CHEMICAL SPILL PROCEDURES

If there is any risk to your health or safety, evacuate the area, close the door and contact Campus Safety & Security at 315-268-6666; do not attempt to stop or contain the spill.

GENERAL PROCEDURES

1. Remove contaminated clothing immediately and use the nearest emergency shower/eyewash.
2. Alert personnel in adjacent areas. Evacuate non-essential personnel from spill area.
3. Get medical attention for injured personnel:
    a. Minor Injuries: Students should go to the Student Health Center (ERC Suite 1300). Staff should call Campus Safety & Security (315-268-6666) to have Clarkson EMS dispatched to them.
    b. Life Threatening Injuries: Call 911 for an ambulance immediately.
    c. PLEASE SEE SPECIAL DIRECTIONS BELOW IN TABLE 1 FOR CONTACT FROM HYDROFLUORIC ACID AND PHENOL/TRIZOL/PHENOL:CHLOROFORM.
4. Attempt to stop any release into the environment (ex. floor drains)

When the nature of the spill constitutes a more serious hazard or involves the release of gas or fumes, the following procedures should be followed:

1. Activate the emergency fire alarm system.
2. Rescue anyone injured or in immediate danger, if safe to do so without putting yourself in harm's way.
3. Evacuate the building and move at least 50 feet away from the building.
4. Notify Campus Safety & Security (315-268-6666) with the details of the situation.

SPILL CLEAN UP PROCEDURES

1. **Personal Protective Equipment (PPE):** Use the appropriate PPE.
    a. If, during the spill or subsequent actions, any person comes in contact with a chemical, refer to the manufacturer's Safety Data Sheet (SDS) for first aid guidance. SDSs can be accessed through MSDSonline, which is found on Clarkson's Environmental Health & Safety website (www.clarkson.edu/dehs) under "Research & Laboratory Safety".

2. **Control:** Control the source of the spill, if it is still present.
    a. For example, a bottle which was knocked over may still have some material in it. The responder should carefully upright the container, place it on an absorbent pad in safe location, and replace the lid on the container. Any spread of spilled material must also be controlled. This is best done by placing absorbent pads or socks around and on the spill. Many laboratory spills involve broken glass. The spill responder must take precautions to avoid getting cut.

3. **Absorb/Neutralize:** Use CAUTION - neutralization reactions generate heat! Refer to Table 2 for recommended neutralizing agents.
    a. Acidic Liquids

    Apply acid neutralizer on all surfaces affected by the spill (see information below on neutralizers). Spread the neutralizer on the outer edges of the spill, then move inward. Once the spilled material is absorbed and neutralized, place all spill residues (neutralizing powders, absorbent pads, etc) in a plastic bag or 5 gallon pail. Apply fresh neutralizer. Remove the residue with absorbent pads or paper towels. Thoroughly wash the affected area with a mild detergent solution. Use absorbent pads to finish cleaning the area.

    Additional side notes:
    - Some acids are also flammable or oxidizers and can start a fire if in contact with organic matter. Fire may produce irritating or poisonous gas.

- Do not use sodium bicarbonate or similar product on a hydrofluoric acid spill. Soda ash, lime, or an HF-specific neutralizer must be used.

b. Caustic Liquids
Apply caustic neutralizer on all surfaces affected by the spill. Spread the neutralizer on the outer edges of the spill, then move inward. Once the spilled material is absorbed and neutralized, place all spill residues (neutralizing powders, absorbent pads, etc) in a plastic bag or 5 gallon pail. Apply fresh neutralizer. Remove the residue with absorbent pads or paper towels. Thoroughly wash the affected area with a mild detergent solution. Use absorbent pads to finish cleaning the area.

c. Flammable Liquids
Remove all sources of ignition. **Ensure adequate explosion-proof ventilation for clean-up**. Flammable liquids should be absorbed on activated carbon or absorbent pads and socks. Use approximately 2 pounds of activated carbon per pint (0.5 liters) of liquid. Use the dust brush or spatula to thoroughly mix the activated carbon with the liquid. Use the dustpan and the brush to collect all residue. Remove large pieces of broken glass as described in step 4 and place all other debris in a plastic trash bag or appropriate container. Once the spilled material is absorbed, place all spill residues (powders, absorbent pads, etc) in a plastic bag or 5 gallon pail. Apply fresh carbon or absorbent pads. Remove the residue with absorbent pads or paper towels. Thoroughly wash the affected area with a mild detergent solution.

d. Oxidizing Liquids
Remove all sources of ignition. Ensure adequate explosion-proof ventilation for clean-up. Use non-combustible absorbent material to wipe up spilled material. Place spill cleanup materials in materials in plastic bags and label with a chemical hazardous waste label. Once the spilled material is absorbed, place all spill residues (neutralizing powders, absorbent pads, etc) in a plastic bag or 5 gallon pail. Apply fresh absorbent pads, as necessary. Thoroughly wash the affected area with a mild detergent solution.

e. Non-Flammable, Non-Corrosive Liquids
These are most easily absorbed with absorbent pads and socks. Note that neutralizers may be more effective for certain chemicals (refer to the information below on **specific neutralizing materials**). Frequently, laboratory spills will spread into drawers and behind or under equipment. The responder must be careful to locate all such contaminated areas. Once the spilled material is absorbed and neutralized, place all spill residues (neutralizing powders, absorbent pads, etc) in a plastic bag or 5 gallon pail. Apply fresh neutralizer. Remove the residue with absorbent pads or paper towels. Thoroughly wash the affected area with a mild detergent solution.

f. Elemental Mercury
Mercury beads may have fallen outside of the immediate spill area. A flashlight can be used to inspect for mercury in outlying areas. Restrict employees from the spill area to ensure mercury contamination will not spread beyond the immediate spill area. **DO NOT SWEEP OR VACUUM THE MERCURY.** Use rigid paper to consolidate droplets into a larger pool. Follow the direction on the mercury amalgamate to safely remove the mercury (sometimes you have to mix the mercury, powder, and water together). Collect the mercury and amalgamate in a plastic bag and label with a chemical hazardous waste label. **Ensure adequate ventilation for clean-up**.

4. **Remove Broken Glass:** Using tongs, dustpan and brush, remove all large pieces of glass and place them in an appropriate container.

5. **Decontaminate:** Thoroughly wash the area with hot soapy water. Use absorbent pads to finish cleaning.

6. **Inspect:** Carefully check the entire affected area for spilled residue, hidden contamination, or unsafe conditions, and act accordingly.

7. **Package Spill Residues:** Place all spill residues (neutralizing powders, absorbent pads, etc) and contaminated PPE in plastic bags. Seal the bags and place in a bucket or other appropriate container. Attach a properly completed Chemical Hazardous Waste Label on the outside of the container. Contact the EHS Manager (268-6640) or Chemistry Stockroom Manager (268-2338) to remove spill materials.

8. **Restock Spill Supplies:** Gather and restock supplies as needed.

TOXIC/CORROSIVE COMPRESSED GAS RELEASE PROCEDURES

In the event of a compressed toxic/corrosive gas release, if the leak cannot be remedied by tightening a valve gland or a packing nut, emergency action procedures should be activated. When the nature of the spill constitutes a more serious hazard or involves the release of gas or fumes, the following procedures should be followed:

1. If a leak is suspected, do not use a flame for detection; instead use a flammable-gas leak detector or soapy water.
2. Activate the building's emergency fire alarm system and call 911.
3. Alert other people in the building.
4. Evacuate the building and move at least 50 feet away from the building.
5. Help evacuate people with disabilities.
6. Notify Campus Safety & Security (315-268-6666) with the details of the situation.
7. University personnel should never attempt to repair a leak at the valve threads or safety device; rather, they should consult with the supplier for instructions.

TABLE 1. SPECIAL DIRECTIONS FOR CONTACT WITH HYDROFLUORIC ACID OR PHENOL/TRIZOL/PHENOL:CHLOROFORM

HYDROFLUORIC ACID CONTAMINATION	**PHENOL/TRIZOL/PHENOL:CHLOROFORM MIXTURE CONTAMINATION**
Skin Contact 1. Immediately flush with copious amounts of water under an emergency shower. 2. Remove all clothing while under the shower. Flush skin for 5 minutes. 3. Apply calcium gluconate gel (2.5%) while wearing clean impervious gloves. (If calcium gluconate gel is not available continue to flush skin until medical personnel arrive). 4. Get medical attention immediately.* **Eye Contact** 1. Immediately flush eyes with water under an eyewash for **15 minutes**. 2. Get medical attention immediately.* **Inhalation** 1. Remove victim to fresh air. 2. Get medical attention immediately.*	**Skin Contact** 1. In case of skin contact with phenol, TRIZOL® or a phenol:chloroform mixture, immediately flush skin with large amounts of soapy water. 2. Remove contaminated clothing and shoes. 3. As soon as possible, apply isopropanol (IPA) or polyethylene glycol (PEG) 300 or polyethylene glycol 400 to the affected area, and continue to flush the skin with soapy water for a minimum of 15 minutes. 4. Get medical attention immediately.*
***Inform medical personnel that the injury involved this chemical and give them a copy of the safety data sheet.**	

TABLE 2. NEUTRALIZING AGENTS	
ACIDS: Sodium bicarbonate (Baking Soda); Sodium carbonate; or Calcium carbonate	**FORMALDEHYDE/FORMALIN:** Absorbent pads; or Commercially available formaldehyde spill neutralizer
ACID CHLORIDES: AVOID water AVOID Sodium Bicarbonate Absorbent Pad	**HYDROFLUORIC ACID:** Neutralize with soda ash or lime (or absorb spill with special HF spill pillow - standard spill pads won't work) Absorb with inert absorbent material Calcium gluconate gel (2.5%) for skin contact
ALKALI METALS (Lithium, Sodium, Magnesium, Potassium): Class "D" fire extinguisher AVOID contact with water If possible, dispose by slow addition of isopropanol	**MERCURY:** Mercury amalgamate powder, such as Merc-sorb
BASES/CAUSTICS: Sodium bisulfate	**OXIDIZERS:** Non-combustible absorbent pads
BROMINE: 5% solution of sodium thiosulfate Inert absorbent material	**SOLVENTS (ORGANIC):** Inert absorbent
CHLOROFORM/PHENOL: Isopropanol (IPA); Polyethylene glycol (PEG) 300; or Polyethylene glycol 400 for skin contact	**THIOLS/MERCAPTANS:** Activated charcoal (to remove odor)
FLAMMABLES: Activated charcoal; Sand; or Non-combustible absorbent pads	**WHITE OR YELLOW PHOSPHORUS:** Blanket with wet sand; or Wet absorbent