

Standard Operating Procedure

for a Chemical Spill

Facility: ERC Clean Room
C17 Engineering Research Complex
Electrical and Computer Engineering

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355-5233

Scope: This SOP details appropriate procedures that need to be followed in the event of a chemical spill in the ECE Clean Room.

Last Revision: 9/17/2009

Application:

All staff and students in the Electrical and Computer Engineering clean room who handle hazardous chemicals should be familiar with spill response procedures.

This document provides instruction on the response protocol for:

- major spills
- minor spills, including:
 - organic solvents
 - acids
 - bases
 - dry chemicals

Biological spills are covered in the ECE SOP on Biohazard Spills.

HF spills are covered in the ECE HF SOP.

Safety Precautions:

If you are ever in doubt of your ability to clean a chemical spill safely, evacuate and call for help.

If there is risk to the rest of the building, pull the fire alarm and evacuate the building.

Certain materials found in the clean room can be particularly hazardous when spilled. Review the MSDS and make sure you understand the hazardous properties of the spilled material before you attempt to clean it up.

It is always better to err on the side of caution. If you spill something, and you aren't sure if you can clean it up safely, evacuate the lab and consult with your colleagues in the hallway. Contact the ECE Shop 355-5233 or ORCBS 355-0153

First aid is always the top priority. If you spill a hazardous material on yourself, remove any potentially contaminated clothing immediately and utilize the emergency shower. Seek appropriate medical treatment

If material spills in your eye, flush for at least 15 minutes at the eyewash (for corrosive materials, you may need to flush for up to 60 minutes – review the MSDS). Seek appropriate medical treatment

Procedures:

I. Personal Protective Equipment:

The purpose for personal protective equipment (PPE) is to shield the individual in the event of a release of vapor, a spill or other incident. PPE is not a substitute for safe work practices. **Eye protection must be used during handling and cleanup of any chemical spill.** The following eye protection will be used:

Chemical safety goggles and full face shields are required. These are available in the lab at the chemical hood.



Thick Neoprene or Nitrile gloves or other chemical-resistant gloves should be worn. Chemical burns can be extremely painful and difficult to treat.

It is also required that an acid resistant suit or apron be used since clothing can absorb chemical solutions and maintain it close to the skin.

The following gloves/apron must be worn when cleaning up a chemical spill in this laboratory:



II. Supplies:

Recommended Spill Kit Supplies:

Standard/Universal Kit: Should contain the following items

- Goggles
- Chemically resistant gloves
- Absorbent materials (booms, pads, pillows)
- Acid neutralizer
- Base neutralizer
- pH test strips/paper
- Solvent suppressant
- Plastic bags for waste materials
- Plastic scoop and scraper

If the lab has HF

ADD:

- HF-neutralizing agent (calcium carbonate, commercial neutralizer)
- Calcium gluconate topical gel (2.5%)

III. Spill Procedures:

MAJOR SPILL

- Consider a spill to be a 'major spill' if:
 - you are not comfortable proceeding with cleanup
 - it involves more than 5L of a hazardous material
 - there is a risk of fire or explosion
 - the material creates a respiratory hazard (toxic/noxious odours e.g., ammonia, concentrated hydrochloric acid, mercaptoethanol)
 - the spill involves unknown or incompatible chemicals
 - spills of oxidizing acids (conc nitric acid, perchloric acid, chromic acid etc.)
 - spills of unstable, air or water reactive materials
- In the event of a major spill:
 - If you have an opportunity to extinguish nearby ignition sources or contain the spill at the source without risk of injury, please do so.
 - Notify everyone in the lab and evacuate to the hall. Administer first aid if necessary.
 - Dial 911 on a campus phone or use a nearby emergency call box to notify emergency authorities.
 - If there is a risk to the remainder of the building, activate the nearest alarm pull station to trigger a building evacuation.
 - When emergency responders arrive, provide them with all relevant information on the type and quantity of material spilled.

MINOR SPILLS

- In the event of a minor spill:
 - If you have an opportunity to extinguish nearby ignition sources or contain the spill at the source without risk of injury, please do so.
 - If any hazardous material has spilled on you, remove affected clothing immediately and flush the area with water.
 - Alert others in the lab and cordon off the affected area.
 - Retrieve the spill kit. Stop and think about your plan to clean the spill. Do you have the right materials to clean the material up safely? If not, retrieve the appropriate items from an alternate source (e.g., neighboring lab, chemical stores), or call the ECE Shop 5-5233 to get assistance.
 - Remove the gloves and goggles and from the kit, put them and all appropriate PPE on before approaching the spill.
 - For organic solvents –
 - Ensure there are no ignition sources in the area. If you feel there is risk of fire or explosion, evacuate the lab and treat as a major spill.
- If the spill can be cleaned up safely, proceed with the following.
- If there are drains in the area, use a boom, sock, or other material

to prevent the hazardous material from reaching the drain.

- Gently pour solvent vapor suppressant (activated carbon) over the spill, working from the outer edge to the middle.
 - Using the absorbent pads from the spill kit, carefully wipe up the spilled liquid, again working from the outside in.
 - Place all waste materials in a plastic bag. Once the spill has been fully cleaned, place the waste bag within the fume hood temporarily. Label the bag as hazardous waste, and submit a Chemical Waste Disposal Request form to ORCBS.
 - Remove PPE and thoroughly wash hands.
 - Use soap and water to wash the affected area and remove any minor residues that may be left.
 - Report the spill using the ECE Incident Report form.
- For acids –
- If there are drains in the area, use a boom, sock, or other material to prevent the hazardous material from reaching the drain.
 - Gently pour acid neutralizing agent (e.g, sodium bicarbonate, calcium carbonate, etc.) over the spill, working from the outside in.
 - Allow several minutes for acid to mix with neutralizer, then test a representative area with pH paper.
 - When the spill has been neutralized, use the available absorbent pads or paper towel to wipe up the spilled material.
 - Place all waste into a plastic bag and label as hazardous. Place in a suitable location and submit a Chemical Waste Disposal Request to ORCBS.
 - Remove PPE and thoroughly wash hands.
 - Use soap and water to wash the affected area and remove any minor residues that may be left.
 - Report the spill using the ECE Incident Report form.
- For bases –
- If there are drains in the area, use a boom, sock, or other material to prevent the hazardous material from reaching the drain.
 - Gently pour base neutralizing agent (e.g, citric acid, sodium bisulfate), etc.) over the spill, working from the outside in.
 - Allow several minutes for the base to mix with neutralizer, then test a representative area with pH paper.
 - When the spill has been neutralized, use the available absorbent pads or paper towel to wipe up the spilled material.
 - Place used materials into plastic bag and label as hazardous waste. Label the bag as hazardous waste and place in a suitable location and submit a Chemical Waste Disposal Request to ORCBS.
 - Remove PPE and thoroughly wash hands.
 - Use soap and water to wash the affected area and remove any minor residues that may be left.

- _ Report the spill using the ECE Incident Report form.
- For dry chemicals –
 - For materials that are highly corrosive, toxic, or reactive, treat as a major spill. A hazardous materials team, with specialized HEPA vacuums may be needed in these circumstances.
 - For materials of limited hazard, the powder or crystals can be cleaned up using the scoop and dustpan. Place waste material in a suitable container or bag, and submit a Chemical Waste Disposal Request to ORCBS.
 - Remove PPE and thoroughly wash hands.
 - Use soap and water to wash the affected area and remove any minor residues that may be left.
 - Report the spill using the ECE Incident Report form.