



# Chemical Spills

## 1. Purpose:

Provide guidance on the containment, cleanup and reporting of chemical spills in the Chemistry Teaching Laboratory for the safety of lab personnel and lab users.

## 2. Scope:

Staff, Faculty, Postdoctoral Fellows, Graduate Students, Undergraduate Research Students, Volunteers and visitors working in the Chemistry Teaching Laboratory in the Department of Chemical and Physical Sciences (CPS).

## 3. Prerequisites:

EHS101: WHMIS and Lab Safety (or Annual Refresher EHS112)

EHS002: Basic Health and Safety Awareness

EHS111: Mercury Safety Awareness

EHS820: Response to Small Laboratory Spills

EHS532: Respiratory Protection

CPS Onboarding Training

Respirator Fitting

\*Not an extensive list. Confirm with PI, Supervisor or Manager.

## 4. Introduction: *(Adapted from UofT EHS Office)*

A spill refers to the discharge of a pollutant that is abnormal in quality or quantity from a container or building into the natural environment. A spill can enter the environment through air, water or land. Examples in the chemistry lab include spills from broken bottles and excessive fumes being vented through a fume hood.

## 5. Responsibilities:

### 5.1 Chairs/Directors

It is the responsibility of Chairs or Directors to ensure employees are aware of these guidelines.

### 5.2 Principal Investigators (PI) and Lab Managers

Principal Investigators and Lab Managers must ensure that all laboratory users have the appropriate training to respond to chemical spills in their specific laboratory work space.

### 5.3 Employees, Student Lab Users and Lab Visitors

It is the responsibility of any University of Toronto lab user or lab visitor to adhere to the procedural requirements specified in this SOP.

## 6. Spill Kits (Adapted from UofT EHS Office)

### 6.1 Spill Kit Content

#### 6.1.1 Required Materials

 <p>Leak-proof Container</p>	 <p>Acid Absorbent Base Absorbent Organic Liquid Absorbent</p>	 <p>Neoprene or Nitrile Gloves</p>
 <p>Goggles</p>	 <p>Dustpan and Brush</p>	 <p>Disposable bags</p>
 <p>Chemical Waste Label</p>	 <p>Warning Signs</p>	 <p>Absorbent Pads</p>

#### 6.1.2 Optional Materials

- Drain Cover
- Caution Tape
- Shoe Covers
- pH indicator
- Absorbent socks
- Overalls
- Full face respirator
- Cartridges (multipurpose)
- Cartridges (Mercury)
- Aspirator bulb
- Medicine dropper
- Mercury sponge
- Mercury Vapor Suppressant

## 6.2 Spill Kit Locations

The following spill kits can be found in the Chemistry Teaching Labs. A sign at each location in the laboratory indicates the exact location of the spill kits. Floor plans showing the location of the Chemical and Mercury spill kits can be found in Appendix A.

DV3007 Preparation Room - Spill Kit (by double doors)

DV3065A – Biological Spill Kit (Please refer to Biological Spills SOP as part of Biosafety Manual)

DV3065C - Mercury Spill Kit (below LCMSMS)

DV3065C - Spill Kit (under the sink)

DV3068 Tech Office - Spill Kit **(Can only be accessed by Laboratory Coordinators)**

DV3075D - Spill Kit (under the sink)

Respirators are available to trained and fitted laboratory coordinators. They are located near the spill kit in DV3068.

Extra absorbent pads are located in DV3068. **(Can only be accessed by Laboratory Coordinators)**

Extra absorbent socks are located under the sink in DV3075E.

## 6.3 Maintaining Supplies in Spill Kits

Laboratory Coordinators should replenish the spill kits after use.

If a spill kit is used by a lab user other than a Lab Coordinator, please report to Senior Laboratory and Safety Coordinator to replenish supplies and confirm that an incident report was submitted.

The contents of the spill kits are checked monthly by the Senior Laboratory and Safety Coordinator and replenished if necessary.

The respirators and cartridges are checked monthly by the Senior Laboratory and Safety Coordinator for integrity and expiration dates (if applicable) per manufacturers' recommendations. The respirators are cleaned, when necessary, per manufacturers' recommendations.

All records are kept by the Senior Laboratory and Safety Coordinator.

## **7. Procedures:** *(Adapted from UofT EHS Office and UTSG Chemistry Department)*

*(See section 8 for mercury spills)*

### **7.1 Spills on Person**

Attend to contaminated person. Report the incident to Manager, Teaching Laboratories Operations and to Environmental Health & Safety using the [Incident Report form](#).

#### **7.1.1 Spills on Body**

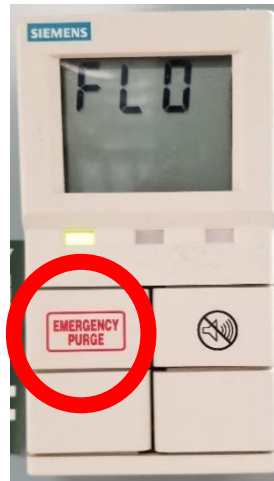
Remove contaminated clothing and wash affected area immediately for 15 minutes at sink or under safety shower. Consult SDS for additional medical attention. If in doubt about further treatment, call the EHS office at 4169784467 Monday to Friday during business hours. Call 911 outside these hours.

#### **7.1.2 Chemicals in Eyes**

Flush eyes at eyewash station immediately for 15 minutes. Depending on the severity call 911, otherwise seek medical attention immediately.

### **7.2 Spills inside Fume hoods**

1. Stop work immediately, unplug equipment and eliminate sources of ignition.
2. If possible and safe to do so, prevent the spill from going into the sink at the back of the fume hood. This can be accomplished by creating an obstruction or placing tissue paper around the sink.
3. Lower the sash and place a note indicating a spill. The note can be hand written or obtained from a spill kit.
4. Press the emergency purge button located on the fume hood alarm.



### **7.2.1 Volatile Chemicals**

1. Allow the spill to evaporate completely before opening the sash.
2. Wipe down fume hood with soap and water if residue remains and remove the spill sign.

### **7.2.2 Non-volatile Chemicals and Corrosive**

1. Bring the spill kit to the fume hood.
2. Consult Section 6.3 of SDS for Containment and Clean up particulars.
3. Ensure proper PPE: Lab coat, goggles, and chemical resistant gloves at minimum.
4. Retrieve necessary material from the spill kit.
5. Open sash to proper working height and place the absorbent on the spill working from the periphery inwards.
6. Place soaked absorbent into a waste bag. Leave the bag in the fume hood to vent for at least 24 hours.
7. Seal the bag and discard as chemical waste in appropriate green waste pail.
8. Remove spill sign from sash.

## 7.3 Spills outside fume hoods

### 7.3.1 Minor Spills

**Definition:** Indoor spills that do not pose immediate or significant threat to personal health and safety or the environment and can be cleaned up by lab personnel. **All** of the following conditions must be met for a spill to be considered minor.

- ✓ The responsible party is at the scene
- ✓ The material spilled is known and not toxic
- ✓ The quantity spilled less than 4 L, 4 Kg
- ✓ There is no fire hazard present
- ✓ The spill is contained inside a building
- ✓ The material has little or no potential to reach the environment (e.g., via a drain, vent)
- ✓ The spill is not in a common area (e.g., a hallway)
- ✓ Medical attention is not required
- ✓ On-site personnel are trained, equipped (required PPE) and able (comfortable) to clean up spill

#### **Minor Spills Procedure:**

1. Do not rush! Carefully plan cleanup. Consult section 6.3 of SDS to determine appropriate cleanup procedures for the material. The effects of a spill can be minimized with proper planning.
2. Ensure proper PPE: Lab coat, goggles, and chemical resistant gloves at minimum.
3. Retrieve necessary material from the spill kit.
4. Confine the spill to a small area. Do not allow the material to spread. Contain the size of spread of liquid spill by using appropriate absorbing material.
5. Carefully remove other materials, containers, equipment from path of the spill.
6. Sweep solids of low toxicity into a dust pan and place into container for disposal.
7. Dispose of all cleanup materials as hazardous waste. Allow soaked waste to vent in a fume hood for 24 hours. Waste must be properly packaged in a leak-proof container, sealed and labelled with a hazardous waste label.
8. After removal of spilled material, wash the area with warm soapy water to remove any remaining residue.
9. Report the incident to Manager, Teaching Laboratories Operations and to Environmental Health & Safety using the [Incident Report form](#).

### 7.3.2 Major Spills

**Definition:** A spill that fails one of the criteria to be classified as minor spill is considered major. Specifically, a spill is considered major **if ANY** of the following apply.

- ✓ The responsible party is unknown
- ✓ The material spilled is unknown, highly toxic, or presents a significant fire hazard
- ✓ Large (or undetermined) quantity was spilled
- ✓ Someone has been exposed to the material or requires first aid or medical attention
- ✓ The spill occurred outdoors
- ✓ The material has the potential to reach the environment (e.g. via a drain)
- ✓ The spill is in or affects a common area (e.g. hallway)
- ✓ On-site personnel are not trained or equipped (required PPE) to clean up spill (or not comfortable)
- ✓ You are unsure whether the spill should be considered *Minor* or *Major*

**Major Spills Procedure:** *(Taken Directly from UofT EHS Office)*

1. Evacuate immediate area. Call Environmental Protection Services at: 416.978.7000 on weekdays between 8:00am-4:00pm. After hours call Campus Safety 905.569.4333
2. State your name, location, chemical(s) involved, and the amount spilled.
3. Attend to any persons who may have been contaminated. Consult SDS for first aid information.
4. Wait in a safe area for the response team. Your knowledge of the area will assist the team.
5. Do not allow unauthorized personnel to enter the contaminated area.
6. Report the incident to Manager, Teaching Laboratories Operations and to Environmental Health & Safety using the [Incident Report form](#).

### 8. Mercury Spills: *(Taken directly from UofT EHS Office)*

**Mercury vapors are toxic. Mercury is a designated substance under Ministry of Labour Regulations.**

**Large Spill:**

1. For a Major spill call Environmental Protection Services (Hazardous Materials) at 416.978.7000 between 8:00am - 4:00pm on weekdays. After hours, call Campus Safety at 905- 569-4333
2. Seal off the area until assistance arrives.

**Small Spill:**

**Only personnel who received hands-on training by the Senior Laboratory and Safety Coordinator can perform the following clean-up procedure.**

1. Use Commercial mercury spill kits may per instructions in the spill kit (See Appendix B). Do not use household shop vacuum cleaner.
2. Place the mercury in the spill kit pail and seal it. Contaminated items (e.g. broken thermometer, gloves, suction bulbs, etc.) should also be placed into the pail.
3. Dispose of all cleanup materials as hazardous waste. Waste must be properly packaged, sealed and labelled with hazardous waste label. Refer to Chemical Waste Disposal Procedures.
4. Sealed and labelled pail should be disposed at Shipping and Receiving.
5. Report the incident to Manager, Teaching Laboratories Operations and to Environmental Health & Safety using the [Incident Report form](#).

**9. Polychlorinated Biphenyl (PCB) Spills** *(Parts taken directly and parts adapted from UofT EHS Office)*

A PCB material is legally defined as any monochlorinated or polychlorinated biphenyl or any mixture that contains one or more of them. This includes equipment, solids [including empty containers] and contaminated liquids. The handling of PCB-contaminated materials requires special consideration. Many provincial and federal environmental requirements apply. It is important for the University to recognize and implement appropriate handling requirements for such material.



## 9.1 Major Spills:

**Definition:** PCB spills are considered major if one of the following applies:

- the spill is large [ $> 1$  litre of liquid or 1 kg of solid PCB-contaminated material]
- the concentration of the PCBs is  $> 5000$  ppm
- **Any** PCB material has spilled outside [into the “natural environment”]
- the hazard from a spill exceeds the capabilities for cleanup in the work area
- any doubts exist about the proper procedures

### **Major Spill Procedure:**

1. Evacuate the immediate area.
2. **Immediately** contact the Environmental Protection Services at 416.978.7000. After hours call Campus Safety at 905-569-4333.
3. State the location, extent of the spill and that the spill involves PCBs.
4. Await the arrival of the response team in a safe area.
5. Attend to any persons who may have been contaminated.
6. Do not allow unauthorized personnel to enter the contaminated area.

## 9.2 Minor Spills:

**Definition:** PCB spills are considered minor spills if all of the following apply:

- the spill is small [ $> 1$  litre of liquid or 1 kg of solid PCB-contaminated material]
- the concentration of the PCBs is  $< 5000$  ppm
- **No** PCB material has spilled outside [into the “natural environment”]
- the hazard from a spill does not exceed the capabilities for cleanup in the work area
- Lab personnel have no doubts about the proper clean-up procedure and are comfortable doing so

### **Minor Spill Procedure:**

#### **Personal Protective Equipment:**

- Chemical splash goggles
- Respirator with organic cartridges
- Skin Protection
- Neoprene gloves
- Disposable coveralls
- Rubber boots

**For Solid Spills:**

1. Confine the spill to a small area; do not allow the material to spread.
2. Shovel or scoop material into steel drum or other suitable container.
3. Wipe contaminated area with detergent.
4. Vent area to prevent accumulation of vapours.

**For Liquid Spills:**

1. Confine the spill to a small area; do not allow the material to spread.
2. Absorb liquid with vermiculite, sand or other inert absorbent.
3. Shovel or scoop material into steel drum or other suitable container.
4. Wipe contaminated area with detergent.
5. Vent area to prevent accumulation of vapours.

**All contaminated materials including clothing, gloves, to be treated as PCB waste [per O. Reg. 362].** Contact Environmental Protection Services at 416.978.7000 for disposal of materials.

**Post-Spill Monitoring**

Contact Environmental Protection Services at 416.978.7000 to arrange for lab analysis of cleanup. Assistance in cleanups also provided.

**9. Resources:**

<https://ehs.utoronto.ca/report-an-incident/emergency-procedures/chemical-spill-procedures/>

<https://ehs.utoronto.ca/report-an-incident/emergency-procedures/mercury-spill-procedures/>

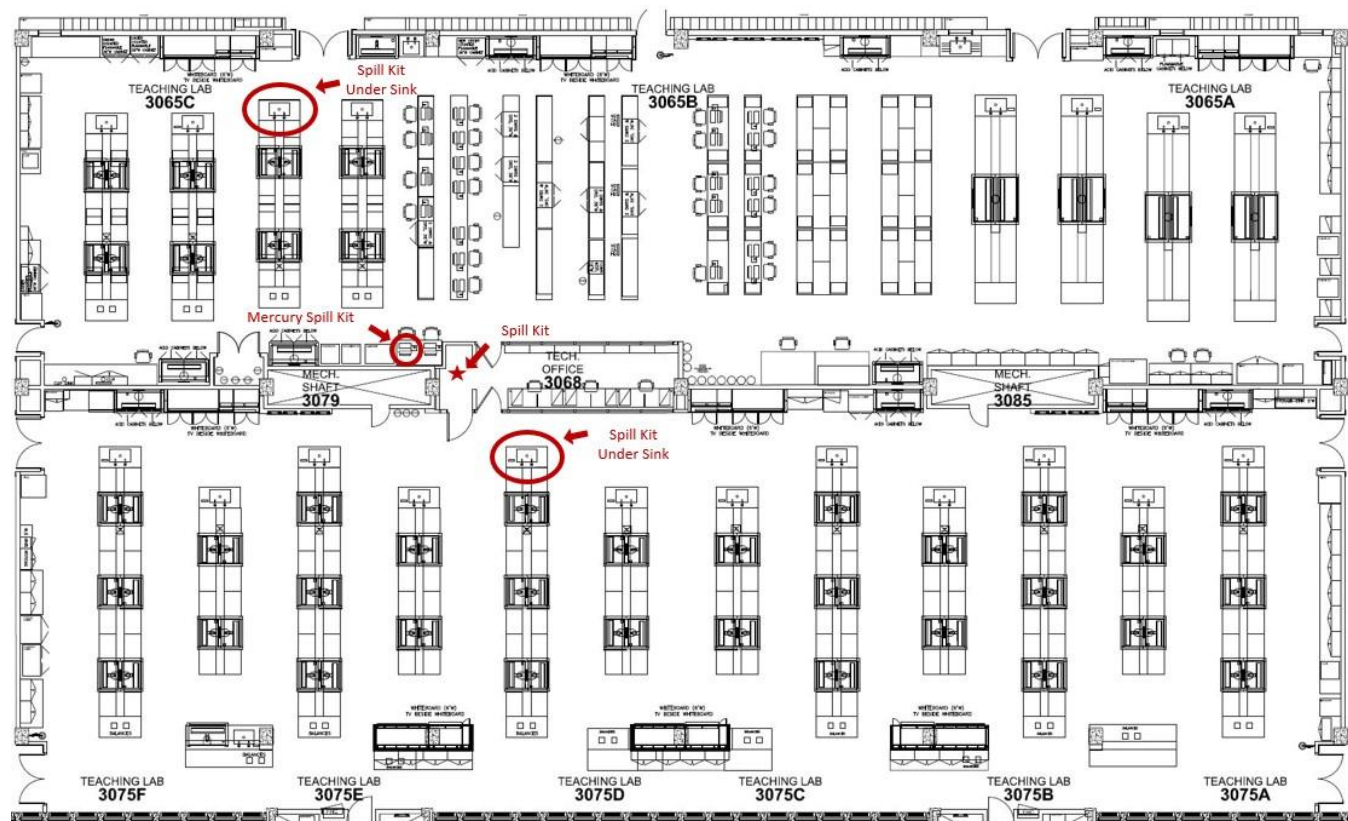
<https://www.chemistry.utoronto.ca/sites/www.chemistry.utoronto.ca/files/LM-SOP-06%20-V01-%20Chemical%20Spills%20%2811-01-2019%29.pdf>

<https://ehs.utoronto.ca/our-services/environmental-protection-services/pcb-disposal/>

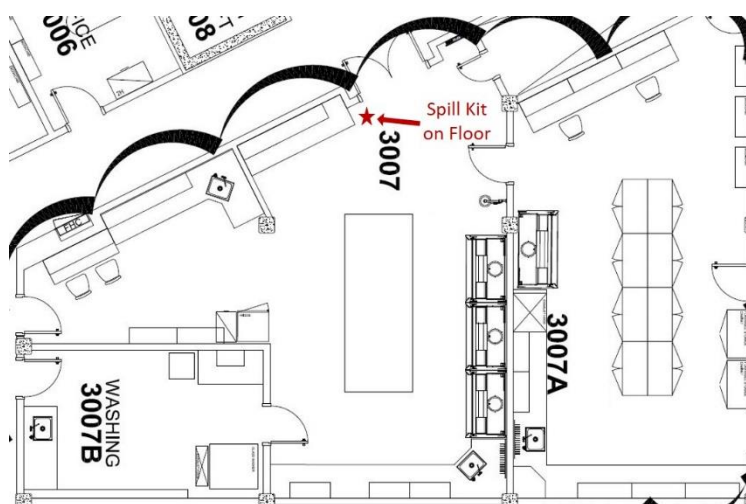
# APPENDIX A

## Locations of Spill Kits

Chemistry Teaching Lab DV3065, DV3068, DV3075



Chemistry Preparation Room DV3007



## Kit Contains

270g Amalgamation Powder	250g Indicator Powder
(1) Vapor Suppressor, Shaker Bottle	(1) Aspirator Bottle
(1) Waste Collection Bottle	(1) Mixing Tub with spatula
(1) Chemical Sponge	1 pr. Nitrile Gloves & Goggles
(1) Disposal Bag and Twist-Tie	(1) Wisk on Pan

## HOW TO USE MERCURY SPILL KIT:

1. Evacuate employees from the spill area.
2. Personal protective equipment for exposure to mercury should be worn.
3. Ventilate the contaminated area.
4. Shake the vapor suppressor over the contaminated area being sure to cover any visible mercury.
5. Collect all vapor suppressor covered mercury using the wooden spatula and the mercury aspirator bottle. Wait 30 minutes before final clean-up.
6. Empty the aspirator bottle into the mercury waste bottle.
7. Activate the MERCSORB® Amalgamation Powder with two (2) ounces powder in a plastic mixing cup. Apply just enough water to form a paste (about 1 ounce). Mix the MERCSORB® Powder and water with a wooden spatula.
8. Apply a strip of MERCSORB® paste across the edge of the mercury-contaminated area. Push the strip slowly across the contaminated surface with a wooden spatula. Apply the MERCSORB® paste in one direction only. Small droplets of mercury will be absorbed in the MERCSORB® paste.
9. Apply a second strip of the MERCSORB® paste to the area and push the strip across the area a second time.
10. Place the contaminated MERCSORB® paste into a sealed plastic container.
11. Wipe the contaminated area using a damp sponge.
12. Dispose of the used items and products in accordance with all local, state, and federal regulations.
13. After all visible mercury has been properly collected from horizontal surface; sprinkle Mercury Indicator Powder over contaminated area. For vertical surfaces, mix one (1) part Mercury Indicator Powder with four (4) parts water to form a slurry. Paint the slurry on the contaminated vertical surface.
14. Mercury Indicator Powder should be left undisturbed on the contaminated surface for 24 hours.
15. A color change of pink to reddish-brown spots indicates contamination. Large black spots or areas indicate fresh or extensive mercury contamination.
16. Collect the Mercury Indicator Powder and place in a temporary disposal bag.
17. Clean up remaining mercury contaminated area with physical and chemical means as described in steps 7-11.
18. Repeat steps 12-16 until no indication of mercury is observed.
19. Once decontaminated, clean the area using a sponge and warm soapy water.

All used products are contaminated and must be disposed of as toxic waste in accordance with local, state, and federal regulations. Depending on the size and extent of the spill, additional equipment may be needed. Kit sorbency capacity is 25ml (337g) of Mercury. CAUTION: Only trained personnel should respond to mercury spills. MERCSORB® kits do contain any chemicals designed to alter the mercury's toxicity or danger. Mercury is absorbed directly through the skin and inhalation. Kit is designed for one-time use only. NOTE: Mercury has a density of 13.55 g/ml at 68° F(20° C).