle with gloves and eye protection to avoid contact with skin and eyes.
- Respiratory irritants should be handled while wearing a mask to avoid inhalation of irritating fumes and vapors.
- Seek medical attention advised by the manufacturer on the SDS if contact with a harmful chemical occurs.

6.0 HAZARD INFORMATION AND TRAINING

Laboratory employees must be trained on project-specific hazards of chemicals in the work area. Laboratory Training should assure that all personnel understand the risk involved in lab activities, and how to handle an accident – including emergency procedures. All employees should be trained at the time of assignment to any laboratory where hazards are present, and whenever a new assignment presents a new hazard exposure. Laboratory training should be standardized and coordinated by the relevant Department Chair and the University Safety Officer. Training materials should include the following:

- Proper handling and storage of hazardous chemicals according to Safety Data Sheets.
- Exposure signs and symptoms.
- Fire prevention AND Fire response procedures.
- Emergency response and evacuation routes.
- Interpretations of SDS's.
- Use of engineering controls (fume hoods, glove boxes, snorkels, etc.,).
- First aid.
- Personal hygiene.
- Protective clothing and PPE.



- Chemical and infectious waste disposal.
- Contents of Chemical Handling & Storage procedures.
- Basic laboratory safety measures.

Training should be documented and kept on record by the laboratory supervisor. Records should include the date of training, the content of the training, and the signature of the trainee, acknowledging their full understanding of the risks and precautions of the lab activities they will participate in.

7.0 IN CASE OF EMERGENCY

This section shall provide a detailed procedure for responding to emergency situations. Before participating in a laboratory activity, personnel should be aware of hazardous situations that may arise, who to contact, if a hazard can be cleaned up safely, and whether or not the building needs to be evacuated. Emergency phone numbers should be posted and highly visible within each lab. The protocols for each hazard class are as follows.

PHONE NUMBERS:

Emergency:	911
NMHU Environmental Health & Safety:	505-426-2059
NMHU Police:	505-454-3278
Las Vegas Fire Department:	505-425-6321

7.1 In Case of Fire

If a fire begins in the laboratory, identify the cause. If the fire is small and the available fire extinguisher is rated for this type of fire, a lab instructor may attempt to fight the fire after instructing students to evacuate the laboratory. If the fire is too large, quickly growing, or there is not an appropriate fire extinguisher available, all personnel must evacuate the building immediately and alert others via a pull alarm. The lab instructor or researcher should alert NMHU and Las Vegas Fire Department immediately, and inform First Responders of any additional hazards present in the lab space where the fire started.

7.2 In Case of Chemical Spills

Many harmless chemical spills can be cleaned up by the responsible party in the laboratory. If a small amount of hazardous material is spilled, and can be cleaned up reasonably **AND** safely by lab personnel, manufacturer or SDS instructions should be followed, and the spill should be reported to the laboratory supervisor. If spill pillows are used, they must be disposed of properly according to the hazard class of the spilled chemicals. The use of spill pillows should be reported to the laboratory supervisor for replacement. If a large amount of hazardous or toxic material is spilled, follow the proper protocols according the SDS, as well as:

- Notify others working in the area, and evacuate if necessary.
- Contact the University Safety Officer to alert them of the spill and hazard class (toxic, corrosive, explosive, flammable, etc.,).
- If a fire or toxic exposure is imminent, pull the fire alarm to alert and evacuate others.
 - Dial 911 and alert dispatcher and emergency response personnel of the nature of the hazards involved.



- Be prepared to meet with EMS to provide information about the accident.

8.0 WASTE DISPOSAL

Chemical waste still poses a threat to health and safety within laboratories and storage areas. Waste should not be allowed to accumulate in excess in any area. Waste materials should be removed from the premises on a regular basis. It is crucial that incompatible families of waste are separated from each other in storage. The procedures for disposal of waste of different chemical families are as follows:

8.1 Disposal of Solvents and Organic Compounds

- Do not pour down drain **EVER**.
- Take care that waste is only put into containers with compatible materials.
- Empty containers should be left overnight in a fume hood to evaporate remaining residue
- Deface the label of empty containers (a large, conspicuous “X”, for example).
- Discard **uncapped** containers in the appropriate waste container.

8.2 Disposal of Acids and Bases

- Do not pour down drain – **UNLESS** facility is equipped with an active acid-base neutralization system.
- Take care that waste is only put into containers with compatible materials.
- Triple rinse empty containers, pouring rinsate down the drain.
- Deface the label of empty containers.
- Discard **uncapped** container in the appropriate waste container.

8.3 Disposal of Hazardous Waste

- Put waste in closed containers.
- Cap empty containers and label as “**WASTE**”.
- **DO NOT RINSE BOTTLES.**
- **DO NOT DISPOSE OF BOTTLES AS GLASS WASTE OR TRASH.**
- Contact an approved chemical waste disposal service to remove the waste.

8.4 Labeling of Waste

- **WASTE CONTAINERS MUST BE LABELED BEFORE WASTE GOES INTO THEM**
- Excess materials in their original container need not be relabeled – **UNLESS** the manufacturer’s label does not contain the chemical’s name
- Waste collection containers must be labeled with the following:
 - The word “**WASTE**” in a conspicuous location
 - The type of waste being accumulated in the container – *generic terms with no indication of the hazard class are not acceptable!*
 - Approximate amount or percentage of each constituent
 - The date the first waste was added to the container
- Before the material is picked up, the following must be on the label:
 - Name and telephone number of an individual who certifies the waste container contents
 - The chemical names (not abbreviations) of the contents of the container

- Classrooms, conference rooms, meeting rooms, athletic facilities, cooking areas, auditoriums, and/or assemblies.

9.0 EHS DEPARTMENT RIGHT-TO-ENTER

The EHS Department, its employees, contractors, agents and/or work-study employees have the right-to-enter laboratories, studios, elevated risk areas, or any area containing hazardous materials to conduct fire safety inspections, maintenance of fire suppression systems, safety audits, and/or other life safety activities. Per national fire codes, monthly inspections must take place for all fire suppression/prevention systems. In addition, periodic safety audits may/will also be conducted to ensure OSHA requirements are adhered to.

10.0 AMENDMENTS/MODIFICATIONS

The *Ivan Hilton Hazardous Materials Handling and Storage Guidelines* are intended to be a working document. Modifications and/or amendments should be suggested in writing to the Environmental Health and Safety Director. The Environmental Health and Safety Director will meet with the appropriate individuals to discuss changes/modifications. If modifications/changes are warranted, the changes will be reflected either as an Amendment or within the procedures manual. Distribution and dissemination of changes will be the responsibility of the Environmental Health and Safety Director.

10.0 ADOPTION

The procedures contained herein have been adopted and accepted by New Mexico Highlands University Executive Team, the University Safety Officer (Environmental Health and Safety Director), the Faculty Senate and applicable faculty and staff. In addition, the procedures were adopted as policy by the New Mexico Highlands University Board of Regents on December 15, 2017.

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