

# Chemical Spill SOP

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**CBS-SOP-014-18**

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## Purpose

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

## Scope

All staff and students in the College of Biological Science who handle hazardous chemicals should be familiar with spill response procedures.

This document provides general instruction on the response protocol for:

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

Biological spills are covered in the CBS-SOP-010-18 Biohazard Spills.

## Definitions/Acronyms

***Hazardous chemicals*** – drugs, chemicals, natural and synthetic products which present a significant, immediate or long-term health risk to persons or their offspring exposed to them.

## Requirements/Policies/Regulations

- Environmental Protection Act, R.S.O. 1990
- O.Reg. 675/98, Classification and Exemption of Spills
- City of Guelph Sewer Use Bylaw (1996)-15202
- HR Policy [Laboratory Spill Response](#) – Chemical, Biological, Radiological

## Training

### Training and competency:

- WHMIS, Laboratory Safety training

## Maintenance

The JHSC inspects each laboratory annually, and documents that the appropriate spill kit is readily available for chemicals used to conduct the work in the lab.

## 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 CBS labs can be particularly hazardous when spilled. Review the SDS 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.
- ⚠ 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 SDS).

## Description of the Task

### Preparation: Required Spill Kit Supplies

Standard/Universal Kit must include 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 your lab uses formaldehyde add:

- Formaldehyde neutralizing agent

If your lab uses hydrofluoric acid add:

- HF-neutralizing agent (calcium carbonate, commercial neutralizer)

- Calcium gluconate topical gel (2.5%)

If your lab uses mercury add:

- Mercury spill kit

**NOTE:** CBS does not endorse any specific brand of product. Acid/Base/Solvent handlers, pH strips, absorbent pads, and gloves, are available from the Chemistry Stockroom or alternatively through contracted vendors; Fisher Scientific or VWR.

*Table 1 Common Spill Kits Sources*

Spill Kit Type	Product, Manufacturer	Fisher Catalogue #	VWR Catalogue #
Formaldehyde neutralising agent	Scigen Neutralex, Scigen	23-730-561	
	Formalex, Thermo Scientific	31-201-30	
	VYTAC™ FNC, Cartier Chemicals		CAFNC001-83
	VWR® Formalin Neutralizing Powder		CA95057-830
	Form-Zero, Azer Scientific		CA10861-742
Formaldehyde spill kit	SpillSolv® Formaldehyde Spill Kit, MilliporeSigma		CASX1340-1
	Neutra-Form Formalin Spill Control, Scigen	23-730-569	
Mercury spill kit	SpillSolv® Mercury Spill Kit, MilliporeSigma		CASX1350-1
	Mercury Spill Kit, Mercon	17-976-2	
	Mercury Spill Kit, NPS Corp.	19-021910	
Multipurpose Spill Kit	SpillSolv® Acid, Caustic, Solvent Spill Kit, Millipore Sigma		CASX1300-1
	Acid, Caustic and Solvent Spill Kit, Aldon Corp Se		470146-402
Hydrofluoric acid neutralizer	Spilfyter™ Kolor-Lock Hydrofluoric Solidifiers, NPS Corp	19-122-874	15552-226
	Hydrofluoric Acid Neutralizer, NPS Corp		15552-228
Calcium gluconate gel	Calcium Gluconate Gel, Safecross First Aid Ltd	31-505-385	CA06645

## Procedure:

### MAJOR SPILL

Consider a spill to be a 'major spill' if:

- you are not comfortable proceeding with cleanup,
- it involves >4L 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 (concentrated nitric acid, perchloric acid, chromic acid),
- 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 52000 on a nearby 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.
- Put up a barrier or sign to prevent entry into the area.
- 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 52000 to get assistance.
- Ensure you are wearing closed toe shoes, your long-sleeved lab coat is fastened, and you have tied back long hair.

- Remove the goggles and chemically appropriate gloves 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. This minimizes inhalation hazards.
- 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](#).
- Replenish your spill kit supplies.

#### *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. Neutralizing agents should be added cautiously and slowly as the reaction generates heat. If this heat is generated too rapidly splattering can occur.
- Avoid leaning over the spill when applying the neutralizer to prevent from breathing in any off gasses or vapours.
- Allow several minutes for acid to mix with neutralizer, and then test a representative area with pH paper.
- When the spill has been neutralized, (pH 6-9), use the available absorbent pads or paper towel to wipe up the spilled material.
- Place all neutralized waste into a plastic bag and dispose of in the regular waste stream.
- 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](#).
- Replenish your spill kit supplies.

#### ***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. Neutralizing agents should be added cautiously and slowly as the reaction generates heat. If this heat is generated too rapidly splattering can occur.
- Avoid leaning over the spill when applying the neutralizer to prevent from breathing in any off gasses or vapours.
- Allow several minutes for the base to mix with neutralizer, and then test a representative area with pH paper.
- When the spill has been neutralized (pH 6-9), use the available absorbent pads or paper towel to wipe up the spilled material.
- Place all neutralized waste into a plastic bag and dispose of in the regular waste stream.
- 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](#).
- Replenish your spill kit supplies.

#### ***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](#).
- Replenish your spill kit supplies.

***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 52000 for assistance.
- A mercury spill kit must be used for all small spills. Review directions provided with the kit prior to using.
- Typically, the kit protocol will call for collection of visible droplets with a suction device or sponge, followed by application of a 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.
- Place waste material in a suitable container, and submit a [Chemical Waste Disposal Request](#) to EHS.
- Report the spill using the [EHS Incident Report form](#).
- Replenish your spill kit supplies.

***For hydrofluoric acid;***

- Hydrofluoric acid (HF) differs from other acids because it readily penetrates the skin and dissociates into fluoride ions, causing destruction of deep tissue layers, including bone. Pain associated with skin exposure to HF may not occur for 1-24 hours. Unless you can rapidly neutralize the HF and bind the fluoride ions, tissue destruction may continue for days and result in limb loss or death.
- 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.** Medical intervention may involve debridement of wound, injections of calcium gluconate or observation/treatment of systemic effects.
- 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, magnesium sulfate or commercial HF spill neutralizer), working from the outside edge of the spill to the interior.
- 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, for disposal in the regular waste stream.
- Remove PPE and thoroughly wash hands.
- Don fresh gloves and wash the spill site with a sodium bicarbonate solution.
- Report the successful spill cleanup using the [EHS Incident Report form](#).
- Replenish your spill kit supplies.

## Contingency Plan and Reporting

Each laboratory is responsible for creating or purchasing their own spill kits and establishing a spill response plan specific to the chemicals used in that laboratory.

### Incident Response:

Report the spill using the [EHS Incident Report form](#).

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.

## Waste Management and Environmental Responsibility

- Place organic solvent wastes into clearly labelled, appropriate containers for Hazardous waste disposal. Chemical Waste pick up is every Friday.
- Do not mix different kinds of organic solvents together.
- Materials from neutralized spills can be disposed of in the regular waste stream.
- If the spilled solutions contain heavy metals, then the material must be handled as a potential hazardous waste.
- If human or animal tissue has been in contact with the spilled formalin, then the spill residue material may be handled as a potential bio-medical waste.

## References/Material/Resources

- Safety Data Sheets
- [Chemical profiles](#) Canadian Centre for Occupational Health and Safety
- CBS-SOP-010-18 Biohazard Spills
- Spill kit instructions for use

## Distribution of Copies

Document accessible on [CBS website](#)

## SOP History

Chemical Spills SOP v 8-Feb-2008 prepared by A. Doane.



**Reason for Changes:**

- Update of products available from Chemistry Stockroom, VWR and Fisher Scientific.
- Labs to create contingency plans for hazardous chemicals in their labs.
- Update of emergency contact number, x52000.
- Reformatting to meet AODA compliance

**Review Frequency:**

All CBS SOP's are to be reviewed every two years or as changes in legislation or procedures necessitate.

