UNIVERSITY OF HOUSTON
ENVIRONMENTAL HEALTH AND RISK MANAGEMENT

SECTION: CHEMICAL SAFETY

SUBJECT: GENERAL CHEMICAL SPILL CONTROL PROCEDURES

INTRODUCTION

There are numerous different chemicals used throughout the University of Houston on daily basis. These chemicals are used in a variety of settings such as laboratories, 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 chemical user should consult the Material Safety Data Sheet (MSDS) for the specific chemical that he/she plans to work with and consider response options in case of a spill or release *beforehand.* With the high level of chemical activity (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 small spills in which the user has a thorough knowledge of the chemical 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 the Environmental Health and Risk Management Department (EHRM) for assistance.

Contact EHRM during business hours: Monday through Friday from 8:00 am till 5:00 pm at (713) 743-5858.

At any other time call the UH Police at 911 for Emergencies (713) 743-3333 for Non-emergencies

Spill Response Kit Availability

The University of Houston Research Stores located on the second floor of the Science Building (502) has several spill response kits available that users may want to utilize in their specific chemical area. Currently there are three types of kits available: chemical, mercury and radioactive material. A current listing of available kits is available on this web site by clicking on Chemical Related Safety Website. The chemical and mercury spill response kits will be discussed in this section. Information on radioactive spilled material is available on this web site by simply clicking back to the home page and click on Radiation Safety.

As stated previously, users are expected to handle small spills (i.e. typically up to 5 gallons and 3 or less known chemicals involved) in a safe manner without assistance. The chemical response kits available from Research Stores are designed to handle these types of situations. These kits include the following:

Chemical Spill Kit Contents

ITEM	QUANTITY
5 Gallon Poly Pal	1
Sock/Boom, 3" x 4 '	2
Spill Pillows, 2 liter	2
Disposal Bag	2
4H Gloves, Size 11	2 pair
Nitrile Gloves	2 pair
Tyvek QC Coveralls, XL	2
1 Quart Scoop	1
Scraper	1
4 lb. Citric Acid (for basic spills)	1
4 lb. Sodium Sesquicarbonate (for acidic spills)	1
5 lb. Vermiculite	1
Wipes	4
Litmus (pH) paper	1
Biohazard Bag	1
Biohazard Mask	2
Biohazard Gloves	4 pair
Biohazard Wipes	2
Hazardous Waste Label	2
Ziploc Bag	4

The EHRM recommends the following helpful hints when using this kit:

- Get help and bring your chemical spill kit to the actual site. This is a two-person operation.
- The responsibility of the second person is to stay clean and to hand the supplies as needed to the first responder. This person should also be ready to summon help if needed.
- Put on Nitrile or 4-H gloves.
- Put on safety goggles. They are not provided on the spill kit; however, you should have your own on site.

Depending on what chemical has been spilled you may need to wear a respirator with special filters. Read the MSDS for the chemical spilled to see if this is recommended. A respirator is not supplied with the spill kit and if you have no training in the use of respirators you should seek outside assistance. *A spill response is not the time for your initial respirator use and training.*

Another spill response kit available from Research Stores is the mercury spill kit. These kits include the following:

Mercury Spill Kit Contents

ITEM	QUANTITY
Zinc Shavings (Mercury Absorb)	**1 container**
Sponges	**4**
Safety Glasses	**1 pair**
Disposal Bag	**1**
Vinyl Gloves	**2 pair**

The EHRM recommends the following helpful hints when using this kit:

- Inside the spill kit there is 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 through EHRM. Label spill with red and white Hazardous Waste label with contents name and date.

Common Types Spill Responses

The following section is presented by the EHRM as reference material for the most common types of spills that occur around the campus. However, each spill is unique and you should only perform spill response actions to the level of your training. Call the EHRM or UH Police if conditions change or you need assistance.

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 non-hazardous 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 (i.e. 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
- 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 until neutralization is complete. You want a pH level between 6 and 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 until neutralization is complete. You want a pH level between 6 and 8.

Common Neutralization Reactions

Here are some common neutralization reactions that the responder may utilize during a spill response:

- *For acidic solutions*
  Add (sodium sesquicarbonate) to solutions whose pH is between 0 and 6.

$$HCl + SodiumSesquicarbonate = Heat + CO2 + Salt + H2O$$

- *For caustic or alkaline solutions*
  Add (citric acid) to solutions whose pH is between 8 and 14.

$$SodiumHydroxide + CitricAcid = Heat + Salt + H2O$$

Disposal

After the immediate spill response effort has brought the situation back under control it is time to clean up the area and consolidate the spilled materials into a container. The container should be labeled and dated. Used gloves and other contaminated material should also be placed in a container (i.e. bag, pail etc.) and labeled with the contents and date.

Summit an EHRM Hazardous Waste Pickup Request Form online to arrange for a waste pick-up. These procedures are outlined in the Hazardous Waste Manual section of this website.