DATE: July 31, 2023 - Revised and Updated

SUBJECT: SALISBURY UNIVERSITY CHEMICAL HYGIENE PLAN

REGULATORY STANDARD: Occupational Exposure to Hazardous Chemicals in Laboratories standard (29 CFR 1910.1450)

1.1 GENERAL SAFETY PRINCIPLES

The following guidelines have been established to minimize hazards and to maintain basic safety in the laboratory:

Examine the known hazards associated with the materials being used. Never assume all hazards have been identified. Carefully read the label before using an unfamiliar chemical. When appropriate, review the **Safety Data Sheet (SDS)** for special handling information. Determine the potential hazards and use appropriate safety precautions before beginning any new operation. If you have any questions regarding the safe handling of the chemical, contact your supervisor or EHS.

Clean spills immediately and thoroughly, as per the guidelines established in section 2.0 of this document.

Do not block exits, emergency equipment or controls or use corridors and stairways as storage areas.

Assure hazardous chemicals are properly segregated into compatible categories.

1.5 CHEMICAL HANDLING AND STORAGE

The decision to use a hazardous chemical should be a commitment to handle and use the chemical properly from initial receipt to disposal.

Information on proper handling, storage and disposal of hazardous chemicals and access to related SDSs need to be made available to all laboratory employees prior to the use of the chemical.

Always purchase the minimum amount necessary to maintain operations.

Chemical containers with missing or defaced labels or that violate appropriate packaging regulations should not be accepted.

Chemicals utilized in the laboratory must be appropriate for the laboratory's ventilation system.

Chemicals should not be stored on high shelves and large bottles should be stored no more than two feet from floor level.

Chemicals shall be segregated by compatibility.

Chemical storage areas need to be labeled as to their contents.

Storage of chemicals on the laboratory bench or in other work areas shall be kept to a minimum.

Chemicals shall not be stored in the corridor.

Any chemical mixture shall be assumed to be as toxic as its most toxic component. Substances of unknown toxicity shall be assumed to be toxic.

1.6

Carry glass containers in specially designed bottle carriers or a leak resistant, unbreakable secondary container.

When transporting chemicals on a cart, use a cart that is suitable for the load and one that has high edges to contain leaks or spills.

When possible, transport chemicals in freight elevators to avoid the possibility of exposing people on passenger elevators.

1.7 COMPRESSED GASSES

Special systems are needed for handling

PIs/laboratory supervisors must ensure that labels on incoming containers of hazardous chemicals are not removed or defaced. Labels contain information on the identity of the chemical(s) in the container and the hazard identification of the chemical(s). It is recommended that incoming

receipt.

PIs/laboratory supervisors must ensure that employees have access to SDSs.

Chemicals should be stored according to compatibility. Particularly, hazardous chemicals should be stored and handled with extreme care. When ordering chemicals that are unfamiliar, review the SDS before purchase so that use and storage guidelines are understood. Additionally, storage areas for biohazardous agents and radioisotopes should be appropriately labeled (Contact EHS for more information).

Laboratories that use hazardous materials need to have signs visibly posted with emergency contact numbers (two names, preferably the laboratory supervisor or research director) on the external doorway to the lab. These names and numbers shall be updated when personnel change. Contact EHS with changes. In case of an emergency, responders need this information to contact knowledgeable personnel about specific laboratory hazards. The sign also needs to include information on the hazards in the

If the composition of the chemical substance, which is produced exclusively

hazardous chemical. This can be done by a literature search for similar substances. If the chemical is determined to be hazardous, the supervisor must provide appropriate training to protect employees.

If the chemical produced is a product or a by-product whose composition is not known, the supervisor must assume that the substance is hazardous and must comply with the requirements of the CHP.

If the chemical is produced for sale or use outside of the laboratory, the supervisor must prepare an appropriate SDS in accordance with the OSHA Hazard Communication Standard.

2.4 PROVISIONS FOR PARTICULARLY HAZARDOUS SUBSTANCES

Permissible Exposure Limits (PEL). The Laboratory Standard requires that employers assure that employees' exposures do not exceed the PELs. The PELs represent Time Weighted Averages (TWAs) in parts per million (ppm) or milligrams of substance per cubic meter of air (mg/m^3). The TWA represents the ratio between exposure and work shift.

The American Conference of Governmental Industrial Hygienists (ACGIH) has

of select carcinogens, reproductive toxicants and chemicals with a high degree of acute toxicity.

Protection from these hazards is provided by assuring exposure to such hazards is minimized, i.e. kept under the PEL, TLV, or Short Term Exposure Limit (STEL), or eliminated. To minimize exposure, it is necessary to determine the route by which exposure may occur, whether by inhalation, absorption, injection, ingestion or a combination of exposure routes. To ensure employees do not receive exposures in excess of the PEL or TLV, hygienic standards have been established for many toxic materials. The following general hygiene standards should be observed when using select carcinogens, reproductive toxicants and chemicals with a high degree of acute toxicity.

Establish a designated area:

Use and store materials only in designated areas: a restricted access hood, glovebox, or portion of a lab, designated for use of highly toxic substances. Assure that all personnel with access are aware of necessary safety precautions.

Label all containers, storage and use areas appropriately.

Use proper containment devices for the protocol and chemical(s) being used.

Use a hood or other containment device for procedures which may result in the generation of aerosols or vapors; trap released vapors to prevent their discharge with fume hood exhaust.

It is recommended that breakable containers be stored in chemical-resistant trays. Work and mount apparatus above such trays or cover work and storage surfaces with removable, absorbent, plastic backed paper.

Removal of Contaminated Waste:

Follow the guidelines established in the University Hazardous Waste Disposal policies.

Follow decontamination procedures prior to leaving the designated area:

On leaving the designated area, remove protective apparel (place it in an appropriate, labeled container) and thoroughly wash hands, forearms, face, and neck. Thoroughly decontaminate or dispose of contaminated clothing or shoes. If possible, chemically decontaminate by chemical conversion to a less toxic product. Decontaminate vacuum pumps or other contaminated

Decontaminate the designated area before normal work is resumed.

Use a wet mop or a vacuum cleaner equipped with a HEPA filter to decontaminate surfaces. DO NOT DRY SWEEP SPILLED POWDERS.

Protect vacuum pumps against contamination with traps and/or ap

Note: The flash point is defined as the minimum temperature at which a liquid gives off vapor in sufficient concentration to form an ignitable mixture with air near the surface of the liquid. For handling flammable/combustible materials, observe the following guidelines:

Eliminate ignition sources such as open flames, hot surfaces, sparks from welding or cutting, operation of electrical equipment, and static

Know the reactivity of the materials involved in the experiment or process. Ensure there are no extraneous materials in the area which could become involved in a reaction.

Store light-sensitive materials in a cool, dark place in amber colored bottles or other containers which reduce or eliminate penetration of light.

Unstable Materials. Compounds which can spontaneously release large amounts of energy under normal conditions, or when struck, vibrated, or otherwise agitated. Some chemicals become increasingly shock-sensitive with age. Of great concern in the laboratory is the inadvertent formation of explosive or shock-sensitive materials such as peroxides, perchlorates (from perchloric acid), picric acid and azides.

Contact EHS when it is suspected that the inadvertent formation of shock-sensitive materials in ductwork, piping, or chemicals being stored has occurred.

Date all containers of explosive or shock-sensitive materials upon receipt and when opened.

If there is a chance of explosion, use barriers or other methods for isolating the materials or the process.

Cryogens. Cryogenic liquids such as oxygen, nitrogen, argon, helium and hydrogen are substances that are normally in the gaseous state but are cooled to extremely low temperatures so that they are liquids. Some of the hazards

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Cryogenic containers should be made from materials such as austenitic stainless steels, copper, and certain aluminum alloys that are capable of withstanding extremely low temperatures.

Since glass ampoules can explode when removed from cryogenic storage if not sealed properly, storage of radioactive, toxic or infectious agents should be placed in plastic cryogenic storage ampoules.

2.6 RADIOACTIVE MATERIAL HAZARDS

Use of radioactive materials at the University is strictly prohibited. Salisbury University is **NOT** licensed to store or use radioactive materials.

3.0 EMERGENCY / MEDICAL PROCEDURES

3.1 BASIC STEPS FOR EMERGENCY AND SPILL RESPONSE

Releases of hazardous substances that pose a significant threat to health and safety or that, by their very nature, require an emergency response regardless of the circumstances surrounding the release or the mitigating factors are emergency situations. The following definitions designate an emergency situation:

The situation is unclear to the person causing or discovering the spill.

The release requires evacuation of persons.

The release involves or poses a threat of fire, suspected fire, explosion or other imminent danger; conditions that are Immediately Dangerous to Life and Health (IDLH); high levels of exposure to toxic substances.

The person(s) in the work area is uncertain they can handle the severity of the hazard with the personal protective equipment (PPE) and response equipment that

The materials are limited in quantity, exposure potential, or toxicity and present minor safety or health hazards to persons in the immediate work area or those assigned to clean up the activity.

Incidental releases of hazardous substances that are routinely cleaned up by EHS need not be considered an emergency.

Emergency Situation - Fire. The following steps are basic protocol for handling a fire or fire-related emergency situation in the laboratory:

1. Pull the fire alarm

2. Notify University Police at 3-6222

3. Evacuate

4. Inform building evacuation supervisor of the nature and location of the fire

Emergency Situation - Spill. If the spill is of high toxicity or flammability or you are unsure of how to proceed or is more than one liter, execute the following:

1. Notify University Police at 3-6222

2. Evacuate personnel from the spill area and alert neighbors to the spill

3. If possible, isolate the spill area and close doors to the room where the spill occurred

4. Shut down equipment if possible

5. Provide information on the nature and location of spill to emergency response personnel

Evacuation of the building may be necessary if chemicals or contaminants could enter the air handling system of a building.

Attend to victims for a body splash:

1. Remove person(s) from spill area to fresh air only if attempts to rescue victim(s) does not present a danger to the rescuers.

2. Remove contaminated clothing while under an emergency shower.

3. Flood affected e

4. Wash skin with mild soap and water - do not use neutralizing chemicals, unguents, creams, lotions or salves.

5. Contact emergency response personnel and assure they know the chemical(s) involved. Have SDS(s) available if possible.

Attend to victims for an eye splash:

1. Remove victim(s) from spill area to fresh air only if attempts to rescue victim(s) does not present a danger to the rescuers.

2. Lead the victim(s) immediately to an emergency eye wash facility.

3. Hold eyelids open.

4. Flush eyes for at least 15 minutes or longer if pain persists.

5. Contact emergency response personnel and assure they know the chemical(s) involved. Have SDS(s) available if possible.

Mercury Spills**.** Each laboratory that utilizes mercury should have or have access to a mercury spill clean-up kit. In the event of a spill (broken thermometer) isolate the area in which the material was spilled and prevent people from stepping on the mercury. Follow the directions provided by the mercury spill clean-up kit and contact EHS to pick up mercury waste when you are done. For spills larger than the laboratory can handle, contact

For non-reactive spills:

1. Cover liquid spills with absorbent and scoop into a plastic disposal bag.

2. Sweep solid materials into a dustpan and place in a sealed container.

3. Contact the EHS for proper disposal instructions.

For reactive or potentially reactive spills:

1. Cover liquid spills with absorbent and scoop into an appropriate disposal container.

2. Wet mop dry substances to avoid spreading hazardous dust, provided it is non-water reactive.

3. If spilled chemical is a volatile solvent, transfer disposal bag to a hood for containment.

4. Follow the University Hazardous Waste Disposal Procedures for disposal.

Power Outages. If emergency lighting and fire alarms ARE NOT operable, evacuate the building after the following steps have been take0.97727 (Dispo)4(sa)-3(l P)-2(roispo

Shut down experiments

3.2 INJURY AND ILLNESS

The "Employee's First Report of Injury"

All medical consultations and examinations must be performed by or under the direct supervision of a licensed physician and must be provided without cost to the employee, without loss of pay and at a reasonable time and place.

The Department or supervisor shall provide the following information to the physician:

The identity of the hazardous chemical(s)

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4.0 STANDARD LABORATORY FACILITY REQUIREMENTS

4.1 SIGNS AND INFORMATION

Labels and warning signs need to alert employees to potentially hazardous materials and allow those unfamiliar with the laboratory surroundings to identify hazardous chemical use and storage areas, safety facilities, emergency equipment and exits and assist emergency response personnel. Signs and labels are generally available from EHS.

Safety Data Sheets (SDSs). An SDS is a document containing chemical hazard identification and safe handling information and is prepared in accordance with the OSHA Hazard Communication Standard. Chemical

4.2 CONTROL MEASURES

Substitute less harmful chemicals for more harmful chemicals whenever possible.
Change or alter processes to minimize exposure.
Isolate or enclose a process or work operation to reduce the number of employees exposed (for example, use a fume hood).
Use wet methods to reduce the generation of dust.
Use local exhaust ventilation (hoods) at point of generation or dispersion of contaminants and use dilution (general) ventilation to reduce air contaminants.
Practice good housekeeping procedures to reduce unnecessary exposures.
Use training and education as primary administrative controls for reducing exposures.
Use special control methods such as shielding and continuous monitoring devices to control exposures in special situations.

4.3 PERSONAL PROTECTIVE EQUIPMENT

The University policy on the use and selection of Personal Protective Equipment (PPE) must be followed. However, the following is some basic information on PPE commonly found in laboratories. PPE must be provided to employees under the appropriate circumstances. Employees need to be trained on the proper use of any PPE issued to them and employees have the responsibility of properly using such equipment.

All eye protective devices must be stamped with "Z87" by the manufacturer if they meet ANSI standards. If the eye protection is not marked, it may not be the most effective protection available.

Safety glasses with side shields offer minimal protection against flying fragments, chips, particles, sand and dirt. When a splash hazard exists, another protective eye equipment needs to be worn.

Safety goggles (impact goggles) offer adequate protection against flying particles. These need to be worn when working with glassware under reduced or elevated pressure or with drill presses or other similar conditions.

Chemical splash goggles (acid goggles) have indirect venting for splash proof sides, which provide adequate protection against splashes. Chemical splash goggles offer the best eye protection from chemical splashes. Impact goggles should not be worn when danger of a splash exists.

Face shields protect the face and neck from flying particles and splashes. Always wear additional eye protection under face shields. Ultraviolet light face shields should be worn when working around UV light sources.

Protection of Skin and Body. Skin and body protection involve the use of protective clothing to protect individuals from chemical exposure. Determine clothing needed for the chemical being used, as protective garments are not equally effective for every hazardous chemical. Some chemicals will permeate a garment in a very short time, whereas others will not. The basic and most effective forms of protection are gloves and lab coats.

Protect exposed skin surfaces when there is a reasonable anticipation of a splash. Open-toed shoes, sandals, shorts, etc. are not permitted when working in University laboratories.

Even when there is minimal danger of skin contact with an extremely hazardous substance, lab coats, coveralls, aprons, or protective suits should be utilized. These garments should not leave the work site.

Exposures to strong acids and acid gases, organic chemicals and strong oxidizing agents, carcinogens, and mutagens require the use of specialized protective equipment that prevents skin contamination. Impervious protective equipment must be utilized. Examples include: appropriate gloves, aprons, boots and protective suits.

Respirators. The use of respirators in laboratories is strongly discouraged. The use of respirators is only allowed where engineering controls are not feasible or where they are being installed. Any individual that uses a respirator as part of his or her

work at the University must be enro

Certain types of local exhaust systems are not designed for the use of hazardous chemicals. If a is not fully understood, check the manufacturer specifications or call EHS before using hazardous chemicals in the system.

5.0 STANDARD REPAIR / CLOSE-OUT / DECOMMISSIONING PROCEDURES

5.1 DECONTAMINATION OF EQUIPMENT

Prior to repairing or moving equipment any chemical, biological or radioactive contaminants must be properly decontaminated. Follow decontamination procedures outlined in the following section.

5.2 INSTRUCTIONS FOR PREPARING A LABORATORY FOR RENOVATION WORK

In order to protect construction workers and University personnel from hazards associated with laboratory work, the following procedures must be followed when work is to be performed in an area which has contained hazardous chemicals, biological hazards and/or radioactive materials.

Chemical Hazard: any surface which a hazardous chemical has come in contact with must be wiped down with a solution of warm soap and water. This applies only to areas that construction

All clean-up procedures must be performed using appropriate personal protective equipment (PPE).

5.3 USE OF FORMALDEHYDE IN LABORATORY OPERATIONS