Laboratory Safety Plan

Building and Room(s)/Lab#(s): **Chemical Safety Facility**

This Lab Safety Plan is to be used to describe work involving: hazardous chemicals, biological hazards, radioactive materials, x-rays, lasers, and other hazards associated with the laboratory, and to identify where those hazards exist. It also identifies the personnel working in the laboratory and the specific hazard classes to which they may be exposed. This document is meant to comply with the UNCG Chemical Hygiene Policy and all applicable state and federal regulations. This Lab Safety Plan is to be updated when changes to lab hazards or personnel occur and must be updated at least annually. Lab personnel shall review the Lab Safety Plan annually or any time changes are made. The Lab Safety Plan binder shall be kept in the laboratory or other location, such that it is accessible to lab personnel at all times.

I. Laboratory Project Information

Contact Information

Principle Investigator/Teaching Lab Coordinator:

Name:	**Eric Zack**
Department:	**EHS**
Phone Number:	**336-334-3249**
After Hours Phone:	**734-223-1621**

Safety Supervisor (Person responsible for safety in absence of the PI):

Name:	**Daniel Todd**
Department:	**EHS**
Phone Number:	**336-334-3091**
After Hours Phone:	**336-549-2195**

II. Laboratory Personnel

List all personnel (i.e., UNCG employees, UNCG students, and other employees) under Eric Zack's supervision that use hazardous materials, or work in close proximity to hazardous materials in Chemical Safety Facility.

Please update (as needed) to account for changes in laboratory personnel.

Chemical Hazards- Works with or in an area where chemicals are used or stored
Biological Hazards- Works with or in an area where Biosafety Level 1,2, or 3 materials are used or stored.
Human Blood or OPIM-Works with human blood, body fluids, cell lines or other potentially infectious materials, defined as human: primary cells, cell lines, unfixed tissues, semen, vaginal secretions; cerebrospinal, synovial, pleural, pericardial, peritoneal, and amniotic fluids; and body fluids visibly contaminated with blood or in situations where it is difficult to differentiate between body fluids.
Radioactive Materials/X-Ray- Works with or in an area where radioactive materials or X-rays are used.
Nanoparticles- Works with or in an area where nanoparticles are used.
Lasers-Works with or in an area where lasers are used.

		Employee may come in contact with:					
Employee Name	Student?	Chemical Hazards	Biological Hazards	Human Blood or OPIM	Radioactive Material/X-Ray	Nano-particles	Lasers
Eric Zack		✓	✓	✓	✓	✓	✓
Daniel Todd		✓	✓	✓	✓	✓	
Tim Slone		✓	✓	✓	✓	✓	
Todd Beck		✓	✓	✓	✓	✓	

2/24/2022

Employee Training - Employee training is required for each box checked. Training can be provided by the EH&S Dept., Researcher/Teaching Coordinator or Department. Please contact EHS to determine the minimum that must be covered during training. A training roster should be kept in the Lab Safety Plan located in the laboratory.

III. Hazard Assessment / Laboratory Operating Procedures

Description of Potential Hazards in Research/Teaching activities:

Handling and packaging of chemical, radiological, and biological wastes from campus departments.

Appendix A. Required Laboratory Operating Procedures

If applicable to your specific laboratory, chemical use procedures are required at UNCG for:

- Flammable Liquids
- Carcinogens
- Corrosives
- Oxidizers
- Reactives

Additionally, the following operating procedures are required for each laboratory at UNCG:

- Chemical Storage And Segregation Procedures
- Chemical Waste Procedures
- Emergency Closure Procedures
- Regulated Chemical Identification

Building	Rooms	Flammable Liquids	Carcinogens	Corrosives	Oxidizers	Reactives	Toxic/ Poison	BSL-1	BSL-2	Compressed Gas	Rad/ XRay	Laser
Chemical Safety Facility	200	☑	☑	☑	☑	☑	☑	☑	☑	☐	☑	☐
Chemical Safety Facility	216	☑	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐
Chemical Safety Facility	217	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
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HAZARD COMMUNICATION PROGRAM

TRAINING

All personnel with potential exposure to hazardous materials must be trained when first assigned to the workplace and when a new chemical hazard is introduced into the work area. Training must include:

1. Hazards of chemicals present in the workplace *(see reverse)*
2. How to access a list of chemicals present in the workplace *(Inventory)*
3. How to access and interpret information on Safety Data Sheets *(SDS)*
4. Labeling requirements and methods for the facility and the meaning of hazard symbols *(see reverse)*

INVENTORY

A list of all chemicals present in the workplace must be readily accessible to personnel at all times. The list does not need to include quantities and can be kept in paper or electronic form.

SAFETY DATA SHEETS (SDS)

SDS for all chemicals present in the workplace must be readily accessible to personnel at all times. SDS can be kept in paper or electronic form. Electronic SDS can be accessed at MSDS Online via the EH&S website **https://safety.uncg.edu**.

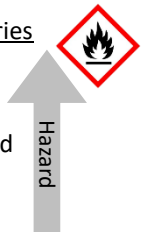
SDS will include information organized into the following sections:

1. Identification
2. Hazard(s) identification
3. Composition/information on ingredients
4. First-aid measures
5. Firefighting measures
6. Accidental release measures
7. Handling and storage
8. Exposure control/personal protection
9. Physical and Chemical properties
10. Stability and reactivity
11. Toxicological information
12. Ecological information
13. Disposal considerations
14. Transport information
15. Regulatory information
16. Other information

The hazard ratings of the new GHS system are opposite the older NFPA/HMIS system.

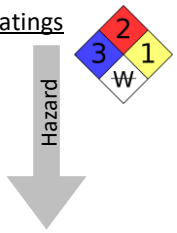
<u>GHS Hazard Categories</u>

1 = Severe Hazard
2 = Serious Hazard
3 = Moderate Hazard
4 = Slight Hazard
5 = Minimal Hazard



<u>NFPA/HMIS Hazard Ratings</u>

0 = Minimal Hazard
1 = Slight Hazard
2 = Moderate Hazard
3 = Serious Hazard
4 = Severe Hazard



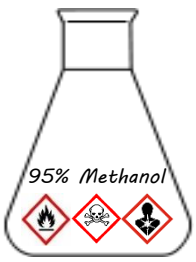
LABELS

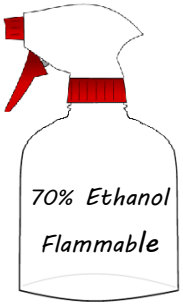
All containers of hazardous chemicals must be labeled, except for chemicals transferred to secondary containers which will be attended by the person making the transfer and used for less than one day.

Original manufacturer labels should not be removed. Label secondary containers with at least:

1. The product, chemical, or common NAME (must match the SDS identifier)
2. Words, pictures or symbols identifying the HAZARDS of the material

Examples of acceptable labeling:





Remember to check labels regularly for deterioration and relabel as needed.

FLAME

Flammable materials can burst into flames easily.

- Flammables
- Pyrophorics
- Self-Heating
- Emits Flammable Gas
- Self-Reactives
- Organic Peroxides

HEALTH HAZARD

Prolonged exposure to these materials may cause health problems such as cancer, birth defects, asthma or damage to specific organs of the body.

- Carcinogen
- Mutagenicity
- Reproductive Toxicity
- Respiratory Sensitizer
- Target Organ Toxicity
- Aspiration Toxicity

EXCLAMATION MARK

These materials can cause immediate health effects such as skin rashes or respiratory irritation.

- Irritant (skin and eye)
- Skin Sensitizer
- Acute Toxicity (harmful)
- Narcotic Effects
- Respiratory Tract Irritant
- Hazardous to Ozone Layer

FLAME OVER CIRCLE

Oxidizing materials cause other materials to catch fire or explode.

- Oxidizers

SKULL & CROSSBONES

Exposure to these materials can cause immediate and possibly serious health problems.

- Acute Toxicity (fatal or toxic)

CORROSION

Corrosive materials can eat away clothing, metals, working surfaces and other materials.

- Skin Corrosion/Burns
- Eye Damage
- Corrosive to Metals

GAS CYLINDER

Gases under pressure can explode, rocket and damage health if they are heated, ruptured or leaking.

- Gases Under Pressure

ENVIRONMENT

These materials can kill fish or other wildlife that live in water.

- Aquatic Toxicity

EXPLODING BOMB

Explosive materials can blow up.

- Explosives
- Self-Reactives
- Organic Peroxides

UNCG Laboratory Operating Procedures / Flammable Liquids Use Procedures

PI / Teaching Lab Coordinator: Eric Zack
Lab / Room #: Chemical Safety Facility

Flammable Liquids: are chemicals that have a flash point below 100 degrees F (38.7 degrees C) and a vapor pressure that does not exceed 40 psig at 100 degrees F. The Global Harmonization Standard (GHS) currently defines a flammable liquid as a liquid having a flash point of no greater than 93 C.

Process Description: Mixing / transferring / using various concentrations of flammable liquids.

Risk Assessment: The most common fire hazard in the lab is flammable liquids and the vapors produced from such liquids. Although the primary hazard arises from the solvents property of being highly or extremely flammable, several are also described as harmful and/or toxic. Solvents frequently affect the central nervous system and at high concentration can cause sedation, coma, and death. For these reasons, flammable solvents should be regarded as very hazardous. Flammable solvents frequently found in most laboratories include, but are by no means limited to, acetone, methanol, ethanol, etc.

Safety Equipment:
Engineering / Ventilation Controls: A safety shower and eyewash must be available and accessible when working with flammable liquids. Experiments involving greater than 500 mL of flammable liquids should be carried out in a fume hood. Always attempt to handle large quantities of flammable liquids in your fume hood. Special ventilation may be required when handling flammable liquids outside of a fume hood. Please contact the Office of Safety if there are any concerns regarding flammable liquid operations.

PPE: Nitrile, PVC, or neoprene gloves can provide effective skin protection. Wear safety glasses or chemical splash goggles with face shield when using large quantities, or chemical safety goggles when using small quantities. Wear rubber, neoprene, or PVC apron when using large quantities and splash potential exists. Safety shielding is required at any time there is a risk of explosion or a highly exothermic reaction. All manipulations of flammable liquids which pose this risk must occur in a fume hood with the sash in the lowest feasible position.

Designated Use Area: Flammable liquids will be used throughout the laboratory. Special caution should be taken to avoid contact with hot surfaces or flame. Quantities over 500 mL will be conducted in a fume hood. Mixing or dispensing should be done in a fume hood with all ignition sources eliminated.

Special Handling / Storage Requirements:
• The storage of flammable and combustible liquids in a laboratory, shop or building area must be kept to the minimum needed for research and/or operations. If more than 25 gallons of flammables are present outside of safety cans per 100 square feet of area, a flammable liquids storage cabinet is required.
• All flammable liquids must be clearly labeled with the correct chemical name. Handwritten labels are acceptable; chemical formulas and structural formulas are not acceptable.
• Where feasible (if the quality of the solvent will not be adversely affected) transfer flammable liquids from glass bottles into metal safety cans.
• Mechanical vacuum pumps must be protected using cold traps and, where appropriate, filtered to prevent particulate release. The exhaust for the pumps must be vented into an exhaust hood. Vacuum pumps should be rated for use with flammable liquids.
• If flammable liquids are stored in a refrigerator or freezer it must be a certified explosion proof device.

Emergency Procedures:
Skin exposure: Rinse affected skin with plenty of water while removing contaminated clothing and shoes.
Eye exposure: Wash eyes for at least 15 minutes, lifting the upper and lower eyelids. Seek medical attention immediately.

Small spills: Do not attempt cleanup if you feel unsure of your ability to do so or if you perceive the risk to be greater than normal laboratory operations. Spill cleanup should be derived from the materials MSDS sheet. Flammable spill response is meant to control the liquid portion of the spill and minimize vapor production. For this reason, do not use paper towels on large area spills or flammable liquids because it exacerbates vapor production.

Large spills: Notify others in area of spill. Turn off ignition sources in area. Evacuate area and post entrance ways to spill area. Call the UNCG Police 4-4444. Restrict persons from area of spill or leak until cleanup is complete. Remain in area in safe location to assist the Police with response.

Step By Step Operating Procedure: Please include any lab specific operating procedures.

UNCG Laboratory Operating Procedures / Carcinogens (poisons) Use Procedures

PI / Teaching Lab Coordinator: Eric Zack
Lab / Room #: Chemical Safety Facility

Process Description: Carcinogens will be used in the laboratory. The UNCG Safety Office must be informed of carcinogen use in a laboratory.

Risk Assessment: A carcinogen commonly describes any agent that can initiate or speed the development of malignant or potentially malignant tumors, malignant neoplastic proliferation of cells, or cells that possess such material. The Global Harmonization Standard (GHS) currently defines a carcinogen as a chemical substance or a mixture of chemical substances which induce cancer or increase its incidence. A listing of carcinogenic materials can be found in the UNCG Required Chemical Reporting Document.

Safety Equipment:
Engineering / Ventilation Controls: Manipulation of carcinogens should be carried out in a fume hood. Manipulation of carcinogens outside of a fume hood may require special ventilation controls in order to minimize exposure to the material. Fume hoods provide the best protection against exposure to carcinogens in the laboratory and are the preferred ventilation control device. When possible, handle carcinogens in a fume hood. If the use of a fume hood proves impractical, attempt to work in a glove box or on an isolated area on the bench top.

PPE: Eye protection in the form of safety glasses must be worn at all times when handling carcinogens. Safety glasses with side shields do not provide adequate
protection from splashes; therefore, when the potential for splash hazard exists other eye
protection and/or face protection must be worn. Gloves should be worn when handling carcinogens. Nitrile gloves provide adequate protection against accidental hand contact with small quantities of most laboratory chemicals. However, when larger quantities are handled or regular contact is involved more protective gloves should be used. Appropriate lab attire (lab coats, closed- toe shoes and long- sleeved clothing) should be worn when handling carcinogenic materials. Additional protective clothing should be worn if the possibility of skin contact is likely.
Designated Use Area: Manipulation of carcinogens should be carried out in a fume hood. If the use of a fume hood proves impractical refer to the section on special ventilation.

Special Handling / Storage Requirements: Carcinogens must be stored in a designated area.

Emergency Procedures: Anticipate spills by having the appropriate clean up equipment on hand. The appropriate clean up supplies can be determined by consulting the material safety data sheet. This should occur prior to the use of any carcinogen. In the event of a spill, alert personnel in the area that a spill has occurred. Do not attempt to handle a large spill of carcinogenic material. Vacate the laboratory immediately and call for assistance. Call the UNCG Police 4-4444. Restrict persons from area of spill or leak until cleanup is complete. Remain in area in safe location to assist the Police with response.

UNCG Laboratory Operating Procedures / Corrosives Handling / Use Procedures

PI / Teaching Lab Coordinator: Eric Zack
Lab / Room #: Chemical Safety Facility

Corrosive Chemicals: are substances that cause visible destruction or permanent changes in human skin tissue at the site of contact. The major classes of corrosives include strong acids, bases, and dehydrating agents.
Process Description: Mixing / Transferring / Using various concentrations of aqueous corrosive solutions.

Risk Assessment: Avoid skin contact, serious burns may result. Avoid eye contact or serious burns may result.
Safety Equipment:
Engineering / Ventilation Controls: Use concentrated corrosives in a fume hood. A safety shower and eyewash must be available and accessible when working with corrosive liquids.
PPE: Safety goggles, nitrile, PVC, or neoprene gloves can provide effective skin protection. Wear safety glasses or chemical splash goggles with face shield when using large quantities, or chemical safety goggles when using small quantities. Wear rubber, neoprene, or PVC apron when using large quantities and splash potential exists. Lab coats, closed toe shoes, and long sleeved clothing should be worn if the possibility of skin contact is likely.
Designated Use Area: Concentrated corrosives are to be used exclusively in the fume hood. Dilute concentrations may be used throughout the laboratory.

Special Handling / Storage Requirements: Store mineral acids together, separate from oxidizing agents and organic materials. Store acetic acid and other organic acids with the combustible organic liquids. Segregate the various types of corrosives (i.e. acids and bases). Liquids and solids should be separated. Corrosive resistant cabinets should be used for storage of large amounts of corrosive materials. Do not store on high cabinets or shelves.
Emergency Procedures:
Skin exposure: Rinse affected skin with plenty of water while removing contaminated clothing and shoes. Rinse for at least 15 minutes. Seek medical attention.
Eye exposure: Splashes may cause tissue destruction. Wash eyes for at least 15 minutes, lifting the upper and lower eyelids. Seek medical attention immediately.
Small spills: Do not attempt cleanup if you feel unsure of your ability to do so or if you perceive the risk to be greater than normal laboratory operations. Cover spill with broad spectrum absorbent. When absorbent is removed, wash contaminated area.
Large spills: Notify others in area of spill. Turn off ignition sources in area. Evacuate area and post entrance ways to spill area. Call the UNCG Police 4-4444. Restrict persons from area of spill or leak until cleanup is complete. Remain in area in safe location to assist the Police with response.
Decontamination: May vary based on material some materials may be neutralized with other reagents. Special neutralizing agents should be on hand to decontaminate area.

Step By Step Operating Procedure: Please include any laboratory specific operating procedures.

UNCG Laboratory Operating Procedures / Oxidizer Use Procedures

PI / Teaching Lab Coordinator: Eric Zack
Lab / Room #: Chemical Safety Facility

Process Description: Oxidizers are to be used in the laboratory. The following is meant to serve as guidelines for their use.
Risk Assessment: Oxidizing chemicals are materials that promote combustion or spontaneously evolve oxygen at room temperature or with slight heating. The Global Harmonization Standard (GHS) currently defines an oxidizing material as a solid liquid or gas , while in itself not necessarily combustible may by yielding oxygen, cause, or contribute to, the combustion of other material. This class of chemicals includes peroxides, chlorates, perchlorates, nitrates, and permanganates. Strong oxidizers are capable of forming explosive mixtures when mixed with combustible, organic or easily oxidized materials.
Safety Equipment:

Engineering / Ventilation Controls: Not applicable.

PPE: Eye protection in the form of safety glasses must be worn at all times when handling oxidizing chemicals. Safety glasses with side shields do not provide adequate protection from splashes; therefore, when the potential for splash hazard exists other eye protection and/or face protection must be worn. (goggles, face shields, etc.) Gloves should be worn when handling oxidizing chemicals. Nitrile gloves provide adequate protection against accidental hand contact with small quantities of most laboratory chemicals. However, when larger quantities are handled or regular contact is involved more protective gloves should be used. Appropriate lab attire (lab coats, closed- toe shoes and long-sleeved clothing) should be worn when handling oxidizing chemicals. Additional protective clothing should be worn if the possibility of skin contact is likely.

Designated Use Area: Oxidizers will be used throughout the laboratory.

Special Handling / Storage Requirements: Oxidizers should be stored in a cool and dry location. Keep oxidizers segregated from all other chemicals in the laboratory. Minimize the quantities of strong oxidizers stored in the laboratory. Never return excess chemicals to the original container. Small amounts of impurities may be introduced into the container, which may cause a fire or explosion.

Emergency Procedures:
Anticipate spills by having the appropriate clean up equipment on hand. The appropriate clean up supplies can be determined by consulting the material safety data sheet. This should occur prior to the use of any oxidizing chemicals. Spill control materials for oxidizers are designed to be inert and will not react with the reagent. Never use paper towels or other inappropriate materials, which are combustible. The waste materials generated during spill cleanup may pose a flammability risk and should not remain in the laboratory overnight unless it is stored in an appropriate container. In the event of a spill, alert personnel in the area that a spill has occurred. Do not attempt to handle a large spill of oxidizing chemicals. Vacate the laboratory immediately and call the UNCG Police 4-4444 for response.
Step By Step Operating Procedure: Please include any laboratory specific operating procedures.

Laboratory Operating Procedures / Reactive Chemical Use Procedures

PI / Teaching Lab Coordinator: Eric Zack
Lab / Room #: Chemical Safety Facility

Reactive Chemicals: Highly reactive chemicals are to be used in this laboratory. The following is meant to serve as guidance for their use.
Process Description: Mixing / transferring / using various concentrations of reactive chemicals.

Risk Assessment: Highly reactive or unstable materials are those that have the potential to vigorously polymerize, decompose, condense, or become self-reactive under conditions of shock, pressure, temperature, light, or contact with another material. The Global Harmonization Standard (GHS) currently further defines "self-reactive" chemicals as thermally unstable liquids or solids liable to undergo a strongly exothermic thermal decomposition even without participation of oxygen. Major types of highly reactive chemicals are explosives, peroxides, water-reactives, and pyrophorics.

Safety Equipment:
Engineering / Ventilation Controls: As many reactive materials liberate combustible and/or toxic gas when exposed to water vapor or air, they should be used in a lab hood to prevent hazardous buildup of gases.

PPE: At minimum, safety glasses, lab coat, long pants, and closed toed shoes are to be worn when entering laboratories having hazardous chemicals. Additionally: Utilize shields and barricades, and personal protective equipment (such as face shields with throat protectors and heavy gloves) whenever there is a possibility of explosion or vigorous chemical reaction. When handling hazardous chemicals or contacting potentially contaminated surfaces, protective gloves are to be worn. Goggles (not safety glasses) are appropriate for processes where splash or spray is foreseeable. For hazardous chemicals that are toxic via skin contact/ absorption, additional protective clothing (i.e., face shield, apron, oversleeves) is appropriate where chemical contact with body/skin is foreseeable.
Designated Use Area: Highly reactive chemicals should be handled in the fume hood. If fume hood use is not possible please describe use areas within the laboratory.

Special Handling / Storage Requirements: Ensure careful handling of handling materials that may be sensitive to shock, heat, friction, or light.
Ensure secondary containment and segregation of incompatible chemicals per guidance within the Chemical Segregation section of the Laboratory Safety Plan. Also, follow any substance-specific storage guidance provided in MSDS documentation.
Label all chemicals with date received and date opened and if an appropriate expiration date does not exist, assign one
Any chemicals with crystallization, visible discoloration, or liquid stratification potentially have undergone peroxidation and must not be used or otherwise disturbed. Please contact the EH&S if this has occurred (4-4357)
Emergency Procedures: Anticipate spills by having the appropriate clean up equipment on hand. The appropriate clean up supplies can be determined by consulting the material safety data sheet. This should occur prior to the use of any oxidizing chemicals. Spill control materials for oxidizers are designed to be inert and will not react with the reagent. Never use paper towels or other inappropriate materials,
which are combustible. The waste materials generated during spill cleanup may pose a flammability risk and should not remain in the laboratory overnight unless it is stored in an appropriate container. In the event of a spill, alert personnel in the area that a spill has occurred. Do not attempt to handle a large spill of oxidizing chemicals. Vacate the laboratory immediately and call the UNCG Police 4-4444 for response.

Step By Step Operating Procedure: Please include any laboratory specific operating procedures.

Chemical Storage and Segregation Procedures

All chemicals kept in this space shall be stored according to the principles below.

Not on the bench top
Do not store stock supplies of chemicals on bench tops where they are unprotected from ignition sources and are more easily knocked over. Only chemicals in use should be on bench tops.

Not in the fume hood
Do not maintain large stock supplies of chemicals in fume hoods. They may interfere with air flow in the hood, and provide fuel if there is a fire.

Not in alphabetical order, except within "Chemical Storage Groups"
Alphabetical arrangement of randomly collected chemicals often increases the likelihood of dangerous reactions by bringing incompatible materials into close proximity.

Away from sun and heat
Storage areas should not be exposed to extremes of heat or sunlight.

Not under the sink
Do not store any chemicals except bleach and compatible cleaning agents under the sink.

Label chemicals properly
All containers within the lab must be labeled with name and hazard(s). Suspected and known carcinogens must be labeled as such and segregated within trays to contain leaks and spills.

Safeguard against theft
This plan does not require security measures (i.e., locked cabinets) to prevent theft, but lab workers should make sure that lab doors are locked when unattended. Use of chemicals regulated by Drug Enforcement Agency may require registration and secured controlled storage.

Liquid chemicals
Storage of liquid chemicals is more hazardous than storage of solids and is subject to numerous and varied storage requirements.

Sturdy compatible containers
Hazardous chemicals must be stored in containers of made of compatible material that are not easily broken.

Secondary containment
Trays, bins, bottle jockeys, etc. sufficient to contain the container contents shall be used when chemicals must be stored with incompatible chemicals or materials (ie. Corrosives in metal cabinets).

Segregate chemicals by storage group
Storage groups and segregation plans are outlined in the pages to follow.

CHEMICAL STORAGE GROUPS

CHEMICAL TYPES STORED IN: Chemical Safety Facility

☑ Group I-Flammable/Combustible Liquids

Examples: all alcohols, acetone, acetaldehyde, acetonitrile, amyl acetate, benzene, cyclohexane, dimethyldichlorosilane, dioxane, ether, ethyl acetate, histoclad, hexane, hydrazine, methyl butane, picolene, piperidine, propanol, pyridine, scintillation liquids, all silanes, tetrahydrofuran, toluene, triethylamine, and xylene

Primary Storage Concern: To protect from ignition

Recommended Facilities/Measures: 1. Flammable cabinet 2. Refrigerator for containers less than 1 liter. Explosion proof/ Lab Safe Refrigerator

Compatible Storage Groups: Volatile poisons may be in the same compartment of the flammable cabinet as flammables if bases are not present. Glacial acetic acid should be stored in flammable cabinets.

☑ Group II-Volatile Poisons

Includes poisons, toxics and known and suspected carcinogens with strong odor or evaporation rate greater than 1 (butyl acetate > 0): Examples: carbon tetrachloride, chloroform, dimethylformamide, dimethyl sulfate, formamide, formal dehyde, halothane, mercaptoethanol, methylene, chloride, phenol.

Primary Storage Concern: To prevent inhalation exposures.

Recommended Facilities/Measures: 1. Flammable cabinet 2. Refrigerator: for containers less than 1 liter.

Compatible Storage Groups: Volatile poisons may be in the same compartment of the flammable cabinet as flammable if bases are not present.

☑ Group III-Oxidizing Agents

All oxidizing acids are highly reactive with most substances and each other. Examples: nitric, sulfuric, perchloric, phosphoric acids, and chromic acids.

Primary Storage Concern: Preventing contact and reaction with each other and other substances and corrosive action on surfaces.

Recommended Facilities/Measures: 1. Safety (Corrosives) Cabinet. Each oxidizing acid must be double-contained, i.e., the primary container must be kept inside canister, tray or tub.

Compatible Storage Groups:
Oxidizing acids must be double-contained and should be segregated in their own compartment in a safety cabinet. When quantities are small (e.g., 1 or 2 bottles) they do not warrant a separate compartment. Small quantities may be double-contained and stored with Group 4 Organic and Mineral Acids. Store oxidizing acids on bottom shelf below Group 4.

☑ **Group IV-Organic and Mineral Acids**

Examples: acetic, butyric, formic, hydrochloric, isobutyric, mercaptoproprionic, proprionic, trifluoroacetic acids.

Primary Storage Concern: To prevent contact and reaction with bases and oxidizing acids and corrosive action on surfaces.

Recommended Facilities/Measures: 1. Safety (Corrosives) cabinet.

Compatible Storage Groups: Small amounts of double-contained oxidizing acids can be stored in the same compartment with organic acids if the oxidizing acids are stored on the bottom shelf. Exceptions: acetic anhydride and trichloroacetic anhydride are corrosive. These acids are very reactive with other acids and should not be stored in this group. It is better to store these with organic compounds as in Group 7 Non-volatile Liquid Poisons.

☑ **Group V-Liquid Bases**

Examples: sodium hydroxide, ammonium hydroxide, calcium hydroxide, glutaraldehyde

Primary Storage Concern: Preventing contact and reaction with acids.

Recommended Facilities/Measures: 1. Safety (corrosives) cabinet; 2. In tubs or trays in normal cabinet.

Compatible Storage Groups: Liquid bases may be stored with flammables in the flammable cabinet if volatile poisons are not also stored there.

☑ **Group VI-Oxidizing Liquids**

Oxidizing liquids react with everything potentially causing explosions or corrosion of surfaces. Examples: ammonium persulfate, hydrogen peroxide (if greater than or equal to 30%)

Primary Storage Concern: To isolate from other materials.

Recommended Facilities/Measures: 1. Total quantities exceeding 3 liters should be kept in a cabinet housing no other chemicals. 2. Smaller quantities must be double-contained if kept near other chemicals, e.g., in a refrigerator.

Compatible Storage Groups: None

☑ **Group VII-Non-Volatile Liquid Poisons**

Includes highly toxic (LD50 oral rat < 50 mg/kg) and toxic chemicals (LD50 oral rat < 500 mg/kg), known carcinogens, suspected carcinogens and mutagens Examples: acrylamide solutions; diethylpyrocarbonate; diisopropyl fluorophosphate; uncured epoxy resins; ethidium bromide; triethanolamine

Primary Storage Concern: To prevent contact and reaction with liquids and, in some cases, air.

Recommended Facilities/Measures: 1. Secure, water-proof double-containment according to label instructions. 2. Isolation from other storage groups.

Compatible Storage Groups: If securely double-contained to prevent contact with water and/or air, metal hydrides may be stored in the same area as Group 9 Dry Solids.

☑ Group VIII-Reactives

Most metal hydrides react violently with water, some ignite spontaneously in air (pyrophoric). Examples of metal hydrides are sodium borohydride, calcium hydride, lithium aluminum hydride. Other pyrophorics are boron, diborane, dichloroborane, 2-Furaldehyde, diethyl aluminum chloride, lithium, white or yellow phosphorus and trimethyl aluminum. Other water reactives include aluminum chloride-anhydrous, calcium carbide, acetyl chloride, chlorosulonic acid, sodium, potassium, phosphorous pentachloride calcium, aluminum tribromide, calcium oxide, and acid anhydrides.

Primary Storage Concern: To prevent contact and reaction with liquids and, in some cases, air.

Recommended Facilities/Measures: 1. Secure, water-proof double-containment according to label instructions. 2. Isolation from other storage groups.

Compatible Storage Groups: If securely double-contained to prevent contact with water and/or air, metal hydrides may be stored in the same area as Group 9 Dry Solids.

☑ Group IX-Dry Solids

Includes all powders, hazardous and non-hazardous. Examples: benzidine, cyanogen bromide, ethylmaleimide, oxalic acid, potassium cyanide, sodium cyanide

Primary Storage Concern: To prevent contact and potential reaction with liquids.

Recommended Facilities/Measures:

- Cabinets are recommended, but if not available, open shelves are acceptable. If solid oxidizers are stored on wood shelves they should be in secondary containment.
- Store above liquids.
- Warning labels on highly toxic powders should be inspected and highlighted or amended if they do not cause the containers to stand out against less toxic substances in this group.
- It is recommended that the most hazardous substances in this group be segregated.
- It is particularly important to keep liquid poisons below cyanide-or sulfide-containing poisons (solids). A spill of aqueous liquid on cyanide - or sulfide - containing poisons would cause a reaction that would release poisonous gas.

Compatible Storage Groups: Metal hydrides, if properly double-contained may be stored in the same area.

Exceptions: Solid picric or picricsulfonic acid can be stored with this group, but should be checked regularly for dryness. When completely dry, picric acid is explosive and may detonate upon shock or friction. Picric acid in contact with some metals may form explosive metal picrates. Use non-metal caps.

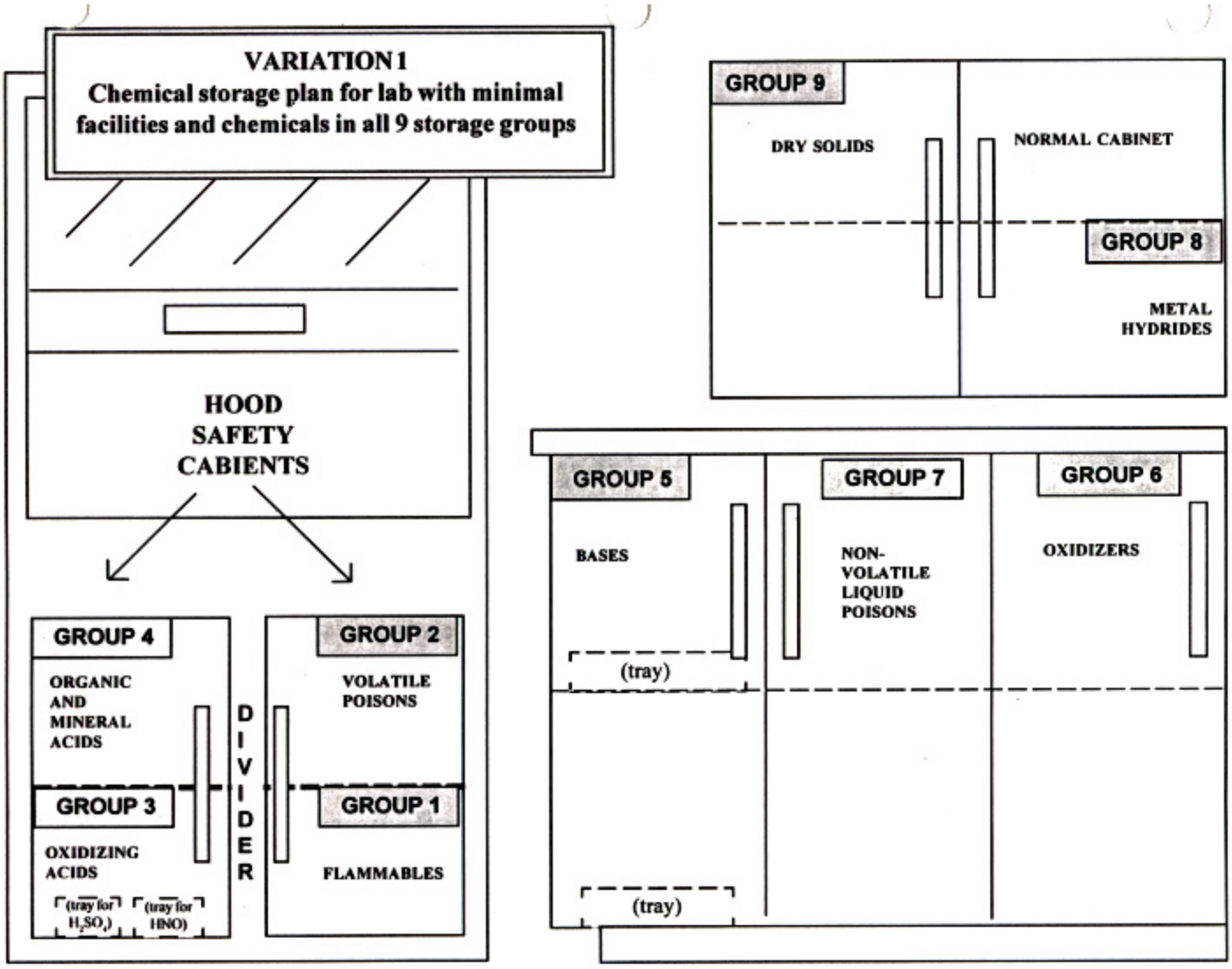
Part III: Storage Plan Variations for Different Lab Facilities

On the following pages are illustrations of possible chemical storage arrangements for two types of lab facilities. They are provided merely as examples of arrangements which satisfy the recommendations of the chemical storage plan. They are not intended to restrict storage designers to the particular arrangements and facilities depicted.

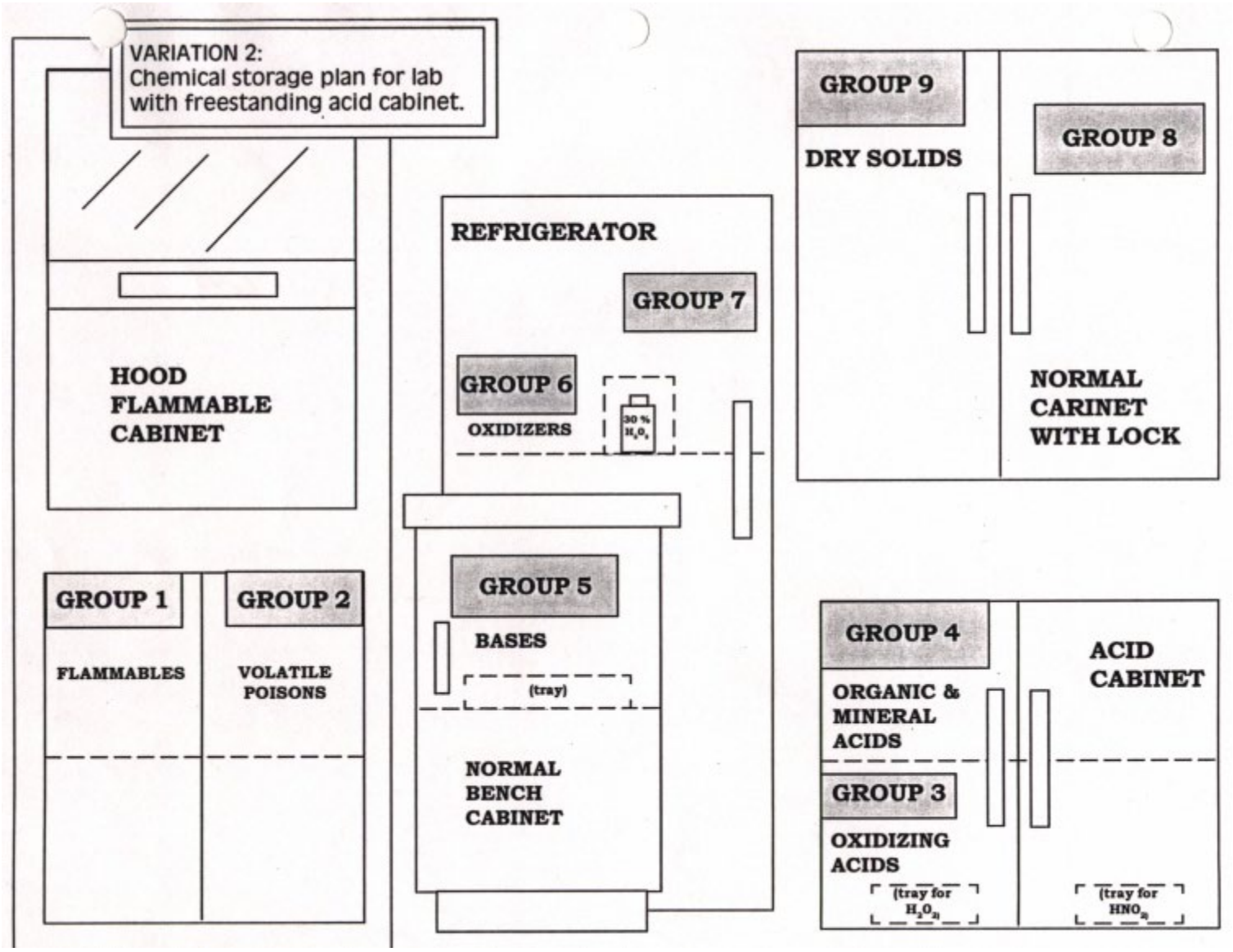
In this plan, there are nine storage groups. Seven of these groups cover storage of liquids because of the wide variety of hazards posed by these chemicals. Specific instructions must be followed for metal hydrides (Group VIII) and certain individual compounds, but otherwise, dry solids are in Group IX.

Many liquid chemicals pose hazards that correspond to more than one storage group. These chemicals should be stored in the <u>lowest group number</u>.

Variation 1:
Chemical storage plan for lab with minimal facilities and chemicals in all 9 storage groups.



Variation 2:
Chemical storage plan for lab with freestanding acid cabinet.



UNCG Laboratory Operating Procedures / Laboratory Waste Procedures

PI / Teaching Lab Coordinator:
Lab / Room #:

The following is meant to serve as the Lab Waste Management protocol for the above referenced laboratory. Pursuant to our Lab Waste Policy, all chemical waste from laboratories will be referred to as "Lab Waste". All UNCG laboratories are managed as Lab Waste Accumulation Areas. All Lab Waste in this space shall be managed according to the University's Laboratory Waste Policy which is in compliance with 40 CFR Subpart K "Alternative Requirements for University Laboratories", and the proper management is outlined in the sections below. For additional information please see the Laboratory Waste Management Policy at https://safety.uncg.edu/waste/.

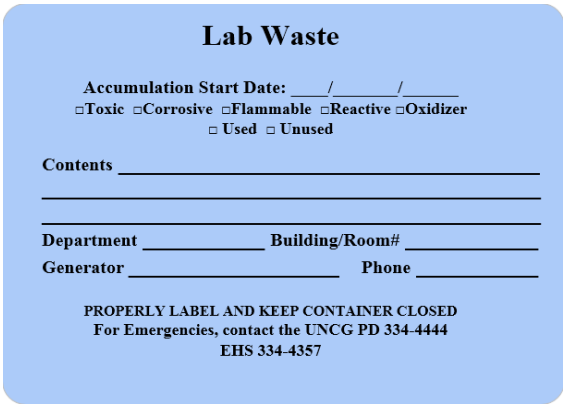
The PI is responsible for ensuring the following requirements are met and maintained for their laboratory. Please do not hesitate to call EHS for assistance.

Storage and Labeling

- Lab Waste accumulated either during the operation of a process or otherwise accumulated in the laboratory must be placed into containers that are in good condition and compatible with the collected lab waste.

- Label the Lab Waste containers with a completed UNCG Lab Waste label immediately when the first drop of waste is added to a collection container or when a material is considered a "waste". The Accumulation Start Date is the date in which waste is added to an accumulation container or the material is considered a waste. **Lab waste must be removed from labs within 12 months of the Accumulation Start Date** noted on the label. Labels are available in the Chemistry Department Stockroom and through EHS.

- Lab Waste labels must be filled out completely; list contents (no chemical abbreviations and use percentages if possible for mixtures), identify the physical hazard(s) of the waste by checking the appropriate box(es), and complete the contact information section. All efforts should be made by lab workers to ensure the chemical constituents of the Lab Waste are identified and listed accurately.



- Replace damaged or illegible labels immediately.

- If a Lab Waste container is not in good condition, or if it begins to leak, carefully transfer the waste to a container that is in good condition and compatible with the waste.
  *Good condition means clean containers with no sign of spillage.

- Manage containers to ensure safe storage to prevent spills and leaks. Use secondary spill containment bins to store the lab waste containers to lessen the hazards in case of a release.

- A container holding hazardous waste must always be closed during storage, except when it is necessary to add or remove waste.
  - Containers must be kept closed at all times, except:
    - for adding, removing, or bulking lab waste
    - for venting of the container if necessary
    - for the proper operation of lab equipment, such as with in-line collection of lab waste from HPLC equipment.

- Labs can store up to 55 gallons of Lab Waste (or 1 qt/1 kg of Acutely Hazardous Lab Waste). If these quantities are exceeded, the date of surpassing the 55 gallon quantity (or 1 qt/1 kg) must be written on the lab waste label. The lab waste must be removed within 10 calendar days from the date the quantity was exceeded. This requirement refers to the actual chemical volume rather than container volume.

Reactive Acutely Hazardous Lab Waste

P006	Aluminum Phosphide
P009	Ammonium Picrate
P065	Mercury Fulminate
P081	Nitroglycerine
P112	Tetranitromethane
P122	Zinc Phosphate (>10%)

- Practice safe handling and storage. Segregate incompatible waste to prevent adverse chemical reactions that may harm human health or the environment (flammable, oxidizers, corrosives, etc.). Do not store flammable waste near heat or flame. Do not store reactive waste near incompatible elements (ex: water reactive materials under sink). Only store containers in hood if storage is the hood's sole purpose.

- Label the lab waste storage area or cabinet in the lab with a label that reads "Lab Waste Accumulation Area". Available through EHS.

- Do not overfill containers. Containers should have about a 10% headspace to allow for vapor expansion.

- Laboratory beakers, flasks, or plastic milk cartons are not acceptable waste containers. Glass or plastic reagent bottles are the most convenient to use. Containers must have a secure fitting caps to ensure complete closure.

Inspections

- Visually inspect lab waste storage areas for signs of leaking containers, proper labeling, open containers, and chemical compatibility. Correct improper management issues immediately. Contact EHS if guidance is needed.

Chemical Waste Removal

- For removal of waste, please complete a Lab Waste Removal form and place with waste for pickup. Then complete the online Lab Waste Removal form on the EHS website.

- Controlled Substances, Radioactive Materials, Biological Materials or pathogens cannot be disposed of through the Lab Waste Management Program. These wastes falls under separate University policies.

Laboratory Clean Outs

Under Subpart K regulations, lab cleanout exemptions are allowed for each lab once per 12 month period with limited requirements. Please contact EHS or refer to the Laboratory Waste Policy for additional information.

Emergency Closure Procedures

Use this **general checklist for developing plans,** or shut down procedures for a temporary closure of lab with limited access by the Principle Investigator/Teaching Lab coordinator, or designated Safety Supervisor. **A Specific Long Term Closure with Prohibited Access**(below) should be developed for worst case scenarios.
Temporary Closure of Lab with Limited Access - Environmental and or external conditions prompt the temporary closure of labs for a period of hours to one day with access by the Principle Investigator/Teaching Lab coordinator, or designated Safety Supervisor limited.
Long Term Closure of Lab with Prohibited Access–Environmental and/or external conditions prompt the long term closure of labs for a period of days to weeks with prohibited access by the Principle Investigator/Teaching Lab coordinator, or designated Safety Supervisor.

General Checklist for Temporary Closure of Labs with Limited Access

1. Have all chemical reagents been returned to appropriate storage locations (e.g. Flammable liquid storage cabinets) to prevent spills and leaks. If containers or caps are not intact transfer contents into compatible containers, write full chemical name and include appropriate warnings from original label and properly dispose of old container.
2. Have all biological materials been returned to appropriate storage locations. Cultures in incubation chambers must be removed and terminated/stored as appropriate.
3. Has all biological waste been autoclaved and properly disposed.
4. Have all biosafety contaminants been decontaminated. If yes turn off fan and close sash.
5. Have radioisotopes, select agents, and controlled substances been properly secured in storage locations.
6. Are all chemical materials, stock solutions or samples that will remain in the lab in storage containers.
7. Have all on going chemical processes and reactions been terminated and stored correctly.
8. Are all heat producing equipment (ovens, hotplates, incubators) been shut off and unplugged.
9. Have all water faucets and supplies been cut off.
10. Have all compressed gas systems been shut off and pressure bled.
11. Have all unnecessary utility services been shut off.
12. Have all power sources from experimental apparatus been disconnected.
13. Have all computers been turned off.
14. Identify, label, and store appropriately all hazardous waste for removal by EHS.
15. Has a final walkthrough of the laboratory been conducted?

Temporary Closure of Labs with Limited Access - **Plan A**

Ensure all chemicals are properly segregated with lids secured on all containers and all doors locked.

Temporary Closure of Labs with Limited Access - Plan A file uploaded? ☐
Temporary Closure of Labs with Limited Access - **Plan B** (optional)
PLAN A NOT ENTERED

Any departmental temporary closure plans or Plan B file uploaded? ☐

Specific Long Term Closure with Prohibited Access

- The following are emergency contingencies designed to protect specific research "perishables" during long term university closure where access is prohibited.
- In case of such emergency, contact departmental faculty personnel immediately upon notification.
- One of the following **plans** should be executed based upon an anticipated power outage or research operations suspended.

  - **Plan A** : university closure; no interruption in power supply
  - **Plan B** : university closure; emergency power only
  - **Plan C:** university closure; complete power outage
  - **Plan D:** university closure; research operations suspended (other utility/manipulation required)

Specific Long Term Closure with Prohibited Access - Plan A
Please specify plans in the text box or attach a file with Plan A below
PLAN A NOT ENTERED

Specific Long Term Closure with Prohibited Access - Plan A file uploaded? ☐

Specific Long Term Closure with Prohibited Access - Plan B
Please specify plans in the text box or attach a file with Plan B below
PLAN B NOT ENTERED

Specific Long Term Closure with Prohibited Access - Plan B file uploaded? ☐

Specific Long Term Closure with Prohibited Access - Plan C
Please specify plans in the text box or attach a file with Plan C below
PLAN C NOT ENTERED

Specific Long Term Closure with Prohibited Access - Plan C file uploaded? ☐

Specific Long Term Closure with Prohibited Access - Plan D
Please specify plans in the text box or attach a file with Plan D below
PLAN D NOT ENTERED

Specific Long Term Closure with Prohibited Access - Plan D file uploaded? ☐

Appendix B. Additional Laboratory Operating Procedures

Additional Operating Procedures

- ☐ Biological Materials Use Procedures
- ☐ Radionuclide Use Procedures
- ☐ Laser Use Procedures
- ☑ Compressed Gas Use Procedures (UNCG policy attached)
- ☑ Cryogenic Materials Use Procedures (UNCG policy attached)
- ☑ Working Alone Procedures (Person working alone) (UNCG policy attached)
- ☑ Unattended Operation Procedures (Work continuing with no person in lab) (UNCG policy attached)
- ☑ Glassware (UNCG policy attached)
- ☑ Fume Hood Procedures (UNCG policy attached)
- ☑ Safe Lab Equipment Use Procedures (UNCG policy attached)

UNCG Laboratory Operating Procedures / Compressed Gases Use Procedures

PI / Teaching Lab Coordinator:

Lab / Room #:

Process Description: Cylinders of compressed gases which are stored or used as part of the laboratory operations.

Risk Assessment: Cylinders of compressed gases must be handled as high energy sources. They pose a serious hazard if the cylinder valve is dislodged. When storing or moving a cylinder, have the cap securely in place to protect the stem. Use suitable racks, straps, chains or stands to support cylinders.

Do not store cylinders or lecture bottles with the regulator in place. If the regulator fails, the entire contents of the gas cylinder may be discharged.

Hazard assessment for work with compressed gases should assure that all staff understands proper use and handling precautions; that all pressurized equipment is properly shielded; regulators are not interchanged between different gas types; all hose connections are properly secured and are appropriate for the pressure(s) used.

Safety Equipment:

Engineering / Ventilation Controls: Manipulation of compressed gases should typically be carried out in a fume hood if the compressed gas is an irritant, oxidizer, asphyxiant, or has other hazardous properties.

PPE: Lab coats, closed toed shoes and long sleeved clothing should be worn when handling compressed gases. Eye protection in the form of safety glasses must be worn at all times when handling compressed gases.

Designated Use Area: Compressed gas cylinders which contain acutely toxic gases must be stored in a secure designated area.

Special Handling / Storage Requirements: Cylinders should be stored in an upright position and secured to a wall or laboratory bench through the use of chains or straps. Cylinder caps should remain on the cylinder at all times unless a regulator is in place. Cylinders should be stored in areas where they will not become overheated. Avoid storage near radiators, areas in direct sunlight, steam pipes and heat releasing equipment such as sterilizers. Transport compressed gas cylinders on equipment designed for this function. Never carry or "walk" cylinders by hand.

Emergency Procedures:

In the event of a spill of a compressed gas that is an irritant, oxidizer, asphyxiant, or has other hazardous properties all personnel in the area should be alerted. Vacate the laboratory immediately and call the UNCG Police 4-4444 for response.

Step By Step Operating Procedure: Dependent upon the operation.

UNCG Laboratory Operating Procedures / Cryogenic Systems Use Procedures

PI / Teaching Lab Coordinator :

Lab / Room #:

Process Description: Cryogenic systems (i.e., liquids and vessels) may only be utilized in accordance with manufacturer safety precautions. The EH&S Department should be notified when any new cryogenic systems are introduced into the University environment. Further information is outlined in Section 029 of the UNCG Safety and Health Policy and Procedure manual.

Risk Assessment: Cryogenic liquids may undergo substantial volume expansion leading to an oxygen deficient atmosphere where ventilation is limited. In addition, other potential hazards of toxicity and flammability may be present if not handled correctly.

Departments that work with cryogenic systems should assure that all users understand: general control of hazards, engineering/ventilation controls, required PPE, spill and accident procedures, waste disposal, decontamination procedures, special handling procedures, and storage requirements.

Safety Equipment:

> **Engineering / Ventilation Controls:** Cryogenic systems shall be utilized in well-ventilated areas (i.e., lab ventilation having a minimum of 6 air changes per hour).
>
> **PPE:** The following PPE shall be utilized when handling cryogenic liquids: heavy gloves (e.g., cryogenic gloves), safety goggles, face shield, and lab apron are appropriate.

Designated Use Area: Cryogenic liquid dewars are to be stored in well-ventilated areas. Storage in closets and stairwells is prohibited.

Special Handling / Storage Requirements: Cryogenic liquid/dry ice baths should be open to the atmosphere to avoid pressure build up. Transfer of liquid hydrogen in an air atmosphere can pose a explosion risk. Store away from combustible materials, and ignition sources. Protect yourself when thawing cryo tubes, using a heavy-walled container or safety shield. Follow substance-specific guidance provided on MSDS.

Emergency Procedures:

If skin or eye(s) come in contact, use cool or warm water for fifteen minutes, and seek medical attention. Refer to MSDS. In the event of a large spill or leak of cryogenic liquid, vacate the area immediately and call the UNCG Police 4-4444 for response.

Step By Step Operating Procedure: Dependent upon the operation.

UNCG Laboratory Operating Procedures / Working Alone

PI / Teaching Lab Coordinator:

Lab / Room #:

Process Description: Working alone (when no one else is present) is discouraged in the laboratory. However, situations exist where it is prudent for working alone. The following guidelines should be followed when work is to be conducted after hours or when no one is present in a laboratory.

Risk Assessment: Working alone in a laboratory presents a unique hazard. Mainly the concern is if there is an accident no one will be there to alert emergency personnel.

Safety Equipment:

Engineering / Ventilation Controls: Dependent upon the operation.

PPE: Dependent upon the operation.

Designated Use Area: Work alone will be conducted throughout the laboratory.

Special Handling / Storage Requirements: Dependent upon the operation.

Emergency Procedures: Someone will periodically check on person working alone either in-person or via phone.

Waste Disposal Procedures: Not applicable

Step By Step Operating Procedure: The following procedures should be followed when working alone in a laboratory.

- Schedule work so that hazardous tasks are performed during times when the worker is not alone.
- The worker should inform a co-worker, or even a friend, family member, colleague that they will be in the laboratory alone and give them information on who to contact in the event the worker does not check in.

The following operations should not be conducted alone in the laboratory.

- Transferring large (over 1 liter) amounts of chemicals.
- Operating laser, or other equipment with unique hazards.

UNCG Laboratory Operating Procedures / Unattended Operation Procedures

PI / Teaching Lab Coordinator :

Lab / Room #:

Process Description: Unattended operation of working equipment is discouraged in any laboratory. However, situations exist where it is not practical to operate equipment with constant attendance. The safety of building occupants must always be placed as a priority when making such a decision.

Risk Assessment: Unsupervised equipment may cause damage to itself, other equipment, and the facility. Also, it may lead to unforeseen conditions in the laboratory that compromise the lab safety.

Safety Equipment: Only use devices and equipment with designed safety features that are approved for unattended operation.

Designated Use Area: Throughout lab spaces.

Special Handling / Storage Requirements: Do not engage in unfamiliar procedures and read carefully the instruction manual prior to use.

Emergency Procedures: Dependent upon operation.

Step By Step Operating Procedure: The following procedures should be followed when working with unattended equipment.

- Minimize time of the unattended operation.
- Read carefully all relevant instructions in the device manual.
- Before leaving equipment unattended, verify all settings and points of potential safety hazards.
- Verify that device is in safe operating mode.
- Be careful when returning to unattended device to ensure that no unforeseen circumstances have occurred.

UNCG Laboratory Operating Procedures: Glassware

PI / Teaching Lab Coordinator:

Lab / Room #:

Process Description: The following operating procedure pertains to the use of all glassware items to be used in laboratory operations. This includes beakers, flasks, pipets, graduated cylinders and all other glassware items.

Risk Assessment: Accidents involving glassware are a leading cause of laboratory injuries. These can be avoided by following a few simple procedures. In general, be certain that you have received proper instructions before you use glass equipment designed for specialized tasks.

Safety Equipment:

> **PPE:** In general, when using glassware the two areas of concern are cuts and eye injuries. Persons handling glassware with the potential for breakage should at a minimum wear protective gloves and safety glasses. Handling glassware under standard conditions requires no personal protective equipment.

Designated Use Area: Glassware will be used throughout the laboratory.

Special Handling / Storage Requirements: Store glassware in a stable manner.

Emergency Procedures: not applicable

Waste Disposal Procedures: Wear hand protection and place in sealed/durable container

Step By Step Operating Procedure:

- Handle and store glassware carefully so as not to damage it or yourself.
- Properly discard or repair damaged items.
- When inserting glass tubing into rubber stoppers, corks or when placing rubber tubing on glass hose connections:
    - Protect hands with a heavy glove or towel.
    - Lubricate tubing or stopper with water or glycerol and be sure that the ends of the glass tubing are fire-polished.
    - Hold hands close together to limit movement of glass should fracture occur.
    - Substitute plastic or metal connections for glass ones whenever possible to decrease the risk of injury.
    - Use glassware designed for vacuum work for that purpose.
    - When dealing with broken glass, wear hand protection and use a broom/dustpan.

UNCG Laboratory Operating Procedures / Fume Hood Use Procedures

PI / Teaching Lab Coordinator:

Lab / Room #:

Process Description: The use of a chemical fume hood is indicated when work performed creates the potential for an exposure to the chemicals/materials being utilized that is above the Occupational Safety & Health Administration's (OSHA) permissible exposure limit (PEL) or the American Conference of Governmental Industrial Hygienist's (ACGIH) threshold limit value-time weighted average (TLV-TWA), whichever is the lowest. The MSDS for the material must always be consulted prior to use in order to determine these values. The following is meant to be a guideline for fume hood use.

Risk Assessment: An adequately operating chemical fume hood, together with good laboratory work practices will keep exposure of employees/students to hazardous chemicals below regulated limits. If there is ever any doubt as to whether either the (PEL) or (TLV-TWA) exposure levels will be exceeded, the work must be performed in a properly functioning fume hood.

Step By Step Operating Procedure: The following are work practices that must be adhered to by all employees/students if proper hood performance is to be achieved. They should be posted in each room containing a chemical fume hood:

- Know the hazard characteristics of the chemicals with which you are working. Consult the MSDS or contact EH&S if you have questions. Be sure to wear all personal protective equipment (e.g., safety goggles, gloves, lab coat, etc.). Chemical fume hoods are not intended to replace PPE.
- Never lean into the hood as to allow your head to enter the plane of the hood face.
- Do not allow equipment inside the hood to block airflow through the baffles.
- Keep materials at least six (6) inches inside the hood face.
- Do not permanently store materials inside the hood. Store materials in approved storage cabinets. Utilize only the quantities or amounts necessary.
- Do not remove hood sash panels unless work to be performed does not involve hazardous materials.
- Maintain sash heights at optimal levels as reflected on frame arrows.
- Never use a hood tagged as not functioning properly or "Out of Service".
- All hoods should be spot checked by user prior to performing work by placing a sheet of paper at the face of the hood. Movement of air to the interior of the hood would be an indication that the ventilation system is operational at the time.

Emergency Procedures: If a hood is found to be nonfunctioning or functioning improperly please discontinue use immediately and contact your building Facilities Manager and EH&S @ 334-4357.

UNCG Laboratory Operating Procedures / Safe Lab Equipment Use Procedures

PI / Teaching Lab Coordinator:

Lab / Room #:

Process Description: Equipment and appliances which are stored or used as part of the laboratory operations.

Risk Assessment:

Hazard assessment for work with lab equipment and appliances should assure that all staff understand proper use and handling precautions; and are instructed in the safe use of the equipment according to manufacturer's recommendations. In addition, any equipment or appliance that is not working properly must be denoted, and use discontinued until repair or replacement.

Safety Equipment:

> **Engineering / Ventilation Controls:** All lab equipment and appliances shall be used in accordance with manufacturer's recommendations.
>
> **PPE:** Lab coats, eye protection, and closed toed shoes and long sleeved clothing should be worn in labs at all times. Eye protection in the form of safety glasses/goggles must be worn at all times when utilizing equipment which could generate splashes or flying particles.

Designated Use Area: All equipment and appliances must be stored in a secure designated area.

Special Handling / Storage Requirements:

Microwave Oven Use – Microwave ovens in the laboratory are for research purposes only, no food items are allowed. Contact EH&S if replacement stickers are needed. Use extreme caution when opening the door and handling items after heating. Liquids maybe superheated and boil over suddenly. Use eye protection and insulated gloves

Plant Growth Chambers- Use extreme caution and eye protection when changing light tubes in growth chambers, as tubes may explode violently when broken. Removing and inserting tubes into receptacles must be done with caution. If changing a tube greater than 4 feet long, an assistant is recommended.

Emergency Procedures:

Please report any malfunctioning or defective equipment or appliances immediately. If an inhalation hazard, irritant, oxidizer, asphyxiant or other hazardous component is released into the atmosphere, vacate the laboratory immediately and call the UNCG Police 4-4444 for response.

Step By Step Operating Procedure: Dependent upon the operation.