



Georgia Highlands College

CHEMICAL HYGIENE PLAN

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This Document and all of its contents has been approved by:

Dr. Renva Watterson- Vice President for Academic Affairs

Ginni Siler- Vice President/ Chief Human Resources Officer

Dr. Greg Ford- Dean of Natural Science and Physical Education

Michelle Boyce – Dean of Health Sciences

David Horace- Chief of Police GHC

Phillip Kimsey- Director of Physical Plant and Environmental Safety Officer

Jason Christian- Lab Safety Officer/ Lab Manager/ RTK Coordinator

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Purpose and Scope

The Occupational Health and Safety Administration (OSHA) promulgated the final rule for the occupational exposures to hazardous chemicals in laboratories effective May 1, 1990. The Occupational Exposure to Hazardous Chemicals in Laboratories Standard (29 CFR 1910.1450), referred to as the Laboratory Standard, specifies the mandatory requirements of a Chemical Hygiene Plan (CHP) to protect laboratory workers from harm due to hazardous chemicals. The CHP is a written program stating the policies, procedures and responsibilities that protect workers from the health hazards associated with the hazardous chemicals used in that particular workplace.

This CHP is therefore intended to ensure that GHC is in compliance with the all applicable State and Federal Laws including the Right-to-Know Act and the Laboratory Standard. The primary objective of this document is to provide a general guide for handling hazardous chemicals in the laboratories; and also to establish basic safety principles for laboratory procedures, equipment and work practices that are capable of protecting employees from both physical and health hazards that may be associated with the use of hazardous chemicals in the laboratory.

This Plan contains Standard Operating Procedures (SOP), standard laboratory safe handling and storage requirements, circumstances that require prior approval, provisions for work with particularly hazardous substances, emergency/medical attention and surveillance, standard laboratory facility requirements and standard repair/close-out/decommissioning procedures. [Appendix A](#) contains a list of acronyms used throughout this document.

This Plan is intended to protect faculty, staff and students, as appropriate, from harm due to exposure to hazardous chemicals while they are working in GHC laboratories. Furthermore, this Plan is designed to keep threshold limit values (TLV) or permissible exposure limits (PEL) below the allowable levels.

This document is intended to highlight only those measures necessary for achieving a safe and healthy work environment. Where the 'scope of hazards' are not adequately addressed by this general document, specific SOPs will be developed. This document hereafter shall be known as the Georgia Highlands College Chemical Hygiene Plan. (GHC-CHP)

Definitions

Chemical Hygiene Plan: A written program that sets forth procedures, equipment, personal protective equipment (PPE) and work practices designed to protect employees from health hazards associated with chemicals used in the work place.

Employee: For GHC's purposes, an employee shall be defined as any individual employed in a lab workplace, whether he/she is paid or volunteer, who may be exposed to hazardous chemicals in the completion of his/her assignments. Student assistants and directed study/research students are considered employees; however, students taking lab classes are not.

Hazardous Chemicals: Any chemical, chemical compound or mixture of compounds which presents a physical and/or health hazard.

Health Hazard Chemicals: A chemical for which there is statistically significant evidence, based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. These include carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic systems, and agents which damage the lungs, skin, eyes, or mucus membranes.

Laboratory: A facility where the 'laboratory use of hazardous chemicals' occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.

Laboratory –Type Hood (fume hood): A 5-sided enclosure with a movable sash, constructed and maintained to draw air from the lab and to prevent or minimize the escape of air contaminants into the lab. It allows for chemical manipulations within the enclosure with only insertion of the employee's hands and arms into the front.

Physical Hazard Chemical: A chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, an explosive flammable, an organic peroxide, an oxidizer, an explosive, a pyrophoric, an unstable reactive or a water reactive.

Primary Barrier: Safety equipment, such as biosafety cabinets, designed to remove or minimize exposure to hazardous biological materials.

Protective Lab Practice and Equipment: Those laboratory procedures, practices and equipment accepted by laboratory health and safety experts as effective, or that the employer can show to be effective, in minimizing the potential for employee exposure to hazardous chemicals.

Secondary Barrier: Safety equipment, such as autoclaves, designed to protect the surrounding community from exposure to hazardous biological materials.

Employee Rights

It is the employee's right under the Georgia State Law "Public Employee Hazardous Chemical Protection and Right To Know Act of 1988", Official Code of Georgia Annotated (O.C.G.A) Chapter 45-22-1, and the Georgia Department of Labor (GDOL) Safety Engineering "Public Employee Hazardous Chemical Protection and Right to Know Rules" Chapter 300-3-19 to receive information about the known physical and health hazards of the hazardous chemicals in their specific work areas and to receive adequate training to work safely with these chemicals.

Hazardous Waste Management

The two (2) primary regulatory drivers for hazardous waste at Georgia Highlands College are the U.S. Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA) Rules and the Georgia Environmental Protection Division (EPD) Rules for Hazardous Waste Management.¹ A brief summary of these rules follows.

1. Resource Conservation and Recovery Act (RCRA); Title 40 of the Code of Federal Regulations (40 CFR), Parts 260-268, 273 and Part 279 and Parts 124 or 270. In 1976, Congress adopted RCRA to actively take for promoting the recovery and reuse of wastes as important resources and ensuring the proper disposal of hazardous and non-hazardous wastes. In essence, RCRA is the Federal regulatory program for *waste management*. As with many federal statutes, certain individual states are delegated the responsibility to implement the regulations and manage wastes, but the EPA still provides oversight.

RCRA was designed for the management of both hazardous and non-hazardous wastes. RCRA introduced the concept of "cradle to grave" responsibility for hazardous waste. RCRA includes requirements for:

- a. *Identifying the characteristics of hazardous wastes*: Any wastes meeting certain characteristics (ignitable, corrosive, reactive, or toxic) are considered "hazardous waste" and must be managed as such. These are often referred to as "characteristic wastes".
- b. *Specifying certain contaminants and process streams as hazardous waste*: These are often referred to as "listed wastes". Lists of hazardous wastes identified by the EPA are as follows:
 - i. Source-specific list (e.g. wastes from petroleum refining, metal fabrication, etc.; these are often referred to as K-wastes)
 - ii. Non-source-specific list (e.g. degreasing solvents, etc.; these are often referred to as F-wastes)
 - iii. Discarded commercial chemical products and spill residues (these are often referred to as P- and U-wastes; P-wastes are also known as "acutely hazardous wastes")

The standards are applicable to generators and transporters of hazardous waste and operators of treatment, storage, and disposal facilities.

Hazardous waste is defined as any solid waste (including liquids, sludges, gases, etc.) that meet the following criteria (materials that will be used in a product are exempted, provided that all of the material is so used):

- a. Waste that causes, or significantly contributes to, an increase in mortality or serious irreversible or incapacitating reversible illness, or
- b. Waste that poses a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Hazardous waste generators are responsible for identifying whether their wastes are listed or if they have specific hazardous characteristics. Mixing hazardous wastes with non-hazardous wastes, to dilute them, causes the entire mixture to be classified as hazardous waste. Some solid waste is exempt from being classified as hazardous waste, including household waste, overburden and spoil returned to the original mine site, petroleum exploration drilling waste, agricultural waste returned to the soil as fertilizer, etc.

¹ http://www.usg.edu/ehs/programs/haz_waste.pdf

RCRA requires that hazardous waste be tracked and managed from the point of generation (“cradle”) to its ultimate disposal point (“grave”). The waste generator is the principal party responsible for meeting the requirements of this law. Generators must obtain a “generator ID number” (discussed in Section 6) from either the EPA or the state-delegated regulatory entity (in Georgia, the EPD). This number must be listed on hazardous waste manifests for all hazardous wastes shipped off-site. The manifest also requires a certification statement that all efforts have been taken to minimize the waste quantity and associated hazards. The manifest accompanies the waste to its disposal site, and copies are returned to the generator and the appropriate agency.

Federal and state laws prohibit the disposal of untreated hazardous wastes in landfills. Locations disposing of those wastes must notify their waste haulers and treatment, storage and disposal facilities about how to treat their wastes before disposing of them. The purpose of this restriction is to prevent health and environmental threats caused by leaking landfills. Land Disposal Restrictions (LDR) applies to wastes that exhibit specific characteristics or are listed in the regulations as a hazardous waste (discussed later in the section entitled “Making the Waste Determination”). The EPA has set standards for treating hazardous wastes before land disposal. The standards require that either one or more specific treatment methods are used or that wastes are treated until hazardous constituents are reduced to specific concentrations.

LDR requirements for notification and record keeping for hazardous waste generators can be found in 40 CFR 268.7 (a). Please note that conditionally exempt small quantity generators (discussed later in section entitled “Determining Generator Status”) are exempt from LDR. Most waste management companies will require you to sign one of their own LDR forms as part of their service procedures. Before you ship hazardous waste, contact the waste management company to see if they require use of their own LDR forms. Whether you use your own form or one provided by a waste management company, you are ultimately responsible for completing a LDR for each hazardous waste shipment.

2. Georgia Environmental Protection Division; Rules for Hazardous Waste Management, Chapter 391-3-11. The U.S. Environmental Protection Agency has granted authority to the Georgia Environmental Protection Division (EPD) to implement and enforce hazardous waste management rules within the state of Georgia. EPD has implemented rules that establish policies, procedures, requirements, and standards to implement the Georgia Hazardous Waste Management Act, O.C.G.A. 12-8-60, et seq. These rules essentially adopt the federal RCRA regulations and are promulgated for the purpose of protecting and enhancing the quality of Georgia's environment and protecting the public health, safety and well being of its citizens.

Generator Status

Georgia Highlands College is classified as a *Conditionally Exempt Small Quantity Generator (CESQG)* according to the EPA and GA EPD. This category applies to a generator of hazardous waste that generates less than 100 kilograms (220 lbs.) of hazardous waste and less than One kilogram (2.2 lbs.) of acutely hazardous waste per calendar month.

GEORGIA EPD & U.S. EPA REGULATIONS FOR HAZARDOUS WASTE GENERATORS	
	Conditionally Exempt Small Quantity Generators
Quantity Limits for Waste Generation	<100 Kg/mo (<220 lbs/mo) < 1 Kg acute (<2.2 lbs/mo)
Manifest/Continuation Pg.	Not Required
On-Site Storage Limits	May Accumulate up to 999 Kg.

Storage Requirements	None
Satellite Accumulation	Not Applicable
Personal Training	Not Required
Contingency Plan	Not Required

Standard Operating Procedures for Laboratory Chemicals

Chemical Storage

Received chemicals shall be immediately moved to the designated storage area. Large glass containers shall be placed in carrying containers or shipping containers during transportation.

The storage area shall be well-illuminated, with all storage maintained below eye level. Large bottles shall be stored no more than three feet from ground level.

Chemicals shall be segregated by compatibility and hazard classification in a well-identified area, with local exhaust ventilation.

Mineral acids should be separated from flammable and combustible materials. Separation is defined in NFPA 49 as storage within the same fire area but separated by as much space as practicable or by intervening storage from incompatible materials (see Appendix A for list of incompatible chemicals)

Acid-resistant trays shall be placed under bottles of mineral acids.

Acid-sensitive materials such as cyanides and sulfides shall be separated from acids or protected from contact with acids.

Highly toxic chemicals or other chemicals whose containers have been opened shall be stored in unbreakable secondary containers.

The storage area shall be accessible during normal working hours. The chemical storage area is under the control of the Laboratory Coordinator assigned to the specific locality, as well as the Laboratory Manager.

The amounts of chemicals at the laboratory bench shall be as small as practical.

Stored chemicals shall be examined at least annually by the Lab Safety Officer/Lab Coordinator for replacement, deterioration and container integrity. The inspection should determine whether any corrosion, deterioration, or damage has occurred to the storage facility as a result of leaking chemicals.

Periodic inventories of chemicals outside the storage area shall be conducted by lab personal. Unneeded items shall be properly discarded or returned to the storage area.

Chemical Handling

Each laboratory employee with the training, education and resources provided by supervision, shall develop and implement work habits consistent with this CHP to minimize personal and coworker exposure to the chemicals in the laboratory. Based on the realization that all chemicals inherently present hazards in certain conditions, exposure to **all** chemicals shall be minimized.

General precautions which shall be followed for the handling and use of all chemicals are:

1. Skin contact with all chemicals shall be avoided.
2. All employees shall wash all areas of exposed skin prior to leaving the laboratory.
3. Mouth suction for pipeting or starting a siphon is prohibited.

4. Eating, drinking, smoking, gum chewing, or application of cosmetics in areas where laboratory chemicals are present shall be avoided. Hands shall be thoroughly washed prior to performing these activities.
5. Storage, handling and consumption of food or beverages shall not occur in storage areas, refrigerators, glassware or utensils also used for laboratory operations.
6. Risk determinations shall be conservative in nature.
7. Any chemical mixture shall be assumed to be as toxic as its most toxic component.
8. Substances of unknown toxicity shall be assumed to be toxic.

Laboratory employees shall be familiar with the symptoms of exposure for the chemicals with which they work and the precautions necessary to prevent exposure.

In all cases of chemical exposure, neither the Permissible Exposure Limits (PELs) of OSHA or the Threshold Limit Values (TLVs) of the American Conference of Government Industrial Hygienists (ACGIH) shall be exceeded.

The safety equipment in the laboratory shall be utilized and inspected..

Specific precautions based on the toxicological characteristics of individual chemicals shall be implemented as deemed necessary by the Lab Safety Officer/ Lab Coordinator.

Laboratory Equipment and Glassware

Each employee shall keep the work area clean and uncluttered. All chemicals and equipment shall be properly labeled. At the completion of each workday or operation, the work area shall be thoroughly cleaned and all equipment properly cleaned and stored.

In addition, the following procedures shall apply to the use of the laboratory equipment:

1. All laboratory equipment shall be used only for its intended purpose.
2. All glassware will be handled and stored with care to minimize breakage; all broken glassware will be immediately disposed of in the broken glass container.
3. All evacuated glass apparatus shall be shielded to contain chemicals and glass fragments should implosion occur.
4. Labels shall be attached to all chemical containers, identifying the contents and related hazards.
5. Waste receptacles shall be identified as such.
6. All laboratory equipment shall be inspected on a periodic basis and replaced or repaired as necessary.

Personal Protective Equipment

1. Safety glasses must be worn in the lab when safety precautions for the activity require it. In general, if anyone using glassware, heat, sharps, projectiles and/or hazardous materials, or any other activity that may cause injury to the eye, everyone in the room is required to wear safety glasses. The glasses must be of the impact protection type with splash guards and must meet ANSI Z87.1 specifications. Other eye/face protection may be required with specific procedures. All students will be provided with their first pair for free out of their student fees, after that they will need to purchase their own, as extras may or may not be available in the lab.
2. Contact lenses are discouraged. The safety of wearing contact lenses in laboratories has been hotly debated over the last several years. Both the ACS and OSHA have issued statements indicating that contact lenses can be worn if and only if proper protective eyewear is also worn. In addition, they cannot be worn when working with specific chemicals or situations. The College recognizes that some eye conditions require contacts for certain vision correction therapies.

However, students who choose to wear contacts must recognize the inherent increased risks - they are difficult to remove if chemicals get in the eye, they have a tendency to prevent natural eye fluids from removing contaminants, and sudden displacement can cause visual problems that create additional hazards. Soft contact lenses are especially problematic because they can discolor and also absorb chemical vapors causing damage before the wearer is alerted to the problem. If you choose to wear contacts, please tell your lab instructor or PI and check the procedure you are doing.

3. Appropriate gloves will be provided when needed. Use of gloves is required for handling chemicals, microorganisms, chemically preserved specimens, and any biohazard materials.
4. Remove your gloves and wash your hands before exiting a lab room. Do not wear your gloves in the hallway. Use the "one glove rule" when transporting materials in the hall (one glove to handle material and one ungloved hand to open doors etc....)
5. Appropriate clothing is required. Your clothing is a barrier between your skin and chemicals. No bare midriffs. You must be covered to the ankle to protect your legs. Knee length shorts and dresses are only acceptable in labs where chemicals are not being used, but not recommended. Lab coats are recommended and are available in each lab.
6. Shoes must be worn. No sandals open toed or open heeled shoes. Shoes must cover the entire foot.
7. Secure loose clothing and long hair when working with equipment, open flame, any chemicals or biological substances.
8. Do not eat, drink (including coffee cups, sport bottles and water bottles). Do not store food in the labs.
9. Do not apply cosmetics in the lab. You should avoid touching your eyes and mouth in the lab.
10. Smoking or use of other tobacco products is prohibited.
11. Wash hands after working with chemicals and biological agents.
12. It is the recommendation of this department that all students of reproductive age, especially women who have recently conceived or are anticipating conception during the semester, discuss the course content and reagents with their physician if they have any concerns.
13. Thermal-resistant gloves shall be worn for operations involving the handling of heated materials and exothermic reaction vessels. Thermal-resistant gloves shall be non-asbestos and shall be replaced when damaged or deteriorated.

Personal Work Practices

Laboratory supervision must ensure that each employee knows and follows the rules and procedures established in this plan.

All employees shall remain vigilant to unsafe practices and conditions in the laboratory and shall immediately report such practices and/or conditions to the laboratory supervisor. The supervisor must correct unsafe practices and/or conditions promptly.

1. Long hair and loose-fitting clothing shall be confined close to the body to avoid being caught in moving machine/equipment parts.
2. Use only those chemicals appropriate for the ventilation system.
3. Avoid unnecessary exposure to all chemicals by any route.
4. Do not smell or taste any chemicals.
5. Encourage safe work practices in coworkers by setting the proper example. Horseplay is strictly forbidden.
6. Seek information and advice from knowledgeable persons, standards and codes about the hazards present in the laboratory. Plan operations, equipment and protective measures accordingly.
7. Inspect personal protective equipment prior to use, and wear appropriate protective equipment as procedures dictate and when necessary to avoid exposure.

Labeling

Any container that is not empty has to have a label. Even if it is just water, it has to say so. Labels for secondary containers have to be in the following form:

1. Chemical name, and formula
2. Concentration
3. Date prepared
4. Your initials
5. Hazard warning (flammable, oxidizer, poison, health hazard, etc). Add the specific hazard if it is known or listed in the SDS (carcinogenic, etc.)
6. **Never** have a container of any kind unlabeled, for any length of time (even if it is only water).
7. Any item that could be used for human consumption must be labeled NOT FOR HUMAN CONSUMPTION

Criteria for Implementation of Control Measures

Housekeeping

Each laboratory worker is directly responsible for the cleanliness of his or her workspace, and jointly responsible for common areas of the laboratory. Laboratory management shall insist on the maintenance of housekeeping standards.

The following procedures apply to the housekeeping standards of the laboratory:

1. All spills on lab benches or floors shall be immediately cleaned and properly disposed. Large spills will necessitate the implementation of the Emergency Action Plan per OSHA 1910.38 and 1910.120.
2. The lab benches shall be kept clear of equipment and chemicals except those necessary for the work currently being performed.
3. The work area shall be cleaned at the end of each operation and each lab.
4. All apparatus shall be thoroughly cleaned and returned to storage upon completion of usage.
5. All floors, aisles, exits, fire extinguishing equipment, eyewashes, showers, electrical disconnects and other emergency equipment shall remain unobstructed.
6. All labels shall face front.
7. Chemical containers shall be clean, properly labeled and returned to storage upon completion of usage.
8. All chemical wastes will be disposed of in accordance with the waste disposal plan.

Storage and Disposal of Hazardous Waste

The following are general guidelines for hazardous waste storage and disposal:

1. Waste should be segregated and collected according to its hazard category.
2. A satellite accumulation area should be set up in each lab and used as the storage location of the wastes.
3. Waste containers should have tight fitting caps.
4. All waste should be properly labeled as hazardous or non-hazardous.
5. Caps should be on waste containers at all times except when adding waste to the container.
6. Once a hazard waste container is full, it may be transferred to the hazardous material storage area until pickup for disposal.

Safety and Emergency Equipment

Telephone numbers of emergency personnel, supervisors and other workers as deemed appropriate have been posted.

Location signs for safety and emergency equipment have been posted.

A. Basic Steps for Emergency and Spill Response

The release of hazardous substances that pose a significant threat to health and safety, or that by their very nature require an emergency response regardless of the circumstances surrounding their release, or

the mitigating factors, are emergency situations. For GHC's purposes, the following definitions designate an emergency situation:

- i. The situation is unclear to the person discovering or causing the spill.
- ii. The release requires evacuation of persons.
- iii. The release involves or poses a threat of fire, explosion, a condition of immediate danger to life and health, high levels of exposure to toxic substances and/or other imminent danger.
- iv. The person(s) in the work area are uncertain if they can handle the severity of the hazard with the PPE and response equipment that has been provided and/or the exposure limit could easily be exceeded.

Conversely, releases that do not pose a significant threat to health and safety, or that do not have the potential to become emergencies in a short period are not considered as emergency situations. The following situations ARE NOT emergency situations:

- i. The person(s) discovering or causing the release understands the properties and can make an informed decision as to the exposure level.
- ii. The release can be appropriately cleaned up by lab personnel using authorized spill kit.
- iii. The materials are limited in quantity, exposure potential or toxicity and present minor health or safety hazards.
- iv. Incidental releases of hazardous substances that are routinely cleaned up by EHS or trained faculty/staff from outside of the immediate release area are not considered an emergency.

B. Emergency Situation – Fire

The following steps shall be basic protocol for handling a fire or fire-related situation in the laboratory:

- i. Pull the fire alarm.
- ii. Evacuate the area.
- iii. Call Campus Safety at 706-252-4813 from a safe location.
- iv. Notify the Lab Safety officer.

C. Emergency Situation – Chemical Spill

The following steps shall be basic protocol for handling a chemical spill.

If you are unsure how to proceed, if the chemical is of high toxicity or flammability, or more than 1 liter is spilled, then execute the following:

- i. Isolate the spill area.
- ii. Remove ignition sources and shut down equipment.
- iii. Evacuate personnel from the spill area and notify adjoining labs.
- iv. Establish exhaust ventilation to the outside of the building, if possible (open windows, etc).
- v. Call Campus Safety at 706-252-4813 from a safe location.
- vi. Notify the Lab Safety officer for further clean up procedures 940-273-9710.

Evacuation of the building is mandatory if chemicals or contaminants could enter the air circulation system of the building.

D. Emergency Situation – Body Splash

- i. Remove person(s) from the spill area to fresh air if doing so does not present a danger to rescuers.
- ii. Remove contaminated clothing while leading victim to an emergency shower.
- iii. Flood affected skin area with water for at least 15 minutes; longer if pain persists.
- iv. Wash skin with soap and water only.
- v. Call 911 then Campus Safety at 706-252-4813 who will contact emergency response personnel. Assure that they know the name of the chemical(s) involved.
- vi. Send a copy of the SDS with the victim.

E. Emergency Situation – Eye Splash

- i. Remove person(s) from the spill area to fresh air if doing so does not present a danger to rescuers.
- ii. Lead the victim immediately to an emergency eyewash station.
- iii. Hold eye lids open.
- iv. Flush eyes with water for 15 minutes or longer if pain persists.
- v. Call 911 then Campus Safety at 706-252-4813 who will contact emergency response personnel. Assure that they know the name of the chemical(s) involved.
- vi. Anyone with an eye injury must seek medical treatment. Send a copy of the SDS with the victim.

F. Emergency Situation – Other Spills – Mercury

For very small spills, (e.g. broken thermometers) use a mercury emergency spill kit or a trapped vacuum line attached to a trapped tapered glass tube, similar to a medicine dropper, to pick up the mercury droplets.

- i. Do not use a domestic or commercial vacuum cleaner.
- ii. Cover small droplets in accessible areas with one of the following:
 - a. Sodium Ash
 - b. Powered Sulfur
 - c. Silver Metal Compounds
 - d. Dry ice to freeze mercury droplets
- iii. Place spill residue in a proper container for hazardous waste pickup.

Note: For Large spills (greater than 1cc) contact the Lab Safety Officer for spill cleanup, instructions or assistance.

G. Spill Kits

Ready access to a chemical spill kit is required in laboratories working with hazardous chemicals. Each employee should be trained in how to use the kit. Minimally, the kit should contain the following:

- i. Resistant splash goggles,
- ii. Chemical resistant gloves,
- iii. Plastic bags and scoop,
- iv. Multi-chemical adsorbent (enough for a 2 gallon spill).

H. Non-Emergency Situation – Spill

If the spill is less than 1 liter and the chemical involved is of low toxicity and low flammable hazard, the material should be handled in the following manner:

- i. Locate the spill.
- ii. Contain or confine the spill.
- iii. Wear gloves, apron, coveralls and protective eye wear.
- iv. Wear boots if needed.
- v. Use a fitted respirator if there is an inhalation exposure above the PEL.

I. Non-Reactive Spills

If the spill is non-reactive, handle in the following manner:

- i. Cover liquid spill with spill kit absorbent, scoop into plastic bag for disposal.
- ii. Sweep solid materials into dust pan and place in a sealed container.
- iii. Dispose of the container in the normal trash as long as the material is non-hazardous and non-volatile.

J. Reactive or Potentially Reactive Spills

If the spill is reactive or has the potential to be reactive, handle it in the following manner:

- i. Cover liquid spills with spill kit absorbent and scoop into appropriate disposal container for hazardous waste disposal.
- ii. Wet mop dry substances to avoid spreading hazardous dust, provided it is not water reactive. Dispose of it as hazardous waste.

K. Power Outages

If Emergency lighting and fire alarms ARE NOT operable, evacuate the building after carrying out the following procedures:

- i. Make sure the lids on all open containers.
- ii. Lower the sash on chemical fume hoods.
- iii. Shut down all equipment (leave cooling water and purge gases on as necessary).
- iv. Turn off all ignition sources.
- v. Secure or isolate reactions that are underway (boiling liquids on a hot plate, distillations, etc.).
- vi. Close fire doors.
- vii. Take your personal belongings with you.
- viii. Lock outside door to the lab.

Note: In anticipation of possible power outages, have a flash light or other lighting source conveniently located. Make sure that the emergency contact information for the laboratory is current.

If the power outage is more than 15 minutes, the building must be evacuated.

L. Minor First Aid

First Aid kits should be available in the laboratories and stocked with essential supplies. Essential supplies should include at minimum various sizes of adhesive bandages, gauze, sterile pads, forceps, scissors, tape, antiseptic wipes and a cold pack. The following guidelines should be followed when administering minor first aid:

- i. Do not dispense or administer any medications, including aspirin.
- ii. Do not apply any ointments or creams to burns or wounds. Use cool water.
- iii. Consult the SDS for chemical specific first aid information.

Laboratory Hoods

The laboratory hoods shall be utilized for all chemical procedures which might result in release of hazardous chemical vapors or dust. As a general rule, the hood shall be used for all chemical procedures involving substances which are appreciably volatile and have a permissible exposure limit (PEL) less than 50 ppm.

The following work practices shall apply to the use of hoods:

1. Confirm adequate hood ventilation performance prior to opening chemical containers inside the hood. An inward flow of air can be confirmed by holding a piece of paper at the face of the hood and observing the movement of the paper.
2. Keep the sash of the hood closed at all times except when adjustments within the hood are being made. At these times, maintain the sash height as low as possible.
3. Storage of chemicals and equipment inside the hood shall be kept to a minimum.
4. Minimize interference with the inward flow of air into the hood.
5. Leave the hood operating when it is not in active use if hazardous chemicals are contained inside the hood or if it is uncertain whether adequate general laboratory ventilation will be maintained when the hood is non-operational.
6. The ventilation system shall be inspected every three months. The hood face velocity shall be maintained above 60. A record of each inspection shall be maintained by the Lab Coordinator.
7. The hood shall not be used as a means of disposal for volatile chemicals.

Storage Cabinets

Storage cabinets for flammable and hazardous chemicals will be ventilated as needed.

Employee Information and Training

Hazard Information

All employees will be apprised of the hazards presented by the chemicals in use in the laboratory. Each employee shall receive training at the time of initial assignment to the laboratory, prior to assignments involving new exposure situations, and at a regular frequency as determined by the Lab Safety Officer.

Forms

The forms in Appendices F–H entitled “New Employee Chemical Hygiene Orientation and Training Checklist”, and “Transfer Chemical Hygiene Training Checklist” shall be used for these purposes.

Training

This training shall include methods of detecting the presence of a hazardous chemical, physical and health hazards of chemicals in the lab, and measures employees can take to protect themselves from these hazards. The training shall present the details of the Chemical Hygiene Plan, and shall include:

1. the contents of the OSHA laboratory standard, and its appendices;

2. the location and availability of the Chemical Hygiene Plan;
3. the permissible exposure limits for OSHA regulated substances or recommended exposure values for other hazardous chemicals not regulated by OSHA which are present in the laboratory;
4. signs and symptoms associated with exposure to the chemicals present in the laboratory;
5. location and availability of reference material on chemical hygiene;

Off-Hours Work Procedures

Laboratory personnel are not permitted to work after hours in the lab, except when permitted by the Lab Safety Officer.

Sole Occupancy

When only one person works in the laboratory, cross-checks to ensure safety by a second person are necessary.

Hazardous Work

All hazardous operations are to be performed during a time when at least two personnel are present at the laboratory. At no time shall a laboratory person, while working alone in the laboratory, perform work which is considered hazardous. The determination of hazardous operations shall be made by the laboratory supervisor and permitted or denied.

Medical Consultations and Examinations

An opportunity to receive medical attention is available to all employees who work with hazardous chemicals in the laboratory. The opportunity for medical attention will be made available to employees under the following circumstances:

Whenever an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory,

Medical surveillance programs will be established where exposure monitoring reveals an exposure level above the action level for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements, and/or,

Whenever an event takes place in the laboratory such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure the employee will be provided an opportunity for medical consultation for the purpose of determining the need for medical attention.

Chemical Hygiene Responsibilities

Georgia Highlands College

Georgia Highlands College has the ultimate responsibility for chemical hygiene throughout the institution and will provide continued support for chemical hygiene.

The Environmental Health and Safety Committee

The Environmental Committee and the Lab Safety Officer shall:

1. work with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices,
2. monitor procurement and use of chemicals in the lab, including determining that facilities and training levels are adequate for the chemicals in use,
3. perform regular, formal chemical hygiene and housekeeping inspections including inspections of emergency equipment,
4. help project directors develop precautions and adequate facilities,

5. review and improve the Chemical Hygiene Plan on an annual basis,
6. maintain overall responsibility for the laboratory operation,
7. ensure that workers know and follow the chemical hygiene rules,
8. determine the proper level of personal protective equipment, ensure that such protective equipment is available and in working order,
9. ensure that appropriate training has been provided.
10. monitor the waste disposal program.

Record Keeping

Accident investigations will be conducted by the immediate supervisor with assistance from other personnel as deemed necessary.

Accident reports will be rewritten and retained for five years by the Lab Safety Officer.

Inventory and usage records for high-risk substances (amounts of substances on-hand, amounts used and names of workers involved) shall be maintained for two years by the Lab Safety Officer.

Records of inspections of equipment will be maintained for two years by the Lab Safety Officer.

Records of employee training will be maintained for two years by the Lab Safety Officer.

Appendix A

Chemical Incompatibilities

When certain hazardous chemicals are stored or mixed together, violent reactions can occur because the chemicals are unsuitable for mixing or are incompatible to each other. Classes of incompatible chemicals should be segregated from each other during storage. Use the following general guidelines for hazard class storage:

- Flammable/Combustible Liquids and Organic Acids
- Flammable Solids
- Mineral Acids
- Caustics
- Oxidizers
- Perchloric Acid
- Compressed Gases

Before mixing any chemicals, refer to this partial list, the chemicals' MSDS's or call EHS to verify compatibility:

<u>Chemical</u>	<u>Incompatible Chemicals</u>
A	
Acetic acid	aldehydes, bases, carbonate, hydroxides, metals, oxidizers, peroxides, phosphates, xylenes
Acetylene	halogens, mercury, potassium, oxidizers, silver
Acetone	acids, amines, oxidizers, plastics
Alkali and alkaline	acids, chromium, ethylene, halogens, hydrogen, mercury, earth metals, nitrogen, oxides, plastics, sodium chloride, sulfur
Ammonia	acids, aldehydes, amides, halogens, heavy metals, oxidizers, plastics, sulfur
Ammonium	Acids, alkalis, chloride salts, combustible materials, metals, nitrate, organic materials, phosphorus, reducing agents, urea
Aniline	acids, aluminum, dibenzoyl peroxide, oxidizers, plastics
Azides	acids, heavy metals, plastics
B	
Bromine	acetylaldehydes, alcohols, alkalis, amines, combustible materials, ethylene, fluorine, hydrogen, ketones, metals, sulfur
C	
Calcium oxide	acids, ethanol, fluorine, organic metals
Carbon (activated)	alkali metals, calcium hypochlorite, halogens, oxidizers
Carbon tetrachloride	Benzoyl peroxide, ethylene, fluorine, metals, oxygen, plastics, silanes
Chlorates	Powdered metals, sulfur, finely divided organic or combustibles
Chromic acid	Acetone, alcohols, alkalis, ammonia, bases
Chromiumtrioxide	Benzene, combustible materials, hydrocarbons, metals, organic materials, phosphorus, plastics
Chlorine	Alcohols, ammonia, benzene, combustible materials, flammable compounds (hydrazine), hydrocarbons, (acetylene,

	ethylene, etc.), hydrogen peroxide, iodine, metals, nitrogen, oxygen, sodium hydroxide
Chlorine dioxide	hydrogen, mercury, organic materials, phosphorus, potassium hydroxide, sulfur
Copper	Calcium, hydrocarbons, oxidizers
Cyanides	acids, alkaloids, aluminum, iodine, oxidizers, strong bases
F	
Flammable liquids	Ammonium nitrate, chromic acid, hydrogen peroxide, halogens, nitric acid, sodium peroxide
Flourine	Alcohols, aldehydes, ammonia, combustible materials, hydrocarbons, ketones, metals, organic acids
H	
Hydrofluoric acid	Metals, organic materials, plastics, silica
Hydrogen peroxide	Acetylaldehyde, acetic acid, acetone, alcohols, aniline, carboxylic acid, combustible materials, metals, nitric acid, organic compounds, phosphorus, sulfuric acid, sodium
Hydrogen sulfide	Acetylaldehyde, metals, oxidizers, sodium
Hypochlorites	Acids, activated charcoal
Hydrocarbons	Acids, bases, oxidizers, plastics (butane, benzene, propane, turpentine, etc)
I	
Iodine	Acetylaldehyde, acetylene, ammonia, metals, sodium
M	
Mercury	Acetylene, aluminum, amines, ammonia, calcium, fulminic acid, lithium, oxidizers, sodium
N	
Nitrates	Acids, metals, nitrites, sulfur, sulfuric acid
O	
Oxalic acid	Oxidizers, silver, sodium chlorite
Oxygen	Acetaldehyde, secondary alcohols, alkalis, alkalines, ammonia, carbon monoxide, combustible materials, ethers, flammable materials, hydrocarbons, metals, phosphorus, polymers
P	
Perchloric acid	Acetic acid, alcohols, aniline, combustible materials, dehydrating agents, ethyl benzene, hydrochloric acid, hydriotic acid, iodides, ketones, organic materials, oxidizers, pyridine
Peroxides (organic)	Acids
Phosphorus (white)	Oxygen
Potassium	Acetylene, acids, alcohols, halogens, hydrazine, mercury, oxidizers, selenium, sulfur
Potassium chlorate	Acids, ammonium, combustible materials, fluorine, hydrocarbons, metals, organic materials, sugars
Potassium	(see chlorates incompatibility), hydrazine, reducing agents, perchlorate, sulfuric acid
Potassium	Benzaldehyde, ethylene glycol, glycerol, sulfuric acid, permanganate
S	
Silver	Acetylene, ammonia, oxidizers, ozonides, peroxyformic acid
Sodium	Acids, hydrazine, metals, oxidizers, water
Sodium nitrate	Acetic anhydride, acids, metals, organic matter, peroxyformic acid, reducing agents

Sodium peroxide	Acetic acid, benzene, hydrogen sulfide metals, oxidizers, peroxyformic acid, phosphorus, reducing agents, sugars, water
Sulfides	acids
Sulfuric acid	Potassium chlorate, potassium perchlorate, potassium permanganate
<u>References:</u> MSDS of various chemical companies, Michigan State University (Office of Radiation, Chemical and Biological Safety)	

Appendix B

Supervisor's Accident / Injury Report Form

Name of Supervisor: _____

Email address: _____

Personal Information					
<input type="checkbox"/>	Student	<input type="checkbox"/>	Employee		
Full Name: _____					
Department: _____					
Phone Number/Ext.: _____					
Email Address: _____					
Building Information					
Building Name: _____					
Room Number: _____					
Incident Information					
Date of accident/injury: _____			Time of accident/injury: _____		
Type of accident/injury (please choose all that apply)					
<input type="checkbox"/>	Strain or sprain	<input type="checkbox"/>	Fracture	<input type="checkbox"/>	Wound
<input type="checkbox"/>	Skin	<input type="checkbox"/>	Foreign body	<input type="checkbox"/>	Amputation
<input type="checkbox"/>	Chemical Exposure	<input type="checkbox"/>	Slip/trip/fall	<input type="checkbox"/>	Puncture
<input type="checkbox"/>	Cut/Laceration	<input type="checkbox"/>	Assault	<input type="checkbox"/>	Contusion
Other (please list): _____					
Body part affected (please choose all that apply)					
<input type="checkbox"/>	Eyes	<input type="checkbox"/>	Head	<input type="checkbox"/>	Face and Neck
<input type="checkbox"/>	Feet	<input type="checkbox"/>	Legs	<input type="checkbox"/>	Finger
<input type="checkbox"/>	Arms	<input type="checkbox"/>	Hands	<input type="checkbox"/>	Upper Back
<input type="checkbox"/>	Lower Back	<input type="checkbox"/>	Chest (Respiration)	<input type="checkbox"/>	Trunk/internal organs
Other (please list): _____					
Name(s) of witness(es): _____					
How did the accident/injury occur?					
Please state how the injury/illness occurred. Include equipment, materials or chemicals in use when the accident/injury occurred. -----					
What caused the accident/injury?					
Please state why the event occurred including conditions that contributed to the accident/injury, such as: slippery surface, chemical reaction, failure to use safety equipment, etc. -----					
Supervisor's signature		Date		Phone number	