

# GENERAL WRITTEN SOP- Chemical Spill Clean-Up Procedures

## Introduction

Despite the best effort of researchers to practice safe science in the laboratory, accidents resulting in the release of chemicals will occur. For this reason, it is essential that laboratory personnel have a spill response plan which includes appropriate procedures and materials to adequately contain and cleanup a spill. The following procedures should be used as a guide to help laboratory personnel design an effective spill control plan for their laboratory.

Individuals should be familiar with the properties and hazards of the materials with which they work with. In the event of a chemical spill, the individual(s) who caused the spill is responsible for prompt and proper clean-up. Improper clean-up of a chemical spill may result in injury, illness, fire, a release to the environment, or property damage. Planning for chemical spills is essential. Before beginning work with chemicals, one should be sure that he or she has adequate training for cleaning up small spills, and that the appropriate types and amounts of spill clean-up materials and personal protective equipment are immediately available.

## Scope and Application

*Janitors and maintenance workers* are neither expected, nor allowed, to clean up chemical spills other than their own. *Citadel-Police/Campus Safety* personnel have been trained to make the proper notifications, but not to clean up chemical spills. *Principal investigators, employees, and students* working in research labs should be aware that required safety training for lab workers includes emergency response training. The OSHA Hazard Communication Standard and the OSHA Standard for Hazardous Waste Operations and Emergency Response (HAZWOPER) mandate such training.

Emergency training applies to building evacuation procedures during fires and explosions, recognition of system alarms, and appropriate action in the event of spills of hazardous materials in the lab. Lab workers must receive training to distinguish between the types of spills they can handle on their own and those spills which are classified as "MAJOR." Major spills dictate the need for outside help.

Lab workers are qualified to clean up spills that are "incidental and/or minor". OSHA defines an incidental spill as a spill that does not pose a significant safety or health hazard to employees in the immediate vicinity nor does it have the potential to become an emergency within a short time frame. The period that constitutes a short time is not defined. Lab workers can handle incidental spills because they are expected to be familiar with the hazards of the chemicals they normally handle. If the spill exceeds the scope of the lab workers' experience, training and willingness to respond, the workers must be able to determine that the spill cannot be dealt with internally.

Emergency assistance is provided by EHS or an outside agency. Spills requiring the involvement of individuals outside the lab are those exceeding the "normal" exposure. Spills in this category are those which have truly become emergency situations in that lab workers are overwhelmed above their level of training. Their response capability is compromised by the magnitude of the incident.

## Procedures

Pre-planning is essential to safely and properly handling a spill. Individuals working with chemicals should consider the following items to prepare themselves for spill control and clean-up:

1. Review Safety Data Sheets or other references for recommended spill clean-up methods and materials, and the need for personal protective equipment (e.g., respirators, gloves, etc.).
2. Acquire sufficient quantities and types of spill control materials to contain any spills than can be reasonably anticipated.
3. Acquire recommended personal protective equipment and training in its proper use. EHS and the Laboratory Safety Manager offer training in the proper use of personal protective equipment, including respirators, gloves, and eye and face protection.
4. Place spill control materials in a readily accessible location, close to the areas where chemicals are used or stored.

#### General Guideline for Cleaning Up Chemical Spills

1. Immediately alert others in the area and the supervisor, and evacuate the area, if necessary.
2. If there is a fire or medical attention is needed, contact Citadel Police at 811 (campus phones only).
3. Attend to any persons who may be contaminated. Contaminated clothing must be removed immediately and the skin flushed with water for no less than fifteen minutes. Clothing must be laundered before reuse.
4. If a volatile, flammable material is spilled, immediately warn others in the area, control sources of ignition, and ventilate the area.
5. Don personal protective equipment, as appropriate to the hazards. Refer to your Chemical Hygiene Plan, the Safety Data Sheet or other references available in your laboratory for information.
6. If the spill is a MAJOR one, if there has been a release to the environment, or if assistance is needed, contact Citadel Police at 953-5114 or 811 (Emergency campus phones).
7. Consider the need for respiratory protection. The use of a respirator or self-contained breathing apparatus requires specialized training and medical surveillance. Never enter a contaminated atmosphere without protection or use a respirator without training. If respiratory protection is needed and no trained personnel are available, call Citadel Police at 953-5114 and then call EHS at 953-4816. If respiratory protection is available, be sure there is another person outside the spill area in communication or in sight, in case of emergency.
8. Protect floor drains or other means for environmental release. Spill socks and absorbents may be placed around drains, as needed.
  - a. Loose spill control materials should be distributed over the entire spill area, working from the outside, circling to the center. This reduces the chance of splash or spreading of the spilled chemical.
  - b. Bulk absorbents and many spill pillows do not work on hydrofluoric acid.
  - c. POLYZORB products and their equivalent will handle hydrofluoric acid. Many neutralizers for acids and bases have a color change indicator to show when neutralization is complete.
  - d. Several materials for cleaning up mercury spills are available in chemical catalogs, safety supply catalogs and at some of the science and engineering stockrooms. Broken thermometers, gauges or other mercury-containing materials, may be placed in a plastic bag or glass or metal container, and sealed.

9. When the spilled materials have been absorbed, use a brush and scoop (spark-resistant if flammable materials are involved) to place materials in an appropriate container. Polyethylene bags may be used for small spills. Five gallon pails or 20 gallon drums with polyethylene liners may be appropriate for larger spills.
10. Complete a hazardous waste tag, identifying the material as Spill Debris involving XYZ Chemical, and affix the sticker to the container or bag. Remember the use of an absorbent does not alter the chemical properties of the chemical. Contact the Laboratory Safety Manager at 953-1067 or EHS at 953-4816 for advice on storage and packaging for disposal.
11. Place the container in a hood or other properly ventilated area until the next chemical waste pick-up.
12. Decontaminate surfaces involved in the spill using a mild detergent and water, as appropriate.
13. Report all spills to your supervisor or the principal investigator.

## **Roles and Responsibilities**

### Department

- Provide adequate spill control materials.
- Ensure individuals receive appropriate training.
- Develop and periodically review (at least annually) spill response plan.
- Assess the need for spill control materials.
- Ensure spill control materials are replenished after use.
- Investigate causes of spills, provide necessary follow-up, including means to minimize the likelihood of spills.

### EHS and Laboratory Safety Manager

- Provide training, upon request.
- Provide advice and assistance, as needed.
- Audit departmental plans periodically.

### Citadel Police

- Contact appropriate emergency responders.
- Contact EHS for reported spills or releases.

### Individual

- Become familiar with the hazards of chemical products before using them.
- Use preventive measures to minimize the likelihood of spills, such as using secondary containers when transporting chemicals and placing absorbent materials on work surfaces.
- Receive training, as needed.
- Assess the need for spill control materials.
- Assist in developing spill response plans.
- Clean up small spills properly.
- Report all spills to supervisor or principal investigator and Laboratory Safety Manager.

### For More Information:

- Contact the Laboratory Safety Manager at 953-1067

## CONTENTS OF CHEMICAL SPILL KIT

### 1. Absorbents

- Universal Spill Absorbent – universal spill pillow or absorbent pads in commercial spill kits. Alternatively, a 1:1:1 mixture of Flor-Dri (or unscented kitty litter), sodium bicarbonate, and sand. *This all-purpose absorbent is good for most chemical spills including solvents, acids (NOT for hydrofluoric acid), and bases.*
- Hydrofluoric Acid - HF compatible spill pillow or liquid “HF acid eater”
- Solvents/Organic Liquid Absorbent - Inert absorbents such as vermiculite, clay, sand, FlorDri, and Oil-Dri.

### 2. Neutralizers

- Acid Spill Neutralizer - sodium bicarbonate, sodium carbonate, or calcium carbonate.
- Alkali (Base) Neutralizer - sodium bisulfate.
- Bromine Neutralizer - 5% solution of sodium thiosulfate and inert absorbent.

### 3. Personal Protective Equipment (PPE)

- Goggles and Face Shield
- Heavy Neoprene Gloves
- Disposable Lab Coat and Corrosive Apron
- Plastic Vinyl Booties

### 4. Tools for clean-up

- Plastic Dust Pan and Scoop
- Plastic Bags (30 Gallon, 3 mm thickness) for contaminated PPE
- One Plastic Bucket (5 gallon polyethylene) with lid for spill and absorbent residues

### 5. Others

For HF: calcium gluconate gel (always check expiration date)  
For mercury: aspirator bulb and mercury decontaminating powder  
For alkali metals: dry sand or a class “D” fire extinguisher  
For acid chlorides - Oil Dri, Zorb-All or dry sand

### 6. Spill clean-up procedure