

College of Biological Science - Standard Operating Procedure			
Chemical Spills			
Date:	8-Feb-2008	Prepared by:	A Doane
Revision:	New	Supersedes:	n/a

Purpose:

To provide direction on the proper response to a chemical spill.

Application:

All staff and students in the College of Biological Science 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:
 - o organic solvents
 - o acids
 - o bases
 - o dry chemicals
 - o mercury
 - o hydrofluoric acid

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

Safety Precautions:

- o **If you are ever in doubt of your ability to clean a chemical spill safely, evacuate and call for help.**
- o If there is risk to the rest of the building, pull the fire alarm and evacuate the building.
- o Certain materials found in CBS labs 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.
- o 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.
- o First aid is always the top priority. If you spill a hazardous material on yourself, remove any potentially contaminated clothing immediately and utilize to the emergency shower. 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).

Notes

- Spills that reach a drain must be reported to the area supervisor and EHS immediately, as municipal authorities and Ministry of Environment may require notification.

Recommended Spill Kit Supplies:

Standard/Universal Kit	If your lab uses formaldehyde...	If your lab uses HF...	If your lab uses mercury...
<ul style="list-style-type: none"> - 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 	ADD: <ul style="list-style-type: none"> - Formaldehyde neutralizing agent (e.g., Polyform-F, FANpad GL, Formalex). 	ADD: <ul style="list-style-type: none"> - HF-neutralizing agent (calcium carbonate, commercial neutralizer) - Calcium gluconate topical gel (2.5%) 	ADD: <ul style="list-style-type: none"> - Mercury spill kit
<p><i>CBS does not endorse any specific brand of products. Suitable supplies may be available through the stockroom, or alternatively through Fisher Scientific (see examples below):</i></p>			
<p>NOTE: Acid/Base/Solvent neutralizers, absorbent pads, plastic bags, gloves, and pH strips are available from the stockroom in the New Science Complex.</p>			
	<i>Manufacturer</i>	<i>Fisher Catalog No. (2008)</i>	
Standard Kit	FisherBrand	18-061E	
pH strips	EMD Chemicals	M95903	
Scoops and scrapers	Remco	17-931A 17-932-4	
Complete formaldehyde spill kit	Safetec	19-314-634	
Formaldehyde neutralizer (Polyform-F)	Darlco	HMR-2535	
HF Acid Eater	Spill 911	NC9580958	
Calcium gluconate gel	Attards	NC9569036	
Mercury spill kit	Mercon	S41268	

Procedure:

MAJOR SPILL

- Consider a spill to be a 'major spill' if:
 - o you are not comfortable proceeding with cleanup
 - o it involves >4L of a hazardous material
 - o there is a risk of fire or explosion
 - o the material creates a respiratory hazard (toxic/noxious odours e.g., ammonia, concentrated hydrochloric acid, mercaptoethanol)
 - o the spill involves unknown or incompatible chemicals
 - o spills of oxidizing acids (concentrated nitric acid, perchloric acid, chromic acid)
 - o spills of unstable, air or water reactive materials
- In the event of a major spill:
 - o If you have an opportunity to extinguish nearby ignition sources or contain the spill at the source without risk of injury, please do so.
 - o Notify everyone in the lab and evacuate to the hall. Administer first aid if necessary.
 - o Dial 2000 on a nearby phone or use a nearby emergency call box to notify emergency authorities.
 - o 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 dial 2000 to get assistance.
 - Remove the gloves and goggles from the kit and put them 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 vapour 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 with in the fume hood temporarily. Label the bag as hazardous waste, and submit a Chemical Waste Disposal Request form to EHS.
 - 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 EHS 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 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 EHS.
 - 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 EHS 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 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. Complete a Chemical Waste Disposal Request.
 - 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 EHS Incident Report form.
- For dry chemicals –**
- For materials of high corrosivity, toxicity, or reactivity, 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 EHS.
 - 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 EHS Incident Report form.
- For mercury –**
- DO NOT attempt to clean up spills involving more than a few milliliters. Mercury is highly toxic and releases vapours that can accumulate to toxic concentrations.
 - For spills larger than a few milliliters, treat as a major spill. Evacuate the lab and dial 2000 for assistance.
 - A mercury spill kit must be used for all small spills. Review directions provided with the kit prior to using.
 - Follow the directions with the kit. Typically, the protocol will call for collection of visible droplets with a suction device or sponge-spray vapour suppressant over the spill. Use the mercury sponge or the impinger to collect the visible mercury droplets. After the easily retrievable droplets have been collected, sprinkle or spray the area with the mercury decontaminant provided with the kit.
 - Report the spill using the EHS Incident Report form.

- For hydrofluoric acid –

- Hydrofluoric acid is particularly hazardous due to the release of free fluoride ions, which form insoluble salts with calcium and magnesium. HF exposure can cause deep tissue damage and has produced fatalities in the past, resulting from an induced acute calcium deficiency.
 - If there is any skin contact, flush the area for one minute and apply calcium gluconate gel.
 - If eye contact occurs, flush the eye for 30 minutes. Have someone call ahead to the hospital emergency ward and inform them of the incident so that an antidote solution can be prepared.
 - Seek professional medical help following any exposure to hydrofluoric acid.
- If the spill is small, and there is a low respiratory hazard (i.e. you have spilled a small amount inside the fume hood) you may clean the spill.
- Carefully cover the spill with a HF-neutralizing agent (calcium carbonate or commercial HF spill neutralizer), working from the outside in.
- Use a pH strip to verify the spill has been neutralized.
- Use absorbent material, scraper and scoop to collect neutralized material, and place all waste into a plastic bag.
- Label the bag as hazardous waste and complete a Chemical Waste Disposal Request.
- 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 successful spill clean up using the EHS Incident Report form.

Applicable Policies & Regulations:

- University of Guelph Safety Policy 851.04.04
- University of Guelph Safety Policy 851.08.01