Hazardous Waste Program Manual

Environmental Health, Safety and Risk Management Department
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Thanks to the University of Houston for the use of their Hazardous Waste Manual

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I. PREFACE

Environmental awareness and protection of our natural resources has become a national priority for the past decade. As a nation, we have come to recognize that hazardous agents of all types have entered our environment through improper use and disposal. In response to the national concern for proper management of waste materials, Congress passed the Resource Conservation and Recovery Act (RCRA) in 1976. Under this act, the Environmental Protection Agency (EPA) was given the responsibility for regulating hazardous chemical wastes. In Texas, the Texas Commission on Environmental Quality (TCEQ) controls hazardous chemical wastes, while the Texas Department of Health (TDH) regulates radioactive and biohazardous wastes.

Stephen F. Austin State University (SFASU) produces a small amount of hazardous waste in performing its functions of service, teaching, and research. Since the university generates less than 220 pounds of hazardous chemical waste per month, it is classified by the Environmental Protection Agency as a “conditionally exempt small quantity generator”. In addition, we are subject to regulations promulgated for the control of biological and radioactive wastes.

The Environmental Health, Safety, and Risk Management Department is charged with the responsibility for ensuring that hazardous waste generated on campus is disposed of in accordance with all applicable regulations. The function of the Environmental Health, Safety, and Risk Management Department is to assist faculty, staff and students with their responsibility for managing all wastes properly and cost-effectively. The Environmental Health, Safety, and Risk Management Department also coordinates all hazardous waste efforts for the university, which includes enforcing proper storage, keeping records, and making sure the waste is disposed of properly through environmentally and financially sound waste contractors.

Stephen F. Austin State University requires that all members of the campus who use hazardous materials are trained in the procedures for proper handling of these wastes. The Environmental Health, Safety, and Risk Management Department offers a hazardous materials training class to assist departments with the Hazmat training requirements. This manual explains the requirements of the Stephen F. Austin State University Hazardous Waste Program and describes the proper procedures for preparing hazardous waste for storage as regulated under the law.

Please contact the Environmental Health, Safety, and Risk Management Department for additional information and help regarding your hazardous waste (468-4532). The cooperation of every member of the Stephen F. Austin State University is essential.

The Stephen F. Austin State University Environmental Health, Safety, and Risk Management Department would like to thank the University of Houston for allowing us to use their Manual. Of particular note, we acknowledge the core content and organization of this manual, which was generously provided by Colorado State University. Without the help of their model manual, development of this manual in its present form would not have been possible.
II. HELPFUL TELEPHONE NUMBERS & USEFUL INFORMATION

1. Environmental Health, Safety, and Risk Management Department
   468-4532
   Fax # 468-7312
   • Environmental Health, Safety, and Risk Management Department
     hours: Monday through Friday, 8:00 a.m. -- 5:00 p.m.

2. University Health Center
   468-4008

3. Stephen F. Austin State University Police Department
   Non Emergency - 468-2608
   Emergency - 911
   • In the event of an after hour chemical, biological, or radioactive
     materials emergency: Contact the Stephen F. Austin State University
     Police Department. The Environmental Health, Safety and Risk
     Management Department maintains an on-call mechanism to provide
     assistance in the event of an after hours situation.
III. RESPONSIBILITIES OF COLLEGES AND DEPARTMENTS

Each college and department within the university must assure that personnel who generate hazardous wastes have received training in the use of the Stephen F. Austin State University Hazardous Waste Program and are complying with university policy and procedure regarding environmental, health and safety. Training is typically provided by the individual colleges/departments, but special college/departmental specific sessions will be provided by the Environmental, Health, Safety and Risk Management Department if requested.

Each department which includes laboratory facilities for teaching or research must also assure that a mechanism is in place for terminal hazardous waste disposal from lab facilities when faculty or staff complete their work and leave the University. In such cases, it is the college/department's responsibility to see that waste is properly identified and disposed of by a legal disposal company.

**COMPLIANCE CAUTION**

FEDERAL AND TEXAS LAW STIPULATES THAT EACH INDIVIDUAL WHO GENERATES HAZARDOUS WASTE IS PERSONALLY LIABLE AND IS RESPONSIBLE FOR ASSURING COMPLIANCE WITH REGULATIONS AND PROPER HAZARDOUS WASTE MANAGEMENT.
IV. HAZARDOUS WASTE TRAINING REQUIREMENTS

All individuals who may generate hazardous chemical, biological, or radioactive waste must receive documented training, according to Stephen F. Austin State University’s Hazardous Waste Program Manual, the EPA's Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the Texas Commission on Environmental Quality (TCEQ). It is the responsibility of each department to make sure this training is completed. The Environmental Health, Safety, and Risk Management Department can provide the means to satisfy the training requirements, if requested. All new employees (faculty, staff, students, etc.), either full or part time, who will use hazardous materials and in so doing generate waste are required to receive General Hazardous Waste and Hazard Communication training. This training must be received before the employee is assigned to use or handle hazardous chemicals.

The General Hazardous Waste training referenced above provides general information, but information specific to the employee’s particular work area must be provided by the supervisor. Supervisors will train every employee who works with or may be exposed to hazardous chemicals on the safe use of those substances and about the Texas Hazard Communication Act. The Environmental Health, Safety and Risk Management Department also recommend that individuals periodically attend subsequent training seminars to be aware of changes in regulations.

All Hazardous Waste Training shall be documented on the Hazardous Waste Training Roster (available in the Appendix), which shall be forwarded to the Environmental Health Safety and Risk Management Department prior to December 31st of each year. To meet regulatory requirements and as a service to departments, faculty and staff, the Environmental Health, Safety, and Risk Management Department keeps training records on all individuals who have attended our training seminars. See the appendix for a copy of a training roster. If you have a question with regards to your training record, please contact the Environmental Health, Safety, and Risk Management Department.
V. DISPOSAL OF CHEMICAL WASTES

Individual users of hazardous materials have specific duties and responsibilities under state and federal law and university policy and procedure regarding hazardous waste handling and disposal. These responsibilities include hazardous waste identification and waste minimization as well as proper waste storage and disposal.

A. IDENTIFICATION OF HAZARDOUS WASTE

Each generator of chemical waste must determine if the waste is "hazardous" by considering the characteristics and the chemical composition of the waste. Federal and state laws define specific categories of hazardous waste. If the waste generated fits under any one of the given classifications, it must be handled through the hazardous waste disposal program. If the material cannot be identified by either prior knowledge of the process which produced it, or by a proper label, it must be analyzed. The cost of analysis is the responsibility of the department that generated the waste.

Ignitable Waste

Any waste product that has a flash point of less than 140 degrees Fahrenheit is considered an ignitable (flammable) hazardous waste. This determination is best made by consulting reference texts that describe physical properties of the waste or material safety data sheets.

Corrosive Waste

Any liquid waste with a pH of less than 2 or greater than 12.5 is considered a corrosive hazardous waste. The waste may continue to be hazardous, based on other characteristics, even if the pH is adjusted to within these limits. No solution may be discharged to the sanitary sewer system.

Reactive Waste

Any sulfides or cyanides bearing waste, any waste that is explosive or pyrophoric, or any waste that can combine violently with air or water to produce heat, light or toxic products is considered a reactive waste.

These wastes require special handling if they are shock sensitive or if they exhibit other particular characteristics. Common examples of potentially shock sensitive materials include crystallized picric acid, opened ether older than six months, or ether in a container, which has deteriorated. The Environmental Health, Safety, and Risk Management Department must be notified of such special characteristics of reactive waste.

SAFETY CAUTION

IF YOU UNEXPECTEDLY FIND A REACTIVE WASTE (SUCH AS CRYSTALLIZED PICRIC ACID), DO NOT OPEN OR NEEDLESSLY HANDLE THE CONTAINER. CALL THE ENVIRONMENTAL HEALTH, SAFETY, AND RISK MANAGEMENT DEPARTMENT IMMEDIATELY FOR ASSISTANCE IN DEALING WITH THE MATERIAL.
Toxic Waste
Waste products are generally considered toxic if they have adverse effects on organisms in relatively low doses or small quantities. The EPA has published lists of toxic and acutely toxic waste, as well as wastes which could enter the environment through leaching (See Appendix A for assistance). If waste is considered toxic under any of these criteria, it must be handled through the hazardous waste program.

Chemical wastes, which do not have the characteristics of ignitability, corrosivity, or reactivity, which do not appear on the lists of toxic wastes, and those, which cannot be put into the landfills, must be disposed of properly.

Sources of Chemical Information
1. Material Safety Data Sheets (MSDS): A MSDS is a detailed information bulletin about a chemical, describing physical and chemical properties, health hazards, routes of exposure, precautions for safe handling, use and storage, spill response and first-aid procedures.

Material Safety Data Sheets are available via the Internet from a variety of servers.

Hardcopy MSDS are also available upon request from the Environmental Health, Safety, and Risk Management Department 468-4532, fax 468-7312, or higginsjk@sfasu.edu.

2. Chemical Manufacturers/Distributors Technical Service Representatives: Manufacturers can be valuable resources regarding the use, handling, and storage of hazardous materials. Direct contact with representatives, review of technical bulletins, and specification sheets can provide valuable safety, storage, and use information.

B. WASTE MINIMIZATION

Once an individual has determined that hazardous waste is being produced, options for disposal must be considered. As part of the University agreement with the State of Texas, we must make significant efforts to minimize the amount of waste produced. Therefore, each individual generator must determine if any of the unneeded or waste material can be used by another person or department. Containers of chemicals that are unopened or largely unused can fall into this category.

C. ON-SITE TREATMENT AND DISPOSAL

There is a general prohibition against on site treatment and disposal of hazardous waste without a permit. Stephen F. Austin State University is not currently permitted for on-site treatment or disposal of hazardous wastes.
D. STORAGE OF HAZARDOUS WASTE

The Texas Commission on Environmental Quality (TCEQ) considers each room or laboratory on campus where hazardous wastes are stored as a "satellite accumulation area". As such, the following requirements apply:

1. Wastes must be in containers made of materials compatible with the contents. Wastes must be compatible with other wastes and hazardous materials in the area. Incompatible wastes such as strong acids and strong bases must be segregated.

2. The container must be in good condition and must be closed except when adding or removing waste. (Evaporating solvent waste from an open bottle of waste inside fume hoods is not an acceptable practice.)

3. The label "Hazardous Waste" and the date when accumulation of the waste began must be clearly visible. In addition, the waste must be labeled with the description of the chemical contents and the name of the responsible person. For example, a label that is marked "Organic Waste" is not good enough. The label must note the specific chemicals and their concentration for each bottle or can of the material.

4. Hazardous waste must be removed off campus annually.

5. No more than 55 gallons (equivalent to approximately 55 4-Liter bottles) of a hazardous waste or one quart of an acutely hazardous waste (P-Listed, see Appendix A) may be stored in any satellite accumulation area at anytime.

6. Room numbers or other identification of all locations where hazardous wastes are stored in each building must be registered with the Environmental Health, Safety, and Risk Management Department and must meet all of the requirements for satellite accumulation areas.

7. The storage areas must be secured to prevent inadvertent access; that is, doors to waste areas should be kept locked when unattended.

8. Each satellite accumulation area must be inspected weekly by the individual responsible for that site to check for container deterioration, container leaks, proper labeling and that wastes stored together are compatible with each other. A small spiral notebook in the satellite accumulation area can be used to record the results of weekly inspections.
E. PROCEDURES FOR DISPOSAL OF HAZARDOUS CHEMICAL WASTE

Overview
Each department at Stephen F. Austin State University is responsible for the disposal of their hazardous waste and should budget appropriately. Currently, SFASU departments contract individually with a commercial vendor for removal and disposal of chemical waste. The Environmental Health, Safety, and Risk Management Department can assist with the removal and disposal process of departmental hazardous waste if requested and should always be contacted whenever hazardous waste is being removed from campus by a vendor (468-4532). Each department should follow the removal and disposal guidelines of their contractor for the disposal of their generated hazardous waste.

Step-By-Step Instructions
Before disposing of hazardous waste.
1. Determine if you can reuse or recycle this waste in your laboratory. If so, there is no need to dispose of the material.

   If you have unopened or uncontaminated containers in a usable form, you should attempt to find another user. This will avoid the cost of disposal, the environmental impact of disposal, and needless cost to another user incurred through the purchase of new chemicals. The Environmental Health, Safety and Risk Management Department can assist in this process.

2. Separate solids and liquids. All liquids must be free of solid material and or sludge to facilitate consolidation, recycling and proper disposal. If solids cannot be separated from liquids, the identification and quantity of the solid component must be listed on the container. Every effort should be made to separate solids and liquids.

3. Consolidate similar wastes. Effort should be made by the waste generator to consolidate same-type waste into as few containers as possible.

4. Properly package the wastes. Make sure containers are compatible with the material inside and if not, perform a transfer to a new container. Containers must be leak free, have a tight cap, and be clean on the outside. Stoppers and corks will not do. Containers must be no more than 90% full.

5. Label all waste containers. Make sure containers are marked with: a) the words "HAZARDOUS WASTE", b) a complete listing of container contents, c) the date the accumulation of waste started. Do not use abbreviations for chemical names.

6. Prepare the waste containers for transport according to your contractor’s specific requirements.

7. Again each department is responsible for the removal and disposal of their hazardous waste and should follow the disposal guidelines of their contractor for the removal of their generated hazardous waste.
F. SEGREGATION OF SOLVENT WASTE

Solvent wastes may be consolidated for disposal purposes. Halogenated solvents (containing chlorine, bromine, etc.) are normally consolidated separately from non-halogenated solvents, as it is more expensive to dispose of halogenated solvents.

It is essential that individual generators of solvent waste segregate these wastes and label them accurately so that this consolidation can be done properly. Just a small amount of a halogenated solvent in a non-halogenated container can result in a significantly greater cost for disposal.

G. SPECIAL NOTES TO HAZARDOUS WASTE GENERATORS

1. Identification: The safety of the personnel who handle the hazardous waste is dependent on their training in handling chemicals, explosives and other hazardous materials. Their ability to use this training effectively is in turn dependent on a complete and accurate label being attached to each waste container. The safe handling of waste requires proper packaging identification.

**COMPLIANCE CAUTION**

IMPROPER DISPOSAL OF HAZARDOUS WASTE IN THE TRASH OR SEWER CAN RESULT IN CIVIL AND CRIMINAL PROSECUTION OF THE INDIVIDUAL RESPONSIBLE.

The Nacogdoches sanitary system may be monitored for hazardous waste constituents. Further, there are numerous sampling locations within the university sewer system to monitor the source of pollutants disposed down the drain.

2. Labels: Proper labeling is necessary to comply with state and federal regulation, to allow proper classification of the mixture, to ensure proper segregation, storage and shipment, and to meet the requirements of your waste disposal contractor. Please label and package your waste as thoroughly as possible.

3. Container Markings: Producers of hazardous waste must properly mark and date containers of hazardous waste with the words "hazardous waste" and the starting and ending dates of accumulation for the waste.

The accumulation date depends on the way the waste is generated. If you are cleaning a storage area and decide to discard some old chemicals, the material becomes a hazardous waste as soon as you decide to discard it.

The label on each container of waste must contain the words "Hazardous Waste", the complete chemical composition of the waste including volume or percent of each component, and the name of the responsible person.

Waste, which is routinely generated, may be collected over a period of time before it is disposed of. For example, a researcher may repeatedly perform a simple separation,
which yields a few milliliters of waste solvent. The waste solvent is then poured into a suitable container such as a one-gallon glass bottle or a five-gallon can. The container must be no more than 90% full.

From the first time a waste is put into the container it must be labeled with the words "Hazardous Waste", a complete itemized list of the contents (chemical name and volume), the date the first amount of waste was placed in the container and the date the container was considered full. It is critically important that waste being accumulated in the satellite accumulation area be labeled and stored properly.

4. **Time Limits**: No facility on campus is allowed to accumulate more than 55 gallons of hazardous waste or one quart of acutely hazardous waste in a satellite accumulation area at one time. Laboratory areas are further restricted by the Fire Code as to the maximum quantity of total "flammable/combustible" material that may be stored there.

It is important to plan ahead for the disposal of hazardous waste.

**COMPLIANCE CAUTION**

FAILURE TO MEET THESE REQUIREMENTS COULD RESULT IN PENALTIES AND FINES ASSESSED AGAINST THE UNIVERSITY AND INDIVIDUAL WASTE GENERATOR(S).
VI. DISPOSAL OF BIOLOGICAL WASTE

To ensure safe and legal disposal, careful attention must be given to the disposal of university generated biohazardous waste. All categories of biohazardous waste must be packaged and handled in accordance with their associated requirements. Currently, Stephen F. Austin State University departments contract individually with a commercial vendor for removal and disposal of biohazardous wastes. Each department should follow the removal and disposal guidelines of their contractor for the disposal of their generated hazardous waste.

A. REGULAR BIOHAZARDOUS WASTE

All biohazardous waste not containing a cut/puncture hazard is to be considered regular biohazardous waste. This material should be wrapped securely and then placed in an approved biohazard bag (orange or red with official biohazard symbol). Currently, SFASU departments contract individually with a commercial vendor for removal and disposal of biohazardous waste. Each department should follow the removal and disposal guidelines of their contractor for the disposal of their generated hazardous waste.

B. NEEDLES, SCALPELS, RAZOR BLADES, AND BROKEN GLASS

All sharp, contaminated objects should be placed in an approved puncture resistant "sharps" container. This container should have securely capped ends or a closable top or lid. Currently, SFASU departments contract individually with a commercial vendor for removal and disposal of biohazardous waste. Each department should follow the removal and disposal guidelines of their contractor for the disposal of their generated hazardous waste.

C. CONTAMINATED ANIMAL CARCASSES

Animal carcasses containing known biohazardous agents should be placed in an approved biohazard bag. Currently, SFASU departments contract individually with a commercial vendor for removal and disposal of biohazardous wastes. Each department should follow the removal and disposal guidelines of their contractor for the disposal of their generated hazardous waste. See the section of this manual titled "Disposal of Radioactive Wastes" for information on handling radioactively contaminated carcasses.

The above procedures apply only for biohazardous waste and not chemical or radioactive wastes.

If you have any questions about safe biohazard handling or proper disposal, contact the ENVIRONMENTAL HEALTH, SAFETY, AND RISK MANAGEMENT DEPARTMENT at 468-4532.
VII. DISPOSAL OF RADIOACTIVE WASTES

A. GENERAL
All radioactive waste generated by the use of radioactive materials at Stephen F. Austin State University shall be disposed of in such a way as to prevent the occurrence of a hazard to the health of university staff, students, faculty and the general public. Adherence to the requirements and recommendations stated in the following sections will achieve these goals, as well as ensure compliance with the Texas Regulations for the Control of Radiation.

B. RESPONSIBILITIES OF DEPARTMENTS
Currently, SFASU departments contract individually with a commercial vendor for removal and disposal of radioactive wastes. Each department should follow the removal and disposal guidelines of their commercial vendor for the disposal of their generated hazardous waste.

The following is required to implement effective radioactive waste management procedures within the laboratory. Specifically, the department shall:
1. Provide adequate radioactive material labeled receptacles for each radioisotope and type of radioactive waste generated.
2. Ensure that radioactive wastes are placed in these assigned receptacles, and are not disposed of as ordinary wastes. You must report any such incidents of improper waste disposal to the Environmental Health, Safety, and Risk Management Department (468-4532).
3. Maintain written records of the activity of all wastes.
4. Assure that radioactive waste is not allowed to be stockpiled in the lab, either in the designated waste storage area, or in any other areas used for temporary storage.
5. Designate an area of the lab to be used as a waste area using the following guidelines:
   - Located away from heavy traffic or constantly used areas.
   - Large enough to allow for shielding if necessary. High-energy beta and gamma emitters must be stored behind the appropriate shielding material to minimize the external exposure to lab personnel.
   - Allows for containment of liquid waste in the event of a spill or container failure.

As the generator of radioactive waste material, laboratory personnel have first hand knowledge of waste content. Consequently, laboratory personnel have full responsibility for all handling requirements and documentation associated with it.

Do not, under any circumstance, place radioactive waste where it might be picked up by housekeeping personnel and be disposed of as ordinary waste in the dumpster. Accidental improper radioactive waste disposal must be reported immediately to the Environmental Health, Safety, and Risk Management Department (468-4532).
C. SEGREGATION OF WASTE

All radioactive waste must be segregated according to isotope. Only Tritium (3H) and Carbon-14 (14C) can be placed in the same container; all other isotopes must be placed in separate containers.

In addition to segregation by isotope, radioactive waste must also be separated by physical form. Ten (10) basic physical forms of radioactive waste are identified:

1. Solid
2. Glass
3. Sharps
4. Liquid
5. Liquid Scintillation Vials
6. Biological
7. Animal Remains
8. Source Vials
9. Lead Pigs
10. Sealed Sources

1. Radioactive Solids
It is compromised of most disposable items, as well as labware that have been contaminated with radioactive material.

Examples: Such items include, but are not necessarily restricted to absorbent work surface coverings and/or other protective coverings; plastic/rubber gloves, tubing, and syringes; unbroken glassware such as pipettes, beakers, flasks, columns, etc.

Containers for Disposal: Yellow Radioactive Materials bags. Do not use any other type of plastic bag to collect the solid radioactive waste. The yellow radioactive material bags must be placed in closeable waste receptacles (e.g. plastic foot operated trashcan) that remains closed at all times. Departments must obtain their own receptacles and bags.

Requirements for safe handling and disposal of this type of radioactive waste are:
- Exercise extreme care when handling radioactive wastes in any quantity.
- Label all bags with the date, isotope, total activity and Department’s name.
- Deface or remove all radioactive labels and labware labels before placing waste into the bags.
- Inspect the plastic waste bag for leaks prior to removal from the lab. Use a second yellow bag to contain the waste if necessary.
- Do take care not to place anything in the bag in such a way that may tear it.
- Do not use any other type of plastic bag to collect the radioactive material waste.
- Do not, under any circumstances, place radioactive waste where it might be picked up by housekeeping personnel and be disposed of as ordinary waste in the dumpsters.
- Waste Receptacles must remain covered at all times.
2. Radioactive Glass
Contaminated glassware and other unbroken glass should be packaged separately from other solid radioactive waste.

*Containers for Disposal:* A strong cardboard box properly labeled and sealed is adequate for disposal use.

3. Radioactive Sharps
Sharps are defined as anything that could tear the yellow radioactive materials bag.

*Examples:* Needles, broken glass, glass pipettes, razor blades, capillary tubes, etc.

*Containers for Disposal:* Puncture resistant plastic tubes. When full, securely recap with orange/red top and properly label tube.

Requirements for safe handling and disposal of this type of radioactive waste are:
- Care must be taken to not injure oneself during placement of sharps into container.
- Do not try to overfill.
- Do make sure that all sharps are dry before placing into container.
- When full, securely cap tube with orange/red top.

4. Radioactive Liquid
The category of radioactive liquid waste can be further divided into: (a) Aqueous, (b) Organic, and (c) Other liquids.

*Examples:*
(a) Aqueous Liquids - Water-based liquids with a pH between 5.0-9.0, such as saline and buffer solutions or washings from contaminated laboratory glassware, weak acids or bases that contain no biological, pathogenic, or infectious materials.
(b) Organic Liquids - Organic laboratory solvents such as alcohols, aldehydes, ketones, and organic acids. Note: This category does not include scintillation fluids.
(c) Other Liquids - Contaminated pump oil, etc.

*Containers for Disposal:* Specially designated containers (carboys). These carboys are to be filled to approximately 80% of available container volume. Do not overfill these containers.

Requirements for safe handling and disposal of this type of radioactive waste are:
- While the container is in the laboratory, provide for double containment as a precaution against leakage. This will control for carboy failure, and is also necessary because pouring is usually accompanied by drips, dribbles, and seeping. Carboys should be placed in a tray or pan that will contain the liquid in the event of a spill of the carboy. At a minimum, plastic backed absorbent paper shall be placed under all liquid waste carboys.
- Do not use glass containers for storage of radioactive liquid waste. If plastic-incompatible contaminated organic solvents are required to be kept in glass containers, the bottle must be doubled contained.
- After emptying labware of radioactive liquid, the first three rinses of the labware must also be placed in the radioactive liquid waste container. No radioactive liquid is to be poured down the sink; sinks will be surveyed during routine audits of the laboratories.
- Do not mix liquid waste types in the carboys (e.g. organic with aqueous).
- Pipettes and other such items must not be placed in the carboys.
- All biological material in the carboys must be properly deactivated. Carboys should be kept as free of contamination as possible.

5. Radioactive Liquid Scintillation Vials

*Examples:* Glass or plastic vials containing organic or aqueous based liquid scintillation fluid.

*Containers for Disposal:* The waste is disposed of in the original cardboard trays and placed in a yellow radioactive material bag or double bagged in a yellow radioactive material bag for disposal. Glass vials not in the original trays must be double bagged in yellow radioactive material bags and placed in a cardboard box. Absorbent material must be placed in the cardboard box to absorb any leakage from the vials. Empty vials are to be disposed of as dry and semi-solid radioactive waste.

Requirements for safe handling and disposal of this type of radioactive waste are:
- Assure that all tops are on the vials tightly.
- Do not empty used vials into plastic bags. Leaking or seeping scintillation fluid will dissolve plastic.
- Label each box of vials containing aqueous scintillation cocktail and segregate from organic cocktail vials.
- If the vials must be used again, pour the liquid waste into a carboy along with the first rinse of the vial. Because most scintillation cocktail solutions are volatile and will contain radioactive substances, the procedures of pouring out the solution should be conducted in a properly ventilated fumehood.

6. Radioactive Biological Waste

This category includes radioactive waste containing biological, pathogenic, or infectious material and the equipment used to handle such material.

*Examples:* By-product animal waste (i.e. serum, blood, excreta), contaminated capillary tubes and other equipment contaminated with animal fluids, radioactive material labeled culture media.

*Container for Disposal:* Yellow radioactive materials bags labeled with biological waste stickers or red biological bags labeled with radioactive material stickers.

Requirements for safe handling and disposal of this type of radioactive waste are:
• Liquids must be absorbed into another material such as paper towels, sponges, gauze, etc. prior to placing into bags.
• Pathogenic and infectious waste must be sterilized by chemical treatment or autoclaving as appropriate. If autoclaved, the autoclave must be checked for radioactive contamination after use.

7. Radioactive Animal Remains
*Examples:* Radioactive animal carcasses, animal bedding, and by-product animal waste with the carcasses (i.e. viscera, serum, blood, excreta, tissue, etc.) and other animal tissue containing radioactive materials.

*Container for Disposal:* Yellow Radioactive Materials bags.

Requirements for safe handling and disposal of this type of radioactive waste are:
• Animal remains containing radioactive material in any quantity are subject to handling according to the guidelines.
• A tag, showing: the date, radioisotope, total activity, and the laboratory shall be tied to the bag.

Bags not labeled cannot legally be disposed of, so an investigation will be performed to identify the generator of the unlabeled waste. If the bag is placed in the freezer by personnel from your lab, the same information must appear on the tag.

• Do not allow animal remains containing radioactive materials to be disposed of in the dumpsters, or otherwise disposed of as ordinary wastes.
• Liquids surrounding carcasses must be absorbed into another material (e.g. paper towels, sponges, gauze, etc.) prior to placing into yellow bags.

8. Source Vials
*Examples:* The original vials that the radioactive materials were shipped in from the supplier. This includes full, partially full, and empty vials.

*Containers for Disposal:* Source vials must be separated from the dry and semi-solid waste stream. Place the vials in a cardboard box for disposal.

• Do not place lead pigs and/or plastic source vial containers into the dry and semi-solid waste. Place these with the vials in the originally cardboard shipping box for disposal.

9. Lead Pigs
*Examples:* the original lead and lead impregnated shielding containers surrounding source vials.

• Lead is a hazardous waste and must be disposed of accordingly.
• Do not place lead pigs and lead impregnated shielding containers into the solid waste. Place these in the originally cardboard shipping box for disposal.
10. All Sealed Sources

Examples: Calibration sources, check sources, quenched standard sets, electron capture gas chromatograph detectors, etc.

Container for Disposal: Sealed sources must be separated from the solid waste. Place the sources in a cardboard box for disposal.

- Check for broken or crushed sources and handle these damaged sources with extreme care.
- All sources must be disposed of properly by a private contractor, even if decayed.
- A final survey and/or leak test on all sources prior to disposal shall be done by the department.

Disposal of Radioactive Waste

Radioactive wastes that are handled by departments are subject to the same time and logistical constraints as the chemical and biohazardous waste streams.

When the waste containers are full:
1. Close and properly seal the containers. Bags are to be taped, carboys must have the lids tightly in place, and sharps must have both end caps on.
2. Yellow-bagged dry and semi-solid waste must be removed from the waste bag supporting container and taped shut to be considered ready for pickup.
3. Full waste containers that require shielding shall not be left outside of the shield while awaiting pickup by private commercial vendor.

SAFETY CAUTION
SIGNIFICANT EXPOSURES MAY RESULT FROM THE FAILURE TO ADEQUATELY SHIELD WASTES AWAITING PICKUP.

4. Label the container with Department's name, isotope, activity and date.
5. Currently, SFASU Departments contract individually with a commercial vendor for removal and disposal of radioactive wastes. Each department should follow the removal and disposal guidelines of their contractor for the disposal of their generated hazardous waste.
VIII. GUIDELINES FOR DISPOSAL OF NON-HAZARDOUS WASTES

COMPLIANCE CAUTION
HAZARDOUS CHEMICALS SHOULD NOT BE PUT IN DUMPSTERS

Not all laboratory wastes are hazardous and so should not be entered into the SFASU hazardous waste program. The following guidelines for determining which non-hazardous laboratory wastes are suitable for disposal through normal waste channels were developed after careful review of Texas Commission on Environmental Quality (TCEQ) regulations.

No wastes, which are defined as hazardous by EPA may be placed in the dumpsters. See Appendix A for assistance in obtaining this list.

Liquid waste (i.e., bottles of unused or partially used solutions) may never be disposed of in dumpsters, as liquid wastes are not permitted at the municipal landfill.

Empty containers of waste commercial products or chemicals are acceptable if no freestanding liquids remain in the containers and all disposal requirements noted on the label are complied with. Pesticide containers or those, which contained acutely hazardous materials, must be triple rinsed and the rinse water collected for disposal as hazardous waste. Empty containers must be perforated on both ends and/or crushed, and the container labels defaced or otherwise marked to indicate the containers no longer contain hazardous materials.

Animal wastes containing formaldehyde are not acceptable in dumpsters; carcasses and the liquid (i.e. formalin) should be disposed of as hazardous waste.

Certain solid, non-hazardous chemicals are suitable for disposal to the sanitary landfill. However, such chemicals should not be placed in laboratory trash containers as custodial personnel have been instructed not to handle any chemical wastes. Non-hazardous solids should be placed directly into the dumpsters.

The following types of solid laboratory wastes, which are generally considered non-hazardous, or of low toxicity and so may be put directly in the dumpsters. As noted above, solutions of such wastes should not be put in the laboratory trash containers. Check with ENVIRONMENTAL HEALTH, SAFETY, and RISK MANAGEMENT DEPARTMENT for quantities greater than 5 pounds.

a. Organic chemicals:
   Sugars and starches
   Naturally occurring α-amino acids and salts
   Citric acid and its Na, K, Mg, Ca, NH4 salts
   Lactic acid and its Na, K, Mg, Ca, NH4 salts
b. Inorganic chemicals
   Sulfates: Na, K, Mg, Ca, Sr, NH4
   Phosphates: Na, K, Mg, Ca, Sr, NH4
   Carbonates: Na, K, Mg, Ca, Sr, NH4
   Oxides: B, Mg, Ca, Sr, Al, Si, Ti, Mn, Fe, Co, Cu, Zn
   Chlorides: Na, K, Mg
   Fluorides: Ca
   Borates: Na, K, Mg, Ca

c. Laboratory materials not contaminated with hazardous chemicals:
   Chromatographic absorbents
   Filter paper, filter aids, and glassware
   Rubber and plastic protective clothing

Non-hazardous gases (e.g. carbon dioxide, nitrogen, argon, neon) may generally be vented to the atmosphere via certified and functioning laboratory fumehood. Please check with ENVIRONMENTAL HEALTH, SAFETY, AND RISK MANAGEMENT DEPARTMENT prior to such venting, particularly for large volumes. While many such gases are not toxic, if vented at a rate greater than the removal rate of the fumehood, an asphyxiant hazard could be created in the laboratory.

If there is any question as to whether a waste is acceptable for landfilling, please contact the Environmental Health, Safety, and Risk Management Department (468-4532).
IX. DISPOSAL OF NON-CONTAMINATED GLASS

When a laboratory on campus wishes to dispose of glassware, empty bottles, glass pipettes, test tubes etc., that is free of radiological, chemical or biological hazards, the waste can be placed by the laboratory personnel into the dumpsters located outside most of the buildings. Custodial Services will not pick up broken glass or empty chemical containers of any kind.

1. All glass must be free of chemical, biological or radioactive contamination before packaging of the material begins.
2. Contaminated materials must be thoroughly cleaned of all visible contamination on or in the glassware. Pipettes can not have appreciable amounts of liquid still inside them. Chemically contaminated glassware must have been triple rinsed and the rinse collected as hazardous waste. Biological contamination must have been sterilized or sanitized to ensure all organisms, pathogens or viruses are dead. Radioactive contaminated glassware should be sent out as radioactive waste and not packaged with other glass waste.
3. After the generator has ensured that the glass is free of all hazardous contaminants, the glass must be packaged in either the broken glass receptacles or packaged in thick cardboard boxes.
4. Each container should be no more than 90% full and weigh less than 20 pounds.
5. The container must be marked with the words "Broken Glass" and be taped shut with no protruding shards of glass or pipettes sticking out. Any container that is not taped shut or has glass protruding will not be picked up.
6. The generator must ensure the material placed in these receptacles is dry. Wet material will damage the bottoms of the receptacles causing the bottoms to become weakened and difficult to pick up.
X. EMERGENCY RESPONSE TO HAZARDOUS CHEMICAL, BIOLOGICAL, AND RADIOACTIVE WASTE SPILLS

A. INTRODUCTION

There are numerous different chemical, biological, and radioactive hazardous materials used throughout Stephen F. Austin State University on a daily basis. These chemicals are used in a variety of settings such as laboratories, research settings, building maintenance operations, construction/renovation projects and so forth. The range of individuals using chemical substances at the University also varies greatly from students, faculty, staff, and contractors. Each hazardous material user should educate themselves with the specific hazardous material that he/she plans to work with, and consider response options in chase of a spill or release beforehand. With the high level of chemical, biological, and radioactivity (i.e. laboratory use, plant operations functions, etc.) around the campus there is a high probability that a “spill” will occur. These general controls are designed to aid the users in responding to spills in which the user has a thorough knowledge of the hazardous substances and there is no immediate threat to the safety and health to the user or others in the vicinity.

However in the event of a spill or a release of any compound that the user can not control or has any concerns about controlling he/she should immediately call for assistance. During regular business hours Monday through Friday from 8:00am to 5:00 pm call the Environmental Health, Safety, and Risk Management Department directly at 468-4532.

Any other time call the SFASU Police at
911 Emergencies
468-2608 Non-emergencies
B. CHEMICAL SPILL PROCEDURES

It is the responsibility of each individual using a hazardous material to become familiar with the emergency response procedures, if any, which govern his or her facility. The Material Safety Data Sheet for the chemical is a good source for specific information.

The following general rules should be followed in the event of a major (i.e. greater than 5 gallons of a typical solvent; much less for more toxic materials) hazardous materials spill or other emergency.

1. CHEMICAL EMERGENCY STEPS

   a. ACTIVATE EVACUATION (FIRE) ALARM, IF NECESSARY, FOR THE BUILDING
      Be familiar with the sound of the alarm system in your facility. If the incident could threaten the health of individuals in the building activate the alarm.

   b. CALL FOR HELP, AND CALL THE UNIVERSITY POLICE, IF NECESSARY, AT 911
      Get as much information as you can about the chemical. If possible, locate a Material Safety Data Sheet (MSDS). Be sure the SFASU Police have been accurately informed as to the nature and location of the spill, and whether there are injuries requiring the assistance of an ambulance. Campus Police will contact the Environmental Health, Safety and Risk Management Department.

   c. ATTEND TO LIFE-THREATENING INJURIES
      The primary concern in the event of an emergency is to protect life and health of others.

   d. PREVENT ACCESS TO THE AREA
      Barricades of some sort should be set up to prevent inadvertent access to the area of the spill. This action may be necessary to prevent injury and to control the spread of contamination.

   e. CONTAIN THE SPILL TO PREVENT RELEASE TO THE ENVIRONMENT
      If the spill can be safely contained, prevent release to the sanitary sewer system, the storm sewer, and/or the ground. Do not jeopardize your own safety.

   f. INITIATE MATERIAL SPECIFIC CLEAN-UP PROCEDURES
      The Environmental Health, Safety, and Risk Management Department will assist in spill clean up. However, accountability for the spill and disposal of spill residue belongs to the individual or department.
2. SPILL PREVENTION AND CONTROL STANDARD OPERATING PROCEDURE

This procedure provides information for spill prevention, control and cleanup at the Stephen F. Austin State University.

DEFINITIONS

a. Hazardous Chemical - Any chemical substance that presents a health or physical hazard, and/or is listed in the following:
   1. CERCLA – Comprehensive Environmental Response Compensation and Liability Act. The Superfund for the cleanup of listed sites.
   2. RCRA - Resource Conservation and Recovery Act. The Environmental Protection Administration (EPA) hazardous waste regulations.

b. Health Hazard - Human exposure to chemicals that are suspected carcinogens, toxic agents, irritants, sensitizers, and agents that may damage human tissue.

c. Physical Hazard - Exposure to chemicals when any of the following hazards are present: explosive, flammable, compressed gas, oxidizer, reactive, or corrosive.

d. Spill - Any unplanned release of a solid, liquid or gaseous chemical.

e. A Release to the Environment - A spill or discharge that escapes beyond the confines of the building or structure, such as when materials reach the soil, surface water, or atmosphere.
REGULATIONS

a. All departments shall take proactive steps to ensure the prevention of hazardous chemical discharges into the environment.

b. All chemical spills released into the environment should be evaluated by and reported to the Environmental Health, Safety, and Risk Management Department who will assist with the appropriate clean up response.

c. A spill that is not a release to the environment and is small enough to be safely cleaned up by the user department and does not require specialized equipment should be cleaned up by the user department. (i.e., spills that do not pose a hazard beyond that which the users typically deal with should be cleaned by the user group). A spill that cannot be safely cleaned up by the user department shall be reported to the Environmental Health, Safety, and Risk Management Department.

* Note: If any quantity of hazardous material is spilled and makes its way to the environment (i.e. soil, water, air or storm sewer) it must be reported immediately to the Environmental Health, Safety, and Risk Management Department at 468-4532. The EHS&RM Department representative will contact the following agencies as necessary:

For all releases call:
Texas Commission on Environmental Quality (TCEQ), Austin
Environmental Release Hotline
1 (800) 832-8224
(512) 239-2507
(512) 463-7727
Questions 1(888) 777-3186

Texas Commission on Environmental Quality Region 10, Nacogdoches County
3870 Eastex Fwy
Beaumont, TX 77703-1892
(409) 898-3838
Fax (409) 892-2119

City of Nacogdoches Emergency Numbers
Hazardous Material Incident 559-2541
Emergency Management Office 559-2541
after hours 559-2607
Fire Department 559-2541
Water Utilities 559-5046
Health Department 559-2556
Public Works 559-2583

Chemical Transportation Emergency Center (CHEMTREC)
1 (800) 424-9300
* If there is a mercury spill of any type, it must be reported to the Environmental Health, Safety, and Risk Management Department immediately. A special procedure must be used to clean up this type of spill.

* Many acid/base spills require special clean up and neutralization procedures depending on what type of acid or base was spilled. This type of spill must also be reported immediately to the Environmental Health, Safety, and Risk Management Department at 468-4532.

d. Each department should ensure that adequate proactive spill prevention and control procedures are in place. Materials to contain and absorb potential spills shall be provided where liquid chemicals are used or handled. The user will develop a cleanup procedure for spills not released into the environmental.

e. No employee will be assigned to work in an area where hazardous chemicals are stored and/or used until proper safety protective equipment is provided and the employee has been adequately trained.

f. New construction and facility modification plans shall include proactive spill prevention and control provisions. The Environmental Health, Safety, and Risk Management Department shall approve all plans that involve tanks or other bulk liquid storage or usage facilities.
   1. Storage tanks shall meet all facility and operational requirements established by Stephen F. Austin State University.
   2. Spill containment for tanks and piping shall meet the requirements of SFASU. Preventive measures will be determined after a review of the chemical's characteristics and risk to employees, the community, and the environment.
SPILL PREVENTION, CONTROL, AND COUNTERMEASURES

1. Departments should store all chemicals in a manner that will ensure that a chemical spill does not occur through negligence or ignorance. All flammables should be stored inside a flammables cabinet. All acids and bases should be separated into their perspective cabinets also. Reactive chemicals should be separated into hazard class according to their specific hazards. For example, store all pyrophorics together, all water reactives together etc.
2. Each area where hazardous chemicals are stored should have adequate lighting at all times.
3. All employees who handle or transfer hazardous chemicals in any manner should be trained in the proper handling and protection procedures for those specific chemicals.
4. A spill kit should be created by each department. This kit contains chemical absorbing wipes, acid and base neutralizers, mercury absorbent and mercury indicator, pH paper. It also contains personal protective gear such as neoprene gloves, apron and face shield.
5. After a spill is reported to Environmental Health, Safety, and Risk Management Department, a Material Safety Data Sheet (MSDS) will be located on that specific chemical so the hazards associated with it can be evaluated. The spill clean up measures will then be initiated from the MSDS spill and leak procedures section. If the chemical spilled is of an extremely hazardous nature, the Nacogdoches Fire Department will be called to assist with the situation.
6. The Environmental Health, Safety, and Risk Management Department will establish safe perimeters around a spill and control access.
7. Contain spills to limit contamination of surrounding areas.
8. Clean up spill when appropriate and decontaminate area. Provide disposal in accordance with EPA procedures and statutes.
9. The Environmental Health, Safety, and Risk Management Department will report any impact that a building or facility will have on continued operations at Stephen F. Austin State University.

3. Spill Kit-General Spill Control Techniques

Chemical Spill Response Kit Expectations

INTRODUCTION

1. Departments are responsible for creating and purchasing their own spill kits.
2. Personnel are expected to handle single chemical spills of up to 5 gallons.
3. Kits are small personal kits for first responders.
4. Chemical spills with two chemicals will be handled by personnel only after consultation with a chemist or the Environmental Health, Safety, and Risk Management Department
5. The Environmental Health, Safety, and Risk Management Department or Nacogdoches Fire Department will handle all chemical spills with three or more chemicals involved.
6. If you do not understand how to use the kit or feel you need help, please contact the Environmental Health, Safety, and Risk Management Department at 468-4532.
# Recommended Chemical Spill Kit Contents Sheet

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Gallon Poly Pal</td>
<td>1</td>
</tr>
<tr>
<td>Sock/Boom, 3&quot; x 4'</td>
<td>2</td>
</tr>
<tr>
<td>Spill Pillows, 2 liter</td>
<td>2</td>
</tr>
<tr>
<td>Disposal Bag</td>
<td>2</td>
</tr>
<tr>
<td>4H Gloves, Size 11</td>
<td>2 pair</td>
</tr>
<tr>
<td>Nitrile Gloves</td>
<td>2 pair</td>
</tr>
<tr>
<td>Tyvek QC Coveralls, XL</td>
<td>2</td>
</tr>
<tr>
<td>1 Quart Scoop</td>
<td>1</td>
</tr>
<tr>
<td>Scraper</td>
<td>1</td>
</tr>
<tr>
<td>4 lb. Citric Acid (for basic spills)</td>
<td>1</td>
</tr>
<tr>
<td>4 lb. Sodium Sesquicarbonate (for acidic spills)</td>
<td>1</td>
</tr>
<tr>
<td>5 lb. Vermiculite</td>
<td>1</td>
</tr>
<tr>
<td>Wipes</td>
<td>4</td>
</tr>
<tr>
<td>Litmus paper</td>
<td>1</td>
</tr>
<tr>
<td>Biohazard Bag</td>
<td>1</td>
</tr>
<tr>
<td>Biohazard Mask</td>
<td>2</td>
</tr>
<tr>
<td>Biohazard Gloves</td>
<td>4 pair</td>
</tr>
<tr>
<td>Biohazard Wipes</td>
<td>2</td>
</tr>
<tr>
<td>Hazardous Waste Label</td>
<td>2</td>
</tr>
<tr>
<td>Ziploc Bag</td>
<td>4</td>
</tr>
<tr>
<td>Safety Glasses</td>
<td>2</td>
</tr>
</tbody>
</table>

## Helpful Hints When Using The Contents Of a Chemical Spill Kit

- Get help and bring your chemical spill kit to the site. This is a two-person operation.
- The responsibility of the second person is to stay clean and to hand the materials in when necessary. This person is also to watch the area.
- Ask someone other than your chemical spill partner to call Environmental Health, Safety and Risk Management Department if you do not feel comfortable or feel you can not handle the spill alone.
- Put on Nitrile or 4-H gloves.
- Put on safety goggles.
- You may need to wear a respirator with special filters depending on what has been spilled. Read the MSDS (Material Safety Data Sheet) for the chemical spilled to see if this is necessary. A respirator is not supplied with the spill kit. Chemical resistant suit is for your protection when cleaning up a chemical spill.
Recommended Chemical Spill Kit Contents Sheet w/ Mercury Spill

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Gallon Poly Pal</td>
<td>1</td>
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<td>1</td>
</tr>
<tr>
<td>Wipes</td>
<td>4</td>
</tr>
<tr>
<td>Litmus paper</td>
<td>1</td>
</tr>
<tr>
<td>Biohazard Bag</td>
<td>1</td>
</tr>
<tr>
<td>Biohazard Mask</td>
<td>2</td>
</tr>
<tr>
<td>Biohazard Gloves</td>
<td>4 pair</td>
</tr>
<tr>
<td>Biohazard Wipes</td>
<td>2</td>
</tr>
<tr>
<td>Hazardous Waste Label</td>
<td>2</td>
</tr>
<tr>
<td>Ziploc Bag</td>
<td>4</td>
</tr>
<tr>
<td>Mercury Shaker</td>
<td>1</td>
</tr>
<tr>
<td>Mercury Sponge</td>
<td>1</td>
</tr>
<tr>
<td>Small Jar</td>
<td>1</td>
</tr>
</tbody>
</table>

Helpful Hints When Using The Contents Of a Mercury Spill Kit

- Inside the spill kit there should be a box marked Hg absorb sponges. These sponges are for small mercury spills only.
- Use the Hg Absorb Sponges to remove small droplets of mercury from surface areas.
- Activate sponges before use by moistening with a small amount of water.
- Place the sponge, rough side up, on a level surface. The rough side of the sponge contains the active material which will amalgamate mercury forming a silvery surface.
- Caution: Excessive water may reduce the ability of the sponge to pick-up mercury.
- Spread the water evenly with a gloved finger. After 1 minute the sponge is ready to use. Slowly move the sponge, activated side down, over the surface to be cleaned. The capacity of the sponge can be increased with a small amount of moistened Hg Absorb powder rubbed into the surface of the activated sponge.
- After finishing with the Hg Absorb Sponge, it should be stored in a plastic bag and disposed of properly.
Common Types of Spill Responses

**Flammable liquids / organic solvents**
There are many different organic solvents, most of which are flammable to some extent, used throughout the campus. If the spill is a flammable liquid or organic solvent:

- Use material in the spill kit marked Vermiculite. (Brown absorbent)
- Dike the spill and pour contents of the bag on the chemical spill.
- Completely cover the chemical, and allow the vermiculite to soak up the chemical completely.

If flammable, protect spill from spark and other sources of ignition. Vermiculite can be used to contain (dike) a chemical spill and used to soak up flammable liquids.

**Acid / Base Spills**
Typically, acid and caustic spills can be neutralized. Simple neutralization will reduce a large portion of the hazardous materials incident into a nonhazardous state. This is the simple element of neutralization. There may be a significant amount of heat generated and gases released (e.g. carbon dioxide). The ideal process is to accomplish this in a relatively controlled and anticipated environment. The adaptable concept described below is for a small to medium size spill of one to five gallons. The format may be enlarged to embrace larger spills by adding additional supplies, equipment and personnel. Your unique situation may demand that you pre-plan how your department will react to small chemical spills. We recommend that you try to keep the plan and process as simple as you can. However, please note strong bases (e.g., sodium hydroxide and potassium hydroxide) should not be used in the neutralization process of strong acid. Likewise, strong acids (e.g, hydrochloric acid and sulfuric acid) should not be used in the neutralization process of strong bases.

The first step is to determine the pH of the spilled substance. This can be done by using the pH paper in the chemical spill kit.

**Using the pH paper**
- Tear off a strip (3 to 4 inches long)
- Dip the pH paper into the liquid that has spilled
- Check the color chart that is located on the pH paper tape dispenser

If pH paper is **RED**

- Use material in the bag marked Sodium Sesquicarbonate
- Dike the spill and pour contents of the bag on the spill
- Cover the chemical completely and
- Leave the immediate area and wait 10-15 minutes to allow complete neutralization
- Recheck the pH to see if neutralization has been reached. If not, repeat steps 1-4 until neutralization is complete. You want a pH between 6-9.
Recheck the pH to see if neutralization has been reached. If not, repeat steps until neutralization is complete. You want a pH between 6-8.

If pH paper is **BLUE**

- Use material in the bag marked Citric acid.
- Dike the spill and pour contents of the bag on the spill.
- Cover the chemical completely
- Leave the immediate area and wait 10-15 minutes to allow complete neutralization.
- Recheck the pH to see if neutralization has been reached. If not, repeat steps 1-4 until neutralization is complete. You want a pH between 6-8.

During chemical neutralization, heat and fumes may be given off. Once the chemical has started to react leave the immediate area for 15 minutes before returning.

**Common Neutralization Reactions**

**Acidic Solutions**
Add (sodium sesquicarbonate) to solutions whose pH is between 0-6.
- Hydrochloric acid + sodium sesquicarbonate = heat + carbon dioxide + salt + water

**Caustic or Alkaline Solutions**
- Add (citric acid) to solutions whose pH is between 8-14.
- Sodium hydroxide + citric acid = heat + salt + water

**Disposal**

**All Spilled Chemicals**
Use the following instruction to clean up and dispose of any type of spilled chemicals.
- Scoop the material up into a big zip-lock bag or container.
- Dispose of all used gloves, chemical resistant suits, and other contaminated materials into bag also.
- Put red and white Hazardous Waste Label with contents and date on the disposal bag.
- It is the responsibility of the department to properly dispose of the waste generated due to the chemical spill.
- If possible, have area mopped after clean up.
- Fill out Chemical Incident Form located on the next page and attach this form to the container of spilled material and mail a copy to the Environmental Health, Safety and Risk Management Department (Box 6113).
CHEMICAL SPILL INCIDENT SHEET
Stephen F. Austin State University

TIME: ___________ NOTIFIED BY ________________________________

DATE: _______ PHONE: _______ DEPARTMENT: _______________________

EXACT LOCATION OF INCIDENT: _______________________________________
(be specific)

TYPE OF CHEMICAL: Hg _______ Acid_________ Alkaline_________

FLAMMABLE LIQUIDS _______ BIOHAZARD _______ OTHER_________

SIZE: QT _______ 5 GAL _______ 55 GAL _______ OTHER_________

LIST SUPPLIES USED FOR CLEAN-UP: __________________________________

_______________________________________________________________________

SPECIAL PROBLEMS ENCOUNTERED _______________________________________

_______________________________________________________________________

SIGNATURE_________________________________________________________

----------------------------- Environmental Health, Safety, and Risk Management Department
Use Only-----------------------------------------

TCEQ WASTE CODE _______________ DISPOSED OF _____________________

EPA WASTE CODES _______________ MANIFEST #_______________________
C. BIOLOGICAL SPILL PROCEDURES
The following procedures are provided as a guideline to biohazardous spill cleanup. In each of the following cases, depending on the size of the spill, notify everyone in the lab, and call the Environmental Health, Safety, and Risk Management Department (468-4532). If a spill contains BSL-2 or greater containment material, or if the spill is considered too large or too dangerous for laboratory personnel to safely clean up, secure the area—including the whole lab—and call the Environmental Health, Safety, and Risk Management Department immediately for assistance.

Spills Inside a Biosafety Cabinet (BSC)
- Wait at least five minutes to allow the BSC to contain aerosols.
- Wear lab coat, safety glasses and gloves during cleanup.
- Allow cabinet to run during cleanup.
- Apply disinfectant and allow a minimum of 20 minutes contact time.
- Wipe up spillage with disposable disinfectant-soaked paper towel.
- Wipe the walls, work surface and any equipment in the cabinet with a disinfectant-soaked paper towel.
- Discard contaminated disposable materials using appropriate biohazardous waste disposal procedures (e.g., autoclave or bag for disposal).
- Place contaminated reusable items in biohazard bags for proper disposal.
- Expose non-autoclavable materials to disinfectant (20 minute contact time) before removal from the BSC.
- Remove protective clothing used during cleanup and place in a biohazard bag for autoclaving.
- Run cabinet 10 minutes after cleanup before resuming work or turning cabinet off.

Spills Outside a BSC
- Call the Environmental Health, Safety, and Risk Management Department if the material is BSL-2 or greater containment.
- Clear area of all personnel. Wait at least 15 minutes for aerosol to settle before entering spill area.
- Remove any contaminated clothing and place in biohazard bag to be disposed of properly.
- Put on a disposable gown, safety glasses and gloves.
- Initiate cleanup with disinfectant as follows:
  1. Place dry paper towels on spill (to absorb liquids); then layer a second set of disinfectant soaked paper towels over the spill.
  2. Encircle the spill with additional disinfectant being careful to minimize aerosolization while assuring adequate contact.
  3. Decontaminate all items within the spill area.
  4. Allow 20 minutes contact time to ensure germicidal action of disinfectant.
  5. Wipe equipment with appropriate disinfectant.
  6. Discard contaminated disposable materials using appropriate biohazardous waste disposal procedures (e.g., autoclave or private contractor).
  7. Disinfect reusable items.
Spill Inside a Centrifuge
- Clear area of all personnel.
- Wait 30 minutes for aerosol to settle before attempting to clean up spill.
- Wear a lab coat, safety glasses and gloves during cleanup.
- Remove rotors and buckets to nearest biological safety cabinet for cleanup.
- Thoroughly disinfect inside of centrifuge.
- Discard contaminated disposable materials using appropriate biohazardous waste disposal procedures.

Spills Outside the Lab, In Transit
- Transport labeled biohazardous material in an unbreakable, well-sealed primary container placed inside of a second unbreakable, lidded container (cooler, plastic pan or pail) labeled with the biohazard symbol.
- Should a spill occur in a public area, do not attempt to clean it up without appropriate personal protective equipment.
- Secure the area, keeping all people well clear of the spill.
- Call Environmental Health, Safety, and Risk Management Department at 468-4532 to assist in cleanup.
- Standby during spill response and cleanup activity and provide assistance only as requested or as necessary.

See the disposal of Biohazardous Wastes section for proper disposal of spill cleanup material. All spills should be reported to the Environmental Health, Safety and Risk Management Department. A Biological Incident Form located on the next page should be filled out and attached to the container of spilled material and a copy should be mailed to the Environmental Health, Safety and Risk Management Department (Box 6113).
TIME: ___________ NOTIFIED BY ____________________________________________

DATE: _______ PHONE: _______ DEPARTMENT: ______________________________

EXACT LOCATION OF INCIDENT: ___________________________________________
(be specific)

TYPE OF BIOHAZARD ______

AMOUNT ______

LIST SUPPLIES USED FOR CLEAN-UP: ______________________________________

________________________________________________________________________

SPECIAL PROBLEMS ENCOUNTERED _________________________________________

________________________________________________________________________

SIGNATURE______________________________________________________________
D. RADIATION, SPILL, ACCIDENT, DECONTAMINATION, AND EMERGENCY PROCEDURES

Spill
- Notify all personnel in the room of the spill.
- If personnel are contaminated, personnel decontamination should proceed immediately using proper techniques.
- Confine the spill as soon as possible.
- Notify the Radiation Safety Officer and the Environmental Health, Safety, and Risk Management Department at 468-4532 immediately of significant personnel contamination or large spills.
- Decontaminate the area using personnel protective equipment and proper techniques.
- Perform surveys and wipe tests to verify that the area has been adequately decontaminated.
- Dispose of all radioactive waste properly.

Accident

Accident involving radioactive dust, mist, fume, organic vapor, or gas
- Notify all personnel to vacate the room immediately.
- Hold breath and vacate the room.
- Notify the Radiation Safety Officer and the Environmental Health, Safety, and Risk Management Department at once (468-4532).
- Keep all access doors locked.
- Do not re-enter the room until approval of the Radiation Safety Officer is obtained.

Accident involving Personnel Injury
- Call the SFASU Police at extension 911 if a physician is needed or for life threatening situation.
- Proceed with personnel decontamination if possible.
- All radiation accidents (wound, overexposure, ingestion, inhalation) must be reported to the Radiation Safety Officer and the Environmental Health, Safety, and Risk Management Department at 468-4532 as soon as possible.
- No one involved in a radiation injury will be permitted to return to work without the approval of the Radiation Safety Officer.
Decontamination

Area
- Attend to the spill as soon as possible.
- All persons not involved and not contaminated should leave the area.
- Put on lab coat, protective eyewear, gloves and shoe covers if available before entering the room or area.
- Prevent liquids from spreading by placing any absorbing material over it.
- Monitor the spill, equipment, and people involved to determine the radiation exposure levels.
- Wash the area with a minimum of soapy water or a standard radioactive decontaminating agent. Using paper towels, start at the furthest end or the place of least contamination and move inwards toward the highest point of contamination. Dispose of all radioactive waste properly.
- Using a filter paper or cotton swab, wipe the area. Count the wipe using a scintillation or gamma counter. If the count is greater than 200 dpm, repeat area decontamination until the count is below this level of contamination.
- Once the affected area has been blotted dry, scrub the contaminated area with soap and water. Continue this process until the contamination is less than 1,000 dpm/100 cm$^2$ of the removable contamination. If the contaminated area cannot be reduced to these levels, the area should be covered with an impervious material (e.g. diaper paper) to prevent further contamination. If the spill produces radiation fields exceeding 2 mrem hr$^{-1}$ at one foot from the source, appropriate shielding material should be placed on the area. If shielding is not feasible, access to the spill zone should be restricted. All areas of non-removable contamination should be labeled with cautionary information, and personnel in the area should be notified. The Radiation Safety Officer is available to supervise personnel concerning decontamination of surfaces, appropriate shielding, and restriction of access.

Personnel
- For contamination of the skin, use light pressure with heavy lather. Wash for 2 minutes, 3 times. Rinse and monitor. Use care not to scratch or erode the skin. (Do not scrub contaminated skin). Use warm not hot water, and avoid reddening the skin.
- Contaminated clothing, including shoes, should be removed before the individual leaves the area. This clothing shall be labeled and held for storage until decayed, decontaminated, or properly disposed. Thorough washing, preferably showers, should be accomplished immediately where major personnel contamination has occurred.
- Cover with sterile dressing and seek medical attention at once.
- Monitor personnel after washing. Repeat if necessary.
- Minor cuts should be encouraged to bleed, thereby reducing absorption.
- Treatment of major cuts should be considered before decontamination.
Emergency

Radiation emergencies are incidents which involve actual or suspected exposure to uncontrolled sources of radioactivity that cause or threaten to cause an external dose in excess of twenty-five (25) rem to the whole body, or gross radioactive personnel contamination resulting in ingestion, inhalation, injection, or skin absorption of radioactive material leading to comparable risk

- Emergencies will be dealt with according to their nature that may include fire, spill, accident, injury, or a combination. The following is the basics for the handling of all emergencies:
- Life-saving or first aid measures take precedence over radiation hazards and decontamination efforts.
- Notify all personnel in the area.
- Contain or secure the radioactive material if possible.
- Take care of injuries and remove injured personnel from the area when possible.
- Notify the Radiation Safety Officer and the Environmental Health, Safety, and Risk Management Department at 468-4532 as soon as possible.
- Permission from the Radiation Safety Officer must be obtained to continue or return.
- Apply decontamination procedures when possible.
- The Radiation Safety Officer will notify the appropriate agencies of any incidents required to be reported.

See the disposal of Radioactive Wastes section for proper disposal of spill cleanup material. All spills should be reported the Environmental Health, Safety and Risk Management Department. A Radiation Incident Form located on the next page should be filled out and attached to the container of spilled material and a copy should be mailed to the Environmental Health, Safety and Risk Management Department (Box 6113).
RADIATION SPILL INCIDENT SHEET
Stephen F. Austin State University

TIME: _____________ NOTIFIED BY ____________________________________________

DATE: _______ PHONE: _______ DEPARTMENT: _____________________________

EXACT LOCATION OF INCIDENT: ________________________________________
(be specific)

TYPE OF RADIATION _________

AMOUNT _________

LIST SUPPLIES USED FOR CLEAN-UP: ______________________________________
_______________________________________________________________________
_______________________________________________________________________

SPECIAL PROBLEMS ENCOUNTERED _______________________________________
_______________________________________________________________________
_______________________________________________________________________

SIGNATURE ____________________________________________________________
E. DECONTAMINATION STANDARD OPERATING PROCEDURE

This procedure should be followed in the event of an emergency where a victim or equipment should need to be decontaminated due to a chemical, biological, or radioactive release or spill. When planning to decontamination in a medical emergency, procedures should be followed to ensure:
- Decontamination of the victim
- Protection of medical personnel
- Disposing of contaminated protective equipment and wash solutions

The decision whether or not to decontaminate a victim is based on the type and severity of the illness or injury and the nature of the contaminant. For some emergency victims, immediate decontamination may be an essential part of life-saving first aid. For others, decontamination may aggravate the injury or delay life-saving treatment. If decontamination does not interfere with essential treatment, it should be performed.
- If decontamination can be done:
  Wash, rinse and/or cut off protective clothing and equipment.
- If decontamination cannot be done:
  Wrap the victim in blankets, plastic, or rubber to reduce contamination of other personnel.

Alert emergency and offsite medical personnel to potential contamination; instruct them about specific decontamination procedures if necessary.
- Send along site personnel familiar with the incident.

EQUIPMENT

In an emergency, equipment will be necessary to rescue and treat victims, to protect response personnel, and to mitigate hazardous conditions on site (e.g., to contain hazardous materials or fight fires). Some regular equipment can double for emergency use. Provide safe and unobstructed access for all firefighting and emergency equipment at all times. Consider adopting the following work procedures.

For personnel protective equipment:
- Basic equipment that should be available at any site in Table A on the next page. Special equipment should be obtained depending on the specific types of emergencies that may occur at a particular site and the capabilities of backup offsite personnel. When determining the type and quantity of special equipment, the following factors should be considered:
  - The types of emergencies that may arise. For each emergency, consider a probable and a worst-case scenario.
  - The types of hazards that site personnel may be exposed to and the appropriate containment, mitigative, and protective measures.
  - The capabilities and estimated response times of offsite emergency personnel.
  - The numbers of site personnel who could be victims during an emergency.
  - The probable number of personnel available for response.
Table A
Onsite Equipment and Supplies for Emergency Response

Personal Protection Medical Hazard Mitigation

- Blankets
- Antiseptics
- Spill-containment equipment such as absorbents and oil
- Personal protective equipment and clothing specialized for known site hazards.
- Emergency Eye Wash
- Containers to hold contaminated materials and clothing.
- Half face respirators and cartridges
- Emergency Safety Showers
- Acid and Base Neutralizers
- Ice
- Other clean up gear such as chemical resistant shovels
- Reference books containing scoops etc. basic first-aid procedures and information on treatment of specific chemical injuries.
- Stretcher
- Water in portable containers
- Persons trained in CPR

MEDICAL TREATMENT / FIRST AID

In emergencies, toxic exposures and hazardous situations that cause injuries and illness will vary from site to site. Medical treatment may range from bandaging of minor cuts and abrasions to life-saving techniques. In many cases, essential medical help may not be immediately available. For this reason, it is vital to train onsite emergency personnel in on-the-spot treatment techniques, to establish and maintain telephone contact with medical experts (e.g., toxicologists), and to establish liaisons with local hospitals and ambulance services. When designing this program, these essential points should be included:

- Train personnel in emergency treatment such as first aid and CPR. Training should be thorough, frequently repeated, and geared to site-specific hazards.
- Establish liaison with local medical personnel, for example: 24-hour-on-call physician, medical service, and poison control center. Inform and educate these personnel about site-specific hazards so that they can be optimally helpful if an emergency occurs. Develop procedures for contacting them; familiarize all on-site emergency personnel with these procedures.
- Set up onsite emergency first-aid stations; see that they are well supplied and restocked immediately after each emergency.
EMERGENCY RESPONSE PROCEDURES
Response operations usually follow a sequence that starts with the notification of trouble and continue through the preparation of equipment and personnel for the next emergency.

A. NOTIFICATION
Alert personnel to the emergency. Sound a site alarm to:
- Notify personnel.
- Stop work activities if necessary.
- Lower background noise in order to speed communication.
- Begin emergency procedures.
- Notify on-site emergency response personnel about the emergency and include essential information.
  * What happened?
  * Where it happened?
  * Whom it happened to?
  * When it happened?
  * How it happened?
  * The extent of damage.
  * What aid is needed?

B. SIZE-UP
Available information about the incident and emergency response capabilities should be evaluated. The following information should be determined, to the extent possible:
- What happened?
- Type of incident.
- Cause of incident.
- Extent of chemical release and transport.
- Extent of damage to structures, equipment, and terrain.

Casualties:
1. Victims (number, location, and condition)
2. Treatment required.

What could happen? Consider:
1. Type of chemicals on site.
2. Potential for fire, explosion, and release of hazardous substances.
3. Location of all personnel on site relative to hazardous areas.
4. Potential for danger to offsite population or environment.

What can be done? Consider:
1. Equipment and personnel resources needed for victim rescue and hazard mitigation.
2. Number of uninjured personnel available for response.
3. Resources available on site.
4. Resources available from outside groups and agencies.
5. Time for outside resources to reach the site.
6. Hazards involved in rescue and response.
C. RESCUE / RESPONSE PROCEDURES
Based on the available information, the type of action required should be decided and the necessary steps implemented. Some actions may be done concurrently. No one should attempt emergency response or rescue until backup personnel and evacuation routes have been identified. Rescue / response actions may include.

**Enforce the buddy system:**
Allow no one to enter an Exclusion Zone or hazardous area without a partner. At all times, personnel in the Exclusion Zone should be in line - of - site or communication contact with the Command Post Supervisors or designee.

**Survey casualties:**
Locate all victims and assess their condition. Determine resources needed for stabilization and transport.

**Assess existing and potential hazards to site personnel and to the offsite population. Determine:**
1. Whether and how to respond.
2. The need for evacuation of site personnel and offsite population.
3. Resources needed for evacuation and response.

**Allocate resources:** Allocate onsite personnel and equipment to rescue and incident response operations.

**Request aid:** Contact the required offsite personnel or facilities, such as the ambulance, fire department, and police.

**Control:** Bring the hazardous situation under complete temporary control; use measures to prevent the spread of the emergency.

**Extricate:** Remove or assist victims from the area.

**Decontaminate.** Use established procedures to decontaminate uninjured personnel in the Contamination Reduction Zone. If the emergency makes this area unsafe, establish a new decontamination area at an appropriate distance. Decontaminate victims before or after stabilization as their medical condition indicates.

**Stabilize.** Administer any medical procedures that are necessary before the victims can be moved. Stabilize or permanently fix the hazardous condition (e.g., repack, empty filled runoff dikes). Attend to what caused the emergency and anything (e.g., drums, tanks) damaged or endangered by the emergency.
Transport: Take measures to minimize chemical contamination of the transport vehicle and ambulance and hospital personnel. Adequately protected rescuers should decontaminate the victims before transport. If this is not possible, cover the victims with adequate sheeting. Before transportation, determine the level of protection necessary for transport personnel. Provide them with disposable coveralls, disposable gloves, and supplied air, as necessary, for their protection. If appropriate, have response personnel accompany victims to the medical facility to advise on decontamination.

Evacuate:
Move site personnel to a safe distance upwind of the incident. Monitor the incident for significant changes. The hazards may diminish, permitting personnel to reenter the site, or increase and require public evacuation. Inform public safety personnel when there is a potential or actual need to evacuate the offsite personnel. Do not attempt a large-scale public evacuation. This is the responsibility of government authorities.

D. FOLLOW-UP
Before normal site activities are resumed, personnel must be fully prepared and equipped to handle another emergency.

- Notify appropriate government agencies as required. For example, OSHA must be notified if there have been any fatalities or five or more hospitalizations in an industrial situation.

- Restock all equipment and supplies. Replace or repair damaged equipment. Clean and refuel equipment for future use.

- Review and revise all aspects of the Contingency Plan according to new site conditions and lessons learned from the emergency response. When reviewing the information, consider typical questions such as:

  Cause: What caused the emergency?
  Prevention: Was it preventable? If so, how?
  Procedures: Were inadequate or incorrect orders given or actions taken? Were these the result of bad judgment, wrong or insufficient information, or poor procedures? Can procedures or training be improved?
  Site profile: How does the incident affect the site profile? How are other site cleanup activities affected?
  Community: How is the community safety affected?
  Liability: Who is liable for damage payments?
E. DOCUMENTATION
The Environmental Health, Safety, and Risk Management Department should initiate the investigation and documentation of the incident. This is important in all cases, but especially so when the incident has resulted in personal injury, onsite property damage, or damage to the surrounding environment. Documentation may be used to help avert recurrences, as evidence in future legal action, for assessment of liability by insurance companies, and for review by government agencies. Methods of documenting can include a written transcript taken from tape recordings made during the emergency or a bound field book (not a loose-leaf notebook) with notes. The document must be:

- **Accurate:** All information must be recorded objectively.
- **Authentic:** A chain-of-custody procedure should be used. Each person making an entry must date and sign the document. Keep the number of documentaries to a minimum (to avoid confusion and because they may have to give testimony at hearings or in court). Nothing should be erased. If details change or revisions are needed, the person making the notation should mark a horizontal line through the old material and initial the change.
- **Complete:** At a minimum, the following should be included:

  - **Chronological history of the incident.**
    - Facts about the incident and when they became available.
    - Title and names of personnel; composition of teams.
    - Actions: Decisions made and by whom, orders given; to whom, by whom, and when; and actions taken: who did what, when, where and how.
    - Types of samples and test results; air monitoring results.
    - Possible exposures of site personnel.
    - History of all injuries or illnesses during or as a result of the emergency.
XI. Appendix

Identification of Hazardous Chemical Waste

All generators of waste materials are required to determine whether their waste is a "hazardous waste". Two methods to make this determination are outlined in Environmental Protection Agency (EPA) regulations, found in 40 CFR Part 261.* The first method of identification requires the generator to check the waste against prescribed lists of hazardous waste compiled by the EPA, while the second method examines the characteristics of the generator's waste for hazardous properties.

Through the first method of identification, waste materials or mixtures specifically listed in EPA regulations have been determined by the Agency to be hazardous and, thus, are subject to regulation. The EPA lists cover the following materials: 1) industrial process wastes from non-specific sources. (Identified in F-list) wastes from specific sources (Identified in K-List) wastes from discarded commercial chemical products, off-specification chemicals, container residues, and residues from spills (Identified in the P and U lists).

The second means by which a waste is classified as hazardous is by possessing one or more of the following hazardous characteristics: ignitability (§261.21), corrosivity (§261.22), reactivity (§261.23), or toxicity (§261.24). Refer to the original regulations cited, for additional description of these categories. All EPA lists are revised periodically.


Certain wastes are excluded automatically from regulation as a hazardous waste. These materials include domestic sewage, some solid wastes such as agricultural wastes, animal wastes, and wastes from combustion of coal and other fossil fuels.

Also excluded from regulation are certain materials that are intended for recycling by the generator. At Stephen F. Austin State University, items falling into this category include those materials that are no longer needed or wanted by a given laboratory, but which may still have value to others on campus.
## EMPLOYEE TRAINING ROSTER
### Hazardous Waste Training

Department/Work Area: ______________________________________________________

Instructor: __________________________________ Date: _____________________

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All Hazardous Waste Training shall be documented on the Hazardous Waste Training Roster, which shall be forwarded to the Environmental Health Safety and Risk Management Department (Box 6113) prior to December 31st of each year.