DEPARTMENT OF MOLECULAR AND CELLULAR BIOLOGY

SAFE OPERATING PROCEDURE

RESPONSE TO A CHEMICAL SPILL

Purpose:
To provide direction and the proper response procedure for a chemical spill to research and teaching staff members in the Department of Molecular and Cellular Biology.

Application:

This procedure should be followed in the event of a chemical spill. Students, staff and faculty working with laboratory reagents should be familiar with the general procedures outlined below.

- Response procedures for **major** and **minor** spills, including:
  - organic solvents
  - acids
  - bases
  - dry chemicals
  - mercury
  - hydrofluoric acid

Safety Precautions:

⚠ **If in doubt of the ability to clean a chemical spill safely, evacuate the lab and call for assistance. It is always better to err on the side of caution.**

⚠ If a potential risk is presented to the rest of the building, pull the fire alarm and evacuate the building.

⚠ Certain materials found in MCB labs can be particularly hazardous when spilled. Always review the MSDS and have knowledge of the hazardous properties of the spilled material prior to clean up.

⚠ 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.

⚠ If material spills in an eye, flush for at least 15 minutes at a designated eyewash station (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.

Standard/Universal Kit	***Laboratories using: Formaldehyde***	***Laboratories using: Hydrofluoric acid***	***Laboratories using: Mercury***
- Absorbent materials (pads) * - Acid neutralizer * - Base neutralizer* - Chemically resistant gloves* - Dust pan and small broom - Goggles - pH test strips/paper* - Plastic bags for waste materials* - Plastic scoop and scraper - Solvent /vapor suppressant*	ADD: - Formaldehyde Neutralizing agent (e.g., Polyform-F, FANpad GL, Formalex).	ADD: - HF-neutralizing agent (calcium carbonate, commercial neutralizer) - Calcium gluconate topical gel (2.5%)	ADD: - Mercury spill kit

➢ * Denotes supplies available from the stockroom in the Summerlee Science Complex (SCIE 1110).

Procedure: Major Spill

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

- You are not comfortable proceeding with cleanup
- Spill 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)
- 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 x2000 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.
- ✓ When emergency responders arrive, provide them with all relevant information on the type and quantity of material spilled.

Procedure: Minor Spill

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 x 2000 to get assistance.
- ✓ Remove the gloves and goggles from the kit and put them on before approaching the spill.

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. https://www.uoguelph.ca/hr/hr-services-environmental-health-safety/forms

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. 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. https://www.uoguelph.ca/hr/hr-services-environmental-health-safety/forms

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. 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. https://www.uoguelph.ca/hr/hr-services-environmental-health-safety/forms

Dry chemicals (granulated/powder):

- ✓ 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 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. https://www.uoguelph.ca/hr/hr-services-environmental-health-safety/forms

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 x2000 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
- ✓ Place 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.
- ✓ Report the spill using the EHS Incident Report form. https://www.uoguelph.ca/hr/hr-services-environmental-health-safety/forms

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.

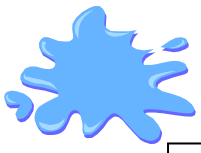
- ✓ If the spill is small, and there is a low respiratory hazard (i.e. you have spilled a small amount inside the fume hood) you may clean the spill.
- ✓ Carefully cover the spill with a HF-neutralizing agent (calcium carbonate or commercial HF spill neutralizer), working from the outside in.
- ✓ Use 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. https://www.uoguelph.ca/hr/hr-services-environmental-health-safety/forms

LABORATORY SPILL RESPONSE PROCEDURES

FOR EMERGENCY - DIAL 2000

CHEMICAL SPILL

1. Assess the spill.



Is the spill manageable? Is it a minor spill that can easily be cleaned up?

NO

- Evacuate lab, restrict area and notify others in the area of the spill.
- If there is immediate risk to the safety of other people in the building, activate the emergency alarm and evacuate.
- Dial 2000 and provide campus dispatch with all relevant information.
- If safe to do so:
  - Attend to injured/contaminated personnel
  - Turn off ignition sources if flammable material involved
  - Restrict/contain spill

YES

- Attend to injured/contaminated personnel.
- Turn off ignition sources if flammable material involved.
- Restrict area and notify others of the spill.
- Don appropriate PPE.
- Contain the spill.
- Neutralize if appropriate /required.
- Soak up spilt material using appropriate absorbents as applicable.
- Transfer to appropriate container and treat as hazardous waste

*Note that certain materials such as pyrophorics, mercury, and hydrofluoric acid require specific neutralizers and/or modified spill response procedures. Specific response procedures should be developed based on the identity and quantity of material being handled.

BIOLOGICAL SPILL

For Level 1 or 2 biohazards:

- Attend to injured/contaminated personnel.
- Restrict area and notify others of the spill.
- Don appropriate PPE.
- Contain the spill
- Decontaminate the area with appropriate disinfectant allowing for sufficient contact time.
- Soak up spilt material using appropriate absorbents as applicable.
- Transfer to autoclave bag and treat as biohazardous waste.

THE DISINFECTANT FOR THIS LAB IS:

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RADIOLOGICAL SPILL

See RSOPROC-010 for detailed procedure.

1. Assess the spill.

Is the volume more than 2L? Is the activity more than 10 x ALI?

NO

- Attend to injured /contaminated personnel.
- Restrict the area and notify others of the spill
- Don appropriate PPE
- Contain spill.
- Use survey meter to establish “hot zones”
- Absorb from the outside in as applicable, transferring used absorbents into disposal containers and treat as radioactive waste.
- Decontaminate area with cleaning agent such as DeCon until radiation counts return to background levels.

YES

- Evacuate lab, restrict area and notify others in the area of the spill.
- Contact the RSO at x54888 (out of hours dial 2000).

Note that this poster reinforces but does not replace the requirement to post CNSC Info-0743: “Spill Procedures”