

Appendix F:

Chemical Spill Response Guidelines

The range of types and quantities of hazardous substances used in UTK teaching and research laboratories make it impractical to provide a comprehensive plan for dealing with chemical spill incidents. Each lab group is expected to deal with minor spills (see definitions, below) occurring in their area. This requires pre-planning, training and rehearsal.

This document provides a template for the development of an individualized spill response plan. Download and modify the document to suit your needs.

1. Types of Spills

- Minor spills are those which can be handled by the lab group, typically low volumes of materials that are not volatile, highly toxic or highly reactive.
- Major spills are those which require notification of or assistance from EHS and/or other external agencies. A spill should be considered major in the following instances:
 - There is a fire or the threat of fire.
 - There is personal injury or exposure likely to require medical assistance.
 - The spill involves unknown, volatile, highly toxic, or highly reactive material. There is a release of a toxic or flammable gas outside of a controlled space.

2. Personnel to Be Notified

Position	Name	Work Phone	Home/Cell Phone
Lab Manager			
Primary Investigator			
DSO/Building Manager			
UT Police		865-974-3111 or 911	
UTK EHS		865-974-5084	
Add Lines as Needed			

3. Spill Control/Containment Material/Supplies

Spill control/containment materials for this laboratory are located _____
(See the Material tables in this document for a recommended list of materials/supplies).

4. Minor Chemical Spill Procedures

Note: Long pants and non-absorbent shoes must be worn when cleaning up chemical spills.

- Alert people in the immediate area of spill.
- Put on protective equipment, including safety goggles, suitable gloves, and long sleeved lab coat.
- Confine spill to small area.
- Use appropriate materials to neutralize and absorb inorganic acids and bases.
- For other liquids, absorb spill with vermiculite, dry sand, or adsorbent pads.

- For solid spills. Cover the spill with a slightly damp paper towel to avoid creating a cloud of dust, Push the material into a dustpan or other instrument using the towel. Do not use a broom/dust brush.
- Collect material, used adsorbents/neutralizing agents, etc. in a polyethylene bucket or bag.
- Bring collected material to the appropriate waste rooms during scheduled waste pick-ups. If the material is a PHS, contact EHS at 865-974-5084 or ehs_labsafety@utk.edu for immediate pick-up.

5. Major Chemical Spill Procedures

- Secure the area.
- Attend to injured or contaminated persons and remove them from exposure.
- Alert people in the area to evacuate. If danger is believed sufficient - pull the fire alarm and evacuate the building.
- If spill material is flammable, turn off ignition and heat sources if that can be done safely.
- Close doors to affected area.
- Call UT Police 865-974-3111. Provide as much of the following as is known.
 - Spill location , chemical(s) involved and approximate amount spilled
 - Nature of any injuries
 - What control measures have been taken
 - Your name and phone number (or where you will be located)
- Meet responders.

6. Type of Material/Clean-Up Procedure

Table F1 below provides a synopsis of types of chemicals that may be spilled and recommended clean-up materials. This list should be amended to add any chemicals requiring special procedures. As always, the SDS on the particular chemical is a preferable reference. If you choose to purchase pre-packaged, commercially available spill kits, the clean-up procedures should be modified to reflect the kit instructions.

Table F1. Quick Reference for Spill Clean-ups	
Chemical Spilled	Clean-Up Procedures
Acids, organic	Apply sodium bicarbonate. Adsorb with spill pillow or vermiculite.
Acids, inorganic	Apply sodium bicarbonate/calcium oxide or sodium carbonate/calcium oxide. Adsorb with spill pillow or vermiculite. NOTE: Hydrofluoric acid is an exception to the general practice, see below.
Acid chlorides	Do not use water. Absorb with sand or sodium bicarbonate.
Aldehydes	Absorb with spill pillow or vermiculite.
Aliphatic amines	Apply sodium bisulfite. Adsorb with spill pillow or vermiculite.
Aromatic amines	Absorb with spill pillow or vermiculite. Avoid skin contact or inhalation.
Aromatic halogenated amines	Absorb with spill pillow or vermiculite. Avoid skin contact or inhalation.
Azides	Absorb with spill pillow or vermiculite. Neutralize with 10% ceric ammonium nitrate solution.
Bases (caustic alkalis)	Neutralize with acid, citric acid, or commercial chemical neutralizers. Absorb with spill pillow or vermiculite.
Carbon disulfide	Adsorb with spill pillow or vermiculite.
Chlorohydrins	Absorb with spill pillow or vermiculite. Avoid skin contact or inhalation.

Table F1. Quick Reference for Spill Clean-ups

Chemical Spilled	Clean-Up Procedures
Cyanides	Cover solids with damp paper towel and push onto dust pan or use a HEPA filter vacuum to collect the solids. Absorb with spill pillow or vermiculite.
Halides, organic or inorganic	Apply sodium bicarbonate.
Halogenated hydrocarbons	Absorb with spill pillows or vermiculite.
Hydrazine	Avoid organic matter. Apply "slaked lime". Adsorb with spill pillow or vermiculite.
Hydrofluoric acid CAUTION!	Adsorb with calcium carbonate (limestone) or lime (calcium oxide). The use of sodium bicarbonate will lead to the formation of sodium fluoride, which is considerably more toxic than calcium fluoride. CAUTION: Some spill pillows contain silicates that are incompatible with hydrofluoric acid.
Inorganic salt solutions	Apply soda ash.
Mercaptans/organic sulfides	Neutralize with calcium hypochlorite solution. Absorb with spill pillow or vermiculite.
Nitriles	Sweep up solids. Absorb liquids with spill pillows or vermiculite.
Nanoparticles	Pick up particles with a HEPA or ULPA filtered vacuum.
Nitro compounds/organic nitriles	Absorb with spill pillow or vermiculite. Avoid skin contact or inhalation.
Oxidizing agents	Apply sodium bisulfite.
Perchloric acid	Neutralize with sodium bicarbonate or other inorganic acid neutralizer. Sweep up neutralized spill with a non-flammable material and then clean the spill area thoroughly with water. DO NOT use rags, paper towels, sawdust, or other organic materials to soak up perchloric acid spills.
Peroxides	Absorb with spill pillow or vermiculite.
Phosphates, organic and related	Absorb with spill pillow or vermiculite.
Reducing substances	Apply soda ash or sodium bicarbonate.

7. Spill Clean Up Materials

Each laboratory/or lab group should have enough material to handle a spill that represents the worst-case scenario. Ensure that appropriate PPE (e.g. chemical-resistant gloves, splash goggles, shoe covers, chemical-resistant lab coats/Tyvek, etc.) is available. Additionally, each laboratory, especially those with floor drains should have spill socks, pillows, pads or bulk absorbent to prevent hazardous materials from being released into the environment. **Table F2** below represents contents of a spill kit for a “typical” laboratory. If your lab contains special hazards not addressed in this guidance, consult the relevant literature or contact EHS at 865-974-5084 or ehs_labsafety@utk.edu.

Table F2. Spill Kits and Usages

Material	Spill Type	What it Does
Mercury adsorb powder	Elemental mercury	Converts elemental mercury on work surfaces, in cracks, and hard to reach places into metal/mercury amalgam.

Table F2. Spill Kits and Usages

Material	Spill Type	What it Does
Dry acid neutralizer	All acids except hydrofluoric acid (HF)	Neutralizes acids
Dry Hydrofluoric acid neutralizer	Hydrofluoric acid	Neutralizes hydrofluoric acid
Dry base neutralizer	Bases/caustics	Neutralizes bases
Formaldehyde polymerizer	Formaldehyde/formalin	Reacts with water based formaldehyde solutions to form a nontoxic, polynoxylin polymer which yields a plastic like solid
Activated carbon	Flammable solvents	Cleans up flammable solvent spills and suppresses hazardous vapors
Solid-A-Sorb	All spills except HF	Mixes well with water and oil-based substances
Sorbent pads	Liquids	Quickly contains small spills
Sorbent socks or booms	Liquids	Quickly contains larger spills
Hydrophobic (oil-only) absorbent spill socks	Oil/pump oil spills	Absorbs oil spill and forms a barrier around floor drains to prevent oil from entering waterway
Oil spill pads	Oil/pump oil	For placement under pumps and work tops to absorb oil used in procedures