CHEMICAL HYGIENE PLAN

Environmental Health, Occupational Safety & Risk Management
650 College Drive
Dalton, GA 30720
Phone (706) 272-4463

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Summary of Changes and Review

Plan approval	**Date**	**Summary of Change**
Initial Plan Approval	February 2015	Initial Approval – Dr. M. Venable
Review	**Date**	**Summary of Change**
Annual	June 2017	Various section/descriptions updated.
Added sentence to Ventilation section	June 2019	Added sentence on ventilation hood use

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SECTION I - INTRODUCTION

A. INTRODUCTION

1. This Chemical Hygiene Plan (CHP) provides guidelines for maintaining the health and safety of faculty, staff, students, and others who may visit the laboratory areas of Dalton State College. Although this CHP primarily concerns chemical safety in the laboratory, it also contains sections on other safety matters.
2. Each faculty and staff member of the School of Science, Technology & Mathematics (SSTM) will read the CHP upon initial assignment to the school or when any changes to the policy are made. Biology, Chemistry, and Physics faculty and staff will read the CHP annually in August of each year and document compliance via email to the SSTM administrative assistant.
3. Copies of the CHP shall be kept in each lab. A copy will also be available through the EH&OS web page.
   https://www.daltonstate.edu/about/safety-risk-management.cms

B. GENERAL PRINCIPLES OF CHEMICAL SAFETY

1. Minimize all chemical exposures. Because few laboratory chemicals are without hazards, general precautions for handling all laboratory chemicals should be followed. Avoid skin exposure, inhalation, and ingestion of all hazardous chemicals.
2. Avoid underestimating the risk. Even for chemicals of no known significant hazard, exposure should be minimized. All work on unfamiliar compounds should be preceded by a literature search for hazards. Procedures to be used in the lab should be based on the hazards found. One should assume that any mixture is more toxic than its most toxic component, and that all substances of unknown toxicity are toxic.
3. Provide adequate ventilation. The best way to prevent overexposure to chemicals is to prevent their escape into the working atmosphere by use of hoods and ventilation controls.
4. Observe the PELs and TLVs. Permissible Exposure Limits (PEL) of OSHA and the Threshold Limit Values (TLV) of the American Conference of Governmental Industrial Hygienists should not be exceeded. The actual values are provided on the Safety Data Sheets (SDS).
5. Laboratory Housekeeping. In compliance with applicable safety regulations, all laboratory areas, whether under the supervision of a researcher, faculty, or course coordinator, shall be kept clean, and orderly. Bench-tops, hoods, drawers, shelves, floors, and cabinets will be free of broken glassware, chemical spills, trash, exposed needles, exactors or razor blades, and all containers not empty will be labeled as to their contents.

SECTION II – RESPONSIBILITIES

A. DEAN of the SCHOOL OF SCIENCE, TECHNOLOGY & MATHEMATICS:

Responsible for chemical hygiene in the SSTM. Must ensure that an effective hygiene program is in place and supported wholeheartedly by everyone in the SSTM. B. SCIENCE LAB COORDINATORS, FACULTY, AND RESEARCHERS:

1. All faculty shall follow the CHP. Each member of the SSTM is responsible for working safely. Faculty are responsible for informing students of safety precautions and for supervising students to ensure they work safely in the laboratory. Students are responsible for following all safety procedures.
2. Before leaving the SSTM permanently, each faculty member is responsible for cleaning out any laboratory space and for coordinating the disposal of unused or waste chemicals.
3. All faculty will be required to complete a separation check-list with the Lab Coordinator to insure that all laboratory space has been cleaned out. This checklist will be verified by the Lab Coordinator.

C. CHEMICAL HYGIENE OFFICER (CHO): The Dean of the School of Science, Technology and Mathematics shall designate a CHO for the SSTM with the following duties.

1. Coordinates and implements the Chemical Hygiene Plan.
2. Surveys all chemical areas for compliance with the CHP semi-annually.
3. Monitors use and disposal of all chemicals used in the SSTM.
4. Maintains all records required by the Chemical Hygiene Plan.
5. Maintains current knowledge of legal requirements concerning hazardous chemicals.
6. Advises course coordinators, researchers, faculty, and workers of how the Chemical Hygiene Plan applies to them.
7. Works to continually improve chemical hygiene practices, procedures and equipment.
8. Assist the Coordinator of Environmental Health and Occupational Safety in maintaining an up-to-date safety library that is available to all personnel.
9. Responsible for training laboratory workers in Hazard Communication and Specific Chemical Training.
10. Supervise an annual inventory of the chemicals in all areas of the SSTM, to include storage, classroom, teaching, and research laboratories in compliance with state and federal fire laws and code requirements. D. SCIENCE LABORATORY COORDINATORS:

1. Ensure that workers and students understand and follow the Chemical Hygiene Plan and are current on all safety-related training.
2. Ensure that all necessary personal protective equipment (PPE) is available, in working order, properly sized, and used.
3. Ensure that housekeeping and operations of all lab areas are up to standard.
4. Ensure that storage of chemicals in the laboratories or classrooms is in compliance with applicable chemical compatibility requirements.

E. LABORATORY WORKERS (Faculty and Laboratory Staff):

1. Must have a working knowledge of the Chemical Hygiene Plan as it applies to their normal duties and follow it.
2. Develop and sustain good personal chemical hygiene habits.
3. This applies to
    a. Student workers
    b. Teaching assistants
    c. Research students.

F. SSTM SAFETY COMMITTEE:

1. Membership:
    a. Dean of the SSTM
    b. CHO (chairperson)
    c. Science Lab Coordinators
    d. Appointed Faculty
    e. Appointed student(s)
2. Duties:
    a. Manage hygiene inspections of all laboratory areas.
    b. Conduct annual review of the Chemical Hygiene Plan and update as necessary.
    c. Develop and implement initiatives to minimize risk in laboratory operations.
    d. Manage labs and operations to gain compliance with ALL regulations and requirements from local, state, federal, USG, and other entities.

SECTION III - LABORATORY FACILITIES:

A. EQUIPMENT. SSTM equipment will be maintained in condition to provide the following:

1. General ventilation system for each lab that ensures 4 to 12 air changes per hour to prevent the buildup of chemical vapors.
2. Stockrooms with adequate ventilation, fire alarms, and spill control material. Appropriate hazardous warning signs shall be posted outside storeroom doors.
3. Individual local exhaust ventilation at each work position and hoods for use with volatile chemicals that are toxic, flammable, or corrosive. Each hood will have simple airflow meter attached that indicates whether the hood is working properly or not.
4. Eyewash fountains and drench showers in each lab. Signs for eyewashes and drench showers will be prominently displayed.
5. Properly labeled bottles and jars for collection of chemical waste.
6. Fire extinguishers accessible to each area to include storerooms.
7. Spill control material for all chemicals shall be maintained the lab storeroom.
8. Personal protective equipment (PPE) such as gloves, aprons, goggles, and lab coats as needed.
9. Maintain an accessible (east end of hallways) emergency telephone and a list of emergency numbers.

10. Signs to mark areas where special chemical hazards are present.

B. MAINTANENCE

1. Hoods shall be checked and certified annually by a third party contractor, documents maintained by CHO.
2. Emergency showers checked and flushed semi-annually by EH&OS.
3. Emergency eye wash devices should be flushed monthly, and documented by EH&OS.
   * Emergency eye wash stations and emergency showers should never be obstructed.
4. Fire extinguisher will be checked monthly, documented, and serviced yearly by the EH&OS.
5. First aid kits will be inspected monthly and restocked as necessary by the Department of Public Safety. C. LAB COORDINATORS:

1. Waste bottles and jars shall be collected and transported to the Satellite Accumulation Point with the proper local use Hazardous Waste Label (see Appendix A) filled out <u>for content, amount and hazard and attached to the container</u>. Environmental Health and Safety Officer (EHSO) and Lab Coordinators will monitor collection of chemical waste generated in teaching labs and from classroom demonstrations; individual faulty, student workers, assistants, and researchers are responsible to deliver waste to the Lab Coordinators. Waste will be combined and reduced in volume where possible. The

Chemical Hygiene Officer or their designate will submit on a bi-annual basis a Hazardous Waste Inventory Report and a "RCRA Hazardous Waste Satellite Accumulation Report" to EH&SO. Hard copies of these reports will be maintained by the EHSO.

   a. All researchers will complete an end-of-semester checklist with the Lab Coordinator to insure that all waste chemicals have been removed from their labs.

2. Spill control kits will be restocked when depleted.
3. The supply of personal protective equipment (PPE) will be checked regularly and reordered as necessary.

<u>SECTION IV - CHEMICAL HYGIENE PLAN</u>

A. DEFINITIONS AND WARNING LABELS.

1. Definition of Chemical Hazards
   a. Explosive: Chemicals that cause a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature. Example: fireworks, nitrogen triiodide, gunpowder
   b. Flammable liquid: Any liquid having a flash point below 100°F (38°C). This class is further subdivided into:
      ♦ IA: Flash point below 73°F (23°C); boiling point below 100°F (38°C).
      Examples: pentane, tetrahydrofuran, diethyl ether, carbon disulfide.
      ♦ IB: Flash point below 73°F (23°C); boiling point at or above 100ºF (38°C).

Examples: acetone, ethyl acetate, ethanol, triethylamine, toluene, methyl ethyl ketone

♦ IC: Flash point 73°F (23°C) to 100°F (38°C). Examples: xylene, butanol, turpentine.

c. Combustible liquid: Flash point 100°F (38°C) to 200°F (93°C). Examples: acetic acid, kerosene.
d. Flammable solid: solid other than an explosive that is liable to cause fire through absorption of moisture or chemical change, or which can easily be ignited and burns vigorously and persistently. Examples: benzyl peroxide, calcium carbide, picric acid.
e. Health Hazards: Any chemical that has been shown to cause acute toxicity or severe chronic health effects in exposed workers. This would include acute toxins, suspected carcinogens, and mutagens. Examples: bromine, hydrofluoric acid, phosgene, nicotine. Also any chemical which is regulated by OSHA as a carcinogen, or listed under "Known Carcinogen" by the National Toxicology Program (NTP), or is listed under human carcinogens by the International Agency for Research on Cancer (IARC). Examples: asbestos, vinyl chloride, benzidine
f. Etiologic Agent: A viable microorganism or toxin which causes or may cause human disease.
g. Radioactive Material: Any material or combination of material which spontaneously emits ionizing radiation having specific activity greater than 0.002 microcuries per gram. Example: Uranium 235 Permissible Exposure Limits (PELs): The average amount of any chemical vapor that workers can be exposed to during an 8-hour day. Example: the PEL for Benzene is 30 mg/cubic meter.
h. Threshold Limit Values (TLVs): The time weighted average concentrations for a normal 8-hour workday and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effects.

2. Warning Labels and Safety Data Sheets
   a. All chemicals should remain in their original containers with their manufacturer's original container warning label. Containers with working quantities that do not have a manufacturer's label will be labeled by the Biology/Chemistry Lab Coordinator. The label will contain, as a minimum, the chemical name, all appropriate information and hazard wording. Commercial labels must not be removed, altered, or obscured. In the event that the label is deteriorating or is difficult to read, a new label must be made and affixed to the container.
   b. DOT labeling system. Department of Transportation (DOT) labels that are used on external packaging of all shipments of chemicals should be understood by all employees. DOT labels use color-coded diamonds with picture and word warnings to convey their messages. They are largely self- explanatory. Effective June 2015 these

labels will be required to be compliant with the Global Harmonization program requirements so the pictograms on the labels will be changing. All employees and students need to be familiar with those changes.

c. Private labeling systems. Many private chemical companies use their own warning label systems, but most include the NFPA 704 symbol in addition to their own. Most company systems use pictures to convey easily understood warnings. In addition to the types of warnings given by the NFPA system, the private systems often give additional warnings as to protective equipment to use and how to store the chemical.

d. Safety Data Sheets are available to all staff, faculty and students via the internet at the EH&OS web page.

https://www.daltonstate.edu/about/safety-risk-management.cms

B. PROCUREMENT AND RECEIPT OF CHEMICALS

1. Incoming chemicals: All requisitions for chemicals are initiated by the Biology/Chemistry Lab Coordinator who will become aware of any hazards involved. Receipt of a chemical shipment occurs when a member of the SSTM receives it from the delivery personnel or from a private carrier, if direct shipped. Normally, shipments are made to the DSC loading dock, but may be made directly to the lab. The person picking up the shipment should use a cart for large packages to minimize the risk of dropping and spilling chemicals.

2. Check-out and labeling: When a shipment arrives in the laboratory, the Biology/Chemistry Lab Coordinator, or designated personnel will inspect it to ensure that it is in fact the material ordered, is in good condition, and that an SDS is on file. They will mark each container with the date of receipt. The material will then be stored in the appropriate storeroom and all paperwork turned into the Laboratory Coordinator. Throughout this handling process, appropriate protective gear will be used.

C. STORAGE OF CHEMICALS

1. General Storage Conditions

a. No smoking or flames of any kind in chemical storerooms.

b. All storerooms shall have adequate ventilation, but this must not be taken for granted and shall be checked if any buildup of odors is noticed.

c. Annually inspect all containers for seal, label integrity, warning labels, quantity on hand, and any sign of decomposition. This inspection may be accomplished during the conduct of the bi-annual chemical inventory.

d. Storage of chemicals in hoods and on lab benches is discouraged and all such containers shall be returned to the appropriate storerooms whenever the experiment is complete. All areas outside the storerooms shall be inspected for such containers annually.

e. Aisles in storerooms shall not be blocked.

f. Keep chemicals away from heaters and sunlight.

g. Ensure storerooms with floor drains have drain covers to prevent contamination of water supplies in case of spill.

h. All storerooms shall be clearly posted for the type of hazards inside.
i. All refrigerators used for the storage of flammables should be explosion proof. Clearly label all materials placed in refrigerators.
j. Refrigerators used for chemicals shall be labeled: DO NOT STORE EDIBLES IN THIS REFRIGERATOR.

2. Flammable Chemical Storage
   a. Containers of chemicals with flashpoints less than 200 °F and one gallon or larger shall be normally stored in the chemical storage room #208 in Sequoya Hall and Room #320, Peeples Hall. Containers will be brought to the laboratory where the chemical is needed and decanted into another vessel, and the container returned to the storage room.
   b. All containers of chemicals with flash points less than 100 °F shall be stored in a flammable storage cabinet. The size and number of such containers will be kept to a minimum. Only chemicals with compatible storage characteristics will be stored in the same cabinet.
   c. Isolate all flammables from: strong oxidizers, explosives, water reactives, compressed gases, and cryogenic liquids
   d. Spill control material will be available in marked containers.
   e. Chemicals will be stored in containers to prevent spillage.
   f. Potential peroxide formers such as: diethyl ether, cyclohexene, cyclooctene, p-dioxane, tetrahydrofuran, and tetralin will be tested annually for peroxide formation with test strips and disposed of or freed of such contamination, if peroxides are detected. <u>Diethyl ether will not be kept for more than two years in any case.</u>
3. Corrosive Chemical Storage
   a. Corrosives will be stored in appropriate storage room and clearly labeled as such.
   c. Keep storage areas dry, well ventilated and cool, but not cold, as acetic acid freezes at 60°F (16°C).
   d. Isolate corrosives from all other nearby chemicals.
   e. Whenever possible, store corrosives in their original shipping containers.
   f. Acid spill control material will be readily available.
   g. Store corrosives four feet or less above the floor.
   h. Recognize that some acids, such as perchloric and fuming nitric, must be treated as strong oxidizers rather than acids.
   i. Separate corrosives that will react with other corrosives, such as hydrochloric acid and ammonium hydroxide.
4. Water Reactive and Moisture Sensitive Chemical Storage
   a. Isolate from other chemicals, especially flammable ones, and label clearly.
   b. Store in a dry place such as a desiccator or an inert gas-filled Glovebox.
5. Compressed Gas Storage

a. All extra gas cylinders will be secured by chain to the wall, or other suitable anchor point, at all times. Caps will remain on the cylinder until it is used.
b. Cylinders will be transported on gas cylinder carts, with caps in place.
c. All cylinders outside the storage area must be securely attached to walls or benches with chains or straps.
d. Gas Cylinders must have a pressure regulator attached when in use.
e. Compressed gases must be stored in a location appropriate to the hazards of the gas in use and be stored in compatibility groups.

6. Health Hazard Chemical Storage
   a. All toxic chemicals will be stored in the designated lab with appropriate warning signs.
   b. Isolate from all other chemicals and label the area clearly for the hazard involved.
   c. Store close to the ventilation intake to minimize vapor hazards.
   d. Properly dispose of as soon as possible.

D. GENERAL RULES FOR CHEMICAL LABORATORIES

1. Minor Spills and Accidents
   a. Eye contact - If a chemical is splashed in the eye(s), the eye(s) must be flushed <u>IMMEDIATELY</u> with water. (Some reagents, strong NaOH solutions for example, damage the eye(s) within 10 seconds.) Flush the eye(s) gently with water using the emergency eyewash for at least 20 minutes have the victim roll his/her eye(s) to ensure that all areas under the eyelid is cleaned. It is critical for co-workers to pull the victim's eyelid open all the way to ensure full irrigation. Seek medical treatment immediately.
   b. Skin contact - For spills on the skin, wash with plenty of soap and water. Toxic or corrosive spills on clothing are to be flushed with plenty of water, as the cloth may retain the chemical and cause injury to the skin beneath it by releasing it slowly. In the event of a large spill on clothing immediately move the victim to the safety shower and pull the chain. Remove contaminated clothing to ensure thorough cleaning of the skin. Place the contaminated clothing is a plastic bag or some other type of secure container. Seek medical treatment.
   c. Minor inorganic spills on desk tops or floors are to be wiped up with a wet sponge, rinsed and wiped again. Wear proper protective gear to protect hands and clothes. If a spill is a concentrated acid, pour sodium bicarbonate over the area first to neutralize it before wiping it up. Organic spills should be absorbed with dry powder from the spill control kit, swept up, and disposed of properly.
   d. Avoid routine exposures by developing and encouraging safe work habits that limit chemical exposures by any route. These include wearing safety apparel appropriate for the task (goggles, aprons, gloves etc.), not smelling or tasting chemicals, not pipetting by mouth, clamping all apparatus securely, and thinking safety at all times.

e. Plan your experiment ahead of time so that you have the necessary chemicals, equipment, and safety apparatus on hand. Check literature sources to determine the hazards possible and utilize the proper amount of ventilation.

f. As a rule of thumb, use a hood or other local ventilation device when working with any appreciably volatile substance with a TLV of less than 50 ppm. See SDS for TLVs. g. **No eating, drinking, gum chewing, handling of contact lenses, or application of makeup is allowed in areas where chemicals are present. Do not use chemical glassware to hold food or drinks. Do not store food or drink in laboratory areas. Wash hands thoroughly after working in a chemical environment, and especially before any activity listed above.**

h. **No practical jokes, "horseplay," or other behavior which might confuse, startle, or distract others is allowed in the laboratory.**

i. Confine long hair and loose clothing while in the lab. Wear closed toed shoes at all
times, and <u>no sandals, cloth sneakers, high heels or perforated shoes</u>. Long pants are required. All workers will wear lab coats or aprons at all times.

j. Keep work areas clear and uncluttered. Clean up the work area upon completion of an operation or at the end of the day. Label all containers awaiting further work. Send waste any unused chemicals to the Lab Coordinator.

k. Eye Protection.

(1) **Chemistry Labs**. All personnel in the chemistry labs, including visitors, will wear goggles or safety glasses at all times. <u>No employee, student, or instructor should wear contact lenses in the chemistry labs at any time.</u> Use the correct type of gloves whenever handling toxic chemicals. Not all gloves are acceptable for chemicals. Inspect the gloves before use for holes, replace gloves as needed, and wash hands after use.

(2) **Biology Labs**. <u>No employee, student, or instructor should wear contact lenses in the biology lab at any time</u>. Wear of safety glasses and goggles is at The discretion of the instructional faculty, depending on the nature of lab activities.

l. <u>All</u> research students will be thoroughly briefed by their faculty on all hazards and required safety procedures associated with their specific research project(s).

m. All students involved in a research project will read and acknowledge they understand the provisions of the Chemical Hygiene Plan which can be viewed and acknowledged in GA View.

n. The Course Faculty will ensure compliance with this requirement and maintain appropriate documentation. Instructors must be aware of the research schedule for all of their students.

o. Students and their faculty members desiring to work alone outside of normal working hours must assess risk and take appropriate measures to minimize risk. The intent is

to ensure researchers have latitude to determine work times but also minimize risk of working outside of normal working hours.

p. All unsafe conditions will be reported immediately to the supervising instructor or Lab Coordinator so they may be corrected quickly.

q. Before any operation is left running unattended, secure all water lines with wire or clamps, leave lights on in the area, and post signs on the door listing who and where to call if problems develop.

r. **Dispose of all waste in accordance with established procedures.**

s. Wash exposed hands and arms before leaving the lab.

1. Any chemical exposure is to reported immediately to the supervising instructor,

and or the lab coordinator.

2. EH&OS should be notified of any incidents involving chemical exposure.
3. All faculty, staff or students who may have chemical exposure should seek medical attention.

u. Any lab work outside the norms of established lab procedures MUST be approved by

the Lab Coordinator, the Head of the appropriate department and the EHSO office.

v. When working with particularly hazardous substances, which include "select carcinogens," reproductive toxins and substances which have a high degree of acute toxicity, specific consideration shall be given to the following provisions which shall be included where appropriate:

1. Establishment of a designated area;
2. Use of containment devices such as fume hoods or glove boxes; 3. Procedures for safe removal of contaminated waste;
4. Decontamination procedures.

E. RULES FOR CORROSIVE, FLAMMABLE, MODERATELY TOXIC CHEMICALS, AND OXIDIZERS.

1. Laboratory Supervision - Injury prevention during labs requires that instructor's brief students on safety hazards and frequently check their equipment set-ups and experimental procedures during the lab periods.

a. Initial Lab Briefing - In each chemistry course, during the first lab attendance, instructors shall stress the importance of working safely in the lab. They shall briefly review the Chemistry/Biology Laboratory Safety Manual for the course. Any student not present for the first lab period shall be briefed before he/she attends any subsequent lab period. Students and Faculty doing research will be briefed on safety by the course instructor.

b. Briefing for Individual Experiments - In the standard course, the Lab Coordinator will consult with faculty on any unusual safety concerns. Lab Coordinators will also include safety information, when appropriate, in "Notes for Instruction" and the briefing notes to be posted at each faculty bench. Faculty shall then include these items in their

briefing at the beginning (and end, sometimes) of the lab period. In other courses, the routine may be less formal, but the end result must be the same: Faculty will screen the experiment for safety hazards and inform students of these hazards before the experiment begins. In every course, any student who arrives after the briefing should be individually briefed on safety hazards.

c. During the briefing before each experiment, faculty shall demonstrate techniques (as required) to be used during the experiment. In doing these demonstrations, faculty must follow the same safety procedures to be followed by the students; for example, wearing goggles and gloves to handle strong corrosives.
d. Where appropriate, faculty must also brief students on cleanup and disposal of spent chemicals.
e. Supervision - At frequent intervals throughout the lab period, each faculty will circulate through the section to ensure that students are working safely: i.e., that equipment is safely assembled, experimental techniques are safe, protective equipment (goggles, aprons, etc.) is used, reactions emitting hazardous gases are run under the hood vents, etc.
f. Clean-up and Waste Disposal - Standard clean-up procedures followed in the lab requires that glassware used in the experiments is washed, removing chemical hazards which might injure others using the same glassware later.
g. **Organic wastes will never be poured down the sink.** Always ensure that students follow the disposal instructions given in the briefing. Waste generation points set up at faculty positions or in waste hoods will be collected by laboratory personnel for transporting to the Satellite Accumulation Point (SAP). Researchers will notify the appropriate lab coordinator for disposal, once properly labeled.

2. Corrosives
   a. Characteristics - Corrosives are those materials that actively attack tissue and often metals as well. Dilute corrosive materials are irritating and cause local inflammation. Corrosives include acids, bases, and such chemicals as phenol, bromine, thionyl chloride, etc. Concentrated corrosives can cause serious skin burns and even char the skin. Severe damage can be done to the respiratory tract, in particular the lungs. If swallowed, corrosive materials can cause serious burns of the gastrointestinal tract.
   b. In addition to their corrosive properties, acids have a number of other hazardous properties. For example, nitric acid is also a strong oxidizing agent and a poison. Some acids, such as sulfuric acid, react with many other compounds to produce heat and toxic fumes. Sometimes the reaction can be explosive. The combination of an acid and an organic compound can produce a fire.
   c. Corrosive materials, in addition to attacking the skin, mucous membranes and eyes, can penetrate the skin. Phenol, for example, causes severe burns rapidly, penetrates through the skin, and acts as a systemic stomach poison. Corrosive materials in the gas phase, or in the gaseous form, are particularly dangerous because of the potential of pulmonary edema resulting from the attack on the lung tissue. d. Personal Protection

1) Skin protection - Corrosives burn the skin on contact. Impervious protective clothing, such as rubber or disposable plastic aprons and gloves, must be used when handling concentrated corrosives. Although dilute acids and bases (e.g., HCl) are also corrosive, their action is so slow that gloves are not needed, since washing with water or bicarbonate solution is sufficient to decontaminate.
2) Eye protection - Eye protection MUST be worn by all personnel handling corrosive materials, regardless of strength. Chemical splash goggles, or eyeglasses with safety side shields and face shield, must be worn whenever there is a danger of corrosive chemical contact.
3) Respiratory protection - The respiratory tract and lungs must be protected from corrosive materials. Ventilation in the area must be adequate when handling corrosives. In the event of a major spill, evacuate the area and alert the Fire Department.
4) The Lab Coordinator will be responsible to insure that all labs are restocked with required PPE as necessary. Additionally, the Lab Coordinator will monitor them to insure that adequate levels of PPE are maintained.

e. Handling Procedures

1) All containers of corrosives must be labeled as such. When strong corrosives are used in student experiments, students shall be specifically briefed on the nature of the corrosive, its strength, speed of activity, type of injury produced, etc.
2) Strong corrosives used in student experiments must be kept under the under hoods for close supervision/control.
3) When acids or bases are used in experiments or demonstrations, sodium bicarbonate shall be immediately available to neutralize spills and splashes.
4) When a chemical gives off significant amounts of corrosive fumes, it must be used in a hood. Any reaction which gives off a significant amount of corrosive fumes must be vented to a hood.
5) Never use corrosives in locations where there is not an eyewash and chemical shower immediately available.

3. Flammables

a. Characteristics - Flammables can be solids, liquids, or gases. Liquids and gases are more hazardous because they can be ignited by a flame or heat source several feet or yards away from the vessel containing the liquid or gas. Flammable vapors are usually heavier than air, and thus are more apt to be found near the floor or bench top. Ignition of flammables may cause an explosion.
b. Personal Protection - Flammable liquids splashed on clothing can ignite and cause severe burns. Therefore, anyone working with flammable liquids must wear a appropriate apron and goggles.
c. Handling Procedures

(1) When possible, large volume lab work with flammable liquids and gases should be done in a hood.
(2) Open flames will not be used in any work area in which flammable liquids or gases are being handled. In labs with different chemistry courses present at the same time, faculty will ensure that no flames are being used in the other courses if flammables are to be used in theirs. Electric heating mantles may be used for heating flammable liquids.
(3) A fire extinguisher must be present whenever flammables are being used.

4. Moderately Toxic Chemicals
   a. Characteristic - A toxic substance is anything that causes damage to the body when ingested, inhaled, or on skin contact. An individual chemical may be hazardous in one, two or all three ways. Moderately toxic means any chemical NOT listed as water reactive, shock sensitive, or carcinogenic in the appendices.
   b. Personal Protection - Wear gloves and long sleeve lab coats or shirts if the toxic chemical can be absorbed through the skin. If toxic vapors are involved, ensure adequate ventilation via fume hoods, bench hoods, or exhaust fans.
   c. Handling Procedures - keep the quantity of toxic material handled to a minimum and dispose of properly. Follow all general rules for laboratory behavior.
   d. Any lab or experiment generating hydrogen gas must be performed in a fume hood to minimize ignition risk associated with the labs.
5. Handling Oxidizers:
   a. Characteristic - An oxidizer is a substance that gives up oxygen which can easily stimulate combustion of an organic material.
   b. Personal Protection - individuals handling oxidizers should wear gloves and long sleeve lab coats to protect their skin.
   c. Handling Procedures - keep the quantify of the use of oxidizers to a minimum. Store oxidizers with properly labeled warning signs in well-ventilated areas, free of ignition sources, and accessible at all times. Store oxidizing materials separately away from processing and handling areas and away from other organic materials.

F. RULES FOR WORK WITH CHEMICALS THAT ARE MOISTURE-SENSITIVE AND WATER-REACTIVE
1. Characteristics - Water-reactive chemicals when exposed to water present a fire or explosion hazard, generate enough heat to boil water, or cause burns to the skin. They may also generate flammable gases with enough heat to ignite the gases. Examples are: strong acids and bases, acid anhydrides, alkali metals (Li, Na, K), alkaline metals (Ca), hydrides, nitrides, carbides.
2. Personal Protection - Always avoid skin contact by use of proper gloves, long sleeves, aprons and goggles. Always wash hands and arms immediately after working with these compounds.
3. Handling Procedures - When diluting strong acid or bases, always add the acid/base to the water not vice versa. Pouring water into concentrated acid can cause the formation of pockets of steam which could cause splashing of hot acid. Add the acid/base to the

water slowly, in small quantities, to prevent heat buildup. This heat can crack non Pyrex containers. These chemicals must be used in clean, dry locations and in/on a tray or in a containment area. Signs or warnings must be posted at unattended work areas indicating a water reactivity.

4. Location and Storage - Store these chemicals in a cool, dry location with warning signs and adequate ventilation. All containers must be tightly sealed. When possible, these chemicals should be stored in desiccators and/or an inert gas-filled Glove box.
5. Spills and Accidents - Be prepared for accidents and spills by thinking ahead and having spill cleanup material nearby and a plan for cleanup ready. Follow the procedures specified on the Safety Data Sheet(s) (SDS). Contaminated clothing should be removed prior to using a safety shower, if possible.
6. Waste - Store contaminated waste in a clearly labeled, closed container. Contaminated clothing shall be sealed in a plastic bag/container, labeled, and disposed of immediately. Dispose of all waste chemicals in the proper manner by containerizing, labeling, and storing in the waste accumulation area.

G. RULES FOR WORK WITH CHEMICALS THAT ARE SHOCK SENSITIVE OR POTENTIALLY SHOCK SENSITIVE.

1. Characteristics - Explosive chemicals may detonate unexpectedly when handled, jarred, or subjected to high temperatures. Examples are ammonium perchlorate and nitrogen triiodide. Unexpected detonation of even a small amount of explosive can cause blindness, maiming, and even death. Additionally, such a detonation may start fires which cause major damage. Frequently, chemicals which are not explosive can react explosively or react to form compounds which might explode. For example, isopropyl ether and diethyl ether combines with oxygen in the air to form highly shock-sensitive peroxides, and ammonium hydroxide reacts with iodine to form very shock sensitive nitrogen triiodide.
2. Personal Protection - Always avoid skin contact by use of proper gloves, long sleeves, and goggles.
3. Handling Procedures - Always follow general laboratory safety rules. These materials will not be transported when in an unstable state. Closed containers will not be used for storage of unstable materials nor shall they be kept in a contained area. These materials shall be conspicuously marked/placarded. Keep away from heat sources.
4. Location and Storage - Store these chemicals in designated storerooms, segregated and isolated from other chemicals, and conspicuously marked with appropriate signs/placards. The storeroom must be cool, dry, and well ventilated. These chemicals should never be stored in a shock sensitive state, their physical condition frequently checked, and must be handled with care.
5. Spills and Accidents - Be prepared for accidents and spills by anticipating problems, having clean-up material available, and a spill response plan. Follow procedures specified on the SDS. Alert the fire department and evacuate the area if a large material spill

occurs. Contaminated clothing must be neutralized with an in-activator/stabilizer, sealed in a labeled container and disposed of immediately.

6. Waste - Store contaminated waste in a clearly labeled, closed container (do not use glass). Do not store in a shock sensitive state.

H. RULES FOR USE OF TOXIC CHEMICALS

1. Characteristics - Toxic chemicals cause damage to the body when ingested, inhaled, or on skin contact. Because of their very hazardous properties special precautions must be taken in their use, storage and disposal. A list of these compounds is located in Appendix B and C. The list of OSHA Schedule Z, Toxic and Hazardous Substances, can be found at http://www.osha.gov under "Regulations", 1910 Subpart Z.
2. (Standards-29 CFR) Air contaminants – 1910.1000 Table Z-1, Limits for Air Contaminants; Table Z-2, and Table Z-3, Mineral Dusts.
3. Personal Protection - Wear gloves, lab coats, and goggles. ALL work must be accomplished in a hood. Hands must be washed immediately after working with these chemicals.
4. Handling Procedures - The general rules for laboratory safety must be followed exactly. Hood must be used for these chemicals and work areas posted with warning signs if left unattended. SDS's should be consulted for precautions for each chemical used.
5. Location and Storage - Store these chemicals in a cool dry location with warning signs and adequate ventilation.
6. Spills and Accidents - Be prepared for accidents and spills by anticipating problems, knowing the location of spill cleanup agents, and have a plan formed around the recommendations of the SDS's.
7. Waste - Waste shall be stored in clearly labeled containers in the waste accumulation area. Dispose of materials in accordance with all regulations.

I. RULES FOR USE OF KNOWN OR SUSPECTED CHEMICAL CARCINOGENS

1. Definition - Any substance which meets one of the following criteria.
   a. Regulated by OSHA as a carcinogen. Click here for OSHA website.
   b. Listed under "Known Carcinogens" in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) of the Health and Human Services Administration.
   c. Listed under Group 1 "Carcinogenic to Humans" by the International Agency for Research on Cancer (IARC) in its latest monograph.
2. Any chemical on this list, or added to the list, that does not have a specific approved protocol for use shall be immediately segregated.
3. Personal Protection - Wear gloves, long sleeves, lab coats, and goggles. All work must be accomplished in a hood. Hands must be washed immediately after working with these chemicals.

4. Handling Procedures - The general rules for laboratory safety must be followed. Hoods must be used for these chemicals and work areas must be labeled or placarded with appropriate warnings. Specific instructions are contained on the SDS.
5. Location and Storage - Store the chemicals in tightly sealed containers and in a cool dry location with appropriate warning signs. Adequate ventilation must be provided.
6. Spills and Accidents - A spill clean-up plan and material must be readily available. Procedures on the SDS must be followed to provide adequate protection. If a spill occurs outside of a hood the immediate area must be evacuated and appropriate personnel notified.
7. Waste - Contaminated waste shall be stored in clearly labeled, closed containers in the waste accumulation area. Dispose of the materials in accordance with state, local, and federal regulations.

J. RULES FOR MICROBIOLOGICAL WASTE HANDLING AND DISPOSAL

1. Collection
   a. Microbiological waste, which includes cultures and stocks of infectious agents, culture dishes and devices used to transfer, inoculate and mix cultures, is considered bio-hazardous and infectious prior to its sterilization or disinfection. Exercise universal precautions when handling such waste. Do not handle such waste unless you have been properly trained.
   b. Microbiological waste prior to its sterilization or disinfection should be kept separate from regular trash and other waste in distinctly labeled biohazard containers that are rigid, leak and puncture resistant, with tight-fitting covers and strong enough to prevent bursting, ripping, tearing and leaking during handling. This waste shall be contained in a manner and location which affords protection from the environment and limits exposure to the public or other untrained personnel.
   c. Microbiological waste in reusable screw top glass bottles should be collected in the designated hood.
   d. Microbiological waste in disposable lab ware (test/culture tubes, Petri dishes and devices for transfer and inoculation) should be collected in autoclavable polypropylene plastic bags that are of sufficient strength to prevent leakage, ripping or tearing.
   e. All microbiological waste will be collected according to its type: glass **(**test tubes, serological pipettes, etc.) and plastics (Petri dishes, pipette tips, plastic culture tubes, etc.) and placed inside a biohazard container that contains a primary polypropylene plastic bag enclosed in a secondary polypropylene plastic bag as a liner.
   f. During microbiological waste collection, ensure that all the screw top caps of reusable glass bottles (corning milk bottles) and disposable glass test tubes are slightly loosened prior to placing the test tubes inside the plastic waste bags or the reusable glass bottles inside the re-autoclavable plastic bins. This will ensure full penetration of steam inside the liquid waste during the sterilization process.
   g. As needed collect each bag, seal or tie the bag individually and place in the Stericycle box. When sealing, the bag should not be shaken or squeezed in an attempt to reduce

volume. Do not compress or compact untreated waste in the collection containers or autoclavable bins with your hands or feet.

h. Carry sealed bags by their necks and away from your body when moving untreated microbiological waste to a transport cart or in and out of the autoclave. Do not lift or hold microbiological waste bags by the bottom or sides. Ensure microbiological waste bags are not dropped, broken or opened.

i. Bottles, bins, containers, bags, liners, Time-Temperature strips/chemical indicators will be located in the Microbiology Lab (Peeples Hall Room #214-215).

2. Disposal

a. After use place all materials red bio-hazard plastic bags in designated Stericycle collection boxes.

b. Decontaminated liquids in reusable glass bottles and test tubes can be poured down the sink and the bottles washed for reuse after proper sterilization.

K. ENVIRONMENTAL MONITORING

1. Regular instrumental monitoring of airborne concentrations is not usually justified or practical in laboratories but may be appropriate when testing or designing hoods or other ventilation devices or when a highly toxic substance is stored or used regularly (e.g., 3 times/week).

L. MEDICAL ISSUES

1. This program applies to laboratory workers and other exposed personnel, with chemical exposure, that the EHSO determines is significant enough to warrant medical surveillance.

2. Whenever an employee exhibits signs or symptoms related to exposure to a hazardous chemical, if exposure monitoring reveals a level above an action level, PEL or TLV, or if an employee is subjected to events such as spills, leaks, or explosions appropriate action to get the employee medical attention will be taken. Incidents requiring a medical evaluation are to reported EHSO office and will be covered by the college under its insurance.

3. Medical Attention - For any serious injury call the hospital for immediate assistance at 9-911. The number is posted at each phone. In less serious cases, the patient can be assisted to the hospital by co-workers or faculty. Proper paperwork must follow the patient to either place.

a. Chemicals in the Eye - <u>IMMEDIATELY</u> begin flushing with water from the eyewash fountain and continue for a minimum of 20 minutes. Anyone nearby should assist by helping to hold the injured individual's eyelids open. In some cases, the eyelid may have to be forced open to allow proper flushing. Eyewash fountains must remain on after activation. Ensure eyewash fountains do not have spring loaded valves.

b. Call the hospital to alert them that the injured party is on the way and describe the injury and type of chemical involved. ALWAYS ASSUME THAT AN INJURY HAS OCCURRED.

c. Chemicals on the Body - IMMEDIATELY flush with plenty of water, using the safety shower, if large areas are involved, for 20 minutes. All affected clothing shall be removed including shoes and socks. Do not allow these clothes to be put back on as they may be contaminated. Secure the contaminated clothing in a plastic bag or other suitable container.
d. Call the hospital and alert them that the injured party is on the way and describe the chemical involved. The extent of chemical burns frequently does not manifest itself for hours or days. NEVER ASSUME THAT AN INJURY HAS NOT OCCURRED.
e. Base burns can be more serious than acid burns. They do not precipitate protein like acids, thus they will penetrate deeper and do not usually cause pain as quickly as acids. Neutralizers, buffers and solvents SHOULD NEVER be used as emergency treatment for chemical burns. The seconds lost looking for them can cause disaster. The use of solvents, such as alcohol for chemical burns, can spread the corrosive material and result in a more severe injury.
f. Inhalation of Chemicals - Never assume that even short exposure to corrosive chemicals or high concentrations of any chemical dust, mist or vapor has not produced lung damage. Pulmonary edema can develop hours after exposure. Anyone over exposed to corrosive vapor or dust should be immediately removed to fresh air and transported to the hospital.
g. Ingestion of Chemicals - If someone has swallowed a hazardous chemical, determine conclusively what it was. Have someone call the hospital emergency room (number at each phone) and report the chemical ingestion. Follow their advice on treatment until help arrives. Always seek medical help for any hazardous chemical ingestion.
h. Non-chemical Accidents (cuts, falls) - Whenever an accident occurs the protection of personnel is the primary concern. Keep calm and collect information. Call for help from the hospital or EHOS if necessary.

M. RECORDS
1. Every accident involving injury to students or personnel or any major spill must be recorded on the proper forms. EH&OS or Public Safety can complete the proper report. These forms should be reviewed by the safety committee regularly.
2. Inventory for chemicals will be reviewed annually by the Safety Committee.
3. All lab procedures will be reviewed annually by the Safety Committee.

N. MAJOR SPILLS, FIRES, AND ACCIDENTS
1. In the event of a major spill of a hazardous chemical, DSC Public Safety is the designated lead agency. The following is their recommendation for action:
   - BE CALM
   - THINK
   - Avoid panic and confusion
   - Evacuate the area
   - Report the spill IMMEDIATELY to:

1. DSC PUBLIC SAFETY @ x-4461
2. LAB COORDINATOR

2. Provide this information to DSC Public Safety:
   - Location of spill
   - Type of material spilled
   - Amount and source of spill
   - Time of spill
   - Direction and noticeable danger from spill (example: into a storm drain) 3. This plan could be used for any spill, ventilation failure or fire. The first consideration in any such emergency should be the safety of all personnel. Voice communication should be sufficient to alert all lab personnel. DSC Public Safety will assist in evacuation of the building/area, and will secure the area to prevent entry and will have an officer available to lead the firemen to the area.
4. In the event of a fire, the first priority is evacuation, second is notifying DSC Public Safety or 911, and third is moving away from the structure without blocking access. Fire alarm pull stations are located at the exits to all buildings. They should be used immediately if a fire occurs. They sound the evacuation bells and send a message to DSC Public Safety dispatchers. It is also advisable that in an emergency someone calls DSC Public Safety at 706-272-4461 or 911 to report the incident. On exiting the fire scene, turn off gas and steam, but leave water (condensers, etc.) going, if safety permits. In no case should students or SSTM department personnel fight a fire which is beyond control. Fire-fighting should be left to fire department personnel, who are trained and equipped to fight major fires. Whenever the fire alarm bells sound ALL personnel must exit the building quickly.
5. All accidents will be reported to EH&OS or DSC Public Safety. These are analyzed by the EH&SO to see if methods or procedures should be changed to decrease accidents.

O. INFORMATION AND TRAINING PROGRAMS

1. All requirements of the Hazard Communication Program (HAZCOM) for employees will be followed to include:
   a. Provide a chemical inventory in the lab.
   b. Ensure all containers are labeled with chemical name, manufacturers name and address, and hazard warning label.
   c. Have available Safety Data Sheets for all chemicals listed on the chemical inventory.
   d. Hold training sessions for employees upon entry, when new products are introduced, when processes change, and annually thereafter.
   e. All employees will know the location and proper use of personal protection equipment available in the lab.
   f. All employees will have access to current information and advice on chemical hygiene from the Lab Coordinator/EH&OS.
   g. Ensure that all HAZCOM/Chemical Hygiene training is documented.

(1) All training will be documented via GA VIEW, or a hard copy of the training roster.

P. WASTE DISPOSAL

1. General. The SSTM is required to comply with state, federal, OSHA, RCRA, EPA, HAZMAT, and EPCRA requirements and Georgia Board of Regents regulations with respect to the disposal of chemical waste. Fulfilling all of these requirements dictates strict adherence to the procedures described below.
2. Chemical waste is classified on the basis of its risk to the environment and the class of hazardous chemicals to which it belonged before being declared waste. Classes of hazardous chemicals have already been covered in Sec IV, paragraphs E-I.
   a. Nonhazardous inorganics. Certain nonhazardous inorganics can be flushed down the drain. These chemicals, which are found in abundance in the environment, pose no threat to it, especially in the minor quantities used in the chemistry labs; e.g., sodium chloride, potassium bicarbonate, iron (III) nitrate, etc. Hazardous acids and bases (those with pHs outside 3 to 11) must be collected and treated with acid or base until the resultant pH is between 5 and 8, as determined by wide range pH paper. This neutralization can only occur in labs when the neutralization process is written into the procedure. Instructors in the teaching labs will follow the disposal directions of the course coordinator.
   b. Insoluble inorganics. Nonhazardous chemicals which are not water-soluble can be disposed of in waste containers to be emptied by the building custodians; e.g., calcium oxalate, ferric hydroxide, and zinc sulfide.
   c. Hazardous chemicals. Hazardous chemicals, whether solid or liquid, will NOT be disposed of in the drains or in the trash. Waste will be placed in glass or plastic containers in the lab and labeled for content using <u>only</u> the local use Hazardous Waste Label (see Appendix A). <u>DO NOT</u> indicate a start date for waste accumulation; this is filled out by EHSO personnel only. After labeling, transport the waste to the appropriate Chemical Storage Room for storage. An appropriate SDS for each hazardous component must accompany the waste container before it will be accepted by the laboratory support staff. There it will be picked up by waste disposal contractors. Coordinate with the Chemical Hygiene Officer whenever hazardous chemical waste disposal is needed or if any questions arise concerning waste disposal. Examples of hazardous chemicals are mercury, chromium, lead, cadmium, and organics.
   d. Animal carcasses. As long as these carcasses are preserved, they may be disposed of by double-bagging and placing with regular trash.

Q. PHYSICAL, ELECTRICAL, AND MECHANICAL SAFETY

1. Any mechanical equipment with exposed moving parts presents a hazard. Anyone working with such machinery (copiers, stirring motors, etc.) should remove bracelets, dangling necklaces, etc. Loose fitting sleeves, etc. should be tied back or covered with a lab coat. Long hair should be gathered together and tied at the back of the neck.

2. Whenever possible, exposed moving parts should be covered by a protective shield to minimize the chance of accidental injury. Do not use equipment with protective shields removed.
3. Any reactions involving vacuum or pressure should be conducted behind a safety shield to protect from glass fragments in case of accidents. All evacuated vessels should be wrapped in tape to minimize hazards from breakage.
4. Ultraviolet light can cause considerable damage to the eyes. The absorption of this radiation by the outer layers of the eye (cornea and conjunctiva) produces conjunctivitis (sensation of "sand in the eyes"). When using UV lights for TLC analysis and other purposes, do not look directly at the lights, limit reflected light off the desktops, and limit time spent looking under lamps. Use of enclosed lights is best for long periods of time spent examining objects under UV light as it does not penetrate regular glass.
5. Electrical energy has potential for grave injury. Most people are aware of this and know how to avoid electrical shocks. The major problem in the SSTM is with high voltage. There are several apparatuses that utilize high voltage generated by a coil box to provide the energy for cathode ray tubes, and smoke precipitators. Great care must be taken in setting up such apparatus to prevent accidental contact with the high voltage.
6. Although the physics laboratory doesn't usually use chemicals like biology and chemistry labs, there are still safety concerns should be addressed that may not necessarily be common knowledge. Often, safety is learned by doing, but this route should be avoided as much as possible. In the physics lab, the main concerns are mechanical, extreme heat and cold, and electrical.
    a. Many of the devices in the physics lab require mechanical motion and use significant amounts of mass. Students should be careful to place themselves, and sensitive electronics, out of the path of possible lab masses, in case a string or other holding device was to fail. This does happen from time-to-time in introductory laboratories.
    b. In a few labs, boiling water and steam are used to test theories of thermodynamics. This presents a scalding hazard, and care must be taken, when working with hot metals and steam generators. Use gloves and hot pads when handling hot objects and steam lines/generators. Always test the temperature of an object before picking it up, when you are working with a thermodynamics lab.
    c. Several electrical devices are utilized in the physics lab. Electrical circuits are built and tested by the students. Most devices are designed to be safe under normal conditions, but when the students build their own circuits, often bare wires are present. Please use caution when dealing with bare wires. Most circuits used, are designed by faculty to operate at non-lethal voltages and currents, but this does not excuse carelessness. Turn power supplies off, when you are changing significant parts of a circuit.

* * THESE SAFETY RULES ALWAYS APPLY IN THE LAB * *

1. **Always wear a lab apron/lab coat and safety glasses/goggles.**
   - Wear these safety devices whenever you are in the lab, not just when you are working on an experiment.
2. **No contact lenses in the lab.**
   - Contact lenses should not be worn during any experiments using chemicals (even if you are wearing goggles). In the event of an accident, chemicals can get behind contact lenses and cause serious damage before the lenses can be removed. If your doctor requires that you wear contact lenses instead of glasses, you should wear eye-cup safety goggles in the lab.
3. **Personal apparel should be appropriate for laboratory work.**
   - On lab days avoid wearing long necklaces, dangling bracelets, bulky jewelry, and bulky or loose-fitting clothing. Long hair should be tied back.
     Loose, dangling items may get caught in moving parts, accidentally contact electrical connections, or interfere with the investigation in a potentially hazardous manner. In addition, chemical fumes may react with some jewelry, such as pearls, and ruin them. Cotton clothing is preferable to wool, nylon, or polyester. Wear shoes that will protect your feet from chemical spills and falling objects,
   - **Open-toed shoes or sandals, and shoes with woven leather straps are not allowed in the laboratory.**
4. **Read the entire experiment before entering the lab.**
   - Your instructor/professor will review applicable safety precautions before the lab. If you are not sure of something, ask your instructor about it.
5. **Always heed safety symbols and cautions written in the experimental investigations and handouts, posted in the room, and given verbally by your instructor.** They are provided for your safety.
6. **Know the proper fire drill procedures and the location of fire exits and emergency equipment.**
   - Make sure you know the procedures to follow in case of a fire or an emergency.
7. **If your clothing catches on fire, do not run;**
   - **WALK to the safety shower, stand under it, and turn it on.**
   - Have someone call to your instructor while you do this.
8. **Report all accidents to the instructor immediately, no matter how minor.**
   - In addition, if you get a headache, feel sick to your stomach, or feel dizzy, tell your instructor immediately.
9. **Report all spills to your instructor immediately.**

- Call your instructor rather than trying to clean up a spill yourself. Your instructor will tell you if it is safe for you to clean up the spill; if not, your instructor will know how the spill should be cleaned up safely.

10. **DO NOT perform unauthorized experiments or use materials and equipment in a manner for which they were not intended.**
    - Use only materials and equipment listed in the activity equipment list or authorized by your instructor. Steps in a procedure should only be performed as described in the textbook or lab manual or approved by your instructor. Instructors will manage ALL persons working in the labs and ALL chemicals at ALL times, and only allow persons in the labs alone when a risk assessment has been completed and the risk is low of an accident/incident occurring.
11. **Stay alert in the lab, and proceed with caution.**
    - Be aware of others near you or your equipment when you are performing an experiment. If you are not sure of how to proceed, ask.
12. **Horseplay in the lab is very dangerous.**
    - Laboratory equipment and apparatus are not toys; never play in the lab or use lab time or equipment for anything other than their intended purpose.
13. **Food, beverages, and chewing gum are NEVER permitted in the laboratory.**
14. **NEVER taste chemicals.**
    - Do not touch chemicals or allow them to contact areas of bare skin.
15. **Use extreme CAUTION when working with hot plates or other heating devices.**
    - Keep your head, hands, hair, and clothing away from the flame or heating area, and turn heating devices off when they are not in use. Remember that metal surfaces connected to the heated area will, become hot by conduction. Gas burners should be lit only with a spark lighter if possible. Make sure all heating devices and gas valves are turned off before leaving the laboratory. Never leave a hot plate or other heating device unattended when it is in use. Remember that many metal, ceramic, and glass items do not always look hot when they are hot. Allow all items to cool before storing.

19. **Exercise caution when working with electrical equipment.**
    - Do not use electrical equipment with frayed or twisted wires. Be sure your hands are dry before using electrical equipment. Do not let electrical cords dangle from work stations; dangling cords can cause electrical shocks and other injuries.
20. **Keep work areas and apparatus clean and neat.**
    - Always dean up any clutter made during lab work, rearrange apparatus in an orderly manner, and report any damaged or missing items.
21. **Always thoroughly wash your hands with soap and water at the conclusion of each experiment.**

Appendix A: See attached hazardous waste label.

HAZARDOUS WASTE LABEL

Date:			Generator Name	
			PH #: 706-2724612	
			Container	
	HAZARDOUS WASTE		Amt. in Container	
	DALTON STATE COLLEGE			
	SCHOOL OF SCIENCE AND MATHEMATICS			
	650 COLLEGE DR.			
	DALTON, GA 30720			
Amount	**Chemical Name**	**Hazard Warning**		
	Total			

Appendix A: See attached hazardous waste label.

SAMPLE LABEL

Date:	2/9/2015		Generator Name	3212
			PH #: (706)-2724612	
	Diels-Alder Rxn			
	HAZARDOUS WASTE		Container	
	DALTON STATE COLLEGE		Amt. in container	
	SCHOOL OF SCIENCE AND MATHEMATICS			
	650 COLLEGE DR.			
	DALTON, GA 30720			
Amt	**Chemical**	**Hazard**		
24 mL	Dicyclopentadiene	**Flammable, Toxic**		
24 mL	Ethyl Acetate	**Flammable, Toxic**		
24 mL	Maleic Anhydride	**Corrosive, Toxic**		
24 mL	Hexanes	**Flammable, Mutagenic, Toxic**		
4 mL	water			
100 mL	**Total**			

Appendix B

Acute Toxins

Acrylonitrile
Berylium
Bromine Bromine
Pentafluoride
Bromine Trifluoride
Cyanamide
Cyanogen
Dimethylsulfate
Fluorine
Hydrogen Cyanide
Hydrogen Fluoride
Lactonitrile
3-Methoxypropionitrile
Methyl Parathion
Nickel Carbonyl
Nicotine
Parathion Phosgene
Propargyl Bromide

Appendix C

A2 and NIOSH CARCINOGEN LIST:

Suspect Carcinogens:

Acrylonitrile
Acryamide
Aldrin/Dieldrin
Arsenic Trioxide
Arsine
Antimony Trioxide
Benzene
Benzopyrene
Berylium
1,3-Butadiene
Cadmium
Carbon Tetrachloride

Chloroform
Chloroprene
Chromium
Chrysene
DDT
Di-2-ethylhexylphthalate
Dimethylcarbanoyl Chloride
1,1-Dimethylhydrazine
Dimethylsulfate
Dinitrotoluene
Dioxane
Epichlorohydrin
Ethyl Acrylate
Ethylene dibromide
Ethylene dichloride
Ehtylene imine
Ethylene oxide Ethylene
thiourea
Formaldehyde Gallium
Arsenide
Hexachlorobutadiene Hexachloroethane
Hydrazine
Hexamethylphosphoramide
Kepone
4,4'-Methylenebis(2-chloroaniline)

Methylene Chloride
4,4'-Methylene dianiline Methylhydrazine
Methyl Iodide
2-Nitropropane N-Phenyl-B-naphthylamine
2-Nitronaphthalene
Phenyl Hydrazine
Polychlorinated biphenyls
Propane sulfone
Radon
2,3,7,8-Tetrachlorodibenzo-p-dioxane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene o-
Tolidine 0-Toluidine p-

Toluidine 1,1,2-
Trichloroethane
Trichloroethylene
Vinyl Bromide
Vinyl Chloride
Vinyl cyclohexenedioxide
Xylidine

Appendix D

EYE WASH INSPECTION RECORD:

PERSON INSPECTING_____ BUILDING_____ROOM_____

NOTES:

- Eye washes must be tested and inspected ***monthly***.
- Post an Eye Wash Inspection Record near each eye wash.

Outlet heads (lids covering where water flows from) should be kept closed when not in use
Instructions:

- Run the eye wash for 2-3 minutes, ensuring:
  - there is sufficient water flow
  - the hands-free mechanism is functioning
  - Initial the appropriate box below to document a passing inspection

- **Should an exposure occur, flush the affected eye(s) for 20 minutes.**
- **To ensure adequate flushing, hold eyelid(s) open and roll the eyeball.**


5508-C

Electroma

EYE WASH / SHOWER INSPECTION RECORD

Equipment ID_____

Location_____

Test_____

Date	Initials	Comments