

NEW MEXICO HIGHLANDS UNIVERSITY

Safety Plan



Art Foundry

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
Dr. David Lobdell	505-454-3570
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
CHEMTREC (Emergency Chemical Response Information)	1-800-424-9300



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1.0 PURPOSE

The purpose of *Art Foundry Safety Plan* is to provide guidance to New Mexico Highlands University (NMHU) personnel on safety standards and requirements for effective and safe procedures within the Art Foundry. The safety plan should be understood and followed by all faculty, students, and employees working at or in conjunction with the Art Foundry. Supervisors, faculty and the Environmental Health and Safety Department are responsible for distributing and enforcing the safety procedures at the Art Foundry.

2.0 FACILITY INFORMATION

The Art Foundry is located on the southwest portion of New Mexico Highlands University. The facility is immediately adjacent to the Ivan Hilton Science Building (to the south), Engineering Building (north) and Slinger Hall (east). 11th Street abuts the foundry on the western boundary.

The physical address is: 914 11th Street, Las Vegas, New Mexico. San Miguel County.

2.1 Fire Suppression Systems

The Art Foundry maintains a Gamewell FC1 Fire Alarm System and is monitored by a central focal point monitoring system located at NMHU Police Dispatch. The system involves a fire alarm control panel, smoke detectors, pull stations and audio/visual indicators. The Art Foundry does not maintain a fire suppression sprinkler system. In addition, the facility has (4) four fire extinguishers varying in sizes. All extinguishers are ABC Dry Chemical extinguishers. All users shall be provided fire extinguisher training by the EHS Department. Finally, the facility maintains several emergency lights and exit lights. All fire suppression systems are inspected monthly and maintained by the Environmental Health and Safety Department.

2.2 Propane

The Art Foundry maintains an underground propane storage tank that provides necessary propane for foundry activities. The underground propane storage tank is located directly west of the facility. The tank is protected by a wall and warning pipes. The location of the tank should be identified with NFPA 704 Decals and DOT Decals.

3.0 STANDARD OPERATING PROCEDURES

The Standard Operating Procedures (SOP) for the Art Foundry shall concentrate on the safety of students and faculty utilizing the facility. The SOP are maintained and managed by the appropriate faculty and/or Department Chair. The information below depicts the standard operating procedures for the facility.

- Students/faculty should be aware of their surroundings and hazards associated with specific activities at all times.
- Individual safety training shall be provided by the appropriate faculty member at the beginning of each semester.
- Users shall not operate any machinery they have not been trained on.
- Hazards and threats should be clearly identified and made aware to each participant.
- Users shall be aware of other user's proximity to high risk activities. Immediate notification should be made to any participant entering an area of high risk activities.



- No activities shall be undertaken by any user who appears to be intoxicated or has taken any drugs (including cold medicine, prescription medicines, etc.)
- Users shall always be concerned with the safety of other users, visitors and/or faculty.
- Dip Room requirements: Wear a dust mask. Lung injury can occur from inhalation of silica. The binder in the slurry can irritate the skin. Rubber gloves are required.
- Always wear protective clothing when operating a kiln, furnace or a welder. Jacket, boots, gloves, face shield, ear plugs are required.
- Shirts should be tucked in while grinding with a side grinder. Face shield, ear plugs and gloves are required.
- Positive air flow helmets shall be used for any activities that exceed 250° Fahrenheit.
- Arc Welder: Do not focus on the arc welder during use. The ultraviolet light can severely burn eyes and skin.
- Use the proper grinding wheel or cutting wheel on side grinders. Be aware of adjacent users. Do not spray others with grinding debris. Face shield, gloves, safety glasses and ear plugs are required.
- Safety Glasses: Safety or prescription impact proof glasses are required for all activities.
- Die grinders: During use, die grinders spin at 20,000 to 60,000 r.p.m. Rotary files shall be used for bronze only. Face shield, safety glasses, gloves and ear plugs are required.
- Patina chemicals can cause damage to eyes, skin and internal organs. Stand up wind from the work. Wear a respirator, gloves and eye protection when creating a patina.
- Treat all metal in the foundry as though it is hot. Never pick up any metal without leather gloves.

3.1 Personal Protective Equipment

Personal protective equipment (PPE) is necessary to ensure an adequate margin of safety for all users utilizing the Art Foundry. The following PPE should be worn by ALL users participating in ANY foundry activity:

- Dust masks or other respiratory protection devices – when working with rubber or plaster mold.
- Heat protective gloves
- Closed toe shoes, boots are required for certain activities.
- Shirts
- Positive air flow helmets- working with high intensity heat elements.
- Ear Plugs
- Hard Hats
- Face Shields
- Safety Glasses

3.2 Administrative Controls

The following administrative controls shall be maintained and implemented by the faculty in-charge of the facility.

- Description of hazards present in the art foundry for the duration of the 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.

3.3 Heat Related Illness/Injury

The appropriate faculty member in-charge shall monitor users for heat related illness or injuries. All users should focus on the proper hydration when planning to work in high heat activities. Dehydration is the first sign of a heat related illness. Conducting activities with high heat production can lead to heat cramps, exhaustion and/or heat stroke.

3.3.1 Heat Cramps are caused by the loss of body salts and fluid during sweating. Low salt levels in muscles cause painful cramps. Tired muscles—those used for performing the work—are usually the ones most affected by cramps. Cramps may occur during or after working hours.

3.3.2 Heat Rash is a skin irritation caused by sweat that does not evaporate from the skin. Heat rash is the most common problem in hot work environments.

3.3.3 Heat Exhaustion is the body's response to loss of water and salt from heavy sweating. Signs include headache, nausea, dizziness, weakness, irritability, thirst, and heavy sweating.

3.3.4 Heat Stroke is the most serious form of heat-related illness, and happens when the body becomes unable to regulate its core temperature. Sweating stops and the body can no longer rid itself of excess heat. Signs include confusion, loss of consciousness, and seizures. **Heat stroke is a medical emergency that may result in death! Call 911 immediately.**

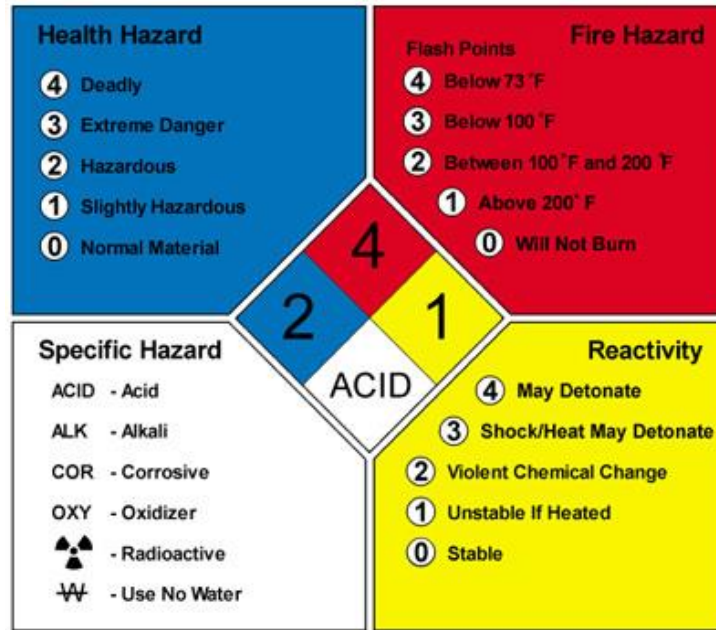
3.3.5 Appropriate Action: Any user demonstrating any of the above conditions, shall immediately cease activities. The situation will be evaluated by the faculty member in-charge. Minor heat related illness, i.e., heat rash and/or heat cramps shall call for immediate stoppage in work and the individual shall begin to immediately hydrate. For more severe cases, EMS assistance should be immediately requested. In addition to contacting 911, NMHU Campus Police and the University Safety Officer shall be notified immediately.

4.0 CHEMICAL FAMILIES AND HAZARD CLASSES

Art foundry users should always be aware of the chemical properties and hazards of substances they encounter in the foundry. 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 labeling should appear on all chemical storage containers and be installed on the outside of the facility, in at least two locations.

4.1 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.

4.2 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.



4.3 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.

4.4 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.

4.5 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.

4.6 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 chemicals.

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 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 labeling 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 labeling may not be removed or defaced. Damaged labeling should be replaced by legible and complete labeling.

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



Chemical waste should be labeling with the type of waste, the safety hazards, and precautions associated with the reagents used in the foundry. 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 foundry 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.
- Foundry 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 safe flammable material refrigerator or freezer. Modifying a non- 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. Contact EHS Department immediately.



- 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 labeling 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 Department 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 foundry, 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 (Contact EHS Department for proper protocol and assistance).
- 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 the EHS Department 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 the EHS Department 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

Art Foundry users must be trained on project-specific hazards in the work area. Foundry training should assure that all personnel understand the risk involved in foundry activities, and how to handle an accident – including emergency procedures. Foundry 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
- First aid.
- Personal hygiene.
- Protective clothing and PPE.
- Chemical waste disposal.



- Contents of Chemical Handling & Storage procedures.
- Basic foundry safety measures.

Training should be documented and kept on record by the foundry 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 foundry 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 foundry 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 the foundry. 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 foundry, identify the cause. If the fire is small and an available fire extinguisher is rated for this type of fire, a foundry user may attempt to fight the fire after instructing students to evacuate the foundry. 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 station alarm. The foundry user alert NMHU and Las Vegas Fire Department immediately, and inform first responders of any additional hazards present in the foundry 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 foundry. If a small amount of hazardous material is spilled, and can be cleaned up reasonably **AND** safely by foundry personnel, manufacturer or SDS instructions should be followed, and the spill should be reported to the foundry 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 foundry 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 foundry 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 foundry 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 labeled – **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



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 *Art Foundry Safety Plan* is 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.

11.0 ADOPTION

The procedures contained herein have been adopted and accepted by New Mexico Highlands Executive Team, the University Safety Officer (Environmental Health and Safety Director), the Faculty Senate and appropriate 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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