

**ARKANSAS STATE UNIVERSITY
GOVERNING PRINCIPLES FOR THE ACQUISITION,
STORAGE, AND DISPOSAL OF BIOHAZARDOUS MATERIALS
AND CHEMICAL WASTE**

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1.0 INTRODUCTION

Arkansas State University (ASU) is committed to providing a safe working environment for its employees, students, and unaffiliated workers. A component of its responsibility is to assure that hazardous materials that are used in the University's instructional and research programs are acquired, stored, and disposed of in accordance with the laws and regulations that guide the use of such materials.

2.0 PURPOSE

The purpose of this document is to assure that all University and unaffiliated personnel adhere to pertinent laws and regulations that govern acquisition, storage, and disposal of hazardous materials. It is likewise the document's purpose to ensure the safety of the University community.

3.0 APPLICABILITY

All University employees and students and unaffiliated workers

4.0 ACQUISITION OF BIOHAZARDOUS MATERIALS

Biohazardous materials or rDNA for Biological Safety Level 2 research activities may only be obtained under the authority of the Institutional Biosafety Committee.¹ Other requirements include the following.

- Select agents require special registration and tracking under the DHHS - Center for Disease Control and Prevention (CDC)

¹ Please see the ASU Radiation Safety Document for guidelines concerning acquisition of radioactive materials.

- High consequence livestock pathogen or toxins and plant pathogens require special registration and tracking under the USDA - Animal and Plant Health Inspection Service (APHIS)
- The US PATRIOT Act restricts possession and access of personnel to Select Agents, High Consequence Livestock Pathogens and Toxins and Plant Pathogens. A list of these agents is presented in Appendix B-4.
- *NIH Guidelines for Research Involving Recombinant DNA Molecules (NIH Guidelines)*: NIH requirements for Campus Research with Recombinant DNA in humans, animals, and plants. See <http://www4.od.nih.gov/oba/rac/guidelines/guidelines.html>.
- *USDA Introduction of Genetically Engineered Organisms Regulations (7 CFR 340)*: Biotechnology transport/introduction permits issued by the APHIS Biotechnology and Scientific Services branch. See <http://www.aphis.usda.gov/biotechnology/index.shtml>.
- The Centers for Disease Control classifies certain bacteria, fungi, viruses, rickettsiae, protozoa, parasites; recombinant products; select agents and toxins of biological origin. See <http://www.cdc.gov/od/sap/docs/salist.pdf>.
- Materials that require CDC import licenses or USDA permits include allergens; cultured human or animal cells and the potentially infectious agents these cells may contain; viroids and prions, and other infectious agents as outlined in laws, regulations, or guidelines.
- *Registration of Select Agents, Centers for Disease Control*, <http://www.selectagents.gov/>
- *High Consequence Livestock Pathogen Or Toxins And Plant Pathogens*, SDA, Animal and Plant Health Inspection Service (APHIS)

5.0 GOVERNING PRINCIPLES

5.1 ACQUISITION

5.1.1 Biohazardous Materials. Principal Investigators, Supervisors, and Instructors who propose to use rDNA or other hazardous materials that are classified at Biological Safety Level 2 must submit: 1) User Registration for Biohazardous Material Application Forms to the Institutional Biosafety Committee (IBSC); 2) purchase requests to the IBSC that contain the Principal Investigator's name, the department name, and where the material will be used and stored; and 3) annual renewals to the IBSC.

Biological materials that do not need to be procured under the authority of a Registered User are Biological Safety Level 1 research activities (except rDNA work) as defined in the *Biological Safety in Microbiological and Biomedical Laboratories (BMBL)* (4th Edition), Diagnostic and Reference Samples (Review for select agents and BSL-2 + activities), and student in vitro training that involve only BSL-1 classified agents, handling, and containment.

Although these biohazardous (biological) materials are exempted from the University's biohazardous materials purchasing policy, they must be properly stored, handled, and disposed of. In particular, The University discourages unnecessary stockpiling of biohazardous materials procured under the exemption and requires that unwanted biological materials be properly decontaminated, inactivated or disposed of by the Department of Environmental Health and Safety.

5.1.2. Hazardous Chemicals. ??

5.1.3 Radioactive Materials. Please see the Radioactive Materials Policies and Procedures for information concerning acquisition.

5.2 STORAGE

5.2.1 Inventories

Registered Users are required to maintain and submit annual inventories to the Environmental Health and Safety Department of biohazardous material for recombinant DNA and Biological Safety Level 2 research activities, Select Agents, High Consequence Livestock Pathogens or Toxins, and others as determined by regulatory requirements.

Consistent with federal and state regulations, the Office of Environmental Health and Safety tracks and reports the types, quantities, and locations of hazardous materials that are acquired and stored on campus. The inventory assists emergency responders, ensures that campus users have the appropriate handling and storage information, and aids in the disposal of chemicals before they become unsafe.

Safe laboratory practice also requires maintenance of on-site inventories. These should be reviewed on a monthly basis to identify deteriorating materials before problems develop with the material or containment.

5.2.2 Biohazardous Materials

Biohazardous materials should be segregated by classification and stored alphabetically in easy-to-reach areas. Containers larger than one gallon should not be stored above shoulder height. Biological Safety Cabinets should not be used to store chemicals or biohazardous materials.

5.2.3 Chemicals

The MSDS and the label on the chemical will provide any special storage information and incompatibilities. As a general rule, separate hazardous chemicals as below. Once separated into hazard classes, chemicals may be stored alphabetically.

Form	Type
Solids	Oxidizers, Flammable Solids, Water Reactive, Others
Liquids	Acids, Caustics, Oxidizers, Perchloric Acid, Flammable/Combustible
Gases	Toxic, Flammable, Oxidizers and Inert

5.2.4 Radioactive Materials. Please see the Radioactive Materials Policies and Procedures for storage information.

5.3 DISPOSAL OF HAZARDOUS WASTES

All hazardous equipment, facilities, residue, or other material must be properly disinfected, contained, secured, and transported in a safe manner. The laboratory PI or supervisor is responsible for preplanning immediate actions and decontamination procedures to cope with biohazard releases through preparation of a Laboratory Specific Exposure Control Plan. Preplanning includes, but is not limited to:

- A laboratory and program survey,
- Development of laboratory specific emergency plans,
- Provision and maintenance of biological safety kits/stations (refer to Appendix J), and
- Training of laboratory personnel in emergency response procedures

The Laboratory Area Program Survey includes the following elements:

- A written assessment providing information on exposure prevention of personnel, environment, and property, with preparations to contain and disinfect the release.
- Types and levels of potential research program risks.
- Decontamination practices must be established for the type of biohazards involved and type of disinfectant needed for the material.
- A good understanding of the air handling systems such as: HVAC units serving laboratory, supply/return vents, general lab air movement, air particulate filter types, laboratory hood, and Biological Safety cabinet ventilation.
- Layout of lab furniture, sinks, floor drains, and emergency equipment.
- Storage locations and security of biohazard materials.
- Primary and secondary routes for evacuation and an assembly area.
- Maintain a Biological Safety kit/station outside the laboratory area.

- Current information on the posted Emergency Notification Signage for the laboratory.
- Familiar and coordination with building specific Emergency Action Plan (see building coordinator).
- Once there is a good understanding of these facts, appropriate action protocols can be developed.

6.0 PROCEDURES

6.1 STORAGE

6.1.1 Chemicals

- Do not store incompatible chemicals in close proximity to each other.
- Use approved storage containers and safety cans for flammable liquids.
- Use spill trays under containers of strong reagents.
- Dispose of old chemicals promptly. See waste disposal section of these guidelines.
- Do not store liquids above eye level.
- Assure all containers are properly labeled.

6.1.2 Containers

Verify the integrity of all containers. If deteriorated containers are found, dispose of the biohazard promptly or transfer it to a properly labeled new container. Make sure that the container is appropriate for the biohazard being stored. Example: some biohazards are stored as a liquid and if frozen, the container needs to adequately contain the expansion of the liquid and not leak after thawing.

8.2 CATEGORIZATION OF WASTE MATERIALS

Hazardous chemical (waste) disposal must comply with procedures established by the Arkansas Department of Environmental Quality.

8.2.1 Single Chemical Containers

The following procedure should be followed to dispose of single chemical containers.

- Do not mix chemicals.
- Each chemical for disposal must be stored in individual, sealed containers. Only use containers made of materials that are compatible with the chemicals to be stored.
- Attach a completed waste label if chemical is in a non-recyclable form.
- Complete a chemical recycle/disposal form.

- When the container is ready to be picked up contact EH&C and provide the following information: Name of person requesting pickup, Building, Room Number, Name(s) and quantities of chemicals to be picked up.
- Segregate and store chemicals according to hazard class and compatibility.

8.2.2 Mixed Organic Solvents

The following guidelines are to be used when disposing of mixed organic solvents.

- Use approved storage containers for mixed solvents and only mix compatible solvents.
- List the name and volume of each solvent on the label at the time of addition.
- Do not overfill.
- When the container is full, complete a recycle/disposal form.
- When the container is ready to be picked up contact EHS with the following:
- Name of person requesting pickup, Building, Room Number, Name(s) and quantities of chemicals to be picked up.

8.2.3 Chemical Mixtures

The following guidelines are to be used when disposing of chemical mixtures which are generated as a result of chemical reactions, preparations of solutions, etc.

- Use approved storage containers for chemical mixtures and don't mix incompatible products.
- List the name and volume of each product on the label at the time of addition.
- Do not overfill.
- When the container is full, complete a recycle/disposal form.
- When the container is ready to be picked up contact EH&C with the following: Name of person requesting pickup, Building, Room Number, Name(s) and quantities of chemicals to be picked up.

8.3 WASTE DISPOSAL

8.3.1 Biohazardous Waste

Use of proper sterilizing and disinfecting methods should be the primary treatment techniques for deactivating and disposal of biohazardous material as regular solid waste. If you suspect that a proposed activity might produce biohazardous materials that are difficult or expensive to dispose, or have, multiple hazards (biohazard, chemical, radioactive) contact Environmental Health and Safety for guidance before conducting your activity.

Unwanted materials and products that have not been rendered innocuous or determined noninfectious by the Principal Investigator or their authorized representative should be considered infectious. These include:

- Blood and blood products - human blood, blood products (serum, plasma and other blood components) and body fluids.
- Sharps - needles, syringes, scalpels and glass vials
- Microbiologicals - including all cultures and stocks of infectious agents
- Pathologicals - including tissues, organs, and body parts discarded from surgical, obstetrical, autopsy and laboratory procedures.
- Broken glass that can be properly decontaminated should not be placed in the Biohazardous Unwanted Materials System.

Hazardous materials that have not been sterilized must be disposed of by Environmental Health and Safety Department or by a hazardous waste disposal vendor approved by Environmental Health and Safety. Hazardous, unwanted materials must be properly labeled, packaged, and stored prior to transport.

Packaging and labels will be provided by Environmental Health and Safety or their authorized biohazard waste disposal vendor, with the exception of special packaging for articles that could potentially puncture bags or boxes.

- Articles that could puncture bags or boxes ("sharps") must be placed in puncture-proof containers available from Environmental Health and Safety or from commercial sources. The containers can then be picked up separately (if liquid-free) or placed in the bags and boxes provided.
- All biohazardous materials including diagnostic specimens and biological products must be packaged to prevent leakage of contents during handling and transportation. Leaking containers or improperly packaged sharps will not be accepted by Environmental Health and Safety or by authorized biohazardous waste vendors.
- Containers for biohazardous material must be in good condition and must not react with other hazardous materials they may hold. Label all containers of biohazardous waste with the date when accumulation begins. There is a biohazard label available from Environmental Health and Safety for this information.
- Biohazard, chemical, and radioactive waste must be segregated. If necessary, contact the Environmental Health and Safety Department for assistance.

Collection from individual laboratories can be arranged by contacting Environmental Health and Safety (972-2862).

8.3.2 Chemical Waste

Use the following guidelines when disposing of chemical waste.

- Treatment in compliance with the Hazardous Chemicals Guide or other approved disposal guide is encouraged to reduce the toxicity or quantity of hazardous waste.
- Closed containers of ethers must be discarded after 1 year and open containers must be discarded within 6 months of opening.
- Only water-soluble substances should be disposed of in a laboratory sink. Flammable solvents must be sufficiently dilute that they do not pose a fire hazard. Strong acids and bases should be diluted (to pH 3-11) before they are poured into the sewer system. Acids and alkalis should not be poured into the sewer at a rate exceeding 50 ml of concentrated substance per min. Small amounts of some heavy-metal compounds may be disposed of in the sewer system, but larger amounts may pose a hazard for the sewer system or water supply. Consult the MSDS for specific disposal information.
- Non-water soluble solutions cannot be poured down the drain, nor should highly toxic, foul-smelling, or tear-stimulating chemicals. Laboratory drains are generally interconnected so a substance that goes down the sink may rise as a vapor in another. Moreover, since sinks are usually communal property, there is a risk that chemicals from two sources may contact one another and react.

All persons requiring waste pick up must fill out a chemical recycle/disposal form (See Forms).

8.3.3 Disposal of Radioactive Materials. Please refer to the Radiation Safety Policies and Procedures for information concerning waste disposal of radioactive materials.

8.4 Waste Accumulation

Hazardous chemical accumulation areas must be maintained according to state and federal guidelines. Contact EH&C (2862) for more information.

Chemicals that can be flushed down the drain include:

Cation	Cation	Anion
Aluminum	Palladium	Bisulfite
Bismuth	Potassium	Bromate
Calcium	Rubidium	Bromide
Cerium	Scandium	Carbonate
Cesium	Strontium	Chloride
Copper	Tantalum	Cyanate
Gold	Tin	Hydroxide
Iron	Titanium	Iodide
Lanthides	Yttrium	Oxide

Lithium	Zinc	Phosphate
Magnesium	Zirconium	Sulfate
Molybdenum (VI)		Sulfite
Niobium (V)		Thiocyanate