Jacksonville University
Chemical Hygiene Plan for Laboratories
(CHP)

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Terms and Definitions

Action Level – A concentration designated in Title 29 CFR Part 1910[z] for a specific substance. This value is calculated as an eight hour, time-weighted average and initiates certain required activities (e.g., exposure monitoring and medical surveillance).

Acute Toxicity – The toxic effect of a substance that has a rapid onset, sharp or severe effects, and pronounced symptoms; this effect is not chronic.

American Conference of Governmental Industrial Hygienists (ACGIH) – An independent professional organization that prepares an annual list of recommended exposure guidelines for hazardous chemicals in the occupational setting. See "threshold limit value."

Chemical Emergency – An incident involving chemicals becomes an emergency whenever there is injury of personnel, an unplanned release to the environment, an explosion, or an unplanned or uncontrolled fire.

Chemical Hygiene Plan – A written program developed and implemented by the employer that sets forth procedures, equipment, personal protective equipment, and work practices to (1) protect individuals from the health hazards caused by hazardous chemicals used in a particular workplace, and (2) meet the requirements of paragraph (e) of Title 29 CFR Part 1910.1450.

Chemical Release – An unintended or sudden release of chemical(s) from manufacturing, processing, handling, or on-site storage facilities to the air, water, or land.

Chronic Toxicity – The toxic effect of a substance that develops gradually, lasts for a long time, and may have a delayed onset after exposure; this effect is not acute.

Combustible Liquid – Any liquid having a flash point at or above 100ºF (37.8ºC) but below 200ºF (93.3ºC), except for mixtures having components with flash points of 200ºF (93.3ºC) or higher, the total volume of which makes up 99% or more of the total of the mixture.

Compressed Gas

a. A gas or mixture of gases in a container that has an absolute pressure exceeding 40 psi at 70ºF (21.1ºC).
b. A gas or mixture of gases in a container that has an absolute pressure exceeding 104 psi at 130ºF (54.4ºC) regardless of the pressure at 70ºF (21.1ºC).
c. A liquid having a vapor pressure that exceeds 40 psi at 100ºF (37.8ºC), as determined by ASTM D-323-72.

Designated Area – An area that may be used for work with "select carcinogens," reproductive toxins, or substances that have a high degree of acute toxicity. A designated area may be an entire laboratory, an area of a laboratory, or a device (e.g., a laboratory hood).

Designated Carcinogen – A carcinogen that meets the criteria for OSHA "select carcinogen" or falls into Category 1 or 2 of the ACGIH's list of carcinogens.

Employee or Personnel – An employee shall be defined as any individual employed within a laboratory workplace, whether they are paid or a volunteer, who may be exposed to potentially hazardous chemicals during an assignment's completion. Therefore, student assistants conducting faculty research efforts or laboratory preparations are considered employees; however, students participating in laboratory course work are not.

Explosive – A chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

Flammable Chemical – A chemical that falls into one of the following categories:

a. **Aerosol, Flammable** – an aerosol that, when tested by the method described in Title 18 CFR Part 1500.45, yields a flammable projection that exceeds eighteen (18) inches at the full valve opening or a flashback (a flame extending back to the valve) at any degree of the valve opening.
b. **Gas, Flammable** – (a) A gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of 13% or less by volume. (b) A gas that, at ambient temperatures and pressure, forms a range of flammable mixtures with air that is more than 12% of volume regardless of the lower limit.
c. **Liquid, Flammable** – Any liquid having a flash point below 100ºF (37.8ºC), except for mixtures having components with flash points of 100ºF (37.8ºC) or higher, the total of which makes up 99% or more of the total volume of the mixture.
d. **Solid, Flammable** – A solid, other than a blasting agent or explosive (as defined by Title 29 CFR Part 1910.109[a]), that may cause fire through friction, absorption change, or retained heat from manufacturing or processing, or that can be ignited readily and when ignited burns vigorously and persistently thereby creating a serious hazard. A chemical shall be considered to be a flammable solid if, when tested by the method described in Title 16 CFR Part 1500.44, it ignites sand burns with a self-sustained flame at a rate greater than 0.1 inches per second along its major axis.

Fume Hoods – A 5--sided enclosure with a movable sash that is designed to prevent air contaminates and hazardous fumes from exiting the enclosure and entering the laboratory workspace. It allows for chemical manipulations to occur within the enclosure by only exposing an employee's hands and forearms.

Hazardous Chemical – 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 if individuals are exposed. The term "health hazard" includes chemicals that are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents that act on the hematopoietic systems, or agents that damage the lungs, skin, eyes, or mucous membranes.

High Acute Toxicity – Substances with the following effects (from Title 29 CFR Part 1910.1200):

a. Median LD50 of 50 mg/kg orally in albino rats, total dosage 200-300g.
b. Median LD50 of 200 mg/kg by continuous contact for twenty-four (24) hours with the bare skin of albino rabbits weighing between two (2) and three (3) kg.
c. Median LC50 in air of 200 ppm (or mg/L) continuous inhalation for one (1) hour.

Laboratory – A facility where the laboratory scale usage of hazardous chemicals occurs, or where relatively small quantities of hazardous chemicals are used on a non-production basis.

Laboratory Scale – To work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safety manipulated by one person. Laboratory scale excludes those workplaces whose function is to produce commercial quantities of materials.

Laboratory Use of Hazardous Chemicals – The handling or use of such chemicals where all of the following conditions are met:

a. Chemical manipulations are carried out on a laboratory scales.
b. Multiple procedures or chemicals are used.
c. The procedures involved are neither part of a production process, nor in any way simulate one.
d. Protective laboratory practices and equipment are available and are commonly used to minimize the potential for exposure to hazardous chemicals.

LC50 – Lethal concentration 50 is the statistical calculation of the airborne level of a substance that, if inhaled, is fatal to 50% of the test organisms. This concentration is usually expressed in units of mass over volume (e.g. mg/m^3) or in parts per million (ppm). Species and exposure conditions must be specified.

LD50 – Lethal dose 50 is that statistical calculation of the amount of a substance that is fatal to 50% of the test organisms. This value is usually expressed in units of mass per body weight of the tested species (e.g., mg/kg). Exposure route, species, and duration of exposure conditions must be specified.

Organic Peroxide – An organic compound that contains the bivalent –O-O- structure. Such a compound may be considered as a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by an organic radical.

Oxidizer – A chemical, other than a blasting agent or explosive (as defined in Title 29 CFR Part 1910.109[a]), that initiates or promotes combustion in other materials, thereby causing fire of itself or through the release of oxygen or other gases.

Particularly Hazardous Substances – For the purpose of this supplement, these include OSHA select carcinogens, reproductive toxins, and substances with a high degree of acute toxicity.

Permissible Exposure Level (PEL) – The OSHA exposure limits for hazardous chemicals in the workplace. These limits are contained in Title 29 CFR Part 1910[z].

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

Primary Barrier – Safety equipment, such as biosafety cabinets, that are designed to remove or minimize laboratory employees from being exposed to biological and chemical hazards.

Protective Laboratory Practices and Equipment – Laboratory procedures, practices, and equipment accepted by laboratory health and safety experts as effective, or those that employees/students can show to be effective in minimizing the potential for exposure to hazardous chemicals.

Reproductive Toxins – Chemicals that affect reproductive capabilities, including chromosomal damage (mutations) and effects on fetuses (teratogenesis).

Secondary Barrier – Safety equipment, such as autoclaves, that are designed to protect the surrounding community from being exposure to hazardous biological and chemical materials.

Select Carcinogen – Any substance is that:

a. Regulated by OSHA as a carcinogen.
b. Listed under the category "known to be carcinogens" in the National Toxicology Program's (NTP's) *Annual Report on Carcinogens*.
c. Listed under Group 1 (carcinogenic to humans) by the *International Agency for Research on Cancer (IARC) Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man.*
d. Listed in either Group 2A or 2B by IARC or under the category "reasonably anticipated to be carcinogens" by NTP. Such a substance causes statistically significant tumor incidence in experimental animals based on any of the following criteria:
    - After oral dosages of less than fifty (50) mg/kg of body weight per day.
    - After inhalation of six (6) – seven (7) hours per day, five (5) days per week, for a significant part of a lifetime of levels less than ten (10) mg/m3.
    - After repeated skin application of less than 300 mg/kg of body weight per week.

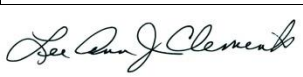
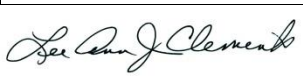
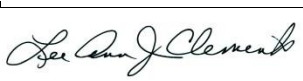
Threshold Limit Value (TLV) – Airborne concentrations of substances to which it is believed that nearly all laboratory workers may be repeatedly exposed, day after day, without adverse health effects.

Unstable (Reactive) – A chemical that, in its pure state or as produced and transported, will vigorously polymerize, decompose, condense, or become self-reactive under conditions of shock, pressure, or temperature.

Water Reactive – A chemical that reacts with water to release a gas that is flammable or a health hazard.

Compliance Annual Review

In accordance with the Occupational Safety and Health Administration (OSHA) Regulation "Occupational Exposure to Hazardous Chemicals" codified as Title 29 CFR Part 1910.1450 (e)(4), a review and evaluation of this Chemical Hygiene Plan (CHP) is conducted annually to ensure the effectiveness of the plan. The plans overall effectiveness will be determined by its ability to (1) protect faculty, staff, and students from health hazards associated with hazardous chemicals in the laboratory, and (2) keep exposure of hazardous chemicals below the regulatory limits specified in Title 29 CFR Part 1910[z]. As a result of this review and evaluation, the Division of Science and Math will amend the CHP within one month of the review to include more effective procedures and controls.

Review Date	Plan Updated	Brief Description of Required Revisions (if necessary)	Signature Certifying to Statement Below	Date of Amendment (if necessary)
7/2012	Yes	Copy of marked up version available for inspection.		
10/2012	Yes	Final revisions made		
6/5/2013	No			
8/26/2014	Yes	Minor revisions including personnel changes		
10/23/2015	Yes	Minor revisions including personnel changes		
11/31/2016	Yes	Updating to policies and procedures. Formatting updating.		
08/08/2017	Yes	Minor revisions to SOPs including personnel changes and new appointment of CHO.		

Certification Statement:

"I have completed a review and evaluation of the CHP for Jacksonville University and will/will not amend the Plan as a result."

Chemical Hygiene Plan Locations

Per OSHA Regulation Title 29 CFR Part 1910.1450 (e)(2), the Chemical Hygiene Plan shall be readily available to faculty, staff, and students of Jacksonville University as well as to the regulatory agencies Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designated representative upon request.

Additional documentation and references made available for Jacksonville University include:

- Jacksonville University Hazardous Waste Management Plan;
- Jacksonville University Disaster Preparedness and Response Plan;
- A copy of Title 29 CFR Part 1910[z] "Occupational Exposure to Hazardous Chemical;"
- A copy of Title 29 CFR Part 1910.1450 "OSHA Laboratory Standards;"
- Jacksonville University Laboratories Chemical Inventories;
- Copies of Safety Data Sheets (SDS) for chemicals used in laboratories at JU; and additional reference materials relating to laboratory safety and the use of hazardous materials.

In order to ensure that the plan is readily available, copies of the CHP will be maintained in the following locations.

- Division of Science and Math Main Office, Merritt-Penticoff Science Building, Room #132;
- Marine Science Research Institute (MSRI), Common Equipment, Room #235;
- Biology Laboratory Manager's Office, Nelms Science Building, Room #21;
- Chemistry Department Office, Swisher Science Building, Room #4C;
- Chemical Hygiene Officer's Office, Nelms Science Building, Room #21;
- Physical Plant Director's Office, Physical Plant; and
- Campus Security's Dispatch Center, Campus Security & Purchasing Department

In case of an emergency, contact JU Campus Security (904-256-7585) to gain access to any needed documentation and references in Merritt-Penticoff Science Building, Room #132 or any other location.

In all other cases, viewing of the documentation and references shall be arranged through the Division of Science and Math Office in Merritt-Penticoff Science Building, Room #132.

As revisions to the CHP are completed and approved, each one of the stored copies that are listed above will be updated.

1.0 Introduction

Jacksonville University (JU) has developed this Chemical Hygiene Plan (CHP) to meet the following objectives:

- Educate and protect faculty, staff, and students from health concerns associated with the use of hazardous laboratory chemicals;
- Assure that chemical exposures are not in excess of the permissible exposure limit (PELs) adopted by OSHA; and
- Protect university students, faculty, staff, visitors and property against potentially dangerous incidents associated with the handling, storage, and disposal of hazardous chemicals.

The CHP follows the general format and content of the Model CHP provided by the Laboratory Safety Institute and modified as appropriate to reflect the current practices of JU.

This CHP also satisfies the requirements of the U.S. Department of Labor, Occupational Safety and Health Administration, Title 29 CFR Part 1910.1450 as modified, *Occupational Exposures to Hazardous Chemicals in Laboratories* and commonly referred to as the "Laboratory Standards." Although some of the policies and practices described in this CHP may not be part of the OSHA Laboratory Standard, they have been deemed by JU as appropriate for maintaining a safe environment for students, faculty, and staff.

Background

Before 1990, OSHA's approach to controlling occupational exposure to hazardous chemicals was to develop lists of permissible exposure limits (PELs), substance-specific standards, and the health hazard communication standard (Title 29 CFR Part 1910.1200 and Appendices A, B, C, D, and E). These regulations address industrial applications where workers typically received prolonged exposure to large quantities of a few chemicals. The OSHA Laboratory Standard (enacted in 1991 and subsequently modified as deemed necessary) applies to all employees engaged in the use of hazardous chemicals in laboratory workplaces where short-term exposure to varying amounts of such chemicals may be encountered. This standard emphasizes worker training and safe work practices.

Applicability

The OSHA Laboratory Standard only applies to laboratory workplaces where chemicals are used in a non-routine, non-production manner by workers with at least some scientific education and training. Biology, chemistry, and marine sciences laboratories are examples of where the CHP is applicable. FWC laboratories that do not utilize university chemicals, electronics laboratories, machine shops, craft shops, and pilot simulation bays are example of where the CHP is not applicable.

When chemicals are used in other JU facilities (such as classrooms or conference areas), individuals will use proper hygiene practices and equipment appropriate for such chemical hazards. At a minimum, individuals will always utilize the recommended protective barriers and equipment required within the chemical's SDS. At no time, will an individual's exposure to such chemicals exceed the permissible exposure limits specified in Title 29 CFR Part 1910[z].

Laboratory usage of hazardous chemicals are defined as the handling or use of hazardous chemicals in which all of the following criteria are met: (1) Procedures using chemicals are carried out on a laboratory scale (e.g., using containers for reactions, transfers, and other handling of chemicals that are easily manipulated by one person); (2) Multiple chemical procedures or chemicals are used; (3) The operations involved are neither part of a production process nor simulate one; and (4) Protective laboratory practices and equipment are available and are commonly used to minimize the potential for employee exposure to hazardous chemicals.

When the operations in a particular laboratory meet all of the above criteria, that laboratory must comply with the requirements of the CHP. Operations in laboratories involved in the use of hazardous chemicals that do not meet the criteria previously outlined shall comply with JU's Disaster Preparedness and Response Plan, Hazardous Waste Management Plan, and all other applicable OSHA regulations.

JU's laboratories also generate chemical wastes that may pose environmental, as well as human hazards. JU has developed a separate Hazardous Waste Management Plan (HWMP) to ensure compliance with these rules and regulations. The HWMP is available from the Physical Plant Director or Campus Security upon request. These wastes are considered hazardous and are regulated by Federal Environmental Protection Agency, Florida Department of Environmental Protection, and local laws & regulations. The most important of these laws and regulations that apply to JU's laboratories are:

- U.S. Department of Labor Occupational Safety and Health Administration Title 29 CFR Parts 1910, 1915, and 1926. Hazard Communication, as modified to conform to the United Nations' Globally Harmonized System of Classification and Labeling of Chemicals (GHS);
- The Federal Resource Conservation and Recovery Act (RCRA - Title 40 of the
- Code of Federal Regulations (40 CFR) Parts 260-272);
- The Florida Department of Environmental Protection Hazardous Waste Rule (Chapter 62-730 in the Florida Administrative Code, FAC); and
- Florida Rules and Regulations relating to the use of the public sewers that applies to certain wastes (saline and sugar solutions only) that can be poured down sink drains and into the public sewer system.

2.0 General Principles and Scope

The following principles and elements have been adapted for JU from the American Chemical Society Model CHP.

a. The CHP provides specific laboratory practices and Standard Operating Procedures (SOPs) to minimize the exposure of faculty, staff, and students to hazardous substances. Following the practices and SOPs specified in the CHP will minimize the associated risk of exposure to hazardous chemicals.

b. It is prudent to minimize all chemical exposures because most laboratory chemicals present hazards of one type or another. Control measures to be implemented include engineering controls, hygiene practices, administrative controls, and the use of personal protective equipment. Employees and students will follow general precautions for handling all laboratory chemicals outlined within the CHP. Specific guidelines for some chemicals that are known to be extremely hazardous, such as those found in the appropriate SDS, will also be followed.

c. The permissible exposure limit (PEL) and threshold limit value (TLV) of a typical chemical used in the laboratory are available on the chemical's SDS. Employees and students exposure to hazardous chemicals should not exceed these limits, and by following the procedures and guidelines within the CHP, exposure will be kept below these limits identified by the American Conference of Governmental Industrial Hygienists, ACGIH.

d. Fume hoods, ventilation devices, and other protective equipment are the best way to prevent exposure to airborne substances. These devices must be kept in good working order to provide employees and students with a safe working area. Specific measures must be taken to ensure proper and adequate performance of such equipment.

e. The purchaser of a chemical should ensure that the corresponding SDS is available or accompanies the chemical. Any entity on campus that receives a SDS in the mail or email will ensure that the correct party receives it. All SDSs should be accessible to employees at all times, and employees will be trained to read, understand, and use the information provided on the SDS.

f. Provisions have been established for all members of the campus community to receive appropriate safety information, required training upon exposure to hazardous chemicals, required yearly refresher training, and medical examinations if necessary.

g. The personnel responsible for the implementation of the CHP will be the designated Chemical Hygiene Officer (CHO) and/or their designated appointees. Under the direction of the CHO, all Laboratory Managers and Technicians support the implementation of the CHP and maintain safe laboratory working environments.

h. Provisions have been established for additional protection for all personnel who work with "particularly hazardous substances." These include select carcinogens, reproductive toxins, and substances that have a high degree of acute toxicity.

3.0 Designation of Responsibilities

If you are teaching, working, or studying within a Jacksonville University laboratory, you are responsible for being aware of, understanding, and following the CHP. The person responsible for the implementation of the CHP is the Chemical Hygiene Officer (CHO) and the person ultimate responsibility for health and safety of the all personnel within Jacksonville University laboratories is the Provost & Chief Academic Officer . A description of these positions and others are discussed below.

3.1 Provost & Chief Academic Officer

At Jacksonville University, the Provost & Chief Academic Officer have the ultimate responsibility for chemical hygiene and provide, along with other officers and administrators, support for efforts to improve chemical safety and health. The Provost & Chief Academic Officer supervise and authorize the CHO to take steps necessary to carry out the objectives of the CHP including the following:

a. Approving the CHP for laboratories at JU.

b. Monitoring the implementation of the CHP at all applicable levels of administration with JU.

c. Reviewing and adopting any proposed changes to the CHP.

d. Obtaining any required licensing, permits, or approval from local, state, and federal agencies to purchase, store, use, synthesize, administer, and/or dispose of any hazardous material, prescribed medication, or controlled substance.

3.2 Chemical Hygiene Officer in coordination with Laboratory Managers

JU appoints a CHO for the Division of Science and Math. The CHO in coordination with Laboratory Managers throughout the Division address all health and safety activities. The CHO has the authority to shut down or suspend activities that do not align with the CHP. Located within Appendix A is the memorandum of designation for the CHO for the institution. Duties include, but are not limited to:

a. Determining which part of JU operations are governed by the Title 29 CFR Part 1910.1450 "OSHA Laboratory Standards," and ensuring that such operations comply with the CHP.

b. Oversee the Environmental Health & Safety (EHS) activities within the Division of Science and Math.

c. Working with the appropriate personnel to evaluate, implement, and update the CHP on a routine basis.

d. Providing technical expertise and administrative support to faculty and staff; and direct inquiries to appropriate resources.

e. Ensuring that extremely hazardous substances are appropriately labeled, handled, stored, and managed. That specific standard operating procedures are developed and maintained for the safe usage, cleanup, and disposal of these substances.

f. Coordinating the operation, acquisition, and maintenance of fume hoods, emergency safety showers, eyewashes, and fire extinguishers where chemicals are handled.

g. Investigating all reports of laboratory incidents, chemical spills, and near-misses to prevent repeat occurrences.

h. Acting as a liaison between laboratory operations and the Provost & Chief Academic Officer. Bring unresolved and potentially serious health and safety problems to the Provost & Chief Academic Officer' attention.

i. Maintaining records and making them available to employees and administrative personnel.

j. Maintaining a collection of references on laboratory safety and hazardous materials.

k. Coordinating and monitoring the procurement, use, and disposal of laboratory chemicals.

l. Coordinating waste pickups with those responsible for waste disposal on campus and familiarizing oneself with the JU Hazardous Waste Management Plan, maintained under separate cover.

m. Developing an appropriate implementation program for chemical hygiene, including procedures for complying with each element of the CHP, such as training, information exchange, and record keeping.

n. Training of all laboratory employees and other personnel who may come into contact with hazardous chemicals.

3.3 Laboratory Technicians

The Laboratory Technicians for the Division of Science and Math are directly involved with the implementation of the CHP. The laboratory technicians report directly to Department Chairs. In the event of the absence of a Laboratory Technician, the Laboratory Manager for that department will be responsible for the completion of these tasks:

a. Working with the appropriate personnel to evaluate, implement, and update the CHP annually.

b. Conducting, or designating the conducting of, annual hazard assessments for laboratories and storage areas and provide a written report and recommendations for follow-up activities, as needed, to the CHO. (Inspection Form provided in Appendix B).

c. Reporting all laboratory incidents, chemical spills, and near- misses to the CHO. Develop, institute, and document remedial actions to prevent such incidences in the future.

d. Completing or designating the task of completing, an annual computerized inventory of chemicals stored within Jacksonville University Laboratories (See Appendix C for chemical inventory requirements).

e. Maintaining a collection of current SDS for all chemicals and mixtures of shipped chemicals stored or housed within Jacksonville University Laboratories.

3.4 Faculty and Staff

Faculty and staff participate in the implementation of this CHP and overall safe laboratory practice by:

a. Informing students and/or laboratory workers on chemical use and operational safety procedures associated with the use of those chemicals as it applies to laboratory activities.

b. Providing students with a copy of the JU Laboratory Safety Guidelines and returning the signed Signature Page to the CHO at the start of each semester or at the commencement of employment (See Appendix J for JU Laboratory Safety Guidelines).

c. Understanding the involvement of hazardous chemicals with planned experimental activities, which includes special personal protective equipment that may be required for those activities.

d. Implementing and enforcing EH&S policies for laboratory, classroom, fieldwork, and support facilities.

e. Ensuring all students and laboratory workers comply with the CHP.

f. Being aware of all hazardous properties associated with chemicals that are stored and used within the area. If possible, evaluating and limiting an experiment potential for environmental emissions.

g. Before each laboratory activity, inform students about all hazards associated with substances being used, and ensure that each student is aware of potential dangers (i.e., identifying safety concerns and developing safety procedures for each experiment).

h. Before beginning employment of students or other workers, inform them about hazardous substances used within the laboratory and ensure each worker is aware of potential dangers.

i. Ensure that proper protective equipment is available, in good working order, and that individuals in the laboratory have been trained in the proper use of such equipment.

j. Ensuring that all containers of hazardous waste are properly labeled and stored according to the JU Hazardous Waste Management Plan.

k. Ensuring that all chemical labels are not defaced or removed.

l. Notifying the CHO and making an incident report immediately if a spill or injury occurs (Incident Report available in Appendix D). Requesting assistance, if needed, from the CHO and/or their designated appointees.

3.5 Students and Laboratory Assistants

Students and laboratory workers participate in the implementation of this CHP and overall safe laboratory practices by:

a. Indicating by signature that they have been notified of the location(s) of the CHP, understand all safety instructions, and are willing to abide by them.

b. Following all health and safety standards, SOPs, and rules established in the CHP as communicated by staff and faculty.

c. Reporting all hazardous conditions to the supervising faculty or staff.

d. Wearing and using prescribed personal protective equipment (PPE).

e. Reporting any illness or job-related injuries to the supervising faculty or staff. (See Appendix D. Incident Report form)

f. Requesting information and training if not sure about proper operational procedures.

g. Monitoring the workplace to identify EH&S concerns.

4.0 Standard Operating Procedures (SOPs)

Staff and students must follow the CHP to minimize their risk since most laboratory chemicals present some form of potential hazard to the health and safety of the campus body, and the surrounding environment. Generally, textbooks, laboratory manuals, and other instructional materials outline the prescribed safety precautions needed for a particular laboratory activity; however, total reliance on such publications to provide complete and accurate information is not advisable. Employees should consult additional references, including SDSs, before undertaking an unfamiliar activity.

4.1 Safety Equipment and Procedures

JU will provide appropriate laboratory safety equipment, such as eyewash stations, emergency showers, fire blankets, fire extinguishers, first aid kits, fume hoods, gloves, respirators, chemical resistant aprons, and face shields. JU will provide employees with their own eye protection (e.g., chemical splash goggles or safety glasses). Due to health, safety, and storage concerns, students will be required to wear eye protection provided by JU or purchased by the student during potentially hazardous operations. Eye protection should meet the American National Standards Institute (ANSI) Z87+ requirements.

Laboratory safety procedures must be developed and consistent with this document to satisfy the requirements outlined within the CHP. In particular, the following section, entitled "Standard Work Practices," will be the primary documentation for how laboratories will implement the CHP.

4.2 Laboratory Hygiene Practices

General laboratory SOPs include the following:

a. Never place food or beverage in storage areas, refrigerators, glassware, or utensils that are also used for laboratory operations.

b. Do not eat, drink, smoke, chew gum, manipulate contact lenses, or apply cosmetics in laboratories where chemicals or other hazardous materials are present. Contact lenses may be prohibited for some laboratory operations with volatile solvents.

c. Minimize exposure to all chemicals regardless of their familiarity.

d. Assume that unknown materials are toxic, and that a mixture of unknown materials are more toxic than its most toxic component.

e. Thoroughly wash areas of exposed skin before leaving the laboratory.

f. Confine long hair and loose clothing. Wear closed-toed shoes in the laboratory. Never wear sandals or flip-flops in laboratories where chemicals are being used. Wear appropriate eye protection at all times.

g. If exposure to chemical splashes or spills exist, always wear long-sleeved and long-legged clothing or appropriate protective covering (such as a lab coat that also ensures protection of the midriff area). While performing laboratory work with the potential of chemical splashes or spills, never wear short-sleeved T-shirts and short skirts or shorts. If short sleeves are worn, a laboratory coat with long sleeves must be worn to cover the exposed arms. Jewelry should not be worn if it interferes with gloves and other protective clothing, could react with a chemical, or could come into contact with electrical sources.

h. Conduct yourself in a responsible manner at all times in the laboratory. This means that horseplay, throwing items, and pranks are strictly prohibited. The usage of cell phones is prohibited during laboratory operations except for in the event of an emergency.

i. No one should work alone in the laboratory or chemical storage area unless others are in the vicinity and are aware that someone is in the laboratory or chemical storage area.

j. "Wafting" to test chemical odors should only be done with extreme caution and when only specifically directed to do so in the written experimental procedure. Chemicals should never be tasted for any reason.

k. Never use your mouth to draw fluid through a pipette. Always use a bulb or other device for suction.

l. Consult a physician if you might be pregnant, or have any medical condition that could render you particularly susceptible to chemical exposure.

m. Do not force glass tubing into rubber stoppers. Lubricate the glass and hold the tubing and stopper with a cloth towel as the tubing is inserted into the stopper.

n. Proper Bunsen burner procedures will always be followed. Never leave an open flame unattended.

o. Should a fire drill or any other evacuation occur during a laboratory activity, turn off all Bunsen burners and non-essential electrical equipment. Leave the room as directed.

p. Hot glass looks like cold glass and remains hot for a considerable time period. Hot plates remain warm for a long time, and many models have no visible sign that the hot plate is still hot. Determine if an object is hot by bringing your hand close to the object but do not touch the object. If unsure, always assume that the hot plate or glass is hot.

q. In the event of glassware breakage, protection for the hands should be worn when picking up the broken pieces. Small pieces should be swept up with a brush and pan. Broken glass contaminated with hazardous chemicals must be treated as hazardous waste. All broken glassware should be disposed of properly in marked broken glassware boxes.

r. Minimize the quantities of uncontained flammable liquids in a laboratory to a single day's combined use.

s. When working with flammable materials, always ensure a safe working distance from sources of ignition.

t. Students and workers must read laboratory directions ahead of time and follow all verbal and written instructions.

u. Students and workers will perform only authorized experiments.

v. Students and workers must report all incidents (including spills or injuries) to the instructor or supervisor at once, no matter how trivial it may seem. The student must seek immediate medical assistance from approved professional care center designed by JU for the treatment of cuts, burns, accidental ingestion of chemicals, or inhalation of fumes.

w. Students will work in a laboratory or chemical storage area only under the direct supervision of an instructor or laboratory supervisor, unless authorized as an undergraduate researcher and have been trained to work within those areas.

x. Students should dispose of hazardous waste and empty containers in accordance with instructor's or supervisor's explicit directions and the Hazardous Waste Management Plan.

y. Students should ask for assistance from faculty and staff whenever one is unsure regarding the safe handling or disposal of chemical waste.

z. In the event of a chemical spill, students and workers must report the incident immediately to the instructor or supervisor. If the chemical spilled is large, toxic, volatile, or particularly hazardous, leave the room immediately and contact Campus Security at 904-256-7585.

4.3 Housekeeping Practices

General housekeeping practices to be followed in the laboratories and stock rooms including the following:

a. Keep all work areas clean, dry, and uncluttered. Bench tops should be wiped down at the end of every laboratory session.

b. Access to emergency equipment, utility controls, showers, eyewash stations, and laboratory exits should never be blocked.

c. Sinks are to be used only for disposal of water and those solutions designated by the instructor to be safe to go down the drain. All other wastes must be deposited in the appropriate, segregated and labeled receptacles, and follow the disposal procedures outlined in the Hazardous Waste Management Plan.

d. Minimize the release of toxic vapors into the laboratory by using fume hoods. When containers are not in use, keep containers closed at all times.

e. Clean up all chemical spills as soon as they occur and dispose of all cleanup materials properly.

f. Properly store chemicals and equipment at all times. Chemicals should not be stored in aisles, on the floor, in stairwells, on desks, on laboratory tables, or in functioning fume hoods.

g. Before leaving the laboratory, turn off services (gas, electricity, water) to the extent permitted by existing equipment.

h. When not in use, keep all cabinets and drawers closed to avoid catching and bumping hazards.

i. Bring only your laboratory instructions, notebooks, calculators, and writing instruments into the laboratory area. Never bring food or drinks into the laboratory.

j. Leave backpacks and other books in the classroom area or designated storage areas within the laboratory.

4.4 Chemical Procurement and Purchasing

General chemical procurement and purchasing procedures consist of the following:

a. Chemicals are initially received either by the post office or central receiving. In the case of Science and Math, the chemicals are usually delivered to the Division Office or the Marine Science Research Institute, where they are stored temporarily in their original packaging until the purchaser is informed and retrieves them. In the case of the Millar-Wilson Laboratory, the chemicals are delivered to the Marine Science Research Institute.

b. All laboratory chemical purchases will be made through the Division of Science and Math, and signed by the Division Chairperson/CHO or their designated appointee to facilitate coordination of inventory and purchase approval. Under certain circumstances, the CHO may disallow the purchase of a chemical. Individual departments will maintain their own chemical inventories and will be responsible for ensuring they are updated when chemicals are purchased or depleted. Additionally, the departments' chemical inventories will be updated annually by Laboratory Managers and/or Technicians.

c. Donated chemicals should <u>never</u> be accepted unless prior permission is received from the appropriate department chair and CHO.

d. When purchasing chemical supplies for laboratories, a copy of all chemical purchase order requests must be sent to the CHO and Laboratory Managers. The CHO will ensure that a copy of all chemical purchase orders are available to laboratory technicians, so that the laboratory technicians can update the department's chemical inventory and SDSs for a provide location.

e. Efforts must be made to reduce purchased chemical quantities to the smallest-sized containers possible. The lesser unit cost for bulk purchases are outweighed by the cost of additional storage and disposal of old, unused materials.

f. Faculty and staff needing chemicals, should check the requested chemical purchases against the department's chemical inventory to reduce duplicate purchases and stock build-up.

g. Before an extremely hazardous chemical/material is ordered (such as carcinogens, reproductive hazards, and acutely toxic substances) consideration must be given to the adequacy of facilities and equipment to safely handle its type and quantity. Consideration must also be given to whether a less hazardous material may be substituted in the place of an extremely hazardous chemical/material.

h. All purchase orders that include chemicals that have been purchased for the first time must include a request for the SDS to be sent along with the new chemical. A copy of the SDS will be stored in the laboratory where the chemical is to be used, and a second copy will be stored in the Division of Science and Math Office. The Laboratory Manager and/or Technician will ensure that the SDS collection is complete, and employees and students have access to them during working hours.

4.5 Chemical Inventory

Inventories of hazardous and potential hazardous laboratory reagents are available for all laboratories on campus. The chemical inventories for each department will include chemical stock rooms (where bulk chemicals are stored) and each individual laboratory (where chemicals are stored and used during the academic year). The inventories are to be updated annually by Laboratory Managers and/or Technicians. In compliance with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS; adopted by OSHA in May 2012), the inventories will be expanded to include the following information:

a. Chemical name (including any synonyms and/or concentration);
b. Chemical Abstract Service, CAS, registry number;
c. Department, Building, Room number, Cabinet/Shelf;
d. Vendor Name;
e. Unit size;
f. Chemical type (liquid, solid or mixture) and Group/Family;
g. Incompatibles;
h. Maximum quantity stored on campus at any time during the calendar year and average daily quantity on hand; and
i. Physical condition and integrity of the container when inventoried (optional).

Chemicals whose storage limits have expired or containers or labels that are in poor condition or missing must be marked for disposal and included in the inventory until their ultimate disposal.

4.6 Chemical Receiving

General chemical receiving procedures include the following:

a. All incoming shipments must be inspected by the purchaser, who will ensure that proper labels are attached, containers are intact and in good condition, and that SDSs are on file or included. In the event that there is a problem, the purchaser will contact the vendor and rectify the issue.

b. If leaking containers are received, the containers must immediately be placed in an appropriate secondary container. The vendor will then be contacted to determine the proper next steps.

c. Chemicals should arrive with expiration dates assigned. If there is no date assigned, the purchaser will contact the vendor to obtain the chemical's expiration date.

d. Within the area where shipments of chemicals are unpacked, appropriate personal protective equipment (PPE), spill-control materials, fire extinguisher, and emergency wash station will be made readily available.

e. Labels on incoming containers must not be removed or defaced. While there is no regulatory requirement for labeling secondary containers, prudent laboratory techniques make this a desirable practice.

4.7 Chemical Labeling, Storage and Distribution

The primary storage concerns with all chemical materials are to minimize the amounts stored, to avoid contact between incompatible chemicals, and to ensure that hazardous storage conditions (e.g., light, heat and humidity) are not present. Specific storage procedures will depend on the type of storage equipment available and the chemicals in use. Chemicals and mixtures of chemicals will be labeled in accordance with the GHS adopted by OSHA on May 25, 2012. Some labeling and standard storage practices are described below:

a. Chemical Identification Labels on shipped containers will contain:

- Product Identifier;
- Signal Word;
- Hazard Statements;
- Pictograms;
- Pre-cautionary Statements;
- Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party;
- Recommended use of the chemical and restrictions on use (*new since 2012); and
- Emergency Contact Information

b. If a chemical did not arrive at JU with GHS-compliant labeling, then the CHO and/or Laboratory Managers will ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with:

- "Product identifier and words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and which, in conjunction with the other information immediately available to employees under the hazard communication program, will provide employees with the specific information regarding the physical and health hazards of the hazardous chemical" (OSHA HCS (NPRM) May 2012).

c. All chemicals should be stored in containers that are appropriately labeled, structurally compatible for the chemical within, and form an air tight seal around the lid. Periodically checks will be performed on the container's label integrity and the shelf life of chemicals in storage. If deficiencies are noted, these containers will be corrected or removed for disposal.

d. If a chemical has been transferred to a secondary container, the new container will be appropriately labeled with all of the hazard information. (See Appendix E for Secondary Labeling Template.)

e. Do not store incompatible materials together. Corrosives, flammables, oxidizers, and poisons are mutually exclusive categories. When a substance has multiple hazards, preference will be given to the most acute or reactive property. Chemicals should be stored based on the reactive nature and compatibility group. (Refer to Chemical Compatibility Chart Appendix F.)

f. Large containers and containers with hazardous chemicals (such as acids and bases) should always be stored on the lowest shelf.

g. The classification system used for the storage of chemicals should be displayed in the principal storage area.

h. Do not overload storage cabinets. Always follow the manufacturer's recommended storage limits.

i. Flammable chemicals must be stored in approved storage containers or in approved flammable chemical storage cabinets.

j. Combustible packaging material (i.e., cardboard) should never be stored inside flammable chemical storage cabinets.

k. At all times, all storage areas should be securely locked. Storage and preparation areas should be accessible only to those persons authorized to work within that area.

l. Glass bottles containing highly flammable liquids will not exceed four (4) liters. For larger volumes, metal or approved plastic will not exceed five (5) gallons, and safety cans will not exceed two (2) gallons.

m. Refrigerators used to store flammable chemicals must be labeled and be explosion proof or designed to store flammable chemicals. Household refrigerators are not to be used.

n. Laboratory refrigerators used for chemical storage should never have consumable food stored within them.

o. Hand-carried chemicals should be placed in a secondary container or acid-carrying bucket to protect against breakage.

p. Wheeled carts used to transport chemicals should be stable and move smoothly over uneven surfaces without tipping or stopping suddenly, and should have lipped surfaces that would restrict the containers if the containers break. If lipped surfaces are not provided on the cart, chemicals should be placed in a secondary container or acid carrying bucket to protect against breakage.

q. Purchase and store only the amount of materials needed for the near future (e.g., a semester or academic year).

r. Ventilate storage areas and individual storage cabinets as needed to limit exposure of individuals in the building.

s. Install and maintain smoke detectors in chemical storage areas.

t. Install and maintain self-closures on doors leading into chemical storage rooms.

u. Consider the technical requirements and implement extreme weather condition safety for chemical storage rooms, shelves, and cabinets.

4.8 Gas Cylinders

Compressed gases present a unique danger since individuals are exposed to both mechanical and chemical hazards. Hazards can arise from reactivity and toxicity of a gas, and asphyxiation can be caused by high concentrations of even "harmless" gases such as nitrogen. The large amount of potential energy resulting from compression of the gas makes a gas cylinder a potential rocket or fragmentation bomb. Therefore, the following procedures must be followed when handling compressed gases.

a. The contents of a gas cylinder should be clearly identified with decals, stencils, or appropriate tags in accordance with hazardous communication standards. A cylinder lacking proper identification should not be accepted from a vendor.

b. The hazardous properties of each gas should be determined before the gas is put to use. The flammability, toxicity, chemical activity, and corrosive effects of the gas should be considered, and the user should take adequate safety precautions at all times.

c. Gas cylinders should not be dragged, rolled, or slid. A suitable handcart should be used for transporting cylinders of K & L sizes. The handcart should be equipped with a belt or chain for securing the cylinder.

d. Under no circumstances should any individual ride in a passenger elevator with a gas cylinder. The cylinder should be secured in the elevator and sent to the desired floor without any passengers. As a precaution, a sign should accompany the gas cylinder indicating that passengers should not enter the elevator.

e. If gas cylinders must be taken up or down stairs (in buildings where elevators are not available), appropriate precautions and sufficient manpower will be supplied to safely transport the cylinders.

f. Gas cylinders should only be moved from one location to another with the protective cap securely in place.

g. Both full and empty cylinders should only be stored where they may be securely restrained by straps, chains, or a suitable stand.

h. The protective valve cap should be kept on a cylinder at all times, except when the cylinder is connected to dispensing equipment.

i. Cylinders should be protected from abuses such as exposure to damp ground, direct sunlight, extreme temperature changes, precipitation, direct flames, electrical currents, corrosives, and physical damage.

j. Gas cylinders should only be used with the appropriate dispensing equipment. Do not force connections or use homemade adapters. Standards for design, installation, and maintenance of dispensing equipment are determined by ANSI.

k. The size of the individual gas cylinders and the total number of cylinders present in a laboratory should be limited to the amount needed for immediate use (e.g., a semester or academic year).

l. A cylinder should be considered empty when there is still a slight positive pressure.

m. An empty cylinder should be returned to the supplier as soon as possible after having been emptied or when it is no longer needed.

n. Cylinders should not be exposed to temperatures above 50 °C.

o. Store flammable gases separately from oxidizer gases.

p. Compressed gas cylinders will be transported by the supplier.

4.9 Waste Disposal

To protect the health and safety of Jacksonville University's campus community and the surrounding environment, hazardous waste must be disposed of properly. The Division of Science and Math will comply with the procedures outlined in the Jacksonville University Hazardous Waste Management Plan (HWMP) for the disposal of all laboratory chemicals. Therefore, all laboratory personnel who generate or handle hazardous, radioactive, or mixed laboratory waste should be adequately trained on proper hazardous waste disposal and the HWMP. The following disposal requirements must be enforced:

a. Do not pour hazardous and/or radioactive chemicals down a drain or sanitary sewer.

b. Place all chemical/biological waste generated within laboratories in properly designated containers for disposal.

c. Before leaving the laboratory, ensure that all chemical waste generated are properly labeled, prepared for disposal, and assigned to a Laboratory Manager/Technician who understands how to manage such waste materials.

d. All hazardous waste generated within laboratories must be removed by a licensed hazardous waste disposal service within 180 days of being generated.

4.10 Chemical Spills

Call JU Campus Security at 904-256-7585 if the following occurs: incident or spill involving hazardous materials that result with a serious injury, a hazardous material being released into the sanitary sewer or storm drain, or if the severity of an incident/accident is unclear.

a. If the chemical spill and/or release poses an immediate hazard to personnel or property, an evacuation of the surrounding area is mandated. Campus Security will immediately lock down and isolate the area until a HAZMAT team and/or trained personnel arrives on site to clean up the chemical spill and/or release. These actions should be taken when the following situations occur:

   - If hazardous vapors are present, the surrounding area should be isolated from all personnel. Only trained and approved HAZMAT response team members may enter the contaminated area. This will frequently mean waiting for the arrival of a HAZMAT team during the event of a hazardous gas release.

   - If hazardous material cannot be neutralized or contained safely by the laboratory personnel on site.

- If a fire is involved with any chemical spill and/or release.

- If individuals are unfamiliar with the potential hazards associated with the spilled material.

b. If a volatile, flammable material is spilled, immediately turn off all electrical apparatuses that could provide fuel to the fire, extinguish flames so that all personnel may evacuate the area safely. Consult the SDS for appropriate clean up procedures and protocols. If the quantity of the spill exceeds the employee's training or ability, seal the area and contact Campus Security immediately.

c. If there is no immediate danger (flammability, toxicity, reactivity, corrosive, or health hazard) to personnel, containment should be accomplished by usage of spill pillows, towels, rolls, or other devices that will keep the spill from spreading.

d. If there is no immediate danger, cleanup procedures listed within the SDS for that chemical should be followed. Appropriate personal protective equipment must be used and proper waste disposal procedures must be followed.

e. A spill kit must be accessible for each laboratory. The kit should include at least one of the items listed below:

   - Spill control pillows, or an inert absorbent such as vermiculite, clay, sand, or kitty litter.
   - Neutralizing agents for acid spills such as sodium carbonate and sodium hydrogen carbonate.
   - Neutralizing agents for alkali spills such as sodium hydrogen sulfate and citric acid.
   - Quantities of cleanup materials sufficient for the largest anticipated spill.
   - Large plastic scoops and other equipment such as brooms, pails, bags, and dustpans.
   - Appropriate personal protective equipment.

f. If the spill material was a hazardous chemical, all of the materials involved in the cleanup will be considered to be hazardous waste and must be disposed of properly.

g. Individuals exposed to hazardous chemicals should respond immediately:

- In the case of eye exposure, flush eyes promptly with water for fifteen (15) minutes and seek immediate medical evaluation.

- In the case of inhalation, isolate the individual from the fumes and seek immediate medical evaluation.

- In the case of skin contact, flush the affected area promptly with water and remove any contaminated clothing. Seek medical evaluation as necessary.

- A copy of all appropriate SDSs should accompany anyone sent for medical evaluation because of injury and potential exposure to hazardous materials. SDSs are available in the laboratories where the chemicals are used and/or in the Office of the Division of Science and Mathematics.

h. In the event of any chemical spill and/or release in any quantity, an Incident Report (Appendix D) should be completed and returned to the Division of Science and Math Main Office, MP #132.

4.11 Emissions to the Environment

Chemical users at JU shall review all new and ongoing laboratory operations to determine if the potential exists for the emission of hazardous materials into the environment. If emissions into the environment are possible, the individual must:

a. Consult with the CHO to determine the appropriate controls needed to limit the amount of environmental emissions.

b. Contact the Provost & Chief Academic Officer to obtain any required licensing, permits, or approval from local, state, and federal agencies.

5.0 Control Measures

5.1 Reduce Exposure to Hazardous Chemicals

The purpose of this section is to provide the framework for selecting control measures to minimize the risk of chemical hazards. Given the enormous variety of hazardous materials and potential operations, JU has adopted the following guidelines.

Chemical hazards are reduced through various control measures that work in unison to minimize exposure. These measures include the following (in order of preference):

a. **Elimination –** Removing of any chemical that poses a significant risk to human health and safety, or to property.

b. **Engineering Controls** – Such as fume hoods, designated areas, security devices, and facility design.

c. **Administrative Controls** – Such as written safety procedures, training, limited access, and medical surveillance.

d. **Chemical Substitution** – Such as using a less hazardous compound.

e. **Work Practices** – Such as personal hygiene and laboratory technique

f. **Personal Protective Equipment, PPE,** – Such as respirators, gloves, face shields, and chemical resistant clothing.

Selection of Controls

After preparing a chemical hazard analysis, a combination of controls may be used based on:

a. The inherent toxic and physical properties of the materials and their intended use.
b. The possibility of unplanned outcomes, spills and accidents.
c. Possible exposure routes (inhalation, skin contact, eye contact, or ingestion).
d. Skills, training, and prior experience of the chemical user.

Selection of the final control measures must be made in consultation with the CHO, Department Chairs, and the Laboratory Manager and/or Technicians. Consultation is especially needed for new operations and any operations involving particularly hazardous substances.

5.2 Personal Protective Equipment (PPE)

The following PPE should be considered as safety hazard control measures for use within laboratories and field work:

a. It is the responsibility of JU to ensure the availability of appropriate safety and emergency equipment for employees and students that are compatible with the required degree of protection for the substances being handled. [Students will be required to purchase appropriate personal protective equipment for use in all academic endeavors].

b. Where necessary, procedures should be prepared on the use of eye, skin, body protection, respirators, and/or other protective gear.

c. Individuals must wear eye protection when visiting or working in areas where hazardous chemicals are handled. All eye protection devices should conform to ANSI Standard Z87+.

d. Chemical splash safety goggles should be used as the standard protective eyewear. Such goggles should fit the face surrounding the eyes snugly to protect the eyes from a variety of hazards.

e. Any experiment that involves heating or the use of chemicals or glassware will require the use of chemical splash safety goggles. The goggles also serve to reduce dust and fumes from reaching the eye.

f. Contact lenses are not necessarily prohibited in the laboratory. If contact lenses are permitted, chemical splash goggles must be worn at all times.

g. Full-face shields protect the face and throat. They must be worn for protection when there is a greater risk of injury from flying particles and harmful chemical splashes. A full-face shield must also be worn when an operation involves a pressurized system that may explode or an evacuated system that may implode. For full protection, safety goggles must be worn with the face shield.

h. Standing shields must be used when there is a potential for explosions, implosions, or splashes, or when corrosive liquids are used. Goggles will be worn whenever using a standing shield.

i. A standing shield will be used for group protection from chemical splash and impact. The standing safety shield should be used with safety goggles or glasses and, if appropriate, with a face shield.

j. Laboratory coats and/or aprons worn in laboratories offer protection from splashes and spills, and should be fire resistant. In the event of an incident, laboratory coats and/or aprons must be easy to remove.

k. When gloves are required, it should be remembered that no one kind of glove is suitable for all situations. The SDS should be consulted for information regarding the proper type of gloves to be used.

l. Gloves must be worn during transfer of chemicals from one container to another or during the transfer of chemical waste. Gloves are available in all laboratories and prep areas. Gloves should be inspected before use to ensure that there are no holes, blisters, and cracking or other ways for the chemical to pass through the glove onto the hand and should be replaced periodically or when damaged or punctured.

m. If necessary, individuals will be trained in the proper use of respirators and must wear them whenever exposure by inhalation is likely to exceed OSHA or ACGIH limits.

n. Carefully inspect of all protective equipment must be completed before using it. Do not use defective protective equipment. The choice of protective clothing depends on the degree of protection required and will be set by the CHO.

5.3 Hazard Identification and Labels

The following SOPs will be followed for hazard identification and labels.

a. Laboratory chemicals must be properly labeled to identify any hazards associated with them. Chemicals and mixtures of chemicals will be labeled in accordance with all hazardous communications standards adopted by OSHA.

b. Chemical Identification in accordance with the GHS, labels on shipped containers will contain:

- Product Identifier;
- Signal Word;
- Hazard statements;
- Pictograms;
- Precautionary statements;
- Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party;
- Recommended use of the chemical and restrictions on use; and
- Emergency phone number

c. If a chemical did not arrive at JU with GHS-compliant labeling, then the individual responsible for ordering said chemical and/or Laboratory Technicians will ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with:

- "Product identifier and words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and which, in conjunction with the other information immediately available to employees under the hazard communication program, will provide employees with the specific information regarding the physical and health hazards of the hazardous chemical" (OSHA HCS (NPRM) May 2012).

d. Chemicals stored in original bottles, must have the manufacturer's original label identifying potential hazards, the date of purchase, the date opened, and the initials of the person who opened the container. This will apply to chemicals purchased after July of 2008.

e. Chemicals transferred to a secondary container, must be appropriately labeled with the chemical name, formula, concentration (if in solution), solvent (if in solution), hazard warnings, GHS pictograms, signal words, and name or initials of the person responsible for the transfer. (Appendix E)

f. Unlabeled bottles of unknown contents should not be opened, and such materials should be disposed in accordance with the HWMP.

5.4 Signs and Posters

The following SOPs will be followed for signs and posters.

a. Laboratory employees have a right to know what hazards are associated with their designated areas of work. Jacksonville University will post signage outside of laboratory doorways to inform employees of toxic substances or hazardous materials found in their workplace.

b. Signs shall be used to indicate the location of exits, evacuation routes, safety showers, eyewash stations, fire extinguishers, fire blankets, first aid kits, fume hoods, and other safety equipment.

c. Telephone numbers of emergency points of contact must be posted in each laboratory, stockroom, and storage area.

d. Flammable storage cabinets and refrigerators must be labeled according to local fire regulations. Emergency telephone numbers will be posted in all laboratory areas.

5.5 Safety Data Sheets (SDS)

The following SOPs will be followed for the use and retention of SDS.

a. Each SDS received should be maintained and made readily available to employees and students that are exposed to or work with that chemical. The SDS of each chemical or mixture of chemicals are made available within each laboratory at the designated SDS station, and upon request, at the Division of Science and Math Office, MP #132. A second digital copy of each SDS is also maintained by Laboratory Managers and Campus Security.

b. The SDS for each chemical usually gives guidelines to exposure limits. Typical limits are expressed as Threshold Limit Values (TLVs), permissible exposure limits (PELs), or action levels. Such limits, along with any other information about the hazardous characteristics of the chemical, will be used to set laboratory guidelines. These laboratory guidelines may be used in determining the safety precautions, control measures, and personal protective equipment (PPE) needed to work with these chemicals.

5.6 Records Retention

The following records are to be maintained by the CHO or his/her appointed designee:

a. An annual inventory of all chemicals and chemical usage.

b. Repairs and regular inspections/maintenance reports to be completed on all safety equipment, including fume hoods.

c. All employee training records.

d. All documented incident or near-miss reports.

e. All recorded air monitoring data, exposure assessments, medical consultations, and medical examinations.

f. All laboratory hazardous waste disposal manifests and records for 3 years past the date of disposal.

g. A copy of all SDSs for laboratory chemicals, either in a digital or hard copy.

5.7 Exposure Monitoring

The following SOPs will be followed for exposure monitoring.

a. If there is reason to believe that the exposure level for a regulated substance has exceeded the action level or permissible exposure limit, the CHO and/or their designated appointee should ensure that the employee or student exposure to that substance is measured.

b. Factors which may raise the possibility of overexposure and therefore warrant an initial measurement of employee or student exposure include:

- The manner in which the chemical procedures or operations involving the particular substances are conducted;
- The existence of historical monitoring data that shows elevated exposures to the particular substances for similar operations;
- The use of a procedure that involves significant quantities or is performed over an extended period of time;
- There is reason to believe that an exposure limit may be exceeded; and
- Signs or symptoms of exposure (e.g., skin or eye irritation, shortness of breath, nausea, or headache), which are experienced by employees or students. (Some of these symptoms are very general and can be due to many other causes including emotional stress or hysteria.)

c. If the substance in question does not have an exposure monitoring or a medical surveillance requirement, exposure monitoring and medical surveillance should be continued until exposure levels are determined to be below the action level or 50% of the PEL. In the absence of PELs, the ACGIH Threshold Limit Values (TLVs) should be referenced.

d. If a substance has an exposure-monitoring requirement and if there is reason to believe that exposure levels for that substance routinely exceed the action level or in the absence of the action level (PEL), the employer will measure the employee or student exposure to the substance.

e. If the initial monitoring (described in above) discloses employee exposure over the action level or in the absence of an action level (PEL), JU will immediately comply with the exposure monitoring provisions of the relevant standard for that substance.

f. Within fifteen (15) working days after the receipt of any monitoring results, Jacksonville University will notify the employee or student of these results in writing either individually or by posting the results in an appropriate location that is accessible to employees.

g. The following substances are regulated by OSHA standards and require personal exposure monitoring:

- Acrylonitrile (Title 29 CFR Part 1910.1045(n); 1926.1145; 1915.1045);
- Arsenic (Inorganic) (Title 29 CFR Part 1910.1018(n); 1926.1118; 1915.1018);
- Asbestos (General Industry) (Title 29 CFR Part 1910.1001(l));
- Benzene (Title 29 CFR Part 1910.1028(i); 1926.1128; 1915.1028);
- 1,3-Butadiene (Title 29 CFR Part 1910.1051(k); 1926.1151);

- Cadmium (Title 29 CFR Part 1910.1027(l); 1926.1127; 1915.1027; 1928.1027);
- Chromium(VI), Hexavalent (Title 29 CFR Part 1926.1126(i); 1915.1026(i);
- Coke Oven Emissions (Title 29 CFR Part 1910.1029(j));
- Compressed Air Environments (Title 29 CFR Part 1926.803(b));
- Cotton Dust (Title 29 CFR Part 1910.1043(h));
- 1,2-dibromo-3-chloropropane (Title 29 CFR Part 1910.1044(m); 1926.1144; 1915.1044);
- Ethylene Oxide (Title 29 CFR Part 1910.1047(i); 1926.1147);
- Formaldehyde (Title 29 CFR Part 1910.1048(l); 1926.1148; 1915.1048);
- Lead (Title 29 CFR Part 1910.1025(j); 1926.62);
- Methylene Chloride (Title 29 CFR Part 1910.1052(j); 1926.1152);
- Methylenedianiline (Title 29 CFR Part 1910.1050(m));
- Vinyl Chloride (Title 29 CFR Part 1910.1017(k); 1926.1117); and
- Ionizing Radiation (Title 29 CFR Part 1910.1096)

6.0 Safety/Emergency Facilities and Equipment

6.1 Reporting Laboratory Incidents and Unsafe Conditions

The following SOPs will be followed for reporting laboratory incidents and unsafe conditions.

a. Report all laboratory incidents, no matter how minor, to the Division of Science and Math. Incident report forms are available from the Division of Science and Math and in Appendix D of this plan. Unusual or unexplainable chemical reactions should be discussed with others in the department, to caution others as to the risk of the procedure. Personal reactions to chemicals that are not identified on the SDS should be reported to the EPA, with the advice of legal counsel, under the Toxic Substances Control Act, TSCA, Section 8 regulations.

b. Report any unsafe conditions by contacting the primary investigator of the area who in return should file a written report with the CHO so that the condition may be corrected. Unsafe conditions that must be reported include, but are not limited to:

   - Nonfunctioning hoods in the science area;
   - Unsafe storage conditions;
   - Blocked emergency exits.
   - Improperly charged or expired fire extinguishers;
   - Eyewash stations or safety showers that do not work or are uninspected; and
   - Absence of personal protective equipment.

   Note: A template for reporting a safety concern is available in Appendix G

6.2 Proper Equipment Use

The following SOPs will be followed for proper safety equipment use.

a. Use equipment only for its intended purpose and design.

b. Inspect all equipment and laboratory apparatuses for damage before use. Never use damaged equipment, such as cracked glassware or equipment with frayed electrical wiring.

c. Consult the user manual or a trained laboratory employee prior to using equipment for the first time.

d. Airflow through fume hood will be inspected and calibrated monthly by Laboratory Managers. Airflow through fume hoods must be annually re-certified by licensed professional.

6.3 Emergency Equipment

The following SOPs will be followed for the availability and use of emergency equipment.

a. Emergency equipment items that should be available include: eyewash station, fire extinguisher of the appropriate type, safety shower, telephone for emergencies, fire blanket, and identification signs.

b. Each laboratory should have a standard first aid kit.

c. Safety equipment will be tagged following an inspection, showing the date, inspector, and results.

d. Laboratories in which hazardous substances are being used should have spill control kits tailored to deal with the potential risk associated with the materials being used. If there is no immediate danger to employees or students, containment should be accomplished by spill pillows, towels, rolls, inert absorbents, neutralizing agents, or other devices.

e. The path to emergency equipment should never be blocked and will remain clear at all times.

6.4 Fume Hoods

Specific measure must be taken to ensure proper installation and adequate performance of fume hoods and other safety equipment, including alarm systems. JU has adopted guidelines from:

- "Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards, Updated Version (2011)," published by the National Research Council. (Available from National Academy Press, 2101 Constitution Avenue, N.W., Washington, D.C. 20418)

- "CRC Handbook of Laboratory Safety, 5th Edition," published in 2000 by A. Keith Furr. (Available from CRC Press, 2000 N.W. Corporate Boulevard, Boca Raton, Florida 33431.)

Before working with hazardous materials, the user should always verify that the fume hood and/or equipment is operating properly. Users noting a deficiency in a fume hood or with safety equipment should immediately notify the Laboratory Manager. A fume hood or piece of equipment that is not operating as intended should never be used. Fume hoods used for hazardous materials (e.g., toxic, radioactive, and /or flammable substances) must be checked before their use for adequate function to alert users to less-than-adequate performance levels.

The CHO and/or their designated appointee will oversee annual performance checks on all fume hoods and safety equipment used for hazardous materials.

- OHSA regulations require that all fume hoods be vented so that a minimum average face velocity of 80-120 feet per minute, fpm, across a sixteen (16) inch sash height is achieved. This range of flow should be certified annually by a licensed professional.

Consult with the CHO before making changes to existing systems and/or to obtain the criteria for unique experimental setups.

Fume hoods are to be used for the following:

a. When the chemical is a known or suspected carcinogen, reproductive hazard, sensitizer, or toxic chemical.

b. When handling large quantities of chemicals (more than 500 mL of liquid or more than thirty (30) grams of a solid)

c. When handling flammable and reactive substances

d. When mixing acid dilutions

e. When handling a substance that is fine and may create a dust

Fume hoods are to be used properly:

f. Check fume hoods before use to ensure adequate functioning. File a safety concern requesting hood maintenance if there is a problem and contact the Laboratory Manager or appropriate faculty/staff immediately. Report all improperly functioning fume hoods by way of completing a Safety Concern Reporting Form (Appendix G). Note: baffles should only be adjusted by trained personnel, and once adjusted, be re-verified for adequate performance.

g. Keep equipment and bottles in use, at least six (6) inches from the front of the hood. Hoods should be uncluttered and the air flow to the back of the hood must be unobstructed during use

h. Connect electrical equipment to outlets outside the hood when possible.

i. Wash the work platform often to maintain a clean, dry surface.

j. Do not use the hoods for a storage area. Once an activity has finished running, remove all bottles to their correct storage areas. Hoods should be closed and turned off when not in use. If chemicals remain in the hood after use, they should be placed in the rear of the hood with secondary containment and the fan left on.

6.5 Ventilation

General laboratory ventilation should not be relied on for protection from exposure to hazardous chemicals. A rate of four (4) to twelve (12) room air exchanges per hour should be the accepted standard for when local exhaust systems, such as hoods, are used as the primary method of control and will be verified annually by a certified professional air control specialist. Exhaust from the fume hoods should be vented directly to the outside.

6.6 Flammable Storage

The following SOPs will be followed for the storage of flammable materials.

a. Chemicals with a flash point below 93.3°C, 200°F, or any chemical with a SDS Label indicating “Flammable” is considered a “fire hazard chemical.”

b. Fire hazard chemicals in excess of 500 mL should be stored in safety cans or in storage cabinets or rooms designed for flammable materials.

c. When transferring significant quantities of flammable liquids from one container to another, it is particularly important that they be properly grounded to prevent accidental ignition of flammable vapors and liquids from static electricity or other sources of ignition.

6.7 Electrical

The following SOPs will be followed for electrical outlets and circuits.

a. All electrical outlets should have a grounding connection accommodating a three-prong plug/adapter.

b. Ground-fault circuit interrupters are required by the fire code to protect users from electrical shock, particularly if an electrical device is handheld during a laboratory operation or if contact with water is highly possible.

c. All laboratories should have circuit breakers readily accessible and their locations mapped.

7.0 Training

The OSHA Laboratory Standard stipulates that individuals must be provided with specific information about the chemical hazards in their work area and trained on how to handle such chemicals. Thus, chemical users will receive the required training to perform every task within a reasonably safe manner. The training must be conducted and documented in accordance with this CHP and OSHA requirements.

Training can be accomplished through formal courses, informal instruction, and/or on-the-job training. All training, however, must be documented. The frequency for refresher training is not stipulated within OSHA regulation. Therefore, Jacksonville University evaluates the need for such training on an annual or case-by-case basis.

7.1 Required Information

Individuals working in laboratories must be provided with the following information:

a. At the time of initial assignment and before the start of a new assignment that involves chemicals to which an individual may be exposed to, the employee will be informed of the location of chemical hazards in their work area.

b. Employees will be informed of the content of the "Laboratory Standard," Title 29 CFR Part 1910. Employees will also be informed of the location and availability of the CHP.

c. Employees will be informed of the permissible exposure limits (PELs) or Threshold Limit Values (TLVs) for OSHA-regulated substances in the laboratory or recommended exposure limits for other hazardous chemicals in the laboratory where there is no applicable OSHA standard.

d. Employees will be informed of the location and availability of known standard reference material on the hazards, safe handling, storage, and disposal of hazardous chemicals where there is no applicable OSHA standard.

e. Employees will be informed of the location of SDSs.

f. Employees will be informed of the location of personal protective equipment (PPE) and of emergency equipment as outlined in the CHP.

g. Employees will be informed of the signs and symptoms associated with exposures to hazardous chemicals used in the laboratory.

7.2 Employee Training

Employees will be provided with information and training to ensure that they are apprised of the hazards associated with chemicals present within their designated work area, the proper procedures to minimize risk of exposure, and the proper response to incidents.

These orientation and training sessions will cover the following:

a. Contents of the Laboratory Standard and its appendices, how JU has responded to meet its responsibilities, and on the location and availability of the CHP, SDS, and resources on laboratory employee health and safety.

b. How to read and interpret the material within a chemical's SDS.

c. The physical and health hazards that are associated with a chemical class.

d. Potential signs and symptoms of exposure.

e. The proper use of fume hoods and personal protective equipment (PPE).

f. Special operating procedures to be used for extremely hazardous chemicals.

g. How to assess a laboratory for potential hazards.

h. Protocol for dealing with permissible exposure limits and other recommended limits.

i. How to file Incident Reports and Safety Concern Reporting Forms.

j. Methods and observations used to determine the presence or release of a hazardous chemical, such as periodic monitoring devices, continuous monitoring devices, and the visual appearance or odor of hazardous chemicals being used.

k. Control measures to protect individuals from chemical hazards. These include appropriate engineering & administrative controls, work practices, personal protective equipment, and emergency procedures.

l. Physical and health hazards in the work area including: flammable and reactive materials, irritants and corrosives, acute poisons, chronic organic toxins, allergens, and genetic toxins.

m. Proper labeling, storage, and waste disposal practices defined within the CHP and HWMP.

n. Any applicable details within the CHP.

Employees should be trained on the potential chemical hazards in the employees' work areas and on appropriate sections of the CHP. This training should be provided to all employees who actually work in the laboratory as well as to other employees whose assignments may require that they enter a laboratory where exposure to hazardous chemicals might occur. After training is completed and the individual has been assessed for their understanding of the CHP, the CHP for laboratory receipt of training document should be signed and retained by the CHO and/or their designated appointee (See Appendix I).

The training an employee will receive should be determined by the nature of the work assignment in the laboratory and be appropriate for educating the employee on safe chemical hygiene practices within the laboratory.

7.3 Student Training

Students should receive the following training at a minimum.

a. Instruction in laboratory safety will be provided to all students involved in laboratory activities.

b. The extent of student training should be based on the CHP, the level of chemical handling, and potential exposure to hazardous chemicals.

c. Safety training should include how to read and understand the content of a chemical's label and associated SDS.

d. At the beginning of the academic year and prior to laboratory activities, class time will be devoted to safe laboratory practices and to the student lab safety guidelines (Guidelines located in Appendix J).

8.0 Hazard Evaluation

JU prohibits all employees and students from accepting used equipment, chemicals, or biological specimens donated by other universities, institutions, or private companies without prior authorization from the administration. While transfer of such items may have been a routine practice at one time, the expense, space limitations, special storage requirements, liability, and/or regulatory restrictions no longer justify this practice. Exemptions to this policy will require the written approval of the CHO, Chair of the department receiving the donations, and the Provost & Chief Academic Officer or Chief Financial Officer.

JU prohibits the use, possession, synthesis, or administration of prescribed medications and controlled substances in the laboratory. Exemptions to this policy will be granted only if:

A detailed protocol is submitted to the Provost & Chief Academic Officer or Chief Financial Officer setting forth the nature of the proposed experiments, the qualifications of the employees/students who will engage in the experiments, the proposed quantity of each prescribed medication and/or controlled substance involved, and the measures necessary to provide for security and proper recordkeeping.

a. A detailed protocol is submitted to the Provost & Chief Academic Officer or Chief Financial Officer setting forth the nature of the proposed experiments, the qualifications of the employees/students who will engage in the experiments, the proposed quantity of each prescribed medication and/or controlled substance involved, and the measures necessary to provide for security and proper recordkeeping.

b. The Provost & Chief Academic Officer or Chief Financial Officer and the Institutional Review Board (IRB), in consultation with JU General Counsel and CHO approves the detailed protocol.

c. Appropriate licensure, permits, and/or approval are secured by the Florida Department of Health (FDOH).

d. Appropriate licensure, permits, and/or approval are secured from the Florida Department of Environmental Protection (FDEP).

e. Appropriate licensure, permits, and/or approval are secured from the Federal Food and Drug Administration (FFDA).

f. Appropriate licensure, permits, and/or approval are secured from the Drug Enforcement Administration (DEA).

Additional hazard evaluations will be made for the following:

g. Prior approval should be obtained from the CHO whenever a new laboratory experiment or test is to be carried out if faculty/staff are uncertain about associated hazards.

h. Prior approval from the CHO before doing any procedure should be obtained where one or more of the following conditions exist if the faculty/staff are uncertain about associated hazards and appropriate protective measures:

   - Potential for a rapid rise in temperature;
   - Potential for a rapid increase in pressure;
   - Potential for a chemical explosion;
   - Potential for spontaneous combustion;
   - Potential for the emission of toxic gasses that could produce concentrations in the air that exceed toxic limits; and
   - Involves the use of a highly toxic substance.

i. Approval will be initiated by use of the Laboratory Procedure Change form, available in Appendix H.

j. Chemicals should not be distributed to other persons or to other areas of the school, outside of Division of Science and Math, without the prior approval of the CHO and/or their designee. Chemicals should not be transferred to another location without the simultaneous transfer of a copy of the appropriate SDS, nor should they be transferred without the person receiving the chemicals having had an appropriate training in their use, storage, and disposal of said chemical. Only employees that are trained and approved by the CHO or Laboratory Managers are permitted to transport chemicals from a laboratory.

k. Students should only work in a laboratory or chemical storage area under the direct supervision of a professor, unless the student is an undergraduate researcher or paid, trained laboratory assistant.

9.0 Medical Consultation and Examination

All injuries or chemical exposures in the laboratory should be reported immediately to Campus Security and the Division of Science and Math. Medical attention following an injury or exposure to chemicals in the laboratory should be sought. Consultation, examination, and treatment by licensed physicians and nurse practitioners are available to all employees/students of JU at the Urgent Care Clinic on Cesery Blvd. In the event of a known acute exposure, referral to a licensed medical profession should be prompted to ensure that appropriate decontamination and medical care are provided in a timely manner.

a. JU personnel working with hazardous chemicals will receive medical care consistent with established worker's compensation procedures under the direction of the Human Resources Director whenever:

   - An employee that develops signs and symptoms of exposure associated with chemicals he/she is using, or may be in contact with OSHA regulated substances measured above "actual" permissible exposure limits;
   - An employee is present at a chemical spill, leak, explosion, or other situation that exposes him/her to a hazardous chemical; and
   - In the event that an employee receives bodily harm from exposure to a hazardous substance.

b. The college will provide the examining physician with:

   - The generic and trade names of all hazardous chemicals and chemical compounds to which the employee may have been exposed;
   - A copy of the SDS and any other relevant data for the chemical that he/she were exposed to;
   - The conditions under which the exposure occurred;
   - Signs or symptoms of exposure experienced by the employee during, soon after, and within seventy-two (72) hours after the incident;
   - The results of the investigation of the incident, including witness interviews; and
   - Any monitoring or test results.

c. The Human Resources Director, on behalf of JU and the employee, will obtain a written opinion from the examining physician. The written opinion should include:

- Recommendation for medical follow-up;
- The results of all medical examinations for this incident;
- Any medical condition that places an employee at risk as a result of future exposure to hazardous chemicals;
- A statement confirming the employee was advised of the risks; and
- The opinion must not reveal specific findings of diagnoses unrelated to occupational exposure if such limitation is within the control of Jacksonville University.

d. Medical attention includes:

- Medical history and examination;
- Specific treatment as necessary;
- Laboratory tests if required; and
- Follow-up examinations, treatments, and laboratory tests as needed.

10.0 Particularly Hazardous Substances

Special consideration will be given to protecting all personnel from particularly hazardous chemicals. For the purposes of this CHP, these include designated carcinogens, reproductive hazards, allergens, extremely flammable substances, highly reactive, and acutely toxic materials.

When particularly hazardous substances are utilized within laboratories at Jacksonville University, the specific control measures below must be implemented for additional protection. The CHO and/or their designated appointee must be consulted for identification of particularly hazardous substances and for guidance on selecting controls if necessary.

a. Establish "designated areas" (see definitions). The chemical user and/or CHO will ensure that the appropriate warning signs are posted in these areas.

b. Use containment devices (e.g., fume hoods or glove boxes) when:

   - Volatilizing substances;
   - Manipulating substances that may generate aerosols; and
   - Using laboratory procedures that may result in an uncontrolled release of the substance.

c. Use high-efficiency particulate air, HEPA, filters, carbon beds, or scrubber systems with containment devices to protect effluent and vacuum lines, pumps, and the environment whenever feasible.

d. Establish procedures for the safe removal of all contaminated hazardous waste. Disposal of any particularly hazardous substance that is regulated by any governmental agency that has jurisdiction over the facilities.

e. Always ensure that chemical residues do not remain on the body, clothing, or equipment. All personnel exposed to chemical residues must follow documented SOPs upon completing work with particularly hazardous substances or in the event of accidental contact with such chemicals.

f. Always inform all personnel of particularly hazardous substances associated with a designated work area. Always ensure that those individuals have been trained and authorized to work with such hazards. Note: all training must be documented.

10.1 General

General procedures for particularly hazardous substances (PHS) include:

a. Employees must have been trained and authorized before commencing in any procedure using PHSs.

b. PHSs include highly toxic chemicals, reproductive toxins, and select carcinogens.

c. The use of these substances requires prior approval of the CHO (Appendix H).

d. PHSs should only be used within their assigned areas and must remain within its approved containment engineering controls.

e. The use of PHSs will require the proper removal/disposal of contaminated hazardous waste and the complete decontamination of the contaminated area.

10.2 Highly Toxic Chemicals

The precautions below shall be taken when working with chemicals of high-chronic toxicity. Examples of these types of substances, but are not limited to, include dimethylmercury and nickel carbonyl, benzo[a]pyrene, N-nitrosodiethylamine, and other human carcinogens or substances with high carcinogenic potency in animals. Other examples of highly toxic chemicals (acute or chronic) that were commonly used in the past are benzene, chloroform, formaldehyde, bromine, carbon disulfide, carbon tetrachloride, cyanide salts, and hydrofluoric acid.

a. When a PEL or TLV value is less than fifty 50 ppm or 100 mg/m^3, conduct all transfers and work with these substances within a controlled area (e.g., a restricted access hood, glove box, or part of a laboratory designated for working with such substances). Ensure that all persons with access to controlled areas are aware of the substances being used, the precautions required, and have received the documented training to properly handle them. If these requirements are not met, no work should be performed using these chemicals.

b. Protect vacuum pumps from being contaminated by scrubbers of HEPA filters; vent them into the hood.

c. Before normal work can resume within the area, decontamination of the controlled space must be performed.

d. Remove any protective apparel and thoroughly wash hands, forearms, face, and neck before leaving the controlled area. Place contaminated apparel in the appropriately labeled container for decontamination.

e. Use a wet mop or a vacuum cleaner with a HEPA filter if the toxic substance is a dry powder; do not dry sweep.

f. If large quantities of toxic substances are used on a regular basis, initiate a medical surveillance program.

g. Ensure that the controlled area is conspicuously marked with warning and restricted access signs and that all containers with these substances are appropriately identified and are marked with the proper warning labels.

h. If an incident occurs, ensure that contingency plans, equipment, and materials are available to minimize exposures to personnel and property.

i. Store chemicals in unbreakable, chemically resistant containers. Label the containers appropriately and store them in well-ventilated areas with secondary containment and controlled access.

j. If a PEL, TLV, or comparable value is not available, the animal or human median inhalation lethal concentration information, LC 50, should be used as a guideline. If that value is less than 200 ppm or 2000 mg/m^3 when administered continuously for one (1) hour or less, then the chemical should be used in an operating fume hood, glove box, vacuum line, or other device equipped with appropriate traps. If none are available, no work should be performed using that chemical.

10.3 Reproductive Toxins

General procedures for reproductive toxins include:

a. A reproductive toxin refers to chemicals which affect reproductive capabilities including chromosomal damage, chromosomal mutations, and which affect fetuses (teratogenesis).

b. A reproductive toxin is a compound that is described as such in the applicable SDS or label.

c. Reproductive toxins should be minimized in the university's teaching laboratories.

d. If such chemicals are used:

- By trained personnel only;
- They should be handled only in a fume hood and when satisfactory performance of the hood has been confirmed;
- Skin contact should be avoided by using gloves and wearing protective apparel;
- Persons using such substances should always wash hands and arms immediately after working with these materials; and
- These substances should be stored within break resistance containers and will be labeled properly. All containers will be stored within well-ventilated controlled areas.

e. Examples of reproductive toxins, but are not limited to, are organomercurial compounds, ethidium bromide, carbon disulfide, xylene, toluene, benzene, mercury, lead compounds, ethyl ethers, and vinyl chloride.

10.4 Allergens and Embryotoxins

The precautions below will be taken when working with allergens and embryotoxins.

a. Review each use of these materials with the research supervisor; review continuing uses annually or whenever a procedural change is made.

b. Properly label these substances; store these substances within break resistance containers in an adequately ventilated controlled area.

c. Notify supervisors of all incidents of exposure or spills; consult a qualified physician when appropriate.

d. Examples of and the requirements for these substances are as follows:

- **Allergens** – Wear suitable gloves to prevent hand contact with allergens or substances of unknown allergenic activity (e.g., diazomethane, isocyanates, and bichromates); and

- **Embryotoxins** – If you are a woman of childbearing age, only handle these substances (e.g., organomercurials, lead compounds, and fomamide) in a hood that functions properly. Use appropriate protective apparel (especially gloves) to prevent skin contact.

11.0 MAINTENANCE AND INSPECTION PROGRAM

JU has a maintenance and inspection program to ensure that ventilation systems and emergency safety equipment are functioning properly and that laboratory working conditions meet legal and regulatory standards. The maintenance and inspection program will target facilities known to be using extremely hazardous chemicals including known potential carcinogens, highly acutely toxic, reproductive toxins, allergens, and others.

11.1 Maintenance Program

The general maintenance program will be overseen by the Laboratory Managers in coordination with Physical Plant Services, and Campus Security.

a. General ventilation systems within laboratories must be well maintained and the quantity and quality of airflow monitored every twelve (12) months by a Physical Plant personnel to ensure that:

   - General ventilation within laboratories must provide fresh air with an exchange rate of four (4) to twelve (12) air changes per hour. All exhaust air from laboratories is vented to the outside and not circulated throughout the building. Special attention will be paid to laboratories in which fume hoods are routinely operating to ensure a proper balance of airflow.

b. All chemical storage areas receive six (6) air changes an hour, and exhausted air is not re-circulated through the facility. Centralized heating, ventilation, and cooling systems that impact laboratories will be maintained by:

   - Water lines frequently checked for proper flow;
   - Filters changed or cleaned regularly;
   - Drip pans cleaned regularly; and
   - Ducting checked and cleaned regularly for biological growth.

c. The fume hood maintenance program comprises:

   - Fans checked for bearing overheating, belt drives for proper tension, fan wheels for proper freedom from accumulations and rotation;
   - Ductwork check for intact joints and no dents or holes in the system;
   - Monthly inspections will be performed to ensure proper flow across the sash of the unit by Laboratory Managers;
   - Baffle adjustment conducted by trained personnel;
   - Visual inspection of the hood will be done to check for signs of corrosion or other indications of needed repairs; and
   - Cleaning the surface of the hood, the sash glass, and the light unit will be cleaned.

d. Emergency eyewash and deluge showers:

- Any needed maintenance and repair will be determined during annual facility inspections/tests.
- Monthly inspections will be performed to ensure proper flow and prevent biological growth by Laboratory Managers.

e. Fire extinguishers:

- All fire extinguishers will be inspected and maintained by Campus Security on a monthly basis.
- Once a year, all fire extinguishers will be re-certified by a licensed professional to ensure proper charging in the event of a fire. Problems should be reported to the Campus Security immediately.

11.2 Inspections

The inspection protocols will consist of the following:

a. Qualified personnel designated (Laboratory Managers and/or Technicians) by the CHO will conduct regular inspections of all laboratories for unsafe conditions and practices, and test key safety equipment to ensure proper functionality. Once a year, a comprehensive hazard assessment will be completed for all laboratory spaces by qualified personnel designated (Laboratory Managers and/or Technicians) appointed by the CHO (Appendix B).

b. Qualified personnel designated (Laboratory Managers and/or Technicians) by the CHO will write inspection reports identifying problems needing immediate attention and those of a lesser priority. Inspection results will be discussed with the department chair and primary investigators, indicating the follow-up needed to correct any problems.

c. The CHO will arrange for the evaluation of fume hood performance by a certified contractor. Each measurement should not vary more than twenty-five percent (25%).

d. The Director of Campus Security, appropriate Laboratory Manager and/or Technician, or appropriate Division and/or Department Chair should be notified of any problem with emergency equipment. The following should be checked:

- Emergency exits;
- Fire extinguishers;
- Availability of spill-control emergency equipment;
- Availability of SDS;
- Proper and working protective equipment is in the facility;
- General housekeeping conditions and systems used to communicate hazards;
- Storage areas for proper segregation of chemical classes, storage facilities, and container integrity; and
- Waste disposal practices

Improvements and corrective actions should be documented in Appendix B. Any serious or potentially serious laboratory safety and/or health problems will be identified and a schedule of steps and a time frame for completing them will be prepared by the CHO and/or their assigned designee.

12.0 Emergency Contact Information

Name	Phone Number Off-site
City of Jacksonville Fire Department	
Non-Emergency	904-630-0434 (M-F 8am – 4pm) 904-630-0527 (after hours)
Emergency	911
City of Jacksonville Sheriff's Office	
Non-Emergency	904-630-0500
Emergency	911
JEA	(904) 665-6000 (800) 683-5542 (M-F 7am - 9pm & Sat. 8am – noon)
National Weather Service	904-741-4370
Poison Control Center	800-222-1222
Florida Department of Environmental Protection State Warning Point	800-320-0519

Jacksonville University Personnel		
Title	**Name**	**Phone Number**
Chemical Hygiene Officer		
Associate Provost for Assessment & Academic Operations	Blake Preston Doiron	904-256-7323
Jacksonville University Safety		
Director of Campus Security	Kevin Bennett	904-256-7585
Director of Physical Plant	Keri Schultheis	904-256-7550
Associate Provost for Assessment & Academic Operations	Dr. Lee Ann J. Clements	904-256-7030
Division of Science & Mathematics		
Chair, Division of Science and Math	Dr. Brian Lane	904-256-7300
Office Associate	Judy San Socie	904-256-7300
Chair, Department of Biology & Marine Sciences	Dr. Nisse Goldberg	904-256-7322
Laboratory Manager, Department of Biology and Marine Science	Blake Preston Doiron	904-256-7323
Chair, Department of Chemistry	Dr. Joe Cradlebaugh	904-256-7329
Laboratory Manager, Department of Chemistry	Alexandria Breshears	904-256-7330
Director, Marine Science Research Institute	Dr. Quinn White	904-256-7766
Office Associate	Stacee Vestal	904-256-7766
College of Fine Arts		
Chair, Division of Visual Arts	Dana Chapman-Tupa	904-256-7682
Office Associate	Cheryl Peters	904-256-7374

Appendix A

Designation of Chemical Hygiene Officer
(Signed copy available once request)

JACKSONVILLE UNIVERSITY

FROM: Dr. Donnie Horner, Provost and Chief Academic Officer
DATE: **August 8, 2017**
SUBJECT: Designation of Chemical Hygiene Officer

8/8/17

As required by the OSHA Standard regarding Occupational Exposure to Hazardous Chemicals in Laboratories (OSHA's Laboratory Standard Title 29 CFR 910.1450), the Chemical Hygiene Officer (CHO) will work to develop and implement appropriate chemical hygiene policies and practices, and hazard communication policies and practices, and monitor procurement, use, and disposal of chemicals within laboratories. In accordance with the requirements set forth in Title 29 CFR 910.1450, Blake Preston Doiron is hereby designated as the Chemical Hygiene Officer for Jacksonville University. As such Blake will be responsible for the implementation of the Chemical Hygiene Plan and its annual review at Jacksonville University.

Appendix B

Hazardous Assessment for Laboratories and Chemical Storage Areas

Jacksonville University
Chemical Hygiene Inspection Checklist

Date of Inspection: _____ Conducted by: _____

Location (room number & building): _____

Laboratory Supervisor: _____

Phone Number: _____

1.0 GENERAL WORK PRACTICES

☐ Yes ☐ No ☐ NA	1.1	Eating, drinking, smoking, etc. prohibited. Hallway outside the laboratory is free of evidence of eating and drinking.
☐ Yes ☐ No ☐ NA	1.2	Mouth pipetting prohibited
☐ Yes ☐ No ☐ NA	1.3	Food, drink not stored in laboratory, refrigerators, freezers, etc.
☐ Yes ☐ No ☐ NA	1.4	Hands washed when work completed
☐ Yes ☐ No ☐ NA	1.5	Radioactive, carcinogenic, biohazard, volatile or other particularly hazardous substances handled in laboratory hoods
☐ Yes ☐ No ☐ NA	1.6	Open flames, sparks kept away from flammables
☐ Yes ☐ No ☐ NA	1.7	Contact phone nos. for laboratory supervisor and safety officer current
☐ Yes ☐ No ☐ NA	1.8	No open-toe shoes, short-sleeved shirts, or shorts worn.

2.0 HOUSEKEEPING

☐ Yes ☐ No ☐ NA	2.1	General appearance of laboratory is neat and orderly
☐ Yes ☐ No ☐ NA	2.2	Aisles and exits free from obstruction
☐ Yes ☐ No ☐ NA	2.3	Work surfaces protected from obstruction
☐ Yes ☐ No ☐ NA	2.4	Spills Absent
☐ Yes ☐ No ☐ NA	2.5	Electrical cords and wires in good condition
☐ Yes ☐ No ☐ NA	2.6	Tools and equipment in good repair
☐ Yes ☐ No ☐ NA	2.7	Defective glassware absent
☐ Yes ☐ No ☐ NA	2.8	Combustible materials not stored near flammables

3.0 SINKS

☐ Yes ☐ No ☐ NA	3.1	Are the sinks free of chemical bottles?
☐ Yes ☐ No ☐ NA	3.2	Are the sinks free of debris?

4.0 HAZARD COMMUNICATION

☐ Yes ☐ No ☐ NA	4.1	Primary and secondary chemical containers labeled appropriately
☐ Yes ☐ No ☐ NA	4.2	Signs on storage areas (e.g., refrigerators) and laboratory room doors
☐ Yes ☐ No ☐ NA	4.3	SDS complete and available
☐ Yes ☐ No ☐ NA	4.4	Chemical Hygiene Plan available

☐ Yes ☐ No ☐ NA 4.5 The front door to all laboratories should have signs indicating the type of hazards present in the laboratory. Write down all information:

5.0 CHEMICAL STORAGE

☐ Yes ☐ No ☐ NA 5.1 Incompatible chemicals segregated

☐ Yes ☐ No ☐ NA 5.2 Current inventory of chemicals available and recent (within one (1) year)

☐ Yes ☐ No ☐ NA 5.3 Hazardous chemicals not stored above 6' on open shelves

☐ Yes ☐ No ☐ NA 5.4 Bulk quantities of flammable liquids stored in approved safety cans, cabinets

☐ Yes ☐ No ☐ NA 5.5 Safety carriers available for bottles

☐ Yes ☐ No ☐ NA 5.6 Expired or out-of-use chemicals absent

☐ Yes ☐ No ☐ NA 5.7 Excessive quantities of chemicals not stored on benches

6.0 COMPRESSED GAS CYLINDERS AND VACUUM PUMPS

☐ Yes ☐ No ☐ NA 6.1 Chained, secured

☐ Yes ☐ No ☐ NA 6.2 Inspected for condition, pressure retention

☐ Yes ☐ No ☐ NA 6.3 Gas lines, piping, manifolds, etc. labeled with identity of contents. Gas ports labeled.

☐ Yes ☐ No ☐ NA 6.4 Protective caps in place except when cylinders are in use

☐ Yes ☐ No ☐ NA 6.5 Vacuum pumps appropriately ventilated. Rotovaporators wrapped in electrical tape when possible

☐ Yes ☐ No ☐ NA 6.6 Vacuum pumps enclosed with fan belt guard

☐ Yes ☐ No ☐ NA 6.7 Flammable gas lines equipped with flashback arrestors

7.0 WASTE DISPOSAL

☐ Yes ☐ No ☐ NA 7.1 Hazardous wastes not disposed in general sewer system (sink) or in general trash

☐ Yes ☐ No ☐ NA 7.2 Waste containers closed except when adding or removing waste

☐ Yes ☐ No ☐ NA 7.3 Containers for hazardous wastes in good condition

☐ Yes ☐ No ☐ NA 7.4 Containers of hazardous waste labeled with the words hazardous waste and other descriptive words

☐ Yes ☐ No ☐ NA 7.5 Is there spill containment available?

☐ Yes ☐ No ☐ NA 7.6 Satellite accumulation areas posted and orderly?

☐ Yes ☐ No ☐ NA 7.7 Broken glassware in designated containers and not in general trash

☐ Yes ☐ No ☐ NA 7.8 Discarded sharps in designated containers and containers closed

☐ Yes ☐ No ☐ NA 7.9 Empty containers labeled and/or triple rinsed

8.0 LABORATORY HOODS AND VENTILATION

☐ Yes ☐ No ☐ NA 8.1 Hoods in sound working condition

☐ Yes ☐ No ☐ NA 8.2 Hoods marked with operating heights, average face velocity. Date of last check:

☐ Yes ☐ No ☐ NA 8.3 Gauges, monitors and alarms operating properly

☐ Yes ☐ No ☐ NA 8.4 Hoods not cluttered with chemicals, equipment

☐ Yes ☐ No ☐ NA 8.5 General ventilation adequate

9.0 SAFETY EQUIPMENT/EMERGENCY RESPONSE

☐ Yes ☐ No ☐ NA 9.1 Spill containment clean-up material vailable?

☐ Yes ☐ No ☐ NA 9.1a Are kits stocked with required supplies

☐ Yes ☐ No ☐ NA 9.2 Eye wash/safety showers in sound working condition, not blocked

9.3 Fire extinguishers:

☐ Yes ☐ No ☐ NA 9.3 a Type and appropriate location, not blocked, good working order

☐ Yes ☐ No ☐ NA 9.3 b Date of last inspection _____

☐ Yes ☐ No ☐ NA 9.3 c All laboratories have at least one extinguisher.

☐ Yes ☐ No ☐ NA 9.3 d Locate all extinguishers in the laboratory, answer the following, then date and initial the back of the tag.

9.3 e Number of extinguishers in laboratory: _____

9.3 f Most recent inspection _____

☐ Yes ☐ No ☐ NA 9.3 g All extinguishers labeled?

☐ Yes ☐ No ☐ NA 9.3 h All extinguishers have tags?

☐ Yes ☐ No ☐ NA 9.3 i Are any tags broken?

☐ Yes ☐ No ☐ NA 9.3 j Are all pins in place?

☐ Yes ☐ No ☐ NA 9.3 k All residue removed from nozzles?

☐ Yes ☐ No ☐ NA 9.3 l Are the extinguishers mounted on the wall?

☐ Yes ☐ No ☐ NA 9.4 First aid kit available?

☐ Yes ☐ No ☐ NA 9.4 a Are kits fully stocked with required supplies?

☐ Yes ☐ No ☐ NA 9.5 Fire blanket available as appropriate

☐ Yes ☐ No ☐ NA 9.6 Locations marked for all above items

☐ Yes ☐ No ☐ NA 9.7 All exits free and unobstructed

☐ Yes ☐ No ☐ NA 9.8 Emergency numbers posted

10.0 TRAINING

List names of all students and faculty working in laboratory and ensure they have been trained according to the CHP and documentation of training is available.

☐ Yes ☐ No ☐ NA _____ Date of training:_____

☐ Yes ☐ No ☐ NA _____ Date of training:_____

☐ Yes ☐ No ☐ NA _____ Date of training:_____

☐ Yes ☐ No ☐ NA _____ Date of training:_____

☐ Yes ☐ No ☐ NA _____ Date of training:_____

☐ Yes ☐ No ☐ NA _____ Date of training:_____

11.0 PERSONAL PROTECTIVE EQUIPMENT (PPE) HAZARD ASSESSMENT

☐ NONE – Hazards requiring PPE are not present or likely to be present.

SOURCE	ASSESSMENT OF HAZARD	PPE REQUIRED
Use or handling of: ☐ Chemicals ☐ Biological agents, human blood, OPIM (Other Potentially Infectious Material) ☐ Radioactive materials	*Eye or face injury* ☐ Impact from flying particles ☐ Chemical splash in eyes ☐ Facial skin chemical contact ☐ Nose/mouth contact with blood/OPIM	☐ Safety glasses ☐ With side shields ☐ Safety/impact goggles ☐ Chemical splash goggles ☐ Face shield ☐ Face mask for blood/OPIM only ☐ Other _____
	Body/skin/hand contact ☐ Biological agents ☐ Sharps ☐ Radioactive materials ☐ Chemicals ☐ Hot/cold objects	☐ Lab coat/gown ☐ Apron ☐ Scrubs ☐ Tyvek HazMat Coveralls ☐ Latex gloves ☐ Nitrile gloves ☐ Rubber gloves ☐ Chemical resistant gloves ☐ Other _____
☐ Operations generating airborne fiber, dust, fume, mist, or hazardous/toxic vapor	☐ Respiratory: inhalation exposure above exposure standards	*Respirator* ☐ Approved by JU EH&S? Name: _____ received fitting and respirator training. Date: _____
	☐ Respiratory: inhalation exposure below exposure standards	☐ Nuisance (non-toxic) dust mask (not PPE) ☐ Other: _____
☐ High noise levels from equipment or operation	☐ Hearing: noise exposure above exposure standards	☐ Ear muffs ☐ Ear plugs ☐ Other _____
	☐ Hearing: noise exposure below exposure standards	
Non-ionizing radiation sources: ☐ Lasers ☐ Infrared ☐ Welding ☐ Ultraviolet	Radiation burns to: ☐ Eyes ☐ Body ☐ Skin	☐ Shaded safety glasses ☐ With side shields ☐ Shaded safety goggles ☐ Protective clothing (welding leathers) ☐ Barriers, shields ☐ Welding helmet ☐ Other _____
☐ General safety: physical hazards from equipment, process, or material	☐ *Foot injury:* equipment, glassware, hazardous chemical, or heavy object that can fall or roll onto feet.	☐ Safety shoes ☐ Closed-toe shoes with high socks ☐ Other _____
	☐ *Impact or penetration* to eye, face, head, body, or soles of foot. ☐ Electrical contact ☐ Extreme heat or cold	☐ Safety glasses ☐ With side shields ☐ Safety/impact goggles ☐ Face shield ☐ Safety shoes ☐ Hard hats ☐ Coveralls ☐ Cut resistant gloves ☐ Thermal gloves ☐ Thermal clothing ☐ Barriers/shields ☐ Other _____
☐ Other		

Appendix C

Chemical Inventory Information

Listed below are the required details that will be maintained within the chemical inventory for each department:

- Chemical Name;
- Asset Tag Number;
- Lot Number;
- Vendor Name;
- Catalog Number;
- Location and Sub-Location;
- Approximate Percentage Remaining;
- Container Size (g) or Volume (ml);
- Date Received;
- Expiration Date;
- Physical State;
- Signal Word;
- NFPA Hazard Diamond Information;
- GHS Hazard Pictograms; and
- SDS URL.

Listed below are the departments that maintain a chemical inventory per the CHP:

- Biology Department via Biology Laboratory Manager, Nelms #21;
- Chemistry Department via Chemistry Laboratory Manager, Swisher 4C; and
- Marine Sciences Research Institute via Marine Sciences Operational Manager, MSRI.

Appendix D

Incident Reports

Jacksonville University Incident Reporting Form

First Name: _____ Last Name: _____

JU ID#: _____ Sex: _____ Age: _____

Address: _____

_____

Contact Number or Email: _____

Date of Incident: _____ Time of Incident: _____

Location of Incident: _____

Did the incident involve property damage? _____

If so, what: _____

Was a motor vehicle involved in this incident: _____

If so, what: _____

Do you require medical attention? _____

If so, who treated you: _____

_____

Describe, step-by-step, how the incident occurred:

_____

_____

_____

_____

_____

_____

What would you recommend to prevent this accident from recurring:

_____

_____

_____

Witnesses of Incident: _____

_____

Employee's Signature: _____ Date: _____

Supervisor's Signature: _____ Date: _____

Routing / Distribution

Copies of this Incident Report must be sent immediately to the following **Chief Financial Officer** and:

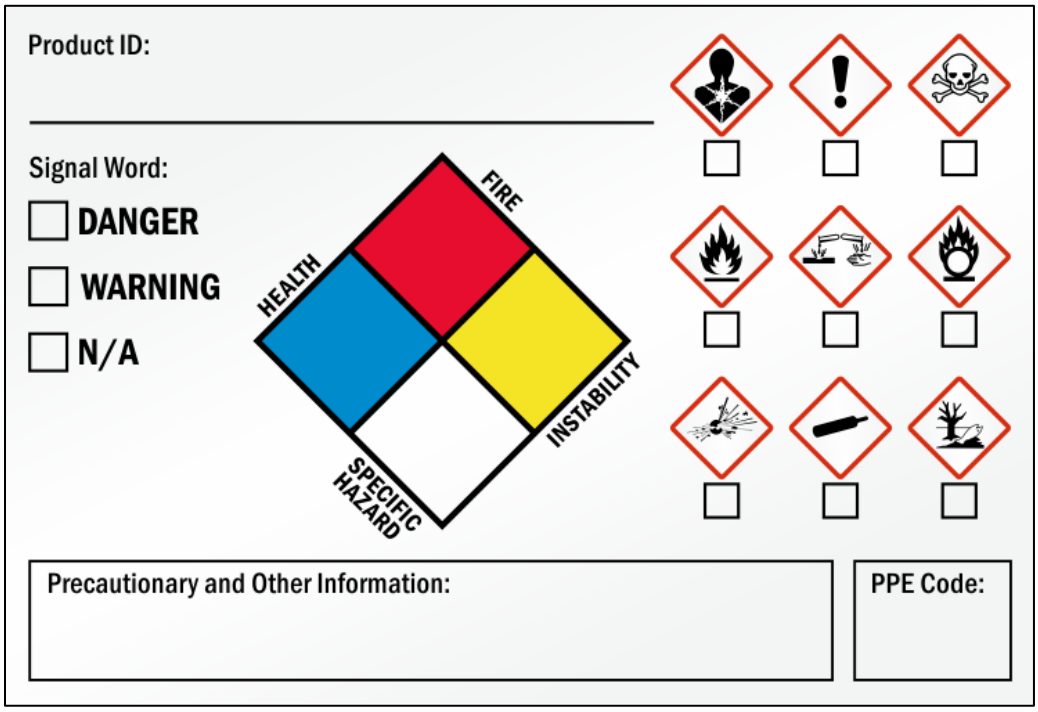
- Appropriate Supervisor (if incident involves staff or employee)
- Chief Academic Officer (if incident occurred in classroom or involves faculty)
- Director of Human Resources (if incident is Worker's Compensation claim)

.

Appendix E

Secondary Container Label Guidelines

Template of Diagram:



Product Identifier – is how the hazardous chemical is identified. This can be, but is not limited to, the chemical name, code number, or batch number.

Signal Words Code Descriptions:

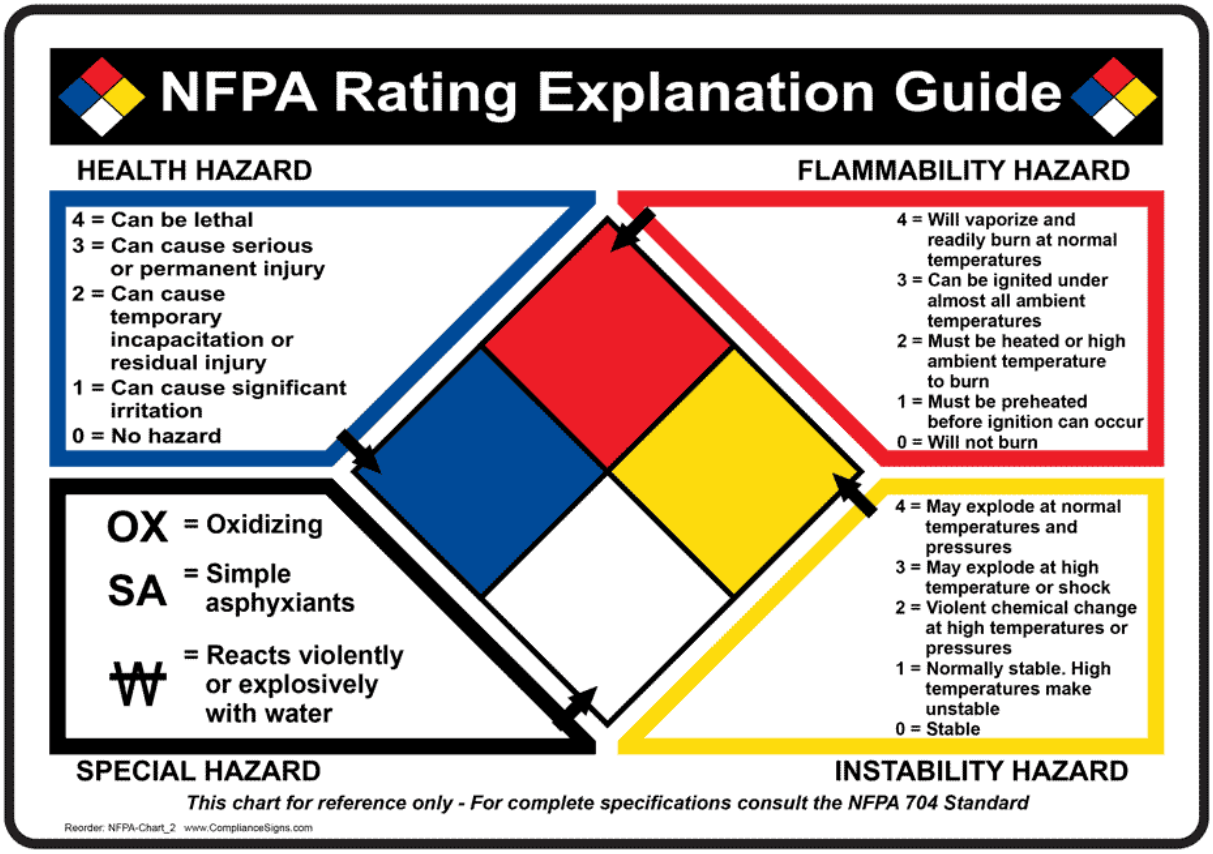
- **Danger** – is used for more severe hazards
- **Warning** – is used for less severe hazards

Precautionary Statements – describes the recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to the hazardous chemical or improper storage or handling. There are four types of precautionary statements: **prevention** (to minimize exposure); **response** (in case of accidental spillage or exposure emergency response, and first-aid); **storage** (how to properly store the substance); and **disposal** (how to properly dispose of the waste).

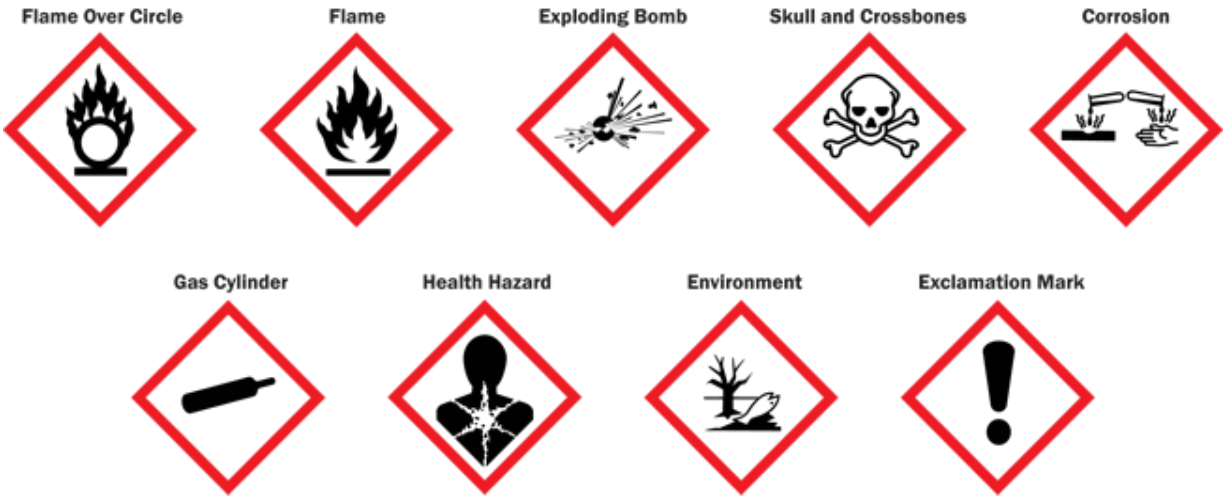
PPE Code Descriptions:

- **(A)** Safety glasses required
- **(B)** Safety glasses and gloves required
- **(C)** Safety glasses, gloves, and an apron required
- **(D)** Face shield, gloves, and an apron required
- **(E)** Safety glasses, gloves, and a dust respirator required
- **(F)** Safety glasses, gloves, apron, and a dust respirator required
- **(G)** Safety glasses, and vapor respirator required
- **(H)** Splash goggles, gloves, apron, and a vapor respirator required
- **(I)** Safety glasses, gloves, and a dust/vapor respirator required
- **(J)** Splash goggles, gloves, apron, and a dust/vapor respirator required

Hazardous Materials Identification System, NFPA, Diamond Code Descriptions:



Globally Harmonized System, GHS, Diamond Code Descriptions:



Appendix F

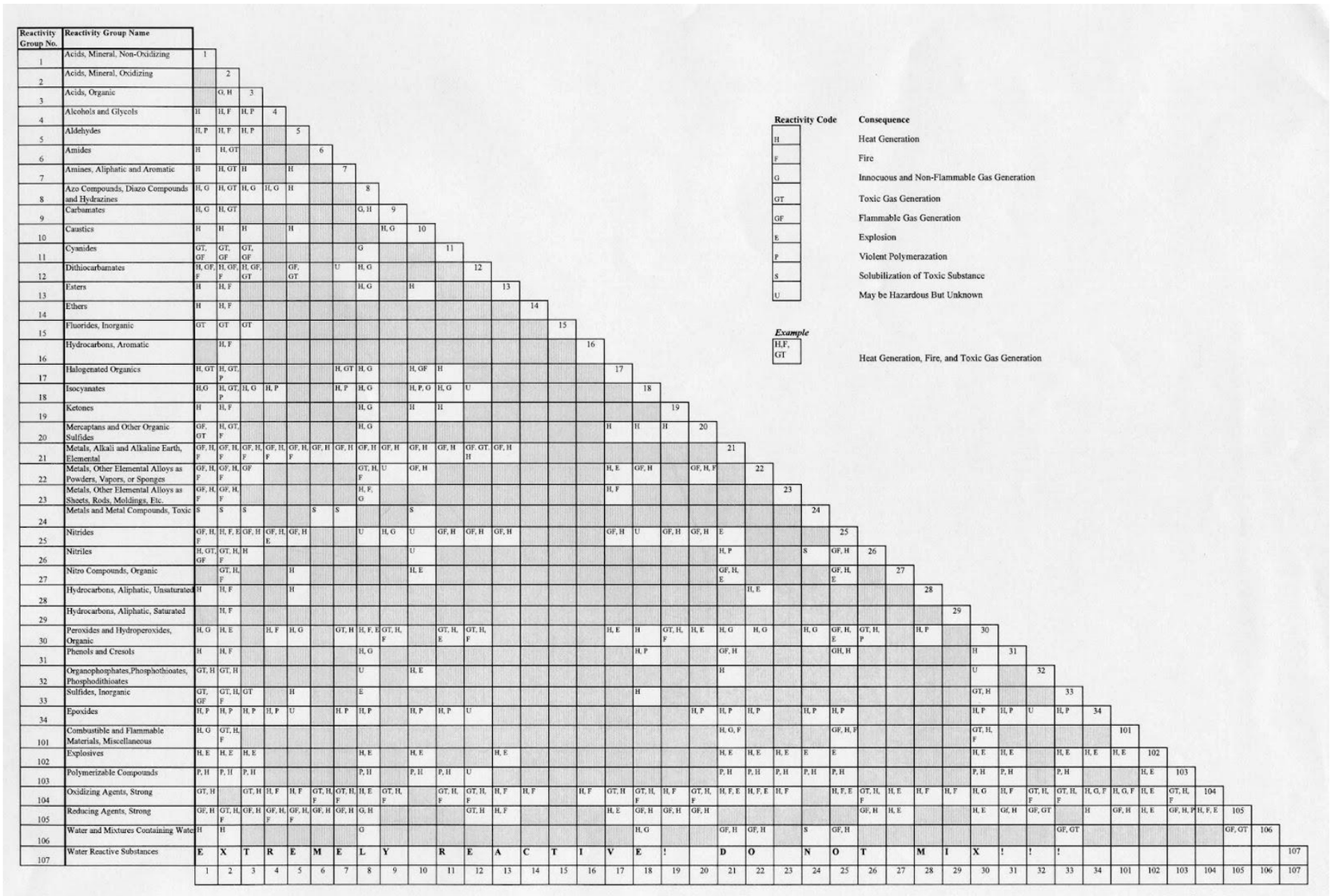
EPA's Chemical Compatibility Chart

EPA's Chemical Compatibility Chart

EPA-600/2-80-076 April 1980 –

A Method for Determining the Compatibility of Chemical Mixtures

Please Note: This chart is intended as an indication of some of the hazards that can be expected on mixing chemical wastes. Because of the differing activities of the thousands of compounds that may be encountered, it is not possible to make any chart definitive and all inclusive. It cannot be assumed to ensure compatibility of wastes because wastes are not classified as hazardous on the chart, nor do any blanks necessarily mean that the mixture cannot result in a hazard occurring. Detailed instructions as to hazards involved in handling and disposing of any given waste should be obtained from the originator of the waste.



Reactivity Group No.	Reactivity Group Name
1	Acids, Mineral, Non-Oxidizing
2	Acids, Mineral, Oxidizing
3	Acids, Organic
4	Alcohols and Glycols
5	Aldehydes
6	Amides
7	Amines, Aliphatic and Aromatic
8	Azo Compounds, Diazo Compounds and Hydrazines
9	Carbamates
10	Caustics
11	Cyanides
12	Dithiocarbamates
13	Esters
14	Ethers
15	Fluorides, Inorganic
16	Hydrocarbons, Aromatic
17	Halogenated Organics
18	Isocyanates
19	Ketones
20	Mercaptans and Other Organic Sulfides
21	Metals, Alkali and Alkaline Earth, Elemental
22	Metals, Other Elemental Alloys as Powders, Vapors, or Sponges
23	Metals, Other Elemental Alloys as Sheets, Rods, Moldings, Etc.
24	Metals and Metal Compounds, Toxic
25	Nitrides
26	Nitriles
27	Nitro Compounds, Organic
28	Hydrocarbons, Aliphatic, Unsaturated
29	Hydrocarbons, Aliphatic, Saturated
30	Peroxides and Hydroperoxides, Organic
31	Phenols and Cresols
32	Organophosphates,Phosphothioates, Phosphodithioates
33	Sulfides, Inorganic
34	Epoxides
101	Combustible and Flammable Materials, Miscellaneous
102	Explosives
103	Polymerizable Compounds
104	Oxidizing Agents, Strong
105	Reducing Agents, Strong
106	Water and Mixtures Containing Water
107	Water Reactive Substances

Reactivity Code	Consequence
H	Heat Generation
F	Fire
G	Innocuous and Non-Flammable Gas Generation
GT	Toxic Gas Generation
GF	Flammable Gas Generation
E	Explosion
P	Violent Polymerazation
S	Solubilization of Toxic Substance
U	May be Hazardous But Unknown

Example

H,F, GT

Heat Generation, Fire, and Toxic Gas Generation

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	101	102	103	104	105	106	107
	1																																							
		2																																						
	G, H		3																																				
H	H, F	H, P		4																																			
H, P	H, F	H, P			5																																	
H	H, GT					6																																
H	H, GT	H		H			7																															
H, G	H, GT	H, G	H, G	H				8																														
H, G	H, GT							G, H	9																													
H	H	H		H					H, G	10																												
GT, GF	GT, GF	GT, GF						G			11																											
H, GF, F	H, GF, F	H, GF, GT		GF, GT		U		H, G				12																										
H	H, F							H, G		H			13																									
H	H, F													14																								
GT	GT	GT													15																							
	H, F															16																						
H, GT	H, GT, P						H, GT	H, G		H, GF	H						17																						
H,G	H, GT, P	H, G	H, P				H, P	H, G		H, P, G	H, G	U						18																					
H	H, F							H, G		H	H								19																			
GF, GT	H, GT, F							H, G								H	H	H	20																		
GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H, F	GF, H	GF, H	GF, H	GF, H	GF, H	GF, H	GF, GT, H	GF, H							21																	
GF, H, F	GF, H, F	GF						GT, H, F	U	GF, H						H, E	GF, H		GF, H, F		22															
GF, H, F	GF, H, F							H, F, G								H, F						23															
$	$	$			$	$			$														24														
GF, H, F	H, F, E	GF, H	GF, H, E	GF, H			U	H, G	U	GF, H	GF, H	GF, H				GF, H	U	GF, H	GF, H	E				25													
H, GT, GF	GT, H, F	H							U											H, P			S	GF, H	26												
	GT, H, F			H					H, E											GF, H, E				GF, H, E		27											
H	H, F			H																	H, E						28									
	H, F																											29								
H, G	H, E		H, F	H, G		GT, H	H, F, E	GT, H, F		GT, H, E	GT, H, F					H, E	H	GT, H, F	H, E	H, G	H, G		H, G	GF, H, E	GT, H, P		H, F		30							
H	H, F						H, G										H, P			GF, H				GH, H					H	31						
GT, H	GT, H						U		H, E											H									U		32					
GT, GF	GT, H, F	GT		H			E										H												GT, H			33				
H, P	H, P	H, P	H, P	U		H, P	H, P		H, P	H, P	U								H, P	H, P	H, P		H, P	H, P					H, P	H, P	U	H, P	34			
H, G	GT, H, F																			H, G, F				GF, H, F					GT, H, F					101		
H, E	H, E	H, E					H, E		H, E			H, E								H, E	H, E	H, E	E	E					H, E	H, E	H, E	H, E	H, E	102		
P, H	P, H	P, H					P, H		P, H	P, H	U									P, H	P, H	P, H	P, H	P, H					P, H	P, H		P, H		H, E	103	
GT, H		GT, H	H, F	H, F	GT, H, F	GT, H, F	H, E	GT, H, F		GT, H, F	GT, H, F	H, F	H, F		H, F	GT, H	GT, H, F	H, F	GT, H, F	H, F, E	H, F, E	H, F		H, F, E	GT, H, F	H, E	H, F	H, F	H, G	H, F	GT, H, F	GT, H, F	H, G, F	H, G, F	H, E	GT, H, F	104	
GF, H	GT, H, F	GF, H	GF, H, F	GF, H, F	GF, H, F	GF, H	GF, H	G, H			GT, H	H, F			H, E	GF, H	GF, H	GF, H	GF, H					GF, H	H, E			H, E	GF, H	GF, GT		H	GF, H	H, E	GF, H, F	H, F, E	105	
H	H						G									H, G			GF, H	GF, H		S	GF, H						GF, GT						GF, GT	106	
E	X	T	R	E	M	E	L	Y		R	E	A	C	T	I	V	E	!		D	O		N	O	T		M	I	X	!	!	!							107

Appendix G

Safety Concern Reporting Form

Safety Concern Reporting Form

Return completed form to Blake Preston Doiron, Biology Laboratory Manager, Department of Biology and Marine Sciences, Nelms #21.

Description of safety concern: _____

_____

_____

_____

_____

_____

_____

_____

Location of Concern: _____

_____

Contact Information (optional): _____

_____

_____

Safety Concern Reporting Form

Return completed form to Blake Preston Doiron, Biology Laboratory Manager, Department of Biology and Marine Sciences, Nelms #21.

Description of safety concern: _____

_____

_____

_____

_____

_____

_____

_____

Location of Concern: _____

_____

Contact Information (optional): _____

_____

_____

Appendix H

Laboratory Procedure Change Form

Laboratory Procedure Change Form

(To be used only under conditions stated in Section 10)

1. Title of Project _____

2. Project Owner Information

Project Owner _____

Department _____

Building/Room _____

Telephone _____ **Fax** _____

E-mail _____

3. Laboratory Information where project will be conducted:

Building/Room _____

Telephone _____

Laboratory contact person if other than owner

Name _____ **Title** _____

Telephone _____ **E-mail** _____

4. List of individuals working on this particular project (including students)

Name	Title	Chemical Hygiene Training Date

5. Brief non-technical abstract of planned work (Use other sheets if more space is needed):

_____

_____

_____

_____

_____

6. Indicate applicable category of this project:

☐ **New proposal**
☐ **Addition or modification to existing proposal (Indicate additional project approval #)**
☐ **Teaching / Training**

7. List below the particularly hazardous chemicals that will be used in connection with this project.

Chemical Name	Chemical Abstract Number (CAS)	Hazard Class (Carcinogen, Reactive, mutagen, etc)

8. What is your previous work experience with the chemicals specified in Section 10? (Use additional sheets if necessary):

_____

_____

_____

9. Are Safety Data Sheets (SDS) available to all employees working on this project?

☐ **yes** ☐ **no If "no" please acquire all necessary SDS**

CONTAINMENT AND SAFETY EQUIPMENT

10. Will a chemical fume hood be used? ☐ **yes** ☐ **no**
Indicate flow-rate and date the chemical fume hood was last tested: _____
(Chemical fume hoods require annual testing and certification)

11. Indicate Personal Protective Equipment (PPE) to be used:

Gloves (indicate type _____) Eye Protection (Indicate type _____)

Protective clothing (indicate type _____) Respiratory Protection *_____

Other (specify) _____

_____

* Note: If a respirator is used, the wearer must be examined by a health care professional to determine if the user is medically fit to wear a respirator. The CHO will choose the appropriate respirator and provide fit testing for the user.

CHEMICAL WASTE DISPOSAL AND HAZARD COMMUNICATION

12. **Perform a waste determination on all waste streams resulting from this project in accordance with the Jacksonville University Hazardous Waste Management Plan. Waste Streams identified:**

    _____
    _____
    _____

13. **Is current emergency contact information posted in the laboratory where this project is to be performed?**

    ☐ **yes** ☐ **no**

14. **Indicate the type of fire extinguishers required**

    ☐ **ABC**
    ☐ **D**
    ☐ **Not applicable**

    Is that type available in the laboratory? ☐ **yes** ☐ **no**

    Date fire extinguishers were last inspected: _____

15. **Please indicate any additional information or components pertinent to the CHO's review of this protocol:**

    _____

    _____

    _____

16. **I have read and am familiar with the Chemical Hygiene Plan, Material Safety Data Sheets, safety practice, containment equipment, and laboratory facilities recommended for the chemicals used in this project. I agree that all faculty, staff and students working on this project will follow these recommendations as a condition of the Safety Committee approval of this project.**

    _____ _____

    Date **Project Owner**

TO BE COMPLETED BY THE CHO ONLY
Date Received
Date Reviewed:
Approved **Yes** **No**
If no, explain:
If yes, assign approval #:
Date Returned to Project Owner:
CHO Name *(print)* *Signature*

Appendix I

CHP Training and Receipt of Copy Provided

Chemical Hygiene Plan, CHP, for Laboratories at
Jacksonville University Receipt of Copy Provided

Employee: _____

Department: _____

Job Title: _____

Telephone Number: _____

E-mail Address: _____

I acknowledge that I have received a copy of the "Chemical Hygiene Plan, CHP, for Laboratories at Jacksonville University." I will read and accept the CHP as a working document. I will support and follow the CHP in my daily work at Jacksonville University.

_____ _____
Signature of Employee Date

_____ _____
Signature of Laboratory Manager/Chemical Hygiene Officer Date

Occupational Safety and Health Administration, OSHA, under the "Occupational Exposure to Hazardous Chemicals" standard (Title 29 CFR Part 1910.1450), I have been instructed on:

- Contact information for Campus Security, the Coordinator of Safety Programs, and Laboratory Manager/Chemical Hygiene Officer, the Student & Employee Safety Teams, and individuals specified in the CHP.
- My responsibilities under the CHP.
- The location and availability of the most recent edition of the Chemical Hygiene Plan for Laboratories at Jacksonville University.
- The location and availability of the "Occupational Exposure to Hazardous Chemicals" standards. (Also referred to as the OSHA Laboratory Standard.)
- The location and availability of the laboratory chemical inventory and collection of Safety Data Sheets (SDSs).
- The location and availability of additional reference materials relating to laboratory safety and the use of hazardous materials.

_____ _____
Signature of Employee Date

_____ _____
Signature of Laboratory Manager/Chemical Hygiene Officer Date

Appendix J

General Laboratory Safety Guidelines

General Laboratory Safety Guidelines

I have read and understand the below entitled, "Laboratory Safety Guidelines", and agree to abide by them.
By signing this form, I accept the consequences for not complying with the safety directions.

Date_____ **Course _____** **Section _____** **Locker No._____**

Name _____ **Signature _____**

Safety Instructions:	**Put a check on the ones that apply to this class**
Note the position of the fire blankets and extinguishers. Be familiar with their operation.	
Determine the location of the nearest emergency shower and eye wash station.	
Determine the location of the first aid supplies.	
Wear protective goggles or safety glasses continuously while in the laboratory as required by state law. If some chemical should get in your eye, wash it with an abundant amount of water. Seek medical attention at once.	
Always wear a lab coat to laboratories where exposure to chemical splashes or spills is possible.	
Assume all the reagents are dangerous as well as corrosive to flesh and fabric and handle accordingly.	
Report all accidents to the instructor immediately.	
Use only footwear which totally encloses the foot while in the laboratory. Sandals, grogs, and flip-flops do not offer adequate protection.	
If you should spill a chemical on yourself, wash it off immediately with abundant water.	
Never taste chemicals.	
Never pipet by mouth. Use a pipet bulb.	
Experiments that produce poisonous or noxious fumes are to be carried out in the fume hood.	
To insert glass tubing and thermometers through rubber stoppers, wet the tube and stopper. Protect your hand with a towel.	
Do not eat or drink in the laboratory.	
No smoking in the laboratory.	

General Laboratory Safety Guidelines

General Procedure:	Put a check on the ones that apply to this class
Only assigned work in the laboratory is permitted and only under proper supervision.	
No experiments may be performed outside of the assigned laboratory period unless explicitly authorized by the professor.	
Work individually unless otherwise directed.	
Always read the label on the bottle of every reagent before using it.	
Use only the amounts of reagent called for in the experiments.	
Discard excess chemicals-never return into reagent bottles.	
Place excess solid in the waste containers at the end of each work area, never in the sinks.	
Used mercury should be transferred to containers labeled: "Used Mercury".	
Always pour acids into water; this is especially true of concentrated sulfuric acid.	
Use distilled water only when directed, never in place of tap water.	
When using a balance, do not place chemicals directly on the balance pan. Clean up any spills from the balance immediately.	
Before leaving the laboratory each period, wash the desk top and make sure everything is in order and that the sink is clean (free of filter paper and matches).	
All apparatus (including calculators) are the property of Jacksonville University and is not to be removed from the laboratories.	

Consequences of non-compliance:

The consequences of non-compliance will be dictated by your professor and will vary for each instruction/procedure. These are the consequences of non-compliance for some of the instructions/procedures. Mark which ones are applicable and the order.

Order of consequence to apply	Consequences (cross any if non-applicable)
	Warning (documented)
	Will not perform the laboratory practice of the day
	The student will not perform the laboratory practice of the day and will get a “0” for that lab.

Appendix K

Biology and Marine Sciences Laboratory Safety Guidelines

Jacksonville University Laboratory and Field Safety Guidelines

Department of Biology and Marine Sciences

General Safety Guidelines for Laboratory-based Activities:	**Check if applicable for course.**	**Initial here once trained and/or intent to comply.**
▪ Inform the instructor of any personal health issues before starting the activity.		
▪ Do not eat or drink in the laboratory.		
▪ No smoking or use of tobacco of any kind in the laboratory. No electronic cigarettes, smokeless cigarettes, or related products in the laboratory.		
▪ Never taste chemicals or pipet by mouth. Use micropipette.		
▪ Determine the location of the first aid supplies.		
▪ Determine the location of the nearest emergency shower and eye wash station.		
▪ Determine the location of fire blankets and fire extinguishers. Be familiar with their operation.		
▪ Determine the location of the chemical spill kit.		
▪ If you should spill a chemical on yourself, immediately notify the instructor, and wash it off immediately with abundant water. Consult SDS, Safety Data Sheet, and seek medical attention, as appropriate.		
▪ Long hair should be tied back in the lab (especially when using a Bunsen burner or alcohol burner).		
▪ Jewelry, particularly dangling necklaces, bracelets, or earrings with the potential to interfere with or be contaminated by an experiment, should not be worn in lab.		
▪ Do not engage in personal grooming in the lab (including hair, makeup, nails, etc.)		
▪ Place backpacks and purses in the designated area away from the lab benches.		
▪ Experiments that produce poisonous or noxious fumes are to be carried out in the fume hood.		
▪ Appropriately dispose of materials immediately after use and in the proper containers.		
▪ Label full chemical names on all bottles, flasks, and secondary containers.		
▪ Never leave an experiment or solution on a hot plate unattended, unless required by your instructor.		
▪ Place a warning note on hotplates that have been turned off, but are still hot.		
▪ Determine the location of JU's Chemical Hygiene Plan, CHP.		
▪ Determine the location of Safety Data Sheets, SDS, for chemicals in use.		
▪ Report all accidents to the instructor immediately.		
▪ Wash your hands after laboratory-based activities, even after wearing gloves.		
Personal Protective Equipment, PPE, in the Laboratory:		
▪ Wear appropriate footwear - feet should be totally protected at all times. Appropriate footwear in the laboratory includes closed-toe shoes and socks above the ankles. Do not wear sandals, flip-flops, or any type of shoes with holes in them in the laboratory.		
▪ Contact lenses may be prohibited when working near volatile chemicals. If contact lenses are permitted, chemical splash goggles must be worn at all times.		
▪ Wear required protective safety glasses or splash goggles continuously while in the laboratory. If a chemical should splash in your eye, immediately notify the instructor, and wash eyes with an abundant amount of water. Seek medical attention at once.		
▪ Always wear a lab coat and long pants in laboratories where exposure to chemical splashes, chemical spills, broken glassware, sharps, or biohazards (biological agents, human blood, or other potentially infectious material) may occur.		
▪ Wear heat-resistant gloves when working with hot plate or hot glassware.		

Jacksonville University Laboratory and Field Safety Guidelines

Department of Biology and Marine Sciences

General Safety Guidelines for Field-based Activities:	**Check if applicable for course.**	**Initial here once trained and/or intent to comply.**
• Inform the instructor of any personal health issues or medical concerns before starting the activity.		
• When weather conditions are hot and/or the heat index is high, bring extra water and drink water continuously to avoid dehydration.		
• Prior to the activity, eat an appropriate meal or snack that will sustain your energy through the activity.		
• When conducting strenuous fieldwork or participating on a lengthy boat trip, do not consume alcohol the day or night before to avoid dehydration during the activity.		
• Determine the location of the first aid supplies in the vehicle and/or boat.		
• Wash your hands after field-based activities.		
Personal Protective Equipment, PPE, in the Field:		
▪ Wear appropriate footwear - feet should be totally protected at all times. Appropriate footwear in the field includes closed-toe shoes, preferably with non-slip soles. Do not wear sandals, flip-flops, or any type of shoes with holes with them.		
▪ Consult weather forecast and wear clothing appropriate for weather exposure (heat, humidity, cold, rainy, windy, wind-chill factor on a moving boat, etc.).		
▪ Be informed of exposure-related risks. Follow guidelines of instructor and boat captain.		
▪ When on a boat, follow the safety instructions of the captain.		
▪ Wear protective gloves when handling potentially harmful organisms (oysters, jellyfish).		
▪ Wear appropriate protection from the sun/UV light - sunscreen, sunglasses, hat, etc.		
▪ Wear insect repellant, as appropriate.		

Consequences of Non-compliance:	**Initial here to document that you understand the consequences of non-compliance.**
1. **First offense:** documented warning.	
2. **Second offense:** dismissal from the remainder of that day's lab activity and a grade of "0" for that lab (that cannot be used as a drop grade).	
3. **Third offense:** automatic "0" as laboratory grade for the entire course.	
4. **Serious violations** (even for a first time offense) will be handled at the professor's discretion.	
5. Any violation of the safety guidelines may be subject to University disciplinary action at the professor's discretion.	
6. Any Biology or Marine Science professor can cite a student for failure to comply with these safety guidelines.	

Jacksonville University Laboratory and Field Safety Guidelines

Department of Biology and Marine Sciences

More Information:

- For more information about safety procedures, consult JU's Chemical Hygiene Plan (CHP). The CHP is available in the Division of Science & Math Office (Merritt-Penticoff Room #132) and Biology Laboratory Manager's Office (Nelms Room #21)

- Watch this safety video: Type this link in your browser *http://www.youtube.com/uscsb*, and click on the "Experimenting with Danger" video.

- **If there is a serious accident:**

    1. First, call 911 **immediately**.
    2. Second, call the Division Office at 256-7300, and Public Safety at 256-7585.

Declaration of Understanding:

I,* [print name legibly] _____*, have read and understand the above "Laboratory and Field Safety Guidelines for Biology and Marine Science Students" and agree to abide by them. By signing this form, I accept the consequences for not complying with the safety guidelines.

Print Name Legibly:

_____

Signature:

_____

Date: _____ Course: _____ Section :_____