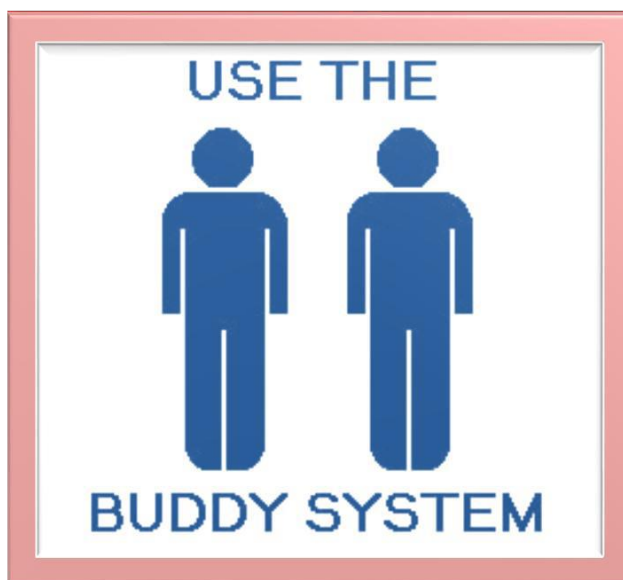


# Spill Response Procedures

## I. Introduction

The CMNBTR Laboratories uses many hazardous chemicals and the possibility of a major spill always exists. Therefore it is necessary to know how to react quickly and properly to any chemical spill to avoid injury, death or major equipment damage. A large acid spill, HF for instance, might cause serious injury or even death if handled improperly. These procedures are intended only to provide guidelines. Common sense should always be used when dealing with any chemical spill. Safe practices should be foremost in your mind whenever you are in any of the CMNBTR laboratories.

You should never work alone in the CMNBTR labs (BUDDY POLICY). TSU CMNBTR Laboratory policy dictates there must be at least one other person in the CMNBTR laboratory at all times.



## II. Spill Response Kit Items

The CMNBTR lab spill response kits are located under the sink in each lab. It is clearly marked as a spill response kit and contains the items you will need to

combat a minor or major spill. **All spills must be reported to the Laboratory Staff, Principle Investigator and documented on the Incident Report Form.**

The items included in the CMNBTR Spill Response Kit are,

- Absorbent spill dam
- Absorbent pillows
- Acid neutralizer
- Caustic neutralizer
- HF ointment (calcium gluconate 2.5%)
- pH paper
- Two pairs of acid gloves
- Two pairs of vapor-resistant goggles
- Trash bags
- 5 gal. Haz-Mat bucket w/ NFPA labels



### III. Spill Response Procedure

Properly clean up spills, using appropriate protective equipment and proper disposal procedures. Chemical spills are contained using the “Think C.L.E.A.N. Plan”

**C**ontain the spill

**L**eave the area

**E**mergency: eye wash, shower, medical care etc.

**A**ccess Material safety Data Sheet (MSDS)

**N**otify supervisor

### **a. Cleanup of Known Chemical Spills**

#### **1. Did the chemical spill on you?**

- If the chemical is a strong acid or base, remove contaminated clothing and run the affected area under water for 15 to 20 minutes. This should relieve some of the pain and reduce the danger of severe burns.
- If the chemical is HF, remove contaminated clothing and run the affected area under water for 15 to 20 minutes.
  - Apply a liberal amount of Calcium Gluconate gel to the area, following the directions on the package.
  - **Seek medical attention as soon as possible.**

*More information on hydrofluoric acid first aid instructions can be found in the First Aid section below.*

#### **2. Is the chemical hazardous?**

If the chemical is hazardous and you feel you cannot handle it, alert others to its presence and evacuate the laboratory. During the workday, notify the CMNBTR laboratory staff. If after hours, call the TSU Police @ 615.963.5171 first, and then notify the CMNBTR Laboratory staff at: 615.277.1668. If the chemical is a solvent or possesses a strong odor, evacuate the lab and put on a respirator and goggles before returning to clean up the spill.

#### **3. Retrieve the spill response kit:**

- If the chemical is acidic or basic, put on acid gloves, respirator and goggles before attempting to clean up the spill.
- Isolate the area around the spill.
- Select the proper equipment for the spill.
  - For large spills, those from a half gallon bottle or larger, an absorbent dam will be necessary to prevent spreading.
  - For small spills, only absorbent pillows are necessary. Select the proper neutralizer for the chemical (note: solvents do not require a neutralizer).

#### **4. Attack the spill:**

- If using an absorbent dam, place the dam around the spill, approximately 4 inches from the liquid.
- Place the neutralizer bottle on the floor. Release the clamp and spray neutralizer, pushing the chemical into the spill dam. Be sure to cover the entire spill.
- For strong acids (HF and Sulfuric), use approximately an 8:1 ratio of neutralizer to chemical to completely neutralize the spill.
  - The acid neutralizer will turn from purple to yellow to red when finished.
  - Check pH, it should be around 7. If still acidic, continue adding neutralizer until pH=7.
- For strong bases (metal and ammonium hydroxides), you will need approximately a 6:1 ratio of neutralizer to chemical.
  - The base neutralizer will turn from red to blue to yellow when finished.
  - Check pH, it should be around 7. If still basic, continue adding neutralizer until pH=7.

- Once the reaction has ceased, allow liquid to cool. Check pH, it should be around 7. When cool, vacuum with the wet/dry vacuum cleaner.
- If dealing with a solvent spill, do not attempt to neutralize it. Soak up the chemical as soon as possible to avoid damage to the floor. Do not use water on the spill until after the entire chemical has been absorbed.

### **5. Clean up:**

- Do not remove personal safety equipment until you have finished cleaning up. There may still be some active chemical on the floor.
- When the liquid has been completely absorbed, place the absorbent dam and pillows in double trash bags.
- If any glass is involved, place the glass in a separate Haz-Mat bucket and label it as “SHARPS” along with the chemical the glass contained.
  - Mechanical means, such as a brush and dustpan, tongs, or forceps should always be used to clean up broken glassware
- Wipe down the spill area with the mop and DI water. When finished, place the mop head in a fume hood sink and rinse it thoroughly with DI water.
- Place the bag in a Haz-Mat bucket and apply an NFR diamond label, writing the chemical on the label.
- Notify CMNBTR Staff.

### **b. Cleanup of Unknown Chemical Spills**

Finding a chemical spill can be more dangerous than spilling the chemical yourself if the proper precautions are not taken. In most cases, the spill will be of a small amount of unknown chemical.

#### **1. Assess any immediate hazards:**

- Is there a strong odor? If so, evacuate the lab and put on a respirator before continuing.

- Is a violent reaction taking place? If so, it may be wise to wait until the reaction has finished.

## ***2. Attempt to identify the chemical:***

- Look for clues to the chemical's identity: labels, tipped containers, etc.
- Wearing an acid glove, use the pH paper to identify whether the chemical is an acid, base or solvent and its strength.
- If the chemical can be classified as an acid or base with the pH paper but not identified, assume it is a very strong acid (HF) or a very strong base (Sodium Hydroxide).

## ***3. Is the chemical hazardous?***

- If the chemical is suspected of being hazardous and you feel you cannot handle it, alert others to its presence and evacuate the lab. During the workday, notify CMNBTR staff. After hours, call 615.963-5171 first and then notify CMNBTR staff.

## ***4. Retrieve the spill response cart:***

- Put on acid gloves and goggles before attempting to clean up the spill.
- Select the proper equipment for the spill.
  - For large spills, those from a half gallon bottle or larger, an absorbent dam will be necessary to prevent spreading.
  - For small spills, only absorbent pillows are necessary. Select the proper neutralizer for the chemical. (note: solvents do not require a neutralizer)

## ***5. Attack the spill:***

- If using an absorbent dam, place the dam around the spill, approximately 4 inches from the liquid.

- Place the neutralizer bottle on the ground. Release the clamp and spray neutralizer, pushing the chemical into the spill dam. Be sure to cover the entire spill.
- For the strong acids (HF and Sulfuric), use approximately an 8:1 ratio of neutralizer to chemical, to completely neutralize the spill.
  - The acid neutralizer will turn from purple to yellow to red when finished.
  - Check pH, it should be around 7. If still acidic, continue adding neutralizer until pH=7.
- For strong bases (metal and ammonium hydroxides), you will need approximately a 6:1 ratio of neutralizer to chemical.
  - The base neutralizer will turn from red to blue to yellow when finished.
  - Check pH, it should be around 7. If still basic, continue adding neutralizer until pH=7.
- Once the reaction has ceased, allow liquid to cool. Check pH, it should be around 7. When cool, vacuum with the wet/dry vacuum cleaner.
- If dealing with a solvent spill, do not attempt to neutralize it. Soak up the chemical as soon as possible to avoid damage to the floor. Do not use water on the spill until after the entire chemical has been absorbed.

## **6. Clean up:**

- Do not remove personal safety equipment until you have finished cleaning up. There may still be some active chemical on the floor.
- When the liquid has been completely absorbed, place the absorbent dam and pillows in double trash bags.
- If any glass is involved, place the glass in a separate Haz-Mat bucket and label it as “SHARPS” along with the chemical the glass contained.
  - Mechanical means, such as a brush and dustpan, tongs, or forceps should always be used to clean up broken glassware

- Wipe down the spill area with the mop and DI water. When finished, place the mop head in a fume hood sink and rinse it thoroughly with DI water.
- Place the bag in a Haz-Mat bucket and apply an NFR diamond label, writing the chemical on the label.
- Notify CMNBTR Staff.

### ***c. First Aid***

First aid is an important element of CMNBTR Laboratory usage. The TSU CMNBTR Laboratory environment contains many potential hazards, especially the chemicals used. This section presents only a simplified first aid procedure for a hazardous chemical spill. For more specific information, consult the MSDS.

- ***Chemical Spill on Self***
  - If the chemical is a strong acid or base, run the affected area under water for 10 to 20 minutes. This should relieve some pain and reduce the danger of severe burns.
  - If the chemical is HF, run the affected area under water for 15 to 20 minutes and then apply a liberal amount of calcium gluconate gel following the directions on the package. **Seek medical attention as soon as possible.**
  - If the chemical is a solvent, rinse the affected area for 10-15 minutes to reduce any irritation.
- ***Chemical spill on Someone Else***
  - If the person is coherent, find out what chemical they were using.
  - If the person is unable to communicate, have someone place them under a safety shower and remove visibly contaminated clothing while attempting to identify the chemical:



