



Chemical Hygiene Plan

Office of Environmental Health and Safety
Department of Facilities Management

Approved by the Hazardous Substances Committee

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Purpose

To document the requirements, roles, responsibilities, and processes to comply with the US Occupational Safety and Health Administration's (OSHA) Occupational Exposure to Hazardous Chemicals in Laboratories Standard (29 CFR 1910.1450), referred to as the Laboratory Standard, which specifies the mandatory requirements of a Chemical Hygiene Plan (CHP) to protect laboratory workers from harm due to hazardous chemicals. The CHP also refers to and summarizes relevant federal and state regulations, consensus standards, University policies, and ENHS guidance approved by the HSC to be followed to ensure laboratory safety.

Applicable to

This Plan applies to all laboratories at the University of Arkansas Fayetteville where chemicals are stored or used. In addition, for labs where radiological and biological materials are used, the safety procedures and regulatory requirements are outlined in the Radiation Safety Manual and Biological Safety Manual, respectively.

Key Regulatory, Policy Requirements, and ENHS Guidance Requirements

- [OSHA Occupational Exposure to Hazardous Chemicals in Laboratories \(29 CFR 1910.1450\)](#)
- [OSHA Personal Protective Equipment General Requirements \(29 CFR 1910.132\)](#)
- [OSHA Personal Protective Equipment Eye and Face Protection \(29 CFR 1910.133\)](#)
- [OSHA Personal Protective Equipment Respiratory Protection \(29 CFR 1910.134\)](#)
- [OSHA Personal Protective Equipment Hand Protection \(29 CFR 1910.138\)](#)
- [OSHA Medical Services and First Aid \(29 CFR 1910.151\(c\)\)](#)
- [OSHA Access to Employee Exposure and Medical Records \(29 CFR 1910.1020\)](#)
- [NFPA 1: Fire Code](#)
- [NFPA 30: Flammable and Combustible Liquids Code](#)
- [NFPA 45: Standard on Fire Protection for Laboratories Using Chemicals](#)
- [NFPA 55: Compressed Gases and Cryogenic Fluids Code](#)
- [NFPA 400: Hazardous Materials Code](#)
- [NFPA 704: Standard System for the Identification of the Hazards of Materials for Emergency Response \(2017\)](#)
- [Resource Conservation and Recovery Act, 42 U.S.C. §6901 et seq. \(1976\)](#)
- [Arkansas Department of Pollution Control and Ecology \(ADPC&E\) Regulation 23](#)
- [Arkansas Hazardous Waste Management Act \(Ark. Code, Ann Sects. 8-7-202 et seq.\)](#)
- [Arkansas Public Employees' Chemical Right-to-Know Act \(AR Code Sec. 8-7-1001 et seq.\), enforced by the Arkansas Department of Labor](#)
- [U of A / VCFA / Fayetteville Policies and Procedures 727.2 – Toxic Substances Use on Campus](#)
- [U of A / VCFA / Fayetteville Policies and Procedures 209.0 – Hazardous Materials/Dangerous Goods Shipping and Transportation](#)
- [U of A Cryogenic Liquid Guidelines](#)

Definitions

Biological Safety Officer (BSO)

The University's appointed ENHS representative responsible for ensuring the safe acquisition, handling, use, and storage of all hazardous biological agents and materials (or their products and derivatives) and waste in accordance with all applicable regulatory and policy requirements.

Chemical Abstracts Service (CAS) Number

A unique numerical identifier assigned by the Chemical Abstracts Service (CAS) to every chemical substance described in the open scientific literature.

Chemical Hygiene Plan (CHP)

The University's written program stating the policies, procedures, and responsibilities that protect all faculty, staff, students, and visitors from the health hazards associated with the hazardous chemicals used in that particular workplace in accordance with OSHA's Occupational Exposure to Hazardous Chemicals in Laboratories standard.

Chemical Hygiene Officer ([CHO](#))

The University's appointed ENHS representative responsible for ensuring the safe acquisition, handling, use, and storage of all hazardous chemicals and waste in accordance with all applicable regulatory and policy requirements.

Chemical Storage Room

Any room or space where any hazardous chemicals intended for laboratory use are stored prior to and after being used in a laboratory.

DEA Controlled Substance

Drugs and other substances that are considered controlled substances under the Controlled Substances Act (CSA). An updated and complete list of the schedules is published annually in Title 21 Code of Federal Regulations (C.F.R.) §§ 1308.11 through 1308.15. Substances are placed in their respective schedules based on whether they have a currently accepted medical use in treatment in the United States, their relative abuse potential, and likelihood of causing dependence when abused. All US Drug Enforcement Administration (DEA) Controlled. The [Office of Research Integrity & Compliance](#) (RSIC) can assist with the process of registering with the state of Arkansas and with the DEA to obtain licenses for controlled substances.

Department Chairperson or Director

The University's appointed chair of a recognized department within a college or a staff director of a recognized administrative division or function.

Eating and Drinking

Eating, drinking, chewing gum, smoking/vaping, applying cosmetics, adjusting contact lenses, taking/storing medicine, and other related activities. It also includes items and equipment used for storing, preparing, and consuming food and beverages.

Fume Hood

A local exhaust device, the primary purpose of which is to protect laboratory workers from hazards of airborne chemical contaminants. Its secondary purpose is to protect people and property from fires and explosions. The fume hood must be used correctly for proper functioning to remove contaminants from the breathing area of the user.

Globally Harmonized System (GHS) of Classification and Labeling of Chemicals

GHS defines and classifies the hazards of chemical products, communicating health and safety information via labels and Safety Data Sheets (SDSs). The goal is that the same set of rules for classifying hazards and the same format and content for labels and SDSs will be adopted and used throughout the world.

Inspection Report

A formally documented record of any violations of the CHP discovered during any scheduled or unscheduled laboratory audit or review by the Laboratory Safety Coordinator which shall include, at a minimum, the date, location, items of noncompliance, the required corrective actions, and due dates to complete the corrective actions.

Laboratory

Any facility, room, or space where the "Laboratory Use of Hazardous Chemicals" occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.

Laboratory Manager

Principal Investigator or a qualified Classified/Non-Classified appointed employee with the knowledge, authority, and presence to administer and execute the requirements of this Chemical Hygiene Plan (CHP) on a day to day basis who has been assigned by his or her Department Chairperson or Director with overall responsibility and accountability for chemical hygiene in the lab spaces shared by PIs. A graduate student or postdoctoral associate may not be assigned as a Laboratory Manager.

While the Laboratory Manager cannot delegate accountability for compliance with the Chemical Hygiene Plan, they may seek assistance and assign to other Principal Investigators, postdoctoral associates, or graduate assistants' day to day laboratory safety requirements defined in the Chemical Hygiene Plan.

Laboratory Relocation and/or Closure

The planning and physical relocation of all or part of an existing laboratory to a different physical space and/or the planning and execution of closing all or part of an existing laboratory.

Laboratory Safety Audit

Regular planned and unplanned compliance audits of the laboratory and chemical storage rooms by the Laboratory Safety Coordinator on behalf of the CHO to assess compliance with this CHP.

Laboratory Safety Coordinator

The ENHS representative assigned to support the PI/Laboratory Manager and Laboratory Workers with respect to laboratory safety and compliance as well as execute Laboratory Safety Audits and

Laboratory Safety Reviews.

Laboratory Use of Hazardous Chemicals

Handling or use of such chemicals in which all the following conditions are met:

- Chemical manipulations are carried out on a "laboratory scale"
- Multiple chemical procedures or chemicals are used
- The procedures involved are not part of a production process, nor in any way simulate a production process
- "Protective laboratory practices and equipment" are available and in common use to minimize the potential for an individual's exposure to hazardous chemicals

Laboratory Worker

Any individual faculty, staff, student, or guest who observes, supports, or performs chemical procedures in a laboratory and who may be exposed to hazardous chemicals in the course of his or her assignments.

National Fire Protection Association (NFPA)

The National Fire Protection Association (NFPA) is a global nonprofit organization, established in 1896, devoted to eliminating death, injury, property, and economic loss due to fire, electrical and related hazards through the development of consensus codes and standards.

Office of Environmental Health & Safety (ENHS)

The University's designated organization responsible for promoting health, safety, and environmental protection in teaching, research, occupational and administrative activities through leadership, technical support, programs, information and training, consultation, and periodic audits of environmental, health, and safety practices and regulatory compliance.

Office of Research Integrity & Compliance (RSIC)

A unit of the Office of the Vice Chancellor for Research & Innovation responsible for assisting faculty, staff, and students in complying with federal and state regulatory requirements for sponsored and unsponsored research and with the associated University policies.

Particularly Hazardous Substance

A category of substances, based on their potential to cause harm, for which OSHA and the U of A Hazardous Substances Committee requires the employer to make provisions for additional employee protection. These provisions will be addressed in a laboratory/research specific SOP.

Personal Protective Equipment (PPE)

Protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury or exposure. The hazards addressed by protective equipment include physical, electrical, thermal, chemical, biohazard, and airborne particulate matter.

Principal Investigator (PI)

The primary faculty researcher or instructor (generally an appointed employee) who has the appropriate level of authority, education, expertise, and responsibility to direct funded, unfunded research or teaching programs in a laboratory.

Radiation Safety Officer (RSO)

The University's appointed ENHS representative responsible for ensuring the safe acquisition, handling, use, and storage of all radioactive materials and waste in accordance with all applicable regulatory, policy, and licensing requirements.

Safety Data Sheet (SDS)

Required by the Hazard Communication Standard (HCS), Safety Data Sheets (SDSs) provide comprehensive information about a substance or mixture for use in workplace chemical management and communicate the hazards of hazardous chemical products.

Secondary Containment

Physical containment that is external to and separate from the primary containment. Secondary containers should be made of material compatible with the substances stored and with sufficient capacity to contain 10% of the volume of the sum of the individual containers or the volume of the largest container, whichever is greater.

Hazardous Substances Committee (HSC)

Appointed by the Provost, the [Hazardous Substances Committee](#) recommends policies for the use, storage, and disposal of toxic substances and monitors implementation of and compliance with this Chemical Hygiene Plan.

Visitor

Any individual faculty, staff, student, or guest who is not a member of the lab and does not perform work but who may be escorted through the lab space. Visitors must be made aware of any potential hazards and safety precautions within the space before being escorted and abide by all laboratory regulations.

Roles and Responsibilities

University Chancellor

Appoints the University's Chemical Hygiene Officer ([CHO](#)) and delegates to the CHO the authority for ensuring the safe acquisition, handling, use, and storage of all hazardous chemicals and waste in accordance with all applicable regulatory and policy requirements. This authority includes, but is not limited to, the authority to stop, with or without prior notice, any operation or activity and secure the immediate area when, in the opinion of the CHO, the health and safety of individuals may be compromised or when there is significant failure to comply with the Chemical Hygiene Plan (CHP), UA policies, or state or federal regulations.

Office of the Provost

Appoints the members of the [Hazardous Substances Committee](#) (HSC). Receives any recommendation to implement any changes regarding the description, duties or composition of the committee and distributes the recommended changes to all the vice chancellors who appoint committees, to the head of the office advised by the committee (if there is one) and to the committee chair for comments. Following receipt of a recommendation, the provost will submit to the chancellor for approval or modification and will implement and promulgate.

Chemical Hygiene Officer ([CHO](#))

The responsibilities of the CHO include, but are not limited to, the following:

- Establishes, maintains, and annually updates this Chemical Hygiene Plan (CHP)
- Creates and revises safety rules and regulations
- Monitors procurement, use, storage, and disposal of chemicals
- Collects hazardous waste for disposal
- Oversees audits and reviews of laboratories, preparation rooms, and chemical storage rooms; and ensures detailed laboratory inspection reports are sent to the PI/Laboratory Manager and the Director of Environmental Health & Safety
- Maintains compliance related audit, personnel training, and chemical inventory records in the Campus' Environmental Health and Safety Information Management System.
- Assists PIs/Laboratory Managers in developing and maintaining safe and compliant facilities
- Seeks ways to improve the chemical hygiene program
- Manages the 90-day hazardous waste accumulation facilities

Director of Environmental Health & Safety

The responsibilities of the Director, Environmental Health & Safety (ENHS) include, but are not limited to, the following:

- Implements this Chemical Hygiene Plan (CHP)
- Completes a formal review and update (as required) of this CHP, no less than annually
- Manages and supervises the CHO's fulfillment of his or her obligations under this CHP
- Reviews all accidents, investigation reports, and preventive measures
- Reviews all laboratory audit reports for violations and ensures that corrective actions are implemented or escalated as required

Department Chairperson or Director

The responsibilities of the Department Chairperson or Director include, but are not limited to, the following:

- Assumes responsibility for personnel engaged in the laboratory use of hazardous chemicals
- Manages and supervises the PIs/Laboratory Manager's fulfillment of his or her obligations under this CHP
- Provides the Chemical Hygiene Officer ([CHO](#)) with the support necessary to implement and maintain the CHP
- After receipt of any Laboratory Inspection Report from the Laboratory Safety Coordinator, meets with applicable PI/Laboratory Manager to discuss cited violations and to ensure timely actions to correct all noted deficiencies
- Provides budgetary arrangements to ensure the health and safety of Laboratory Workers and visitors
- Assigns a qualified and knowledgeable individual to each laboratory as the Laboratory Manager (as defined in this CHP) accountable for day to day chemical hygiene in the laboratory and compliance with the Chemical Hygiene Plan in his or her laboratory
- Be aware of departmental hazards and is recommended by the HSC to complete the BioRAFT training pertinent to all research within the department

Principal Investigator (PI)

The responsibilities of the PI include, but are not limited to, the following:

- Ensures laboratory personnel under their supervision know and follow the guidelines and requirements contained within the CHP and laboratory specific SOPs and that they obtain and maintain all required ENHS training
- Identifies hazardous conditions or operations in the laboratory and establishes SOPs and performs hazard assessments to effectively control or reduce all hazards. Lab hazards must be reviewed and updated in BioRAFT annually
- Completes all required training associated with lab hazards and job activities that lab members are exposed to while working in the lab
- Applies appropriate measures to control identified hazards, including consistent and proper use of engineering controls, administrative controls, and personal protective equipment
- Determines if particularly hazardous substances are being, or are planned on being used, submit [Particularly Hazardous Substance Use Request Form](#) and obtains approval from the [HSC](#) prior to use
- Completes a laboratory specific standard operating procedure and provides training for each particularly hazardous substance being used
- Maintains records of lab-specific training
- Ensures laboratory personnel have adequate knowledge, information, and training to recognize and control hazards in the laboratory
- Informs laboratory personnel of the signs and symptoms associated with exposures to hazardous chemicals used in their laboratory and other possible hazardous conditions (e.g., fire/explosion) that could arise with the use (e.g., mixing, grinding, heating) of the chemical
- Keeps the Department Chairperson and the CHO informed of plans for renovations or new laboratory construction projects
- Ensures that all items identified during the annual ENHS laboratory compliance audit are corrected in a timely manner
- Ensures that all individuals working under his/her direction are informed and familiar with the location of all emergency equipment, routes of egress, and the specific safety rules and requirements for each applicable lab
- Keeps the chemical inventory updated
- If the sole user of a laboratory, also ensures the duties listed below for Laboratory Manager are met

Laboratory Manager

The responsibilities of the Laboratory Manager include, but are not limited to, the following:

- Ensures that Laboratory Workers comply with this CHP and do not operate equipment or handle hazardous chemicals without proper training and authorization
- Completes all required training associated with lab hazards and job activities that lab members are exposed to while working in the lab
- Establishes any laboratory unique training and ensures that Laboratory Workers have been trained consistent with the requirements of this CHP and all other related and required University and ENHS training at the applicable intervals
- Maintains accurate and timely chemical inventory records at all times in BioRAFT.
- Maintains accurate and timely Safety Data Sheets (SDSs) readily available in the laboratory to communicate the hazards of hazardous chemical products

- Identifies and posts all laboratory hazards
- Always wears personal protective equipment (PPE) that is compatible to the degree of hazard of the chemical(s) being used
- Sets an example by following all pertinent laboratory standard operating procedures when working in the laboratory
- Reviews laboratory procedures for potential safety problems before authorizing use by other laboratory personnel
- Ensures that visitors follow the laboratory standard operating procedures and assumes responsibility for laboratory visitors
- Ensures that PPE is available and properly used by each Laboratory Worker and visitor.
- Maintains and implements safe laboratory practices
- Ensures that specific operating procedures for handling and disposing of hazardous substances used in their laboratories are written, communicated, and followed and ensures laboratory personnel have been trained in these operating procedures and use proper control measures
- Provides regular, formal chemical hygiene and housekeeping inspections, including routine inspections of emergency equipment
- Ensures that all items identified during annual ENHS laboratory compliance audit are corrected in a timely manner
- Ensures that all incidents and near misses occurring in their laboratories are reported to their Director or Department Chairperson and that a written Injury/Illness report is filed with ENHS for each incident
- Monitors the facilities and the fume hoods to ensure that they are maintained and function properly. Contacts the appropriate person, as designated by the department chairperson, to report problems with the facilities or the fume hoods
- Identifies potential lab-related hazards and informs facilities personnel, custodial services, other non-laboratory personnel, and any outside contractors or guests how to mitigate these hazards when they are required to work in the laboratory environment. Ensures laboratory equipment is appropriately decontaminated prior to any maintenance or disposal of the equipment

Laboratory Worker

The responsibilities of the Laboratory Worker include, but are not limited to, the following:

- Reads, understands, and follows all applicable elements of this CHP
- Reads, understands, and follows all Laboratory Standard Operating Procedures and any laboratory specific rules that apply to the work area
- Plans and conducts each operation in accordance with the institutional chemical hygiene procedures
- Promotes good housekeeping practices in the laboratory or work area.
- Notifies the PI/Laboratory Manager or the [CHO](#) of any hazardous conditions or unsafe work practices in the work area
- Informs laboratory coworkers of special hazards related to materials they may encounter in the lab
- Uses PPE as appropriate for each procedure that involves hazardous chemicals
- Completes all required training assigned by the PI/Laboratory Manager and/or the [CHO](#)

Hazardous Substances Committee (HSC)

The responsibilities of the [Hazardous Substances Committee](#) (HSC) include, but are not limited to, the following:

- Meets on a regular basis to recommend policies for the use, storage, and disposal of toxic substances and monitors the application of the policies for compliance with this CHP
- Prior to the acquisition, receipt, storage or use of any Particularly Hazardous Substances, reviews and approves the laboratory/research specific SOP
- Reviews the CHP annually and disseminates any changes back to the respective departments and colleges
- Submits committee recommendations to implement any changes regarding the description, duties, or composition of the committee to the [Office of the Provost](#)
- Sends annual report on the status of implementation actions and compliance with the CHP to the Provost and Chair of the Health and Occupational Safety Council

Laboratory Operations

The PI/Laboratory Manager (as defined in this CHP), with support as needed from the [CHO](#), is responsible for the day to day application of and compliance with the following SOPs:

Chemical Hygiene Plan (CHP)

This CHP shall be readily available to all PIs/Laboratory Managers, Laboratory Workers, and visitors.

- Perimeter doors shall be kept closed at all times and locked when lab personnel are absent
- All laboratory hazards shall be properly posted in the laboratory in accordance with applicable guidelines and standards
- Safety Data Sheets (SDSs) (formerly known as Material Safety Data Sheets or MSDSs) for all applicable chemicals shall be readily available in the laboratory. Every attempt should be made to place hardcopies of manufacturer specific SDSs in the work area in a binder where the location is marked. For the occasions when this is not practicable, manufacturer specific SDSs are available electronically through BioRAFT with the [SDS Search function](#). If the only SDS access is through electronic means and that access is not available, contact ENHS at (479-575-5448). After hours, contact UAPD (479-575-2222) and ask to be put in contact with an ENHS representative. Our website has [additional information on SDS availability](#).
- Work surfaces and floors shall be kept clean and free of obstacles and trip hazards
- Open containers of chemicals shall not be left unattended
- Work surfaces, cabinets, hoods, and other equipment shall not be modified from their intended use without prior approval from the [CHO](#)
- Personal protective equipment (PPE) including, but not limited to, a lab coat or other protective clothing, safety glasses, long pants, and closed-toe shoes are required for anyone in the laboratory
- Eye/Face Wash and Safety Shower stations must be tested weekly, with testing logged
- Class A first aid kits that conform to ANSI-Z308.1-2015 must be in a highly visible, unobstructed, and signed location. Laboratories that use hydrofluoric acid must have a first aid kit that contains unexpired calcium gluconate
- No solitary work is permitted in the laboratory on procedures involving hazardous chemicals or other physical hazards without formal written permission by the PI/Laboratory Manager to work unsupervised. Undergraduates must be supervised in the lab at all times by a Lead Investigator, PI/Laboratory Manager, or experienced graduate student assigned by the PI/Laboratory Manager or have formal written permission by the PI/Laboratory Manager to work unsupervised. The PI or lab manager is required to submit the [UA Working Alone in Lab Approval Form](#) for approval
- Laboratory use of hazardous chemicals that will be left unattended must have prior written approval from the PI/Laboratory Manager
- Pipetting by mouth suction is strictly prohibited
- Eating, drinking, chewing gum, smoking/vaping, or the application of a cosmetic (as defined by the Federal Food, Drug and Cosmetic Act [FD&C Act, sec. 201(i)]) are strictly prohibited in the laboratory. Food and drink products, materials, containers, and utensils are not allowed inside the laboratory
- Laboratories using sharps are required to have a puncture proof container for the disposal of sharps and syringes. Note these should not be overfilled. General rule is to replace when container is 3/4 full
- Broken glass should be disposed of in a separate impervious puncture proof container with a liner and lid

Fume Hoods

- Chemicals that may generate contaminants near or above exposure limits or are characterized as being particularly hazardous, must be used in an appropriate fume hood
- Do not have sources of ignition inside the hood when flammable liquids or gases are present
- Visually inspect the device (and flow monitor) daily or before each use
- Keep all items a minimum of 6 inches back from the front edge of the hood to avoid blocking the airflow path
- Keep slot openings at the back of the hood free from blockage with large objects or numerous containers
- Elevate large objects 2 inches off the floor of the hood so air can pass under the object and out the back slots in the hood
- Close the sash when the hood is not in use
- During hood use, the sash should be placed in front of the users face for horizontal sashes, below the chin and more if possible for vertical sashes. Lower or place the sash as a safety shield when working with reactive materials or materials that may splatter
- Do not store chemicals in hoods
- Procedures involving the heating of perchloric acid or the use of perchloric acid greater than 72% concentration must be performed in specially design perchloric acid fume hood with the face velocity of at least 100 fpm
- Do **NOT** heat any concentration of perchloric acid in a conventional laboratory fume hood

Chemical Procurement

All chemicals must be purchased through approved and licensed vendors. The University holds contracts with several vendors for specific chemicals and those vendors must be used when possible. The [Vendor List](#) is found in the appendix of this document. **Procurement of extremely toxic, pyrophoric, and unstable chemicals requires ENHS written approval prior to procuring the chemical. At the CHO's discretion, toxic, pyrophoric, and unstable chemicals may be secured or removed from a laboratory if deemed necessary to ensure public health and safety. The PI/Laboratory Manager will be immediately notified of this action.**

PIs/Laboratory Managers should review the hazards of the chemical prior to ordering to assure there are appropriate controls available to safely work with it before purchase. Many materials require special authorization to purchase, use, and store. Include these ordering procedures as part of your process planning to increase laboratory safety, decrease procurement delays, and reduce potential regulatory deficiencies.

- Obtain any necessary permits, licenses, or registrations prior to ordering. Examples include [DEA Controlled Substances](#); these require DEA registration for purchase. Some DEA-listed chemicals that are not controlled substances will require a signature by a departmental authority on the chemical vendor's forms as part of the purchasing process. The [Office of Research Integrity & Compliance](#) (RSIC) can assist with the process of registering with the state of Arkansas and with the DEA to obtain licenses for controlled substances
- Before ordering chemical materials (see applicable policies and procedures for biological or radiological materials), carefully plan and outline specific safety precautions in an SOP approved by the PI/Laboratory Manager, especially if the material is a Particularly Hazardous Substance. An SOP that includes use of a Particularly Hazardous Substance requires prior approval by the [HSC](#)
- Wherever possible, look for substitutions of less hazardous chemicals

- Check the US Department of Homeland Security (DHS) Chemicals-of-Interest (COI) list for the appearance of the chemical. Contact the [CHO](#) prior to ordering COIs to determine if there are any DHS requirements that can affect your lab or building for chemicals at or above DHS reportable quantities
- Order only those materials for which adequate safety equipment is available
- Order the minimum quantity of chemical, biological and radiological materials required. Excess material often leads to future safety issues
- Prepare the laboratory prior to receipt of the substance (i.e., establish a storage location, post appropriate signage, obtain necessary PPE, etc.)
- All paperwork necessary for initial procurement required by vendor must be signed by PI

Safe Handling of Particularly Hazardous Substances

OSHA's Occupational Exposure to Hazardous Chemicals in Laboratories Standard (29CFR 1910.1450) defines Particularly Hazardous Substances (PHS) as including select carcinogens, reproductive toxins, and chemicals with high acute toxicity. In addition, reactive materials, severe irritants, and sensitizers are viewed as high-risk chemicals and will be considered as PHS under this CHP. OSHA requires provisions for additional employee protection for work with PHS.

1. Particularly Hazardous Substances Procedures

All laboratory workers (e.g., Principal Investigator, laboratory personnel, students, visiting researchers) who use or work with PHS will follow these procedures. Additional safety requirements may apply, depending on the specific chemical (e.g., chemicals may have PHS requirements, American National Standards Institute (ANSI), National Fire Protection Agency (NFPA) requirements).

The PHS approval process begins with the PI or delegated representative submitting the completed PHS Request and supporting documentation (e.g., SDS, Laboratory Specific SOP) to ENHS at enhs@uark.edu. An ENHS representative will coordinate with the PI or delegated representative to confirm the chemicals and procedures within the PHS documentation and request more information if necessary. When ENHS has determined no further information is needed, the documentation will be presented to the HSC during the monthly meeting for consideration.

An explanation of the PHS information and requirements are detailed in the following paragraphs.

A. Laboratory Specific Standard Operating Procedures

1. Individual laboratory groups must prepare and maintain laboratory specific SOP for identifying hazards and handling methods to avoid exposure to PHS. The procedures must indicate the designated use areas, limitations on the quantities and procedures used, information on containments, and information on hazards involved. These procedures may be specific to substances or generalized over a group of chemicals with similar hazardous properties and use limitations. ENHS has developed banded SOPs for general use of chemicals. See the ENHS website banded SOPs.
2. A copy of the PHS procedures, including laboratory specific information, and the Safety Data Sheets (SDS) must be readily accessible by laboratory personnel.
3. UA EHS must be notified immediately at (479) 575-5448 or enhs@uark.edu if laboratory personnel show signs or symptoms associated with hazardous chemicals used in the laboratory. If the situation is immediately dangerous to life and health (IDLH), evacuate the area and call the UA Police Department (UAPD) dispatch office at (479) 575-2222 or dial 911.

B. Training and Documentation

1. All laboratory personnel who work with or may be exposed to PHS must be provided

laboratory specific training and information by the PI or their designee prior to beginning their initial assignment. Laboratory specific training should cover specific policies and procedures and is in addition to the laboratory training required by the CHP. Training records must be uploaded to the SciShield in the PI's laboratory profile, documents tab. Training will include the following:

- a. The hazards/toxicological effects associated with the chemicals being used.
 - b. Routine procedures and decontamination methods.
 - c. Emergency response practices and procedures.
 - d. Methods and observations for detecting the presence or release of hazardous chemicals.
 - e. Available protection measures, including appropriate work practices and Personal Protective Equipment (PPE).
 - f. A review of written SOP's, SDS's, and the CHP.
2. All laboratory personnel are responsible for knowing and complying with all safety guidelines, regulations, procedures required for the task assigned, and for reporting unsafe conditions, accidents, or near misses to the PI, laboratory management staff, and ENHS.
 3. Continuing training will be conducted as needed to maintain a working knowledge of hazards and the safety requirements for all laboratory personnel who work with PHS, including an annual refresher for PHS.
 4. PI's must identify what classes of PHS are in use in their labs on their chemical inventory in SciShield (formerly BioRAFT). SciShield is the management system to collect, organize, and display real-time safety and compliance information. This must be updated when conditions change or at least once each calendar year.
- C. Use in Designated Areas
1. Designated area(s) for use of PHS must be established by developing SOPs and posing appropriate signage. The designated area(s) may be an entire laboratory, a specific work bench, or a chemical fume hood. When a PHS is in use, access to the designated area shall be limited to personnel following appropriate procedures and who are trained in working with these chemicals.
 2. Access to areas where PHS are used or stored must be controlled by trained employees. Working quantities of PHS should be kept as small as practical and their use should be physically contained as much as possible (e.g., fume hood, glove box). It is the responsibility of each PI or their designee to train and authorize their staff for these operations and to maintain documentation for this training and authorization.
 3. Signage is required for all containers, designated work areas, and storage locations. See the Signs (insert hyperlink) section of this CHP for more information.
 4. Work surfaces should be stainless steel, plastic trays, dry absorbent plastic backed paper, chemically resistant epoxy surfaces, or other chemically impervious materials.
 5. Protocols, procedures, and experiments must be designed and performed in a manner to safely maintain control of PHS. Laboratory personnel must specifically consult with their PI if a special hazard is involved (e.g., material under pressure) or if they are uncertain of the potential hazards.
- D. Personal Protective Equipment
1. PPE must be sufficient to protect eyes and skin from contact with hazardous agents. At a minimum, safety glasses, lab coat, long pants, closed toe shoes, and gloves are required when working with PHS. Goggles may be required for processes in which a splash or spray hazard may exist, and flame-resistant lab coats may be required if the chemicals being used are flammable.

2. Refer to the specific chemical SDS and SOP for information on additional PPE.
 3. Contaminated PPE and clothing must be disposed of or decontaminated prior to removal from the designated work area. While small spots of contamination may be cleaned in the laboratory, grossly contaminated lab coats may need to be disposed of as dry hazardous waste. Refer to the Collection, Storage, and Disposal of Waste (insert hyperlink) section in this CHP.
- E. Containment Devices
1. Benchtop work with PHS should be avoided whenever practical in favor of contained systems (e.g., fume hoods, glove boxes) and is not permitted if there is a likelihood of workers exceeding regulatory exposure limitations. For questions regarding exposure limitations and for assistance in conducting a hazard assessment for uncontained procedures, contact ENHS at (479) 575-5448 or enhs@uark.edu.
 2. Laboratories and rooms where PHS are used outside of containment devices must have laboratory ventilation (increased Air Changes per Hour (ACH)) that is maintained at negative pressure with respect to public areas. Air from these ventilation systems must be vented externally; recirculation is not permitted. Doors providing access from public areas must be kept closed.
- F. Special Handling and Storage Requirements
1. PHS must be stored in a designated area and used in a manner that will minimize the risk of accidental release (e.g., capped tightly, secondary containment). Laboratory personnel should remove chemicals from storage only as needed and return them to storage as soon as practical.
 2. Chemicals should be segregated from incompatible materials. The use of PHS must be confined to an established area.
 3. Additional requirements for the safe storage of a specific chemical may be found in the manufacturer's instructions or in the SDS.
 4. When transporting chemicals beyond the immediate laboratory environment, containers should be protected from breakage by using a bottle carrier or other effective containment.
 5. Contact ENHS at (479) 575-5448 or enhs@uark.edu for guidance on the planned use of chemicals that may require further control.
- G. Spill and Accident Procedures
1. Immediate measures must be made available to prevent the possible spread of contamination in the event of a PHS spill. See Spills and Accidents (insert hyperlink) in this CHP for further information.
 2. In the event of direct skin contact with a PHS, the affected person must shower or flush the affected areas for a minimum of 15 minutes. Whenever personal contamination occurs, the event must be reported to ENHS at (479) 575-5448 or enhs@uark.edu and an accident form filled out through the ENHS website.
- H. Routine Decontamination Procedures
1. To limit the spread of contamination, laboratory work surfaces should be decontaminated at the conclusion of each procedure and at the end of each day on which PHS are used.
 2. All equipment should be decontaminated before removing it from the designated area. This decontamination should be carried out in a fume hood or glove box when practicable.
 3. Contaminated PPE must not be removed from the designated area until properly decontaminated. After working with these chemicals, gloves must immediately be removed and disposed of as hazardous waste and hands and arms washed with soap and water.
- I. Waste Disposal Procedures

1. Disposal of waste materials that include PHS must comply with the hazardous waste procedures found in the Collection, Storage, and Disposal of Waste (insert hyperlink) found in this CHP.
2. In addition to general hazardous waste labeling requirements, waste containers containing PHS must also be labeled as appropriate for the specific chemical hazard:
 - “DANGER, CANCER HAZARD – SUSPECT AGENT”
 - “DANGER, CANCER HAZARD – REGULATED CARCINOGEN”
 - “DANGER, REPRODUCTIVE TOXIN”
 - “DANGER, ACUTE TOXIN”
3. Mixed wastes of hazardous chemicals and radioactive material are disposed of in accordance with the UA Radiation Safety Manual. Due to regulatory restrictions and the high cost of disposal, ENHS should be contacted prior to producing mixed waste.

J. Particularly Hazardous Chemicals Table

1. Chemicals meeting the criteria in the following table are considered PHS. The GHS criteria for specific chemicals is located on the GHS compliant SDS. If GHS data is not available, chemical properties on SDS can be compared to the respective GHS criteria. Contact ENHS at (479) 575-5448 or enhs@uark.edu for assistance in characterizing chemicals.

Particularly Hazardous Substances		
Hazard Classification	Criteria	Examples
Carcinogens	OSHA Designated Carcinogen	Benzidine, Ethyleneimine, Formaldehyde
	National Toxicology Program List of known human carcinogens	2,3,7,8-Tetrachlorodibenzo-p-dioxin, Cyclosporin A, Tamoxifen
	International Agency for Research on Cancer Group 1 list	Arsine, Cadmium, Gallium arsenide, Nickel carbonyl
	GHS Carcinogenicity Category 1A or 1B	Vinyl chloride, Ethylene oxide, Dimethyl sulfate, Acrylonitrile, Ammonium dichromate, Benzene
Carcinogens	GHS Category 2 and IARC Group 2 (A and B), and NTP (Reasonably Anticipated to be a Human Carcinogen)	Chloroform, Dioxane, Hydrazine hydrate
	Chemicals known to induce cancer in animals	Azoxymethane
Explosive and Reactive Chemicals	Explosives (GHS category 1.1-1.3)	Lead trinitroresorcinate, Tetrazene
	In contact with water releases flammable gas (GHS category 1 or 2)	Diethylzinc, Trimethylaluminum

	Oxidizing gas, liquid or solid (GHS category 1 or NFPA Class 4)	Ammonium permanganate, Perchloric acid, Tetranitromethane
	Pyrophoric liquid, solid, or gas (GHS category 1)	Diphenylphosphine, Phenylphosphine, Trimethylaluminum
	Self-reactive or organic peroxides (GHS category Type A or B)	2-Butanone peroxide, Benzoyl peroxide
	Self-heating (GHS category 1)	Potassium methoxide, Sodium hydrosulfite, Cobalt carbonyl
Mutagens	GHS category 1A or 1B	Bleomycin (Sulfate), Bromodeoxyuridine (BrdU), Ethylene Oxide, Thalidomide
Reproductive Toxins	GHS category 1A or 1B	Ammonium dichromate, Boric anhydride, Thalidomide
Toxics and Toxins	Acute toxicity by inhalation or dermal exposure (GHS category 1 or 2)	Aldrin, Benzyl chloride, Brucine, Dieldrin, Mercury(II) oxide, Phosgene, Sodium Cyanide,
	Acute toxicity by oral exposure (GHS category 1)	Diisopropylfluorophosphate, Hydrogen cyanide
	Specific target organ toxicity, single exposure (GHS category 1)	Urethane
	Respiratory or skin sensitization (GHS category 1A)	Acrylonitrile, Ammonium dichromate, Atrazine, Isocyanates, Picric acid, Urethane,

Chemical Storage

- Designate a safe storage location for each chemical. Do not store hazardous materials and hazardous wastes together
- Chemicals shall be labeled at a minimum with chemical name, date received, date opened, and appropriate hazards (NFPA 704 ratings)
- Stored chemicals and cabinets used for storage should be examined regularly for deterioration and container integrity
- Stockrooms and storerooms should not be used as preparation or repackaging areas
- Always store chemicals by recommended compatible storage group. **Alphabetical storage is only used within a compatible storage group, never as a chemical storage plan**
- When determining how to store the chemical, always check the chemical label and SDS first for the manufacturer's recommended compatible storage
- Keep chemicals away from ignition sources. Store flammable and combustible chemicals in an approved flammable chemicals storage cabinet
- Avoid storing chemicals in direct sunlight or near a localized heat source
- Store flammable and potentially explosive chemicals according to the manufacturer's directions or according to SDS instructions

- Use secondary containers to physically segregate incompatible chemicals when they are stored in the same physical location
- Label working solutions or chemicals removed from their original container so that all individuals know what is in a given container
- Maintain chemical identification labels, containers, and lids in good condition
- Empty containers that are saved/reused to hold waste must be marked as empty
- When disposing of empty chemical containers, you must completely black out or remove the label before disposal. Reference section "disposal of empty chemical containers"
- Keep chemical containers closed with properly fitted caps when not in use
- Large bottles and bottles containing toxic, flammable, or corrosive liquids should be stored no higher than 5 feet
- Do not store stock chemical supplies in a fume hood. This interferes with proper hood airflow and can provide fuel if there is a fire within the fume hood. Flammable chemicals should not be stored in a fume hood
- Chemicals should never be stored on the floor without secondary containment
- Chemical shelving should have containment lips or trays to contain small leaks/spills. Chemical cabinets should have leakproof door sills
- Compressed gas cylinders must be secured at all times using restraint devices. Tanks can be secured using gas cabinets, cylinder racks, wall brackets, table clamps, or cylinder stands. Oxidizing gases such as oxygen shall be stored far away from flammable liquids, gases, and metals. It is very important that flammable gases should be appropriately separated from oxidizers and oxidizing gases. Unused tanks should have the valve protection caps in place and fully tightened. Contact ENHS (479-575-5448) for specific considerations and assistance

For additional guidance on chemical storage, refer to the following documents found on the ENHS website

- [Chemical Storage & Compatibility Guidelines](#)
- [General Classes of hazardous Chemicals](#)

Chemical Handling

Use appropriate PPE, precautions, and SDS SOPs for each chemical being used. Always choose the more stringent guidelines when presented with multiple recommendations. Check the individual SDS for each chemical for more details.

Working with Cryogenic liquids involves significant health and safety hazards. Refer to the [Cryogenic Liquid Guidance](#) on the ENHS website. It identifies health hazards, safe work methods, safe handling, transport, storage, and emergency spill response information to assist personnel with reducing the risk of working with cryogenic liquids.

Compressed gases pose a potential risk for exposure to multiple types of physical and chemical hazards. Refer to the [Compressed Gas Cylinder Procedures](#) on the ENHS website. This document provides information on the safe use of compressed gas cylinders.

Refer to the ENHS [Controls to Minimize Hazardous Materials Exposure](#) guide for information regarding Engineering Controls, Work Practice Controls, PPE, Respiratory Protection, Emergency Procedures, and Exposure Assessment.

Chemical Inventory

The University of Arkansas maintains an online chemical inventory system to facilitate federal and state regulatory reporting (e.g., Department of Homeland Security; EPA Tier II, Arkansas Chemical Right to Know, etc.). Chemical inventories must be updated annually by the PI/Laboratory Manager and whenever a significant change in the inventory occurs. The inventory must include the chemical name (chemical symbols or abbreviations are not acceptable), CAS #, quantity, physical state, location of chemical within the lab, the manufacturer information (name, address, and phone number), and the date received. In addition, peroxide formers must have the expiration date listed.

Transporting Chemicals

Contact [ENHS](#) for specific chemical transportation instructions within a building, between adjacent buildings, and when vehicles are required to transport the chemicals. In most situations, ENHS will transport the chemicals. **No chemicals shall be transported in personal vehicles or over state roads.**

Shipping Chemicals

For chemicals shipped off campus, the Department of Transportation (DOT) and International Air Transport Association (IATA) require hazardous materials/dangerous goods be packaged and labeled according to the type/volume of material and method of transport whenever they are shipped. Training in order to make these shipping determinations is required and regulated by those agencies. Each Department/PI/employee who will be shipping hazardous materials is responsible for ensuring each person involved in the packaging, labeling, shipping, and handling process is properly trained and certified. The training documents that include the method of training must be readily available in case a package is ever flagged by a shipping company. Many shipping companies provide this training and certification for customers and may require contracts be in place for certain services prior to shipping. Failure to acquire proper shipping certification or packages found to be improperly packaged/labeled can result in civil penalties including fines and jail time. Refer to the [Hazardous Materials/Dangerous Goods Shipping and Transportation](#) policy on the Vice Chancellor for Finance and Administration University of Arkansas webpage.

Collection, Storage, and Disposal of Waste

The federal law governing the management and handling of solid and hazardous waste in the United States is the Resource Conservation and Recovery Act (RCRA). RCRA authorizes the US Environmental Protection Agency (EPA) to regulate the generation, management, treatment, storage, transportation, and disposal of hazardous wastes, solid wastes, and underground storage tanks; and to ensure compliance by enforcing the RCRA statute. The Arkansas Department of Environmental Quality (ADEQ) is tasked by EPA to administer the hazardous waste management programs in the state of Arkansas, including container management, waste identification, training, and contingency planning. The University of Arkansas is required by ADEQ to follow the waste management rules laid out by RCRA.

Laboratory PIs are accountable for the waste procedures at the point of generation and the training of laboratory personnel. ENHS is directly responsible for collecting and disposing of campus/laboratory generated hazardous waste. Additional information can also be found on the ENHS website under [Waste/Hazardous Waste](#).

Waste Accumulation Areas

Waste accumulation areas in laboratories are considered to be Satellite Accumulation Areas (SAA) of the University's 90-day hazardous waste accumulation and storage area and are strictly regulated by the [Arkansas Department of Environmental Quality \(ADEQ\) Rule 23](#).

Each laboratory generating hazardous waste must designate an appropriate area as a Satellite Accumulation Area (SAA) and must sign the area as such (signs available from ENHS). Waste accumulation must be restricted and limited to these SAAs, and not stored in any other area in the laboratory. The location of the SAA must not be changed without prior notification to ENHS and approval of the [CHO](#).

Waste Accumulation Containers

All hazardous waste accumulation containers must have an ENHS provided waste label affixed, the hazard characterization identity of the contents marked, and the complete chemical names and percentages of each constituent in the container are required on the label. The names of the chemicals must be spelled out – **Chemical symbols or abbreviations are not acceptable**. When the container is full, ENHS must be notified so that the container may be picked up and placed in the 90-day accumulation facility. **It is important to remember to leave sufficient headspace in filled waste containers to avoid breakage due to excess pressure.**

Hazardous Waste Accumulation Guidelines

- Contact the University's Chemical Hygiene Officer ([CHO](#)) to determine the best location for your Satellite Accumulation Area
- Place ENHS provided signage to indicate the location of the approved Satellite Waste Accumulation Area
- Store all waste in new or Triple rinsed chemically compatible containers. The container should be inspected frequently and not used repeatedly to store hazardous waste
- Wastes must be stored with appropriate secondary containment
- All waste containers must have tightly fitting caps and be kept closed. Do **NOT** leave funnel in container mouth
- Place ENHS provided waste label on waste container. Labels may be requested from the ENHS office. Chemical waste will not be picked up unless the waste container is labeled appropriately
- The label must contain the complete chemical name (**no** abbreviations, or chemical formulas) and the percentages of each constituent in the container
- Leave head space for the expansion of gas in bottle, approximately 25% of the container should be empty
- Waste generated that is known to be gas-producing must be placed in new or triple rinsed chemically compatible containers with vented caps to prevent over-pressurization and subsequent rupture. Types of gas-producing waste include mixtures with concentrated acids (nitric, sulfuric, perchloric), hydrogen peroxide, aqua regia, and piranha solution. Vented caps are available through ENHS
- No more than 55 gallons of hazardous waste can be stored in a satellite accumulation area or over 1 quart of P-listed waste (as found in the [EPA P and U Lists](#)). These quantities must be picked up within 3 working days from when the container is declared full
- Be familiar with the waste pick-up request process. When a waste container is ready for disposal, go to the ENHS website and complete the required [Hazardous Waste Pickup Request Form](#). Dispose of filled containers promptly

- If the container submitted for waste disposal is too small for a standard label, place the container in a sealable plastic bag and attach the label to the outside of the bag. Bags may be requested from the ENHS office
- Sharps containers ready for disposal must be clearly labeled as sharps and placed in the SAA. An ENHS waste label is not needed for sharps containers

Disposal of Empty Chemical Containers

- Ensure the container is empty (refer to [Arkansas Code 23 Section 261.7](#) for additional information)
- Use the SDS to determine whether the hazardous material once held has any restrictions for disposal of the empty container
- Confirm the empty container did not contain a P-listed waste and if it did contain a P-listed waste, the container itself must be disposed as hazardous waste
- Completely black out or remove the label of the empty container
- Remove any cap that may cause the container to become pressurized when compacting
- Dispose of non-P-listed containers in the dumpster. Do **NOT** dispose of the container(s) in regular trash bins

The improper disposal of empty chemical containers may result in bodily injury as well as trash fires. Please remember that although chemical residues may be non-hazardous by themselves, they may mix with incompatible residues in a trash can or dumpster causing a fire. In addition, sealed containers may become pressurized during compaction, which may result in residues spraying from the truck onto workers.

Laboratory Safety Audits

The Laboratory Safety Program conducts annual safety audits of each laboratory on campus. The purpose of the audit is to identify potential hazards and facilitate compliance with the safety policies and regulations that affect laboratory environments such as the federal OSHA Laboratory Safety Standard. The ENHS Laboratory Safety Coordinators are “in-house inspectors” who look for the same health and safety issues as would regulating agencies visiting our campuses, their primary role is to partner with the PI/Laboratory Manager and assist in keeping the laboratory compliant at all times.

Each lab is assessed for chemical and physical hazards. The [Laboratory Safety Coordinator](#) should be escorted through the lab(s) by the PI/Laboratory Manager if possible. If deficiencies should exist, they will be pointed out and clearly identified during the audit. Deficiencies are noted and corrective action is explained to the PI/Laboratory Manager.

The laboratory compliance audit form and the accompanying definitions of terms found in the audit are linked here:

- [Compliance Audit Form](#)
- [Lab Compliance Audit Terms](#)

Following the audit, an Inspection Report highlighting the inspection findings with corrective actions is sent to the PI/Laboratory Manager with a resolution deadline of two weeks. To close out the audit, the Laboratory Safety Coordinator must be notified within the BioRAFT Inspection Report when the required corrective actions have been completed and provide information about how each finding was corrected. If there is no response to the inspection report or corrective actions are not completed by the due date, a reminder is sent to the PI. Failure of the PI to resolve the inspection findings in a

timely manner will be reported to the Department Chair. Unresolved audits will be reported to the Director of ENHS, the Chemical Hygiene Officer, and the Hazardous Substances Committee to determine further escalation.

Laboratory Safety Reviews

Lab Safety Reviews (LSR) are unannounced walkthroughs of lab spaces by Lab Safety Coordinators to assess safety issues.

Frequency

A laboratory can generally expect one unannounced LSR per year. The Laboratory Safety Coordinator conducts LSRs approximately at the midpoint between one annual lab safety audit and the next. The Laboratory Safety Coordinator may conduct additional LSRs if multiple issues of concern are found or if requested to do so by the lab.

Preparation/Scheduling and the Laboratory Safety Review Visit

No preparation by the laboratory is needed for Lab Safety Reviews. PIs/Laboratory Managers are not required to escort the Laboratory Safety Coordinator during the LSR. The Laboratory Safety Coordinator will notify a Laboratory Worker when entering the lab and will report any safety observations to that team member before leaving the lab. Other than this contact with laboratory staff, Laboratory Workers are not expected to be present to answer questions or to escort the Laboratory Safety Coordinator through the laboratory during the LSR.

Follow-up

Results of the Lab Safety Review will be sent to the PI/Laboratory Manager with the expectation that any issues of concern observed on the Lab Safety Review notification be promptly corrected.

Exposure Assessment and Medical Services

Exposure Assessments

The purpose of an assessment is to determine if there was an exposure that might have caused harm to a Laboratory Worker and to identify the chemical(s) involved. Exposure assessments may include interviews with the affected individual(s) and laboratory staff, air monitoring, evaluation of laboratory controls and protective equipment, and medical consultation and examination. If overexposure is suspected, consult the applicable SDS for guidance or seek immediate medical help. **In an emergency situation where exposure symptoms are escalating, someone loses consciousness or has trouble breathing, call 911.**

When to suspect overexposure

- If a laboratory occupant or visitor manifests symptoms such as headache, rash, nausea, coughing, tearing, irritation or redness of the eyes, irritation of the nose or throat, dizziness, loss of motor dexterity or judgment, etc. and:
 - Some or all of the symptoms disappear when they are removed from the exposure area
 - The symptoms reappear soon after they return to the work location with the same hazardous chemicals
- Two or more persons in the same laboratory have similar complaints

- A hazardous chemical leaked, spilled, or was otherwise rapidly released in an uncontrolled manner
- A Laboratory Worker had direct skin or eye contact with a hazardous chemical

Note: Odor is not a means of determining exposure levels. If there is reason to suspect that a chemical exposure limit has been exceeded notify the lab supervisor whether or not a suspicious odor is involved.

Air Monitoring

Contact [ENHS](#) to request air monitoring to evaluate chemical exposures. Upon completion of monitoring, laboratory occupants must be notified of results in writing either individually or by posting, within 15 business days of the receipt of results. Records of monitoring results and occupant notification must be kept, transferred, and made available in accordance with OSHA Access to Employee Exposure and Medical Records (29 CFR 1910.1020). If exposures are found to be over legal limits further action will be required.

Medical Services

Medical services may consist of a medical consultation, examination, or emergency services. Acute signs and symptoms associated with exposure to hazardous chemicals can be found in the specific chemical's SDS.

When assessment results indicate that an individual may have been exposed to a hazardous chemical, the individual should obtain a medical consultation from the Pat Walker Health Center. Consultations and examinations must be under the direct supervision of a licensed physician. The PI/Laboratory Manager or department representative must inform the physician of the identity of the chemical, the conditions of the exposure, and the individual's symptoms. A written opinion must be obtained from the physician. It must be maintained as a part of the affected individual's record and made readily available to the individual and upon request to his/her designated representative. The written opinion must not reveal findings unrelated to occupational exposure.

The written opinion must include

- Follow-up recommendations
- Exam and test results
- Any medical condition found as a result of the exam that may place the individual at an increased risk as a result of hazardous chemical exposure
- A statement that the individual has been informed by the physician of the results of the consultation

Any event involving workplace injuries must also be reported directly to Risk Management by following the appropriate procedure for filing workers' compensation claims.

Exposure and Medical Records

Records of monitoring measurements or any medical baseline, consultation, or examination, including tests or written opinions, must be kept, transferred, and made available in accordance with OSHA Access to Employee Exposure and Medical Records (29 CFR 1910.1020).

Signs

The PI/Laboratory Manager shall ensure that signs of the following types are posted at each laboratory

- All entrances to the laboratory shall have a sign that contains PI contact information and entrance

procedures. The sign should reflect the lab's hazards, NFPA, GHS, Regulatory information, and PPE/precautions. Use the [door sign template](#) on the [ENHS website](#)

- A laboratory emergency contact/phone number information list of emergency personnel/facilities, supervisors, and/or laboratory workers at each phone inside the laboratory and on the inside of the entry door
- Location signs for eye/face wash and safety shower stations
- Warnings at areas or equipment where special or unusual hazards exist
- A current Arkansas Department of Labor Chemical Right to Know poster inside the laboratory and readily accessible to all occupants and visitors
- Notices at sinks to remind persons to refrain from disposing of hazardous materials or chemicals down the drain
- PPE location
- SDS location (available from ENHS)
- Spill kit location
- First Aid location (available from ENHS)
- Satellite Accumulation Areas (available from ENHS)
- Exits

Spills and Accidents

All labs shall contain a chemical spill kit compatible with the volume/level of hazards in the laboratory (contact the [Laboratory Safety Coordinator](#) for technical support). All PIs/Laboratory Managers and Laboratory Workers shall be familiar with the lab chemical spill response procedures. For additional information, refer to the [Chemical Spill Response Guide](#) on the Campus Safety website.

Small spills include spills that can be cleaned up by lab personnel without putting themselves or others in danger. If the spill presents no fire hazard and the material is not particularly volatile or toxic, cleanup is directed by the volume and state of the material.

- Alert people in the area. Avoid breathing vapors and try to determine what spilled
- Clear and secure the area to prevent others from entering
- Wear personal protective equipment including safety goggles, gloves, and a lab coat during cleanup
- Confine the spill to a small area. Use a commercial kit or absorbent material from your spill kit to absorb spilled materials. Surround the spill first by placing absorbents at the perimeter then moving toward the center
- Use a plastic dustpan to scoop the saturated absorbent in a plastic bag or plastic bucket
- Re-cover the affected area with more absorbent to ensure all spilled chemical has been absorbed, then scoop the material into the same bag or bucket with saturated absorbent
- Label the bag or container with a hazardous waste label and include it in the next hazardous waste collection
- Clean the spill area with water. Detergent may be used if appropriate
- Leave the area clean and dry
- Replenish your spill kit supplies so it will be ready when you need it
- Report the spill to the PI/Laboratory Manager and the [CHO](#)
- Submit an [Accident Report](#)

Large or Hazardous Spills require trained specialists for clean-up.

For spills involving the following:

- An immediate hazard (fire, explosion, chemical exposure, etc.)
- Release of a particularly hazardous substance outside of a controlled space
- Moderate or large-scale chemical spill
- Fire, or the threat of fire, outside of a controlled space (fume hood, laboratory perimeter, etc.)
- Unknown or highly reactive material
- Release of a toxic or flammable gas outside of a controlled space

Immediately activate the nearest fire alarm and evacuate the building.

Call 911 and provide details of the accident including:

- location
- class of hazardous materials involved
- size of spill
- description of any personal injury
- control measures already taken
- your name and phone number
- how you can be identified when emergency personnel arrive at the scene

If the spill involves personal injury or chemical contamination, follow the above steps as appropriate, and at the same time:

- Move the victim from the immediate area of fire, explosion, or spill (if this can be done without further injury to the victim or you)
- Administer first aid as appropriate
- Locate nearest emergency eye/face wash or safety shower. Immediately flush the affected area with water for at least 15 minutes. Call the University of Arkansas Police Department ([UAPD](#)), **479-575-2222**, for advice and seek medical attention as recommended
- In an emergency situation where exposure symptoms are escalating, someone loses consciousness or has trouble breathing, call 911
- Submit an [Accident Report](#) for all situations involving
 - Spills
 - Hazardous conditions or near misses
 - Accidents or injuries

Emergency Eye/Face Wash and Safety Showers

All eye/face wash and safety showers on campus must meet compliance with OSHA 29 CFR 1910.151 and ANSI Z358.1. Any persons that occupy spaces containing emergency flushing equipment must follow the University's [Emergency Eye/Face Wash and Safety Shower Program](#). The program outlines the requirements for the equipment and the roles and responsibilities of university personnel regarding the application, installation, maintenance, inspection, testing, training and emergency use of eye/face wash and shower equipment.

All emergency eye/face washes and showers should be activated weekly by laboratory occupants for a period long enough to verify operation and to help prevent lines from any rust, scale deposits, or bacteria that may accumulate. Personnel who may be exposed to hazardous materials must be trained on the location and proper use of the equipment.

- [Emergency Eyewash Weekly Inspection Checklist](#)
- [Emergency Shower Weekly Inspection Checklist](#)
- [Emergency Eye/Face Wash and Safety Shower Training Log](#)

Training and Information

Prior to working in a laboratory (and at assigned intervals), any person who may work with or may be exposed to hazards and potentially hazardous chemicals in a laboratory must receive the formal training outlined below. The training is found in the ENHS Information Management system, [BioRAFT](#). The intent of this training is to assure that all individuals are informed about hazards and required protections when working in the laboratory.

- This Chemical Hygiene Plan
- Laboratory Safety
- Depending on specific hazards, additional training may be required such as:
 - Compressed Gas Safety
 - Fire Extinguishers - Fire Safety (Instructor-led for initial training)
 - Hazardous Waste Management
 - Any laboratory specific training determined by the PI/Laboratory Manager

The PI/Laboratory Manager is responsible for ensuring that this training is assigned and completed whenever a Laboratory Worker is assigned to a laboratory and at least annually thereafter. For more information, contact [ENHS](#).

Additional training is required when a new hazard is introduced or when there is a need such as the use of Particularly Hazardous Substances (Biological and Radiological training is covered in their respective Plans). Training should also include any laboratory specific procedures and SOPs. SOPs should be loaded into BioRAFT, the ENHS information management system. PI/Laboratory Managers will provide or arrange for the additional training. Examples of a new hazard may be physical, or health hazards associated with chemicals or operations for which prior training was not received. Examples of a need for additional training may be to improve work practices, address measures to prevent a spill or accident from recurring or to provide training for work with Particularly Hazardous Substances. Laboratories are encouraged to routinely include chemical health and safety topics in lab meetings or other communications with laboratory occupants.

Laboratory Relocation and/or Close-Out

Procedures have been developed to assist with the process of closing down a laboratory or moving to another laboratory location. These procedures are designed to assure that the space is cleared of hazardous equipment and materials and the laboratory facility is left in a safe condition when the space is vacated. The procedures provide information about various categories of hazardous materials, a step-by-step timeline for when activities shall be conducted, forms used to implement the process, and contacts to assist with the process.

Overview

All laboratory rooms, chemical storage areas, or areas where hazardous equipment or materials/wastes are used or stored need to be appropriately cleared and coordinated with staff from the Office of Environmental Health & Safety (ENHS) before being assigned to new occupants or scheduled for renovation activities. The PI/Laboratory Manager and the PI/Laboratory Manager's department are responsible for ensuring that the space is appropriately cleared of hazards prior to the

transfer to the next occupant and that all biological, chemical, and radiological materials are removed prior to vacating the space. This may require bringing in hazardous material consultants. All remaining equipment, including biosafety cabinets and storage cabinets, must be properly decontaminated, as well as all surfaces, such as counters, drawers, floors, fume hoods, etc. In addition, all unwanted lab equipment, supplies, electronics, and furniture are also to be removed following proper cleaning or decontamination. For laboratories with research involving exclusively radiological or biological materials, refer to the Radiation Safety Manual and Biological Safety Manual to view safety procedures and regulatory requirements.

Applicability

The following procedures are to be followed whenever Laboratories, Chemical Storage Rooms, or areas where hazardous equipment or materials/wastes have been used/stored will be vacated, whether due to a PI/Laboratory Manager leaving the institution, relocating or terminating laboratory research activities, or a renovation project having been scheduled. Note that this also applies to any hazardous materials belonging to a departing PI/Laboratory Manager but stored in a shared-use or storage space (e.g., flammable liquid storage cabinets, refrigerators, cold rooms, freezers, or stock rooms) belonging to the department or another laboratory.

ENHS should be notified three months prior to the anticipated departure. Once notified, ENHS will provide additional guidance and assistance during a pre-close-out inspection that is intended to identify any safety issues that may need to be addressed.

PI/Laboratory Manager Responsibilities

As PI/Laboratory Manager, you are responsible for the safe operation of the laboratory. This includes leaving these facilities in a safe condition when you vacate the laboratory and/or Chemical Storage Room(s). This guideline outlines the PIs/Laboratory Manager's responsibilities in the laboratory close-out process.

The close-out process should be divided into three stages. The time frame referenced below can be reduced with written approval from the [CHO](#) if you are acting on short notice.

- Three months before you move
- One month before you move
- At moving time

Timeline

Three Months Before Moving Out

Review and complete a [Lab Close-Out Notification Form](#) and submit it to the [CHO](#). In addition, provide a copy to the applicable Department Chairperson or Director.

- Upon receipt of your close-out notice, the CHO will accompany you and your department's administrative representative or other responsible party on a tour of your laboratory
- The CHO will then help you address any safety issues identified during the lab tour. As a team, we will jointly develop a close-out plan that is customized to your lab. We will agree upon target dates for critical process steps
- Review the following close-out checklist items below. General points are covered to help you safely and efficiently vacate your lab spaces. Where needed, more consultation will be provided by ENHS

One Month Before You Move

- Review your lab space to ensure that all hazardous and unknown materials/wastes have been identified and no new ones have been created while preparing to vacate the space. It is productive to repeat this step of the process because identifying and disposing of “unknowns” is a major cost in laboratory close-outs
- Seek assistance from the [CHO](#) in planning the safe transfer to your new lab and removal of any high hazard materials (violently reactive chemicals, toxic gases, etc., as identified during the chemical disposal process)
- Follow-up on the status of time-critical close-out steps such as radioactive and chemical waste collection, special equipment moving arrangements, posting of your new laboratory for biological or radioactive materials, etc.
- If there were previous occupants in your new lab space, visit that space to ensure that no equipment or materials remain
- Verify that all modifications in your new space will be completed before your move
- No equipment used with radioactive materials should be moved if external removable contamination is present. You and your radiation workers can perform wipe and meter surveys to assure this for smaller items. [Radiation Safety staff](#) will provide this service for major pieces of equipment including freezers and refrigerators

At Moving Time

- Although staff that works with hazardous materials should know how to clean up small hazardous materials spills, it is recommended that items are moved during normal business hours so that others are available to assist in the event of a spill or accident
- Provide secondary containment for biohazardous materials, chemicals, and radioactive materials during transport (even when moving only a short distance)
- Do not transport hazardous materials without someone present who is capable of providing assistance
- Do not transport hazardous materials in personal vehicles. Contact [CHO](#) for assistance
- Never transport hazardous materials on public roads, unless the materials are packaged in compliance with DOT regulations, e.g., packaged by a person trained for this purpose, in proper containers that are correctly labeled, etc.
- Wear appropriate personal protective equipment for the materials being handled (e.g., safety glasses or goggles, lab coat, gloves, long pants, closed-toe shoes, etc.)
- Have boxes, plastic bags, and containers for broken glass, etc., ready and available before you begin
- Post any required warning signs (radioactive materials, biohazard signs, etc.) in your new lab location
- Review the location of any emergency flushing equipment, fire extinguishers, and all available means of exit from the laboratories and the building in your new lab location
- Review your old lab space. Do any materials remain in the space that need to be removed?

Final Steps

- Notify the [CHO](#) that the lab space is ready for a close-out survey by signing and sending the [Lab Close-Out Certification Form](#)
- The CHO will meet and review the Lab Close-out Certification form with the PI/Laboratory Manager

- After all forms have been completed, the laboratory will be considered clear of hazardous materials. The completed and signed Lab Close-out Certification Form and any Equipment Clearance Record Forms will be kept on file in ENHS

Laboratory Close-out Checklist/Items

Chemicals

Chemicals can be transferred to other laboratories within the department, or other University departments, with the acknowledgment of ENHS and updating of the laboratory chemical inventory at the recipient's location.

If you have unknown chemicals or, Particularly Hazardous Substances, special handling may be required. Prior to transporting any chemicals, contact ENHS for handling instructions and proper secondary containment. For biological and radiological items, refer to their respective safety manuals. If you have a [DEA Controlled Substance](#), it must be managed under the requirements of your registration. If you no longer wish to keep the controlled substances in your possession, contact the [CHO](#) to ensure the substances are properly managed.

Hazardous Waste

Chemicals to be disposed of through ENHS must be properly containerized and labeled. Labels for this purpose can be obtained through the [CHO](#). Proper labeling requires the chemical name of each chemical to be listed on the container. If a container has a mixture of chemicals, each chemical must be listed with its relative percentage. Chemical formulas, abbreviations, or trade names are not acceptable. For any commercial chemical product that is not labeled with its chemical name, a Safety Data Sheet must be requested from the company and supplied to ENHS with the chemical.

When you have chemical waste ready for pickup, use the online [Hazardous Waste Pickup Request form](#).

Compressed gas

Gas cylinders with an AirGas label attached must be returned to [AirGas](#); call 479-756-9424. If an AirGas label is not affixed to the cylinder, please contact the [CHO](#).

Tubing and regulators that are connected to corrosive or hazardous compressed gas cylinders should be detached using safe procedures such as purging and venting to a hood or ventilated area. Contact the [Lab Safety Compliance Coordinator](#) for assistance or directions on this process

ENHS will pick up lecture bottles; use the online [Hazardous Waste Pickup Request form](#).

Benches and cabinets

Empty everything from laboratory storage areas, e.g., refrigerators, freezers, cupboards, etc. and dispose of hazardous materials according to previously listed instructions.

Clean and decontaminate all spaces that are being vacated including removing all bench paper and contents of cabinets and any equipment that will be left behind, including shared equipment.

Equipment

Turn off and disconnect all equipment from power supplies.

Laboratory equipment or laboratory surfaces that are potentially contaminated with a hazardous material must be decontaminated before that equipment can be removed from the lab. Proper decontamination requires the wipe down of all contaminated surfaces with a cleaning agent capable of removing the contaminant. If equipment contains a hazardous material integral to the operation of

that piece of equipment (i.e., oil, mercury, and asbestos), the hazardous material must be removed prior to disposal. Some examples of internal parts that may contain hazardous materials are mercury switches, mercury thermometers, transformers, oil pumps, and compressors. As noted above, decontamination may require the assistance of an outside consultant.

Notify [ENHS](#) of any equipment or procedures that may have contributed to hazardous chemical residues remaining on surfaces (e.g., perchloric acid).

Notify [ENHS](#) of any equipment or areas that cannot be fully decontaminated (e.g., material potentially containing asbestos).

Biological

Assess any biological materials you have (e.g., recombinant and/or synthetic nucleic acid materials, microorganisms, cells and cell lines, tissues, organs, body fluids, and biologically derived or -contaminated media) and determine which materials will be transferred to your new laboratory or to another PI/Laboratory Manager. Dispose of the remaining materials, per university disposal guidelines, e.g., autoclaving and disposing in biohazardous waste containers.

- **Infectious Waste:** All waste material meeting the definition of biohazard waste must be managed following the University's Biohazard Waste Guidelines. Contact the Biological Safety Officer ([BSO](#)) to obtain additional biohazardous waste tub labels. Unless in their original packaging, place all sharps into a sharps container, which then needs to be placed inside a biohazard waste tub
- **Animal and Human Tissues:** Generally, due to potential risks and numerous extenuating circumstances, please contact the [BSO](#) for guidance prior to the disposal of any animal or human tissue
- **Toxins:** Toxins must be handled on a case by case basis. Contact the [BSO](#) for instructions

Radiological

If you are an authorized user on a radiation protocol, inform the Radiation Safety Officer ([RSO](#)), who will assist in the following:

- Terminate your radioactive materials protocols
- Ensure laboratory facilities and equipment are free of contamination
- Ensure all radioactive materials, radioactive waste, and potentially contaminated equipment or surfaces are properly labeled
- Dispose of radioactive waste by completing the online [Hazardous Waste Pickup Request form](#)
- If the authorized user is leaving the University, return dosimeters, and any borrowed equipment, such as survey meters, radiation protection equipment, and shielding devices to the Radiation Safety Officer
- Inform the [RSO](#) if any radioactive material or survey meter will be transferred to another Authorized User, another location on campus, or to another licensed institution
- Schedule a final laboratory radiation survey (and bioassay, if appropriate) with the Radiation Safety Officer

Laboratory Equipment Disposal/Removal

The University of Arkansas' Surplus Property manages all equipment for proper disposal. If you have laboratory equipment that has been used with biological, chemical, or radioactive materials, X-ray machines, or lasers they must be decontaminated prior to proper disposal. It is the owning department's responsibility to first contact the Surplus Warehouse Manager, [Wenoah Goodson](#) to

request approval for the proper disposal of these types of equipment and conduct/arrange for appropriate decontamination. After approval has been obtained, the PI/Lab Manager should complete an [Equipment Clearance Form](#) and email the form to the [CHO](#). An ENHS staff member will assess the status of the decontamination. Please, contact the CHO for guidance on these specific items.

University of Arkansas ENHS Approved Vendor List

If your preferred vendor is not listed below, please contact ENHS at 575-4076.

Chemicals need to be labeled clearly and in English. Keep the SDS and any other pertinent paperwork that accompanies each chemical.

Contracted Vendors

Vendors categorized as “contracted vendors” are under a contract with the University of Arkansas as a preferred provider of the listed product(s). The preferred contract vendors should be used, if possible, but these are not mandatory contracts.

General Approved Vendors

Vendors categorized as “general approved vendors” are considered appropriate vendors of your general lab needs. There are no specific products associated with these vendors nor are they under contract with the University of Arkansas.

Contracted Vendors

[Airgas](#)– all compressed gases

General Approved Vendors

[VWR](#)

[Sigma Aldrich](#)

[Fisher](#)

[Spectrum](#)

[Acros](#)

[Millipore](#)

[TCI - America](#)