General Laboratory Emergency Procedures
Document No. LAB-004-02

1. INTENT

This Standard Operating Procedure (SOP) applies to all faculty, staff and students at Wilfrid Laurier University. It was developed by Safety, Health, Environment & Risk Management (SHERM) to address incidents and emergency response in laboratories. Questions regarding this SOP can be directed towards SHERM at extension 3108.

2. DEFINITIONS

Accident
A preventable, unplanned, work-related event or exposure or series of events/exposures that result in personal harm and/or damage to property.

Exposure
Contact with a chemical or biological agent via inhalation, ingestion or absorption.

Incident
An event that does not result in injury or illness but which has the potential to do so under slightly different circumstances.

Minor vs. Major Spill
See Appendix B for Guidelines for Classification of a Major Spill. The table provides guidelines for quantities only. Other considerations for classifying a spill as major include the relative hazard properties of the spilled materials, and if the lab personnel are able to clean up the spill safely without outside assistance.

3. ROLES AND RESPONSIBILITIES

Supervisors/Principal Investigators

Supervisors and Principal Investigators (PIs) are responsible for ensuring that:

- full compliance with the SOP exists at all times
- everyone working in the lab under the authority of the PI follows the procedures outlined within this SOP
- everyone working in the lab is aware of the hazards and are adequately trained to handle an emergency situation
- new personnel are trained within three months of onboarding and that refresher training on lab spill procedures is provided every six months
- in the event of an incident or accident, SHERM is notified

- in the event that there is a personal injury to any staff or student, an Accident/Incident Report Form is completed and sent to SHERM

Staff/Students Working In Labs

Staff and students working in labs are responsible for ensuring that they:

- are familiar with the hazards and this SOP as it relates to response to emergency situations
- familiar with the chemical, physical, and toxicological properties of the hazardous substances they are working with
- promptly report any known accidents or unsafe conditions to their supervisor

4. GENERAL GUIDELINES

All accidents and incidents must be reported to the PI or laboratory supervisor as soon as circumstances permit. The PI or supervisor is then required to inform SHERM within 24 hours via the Accident/Incident Report Form, and must include actions taken or planned to prevent future occurrences. Rapid and accurate reporting of accidents and incidents is important to identify potentially hazardous operations and procedures.

Preservation of human life and safety should always be first and foremost in any emergency. If an emergency situation is too serious to handle without assistance, call 9-911 and Special Constable Service for assistance.

5. PROCEDURES

5.1 Personal Injury or Exposure

- Move the injured person away from the scene of the incident.
- Do not attempt to move a non-ambulatory person unless it is absolutely necessary.
- Report the incident to the PI or laboratory supervisor.
- If radioactive materials are involved, report the incident to the Radiation Safety Officer.
- If biological agents are involved, report the incident to the Biosafety Officer.
- Ensure an Accident/Incident Report Form is completed and sent to SHERM.

5.1.1 Cuts/Scratches/Needlesticks

- Allow the wound to bleed freely for a short time to flush chemicals away.
- Wash with soap and water, away from the wound.
- Cover with a bandage and seek medical help if necessary.

5.1.2 Exposure to Chemicals, Biohazardous Agents or Radioactive Materials

- Exposure can occur via inhalation, skin absorption or ingestion.

- Remove all contaminated clothing.
- Flush skin that has been exposed at the nearest shower/eyewash station for 15 minutes.
- If a person has ingested or inhaled a chemical, follow the first aid advice on MSDS and/or seek prompt medical attention.
- For exposure to biological agents, see SOP BIO-004; "Emergency Procedures for Biological Containment Level 1 and 2 Laboratories".
- For exposure to radioactive materials, refer to the Emergency Procedures section of the Radiation Safety Manual.

5.2 Spill/Accidental Release

- For spills of biological agents, refer to SOP BIO-004, "Emergency Procedures for Biological Containment Level 1 and 2 Laboratories".
- For spills of radioactive materials, refer to the Radiation Safety Manual.
- Notify others working in the area to prevent contamination of additional personnel and environment.
- "Spill - Do not enter" signs must be placed on the doors during an evacuation to prevent entry to the lab.
- Each work area or laboratory has a spill kit that is capable of handling volumes of liquid from a small spill.
- Always wear appropriate personal protective equipment.
- See Appendix B for guidelines regarding spill size classification.

5.2.1 Minor Spill

- Remove any contaminated clothing and flush exposed skin with water.
- Put on personal protective equipment appropriate for the spill cleanup, i.e. gloves, safety glasses, lab coat.
- Contain the spill using a spill soc or making a ridge out of paper towels, not allowing liquid to travel away from the spill area.
- Using forceps, remove any sharps such as broken glass from the spilled material and place in the sharps container.
- For acid and base spills, sprinkle on a neutralizing powder, working from the outside of the spill area towards the inside.
- Using absorbent or paper towels soak up the liquid, or if solidified from the neutralizing powder, scoop up into a bag or container for disposal.
- Dispose of paper towels or absorbent into solid chemical, biological or radioactive waste receptacle, depending on nature of spill.
- Decontaminate the area according to the type of material spilled.

5.2.4 Major Spill

- Evacuate the area immediately and call 9-911 and Special Constable Service.
- Do not re-enter the area.
- Meet emergency personnel at the entrance of the building to provide details regarding the nature of the spill.

5.2.5 Release of Water by Activation of Emergency Shower

- An emergency shower delivers a minimum of 76 litres of water per minute.
- Running the shower at this rate for 15 minutes delivers a substantial amount of water to a room and the water should be contained as best as possible to avoid further personal injury and property damage.
- In the event that an emergency shower is activated, spill socs should be used to contain the water.
- A shop vac could be used to remove water contained within the soc reservoir.
- If the water contains no chemicals, it may be disposed of down the drain.
- If the water does contain chemicals, it must be collected and disposed of as hazardous aqueous waste.

5.2.5 Spill Kits

- A spill kit that contains items sufficient to clean up a small spill is located in each laboratory.
- The spill kit must contain supplies that are appropriate to clean up a spill based on the contents of the lab. For example, a mercury spill kit in a lab that contains mercury.
- It is the responsibility of the laboratory supervisor to maintain the spill kit and restock its contents if they are used.
- The kit should be stored in an area that is accessible to everyone working in the lab, and in a location that is easy to get to at the time of a spill.
- See Appendix A for a list of basic spill kit items.
- Refer to the Radiation Safety Manual for Radiation Spill Kit requirements.
- Refer to SOP BIO-004; "Emergency Procedures for Biological Containment Level 1 and 2 Laboratories" for Biological Spill Kit requirements.

5.3 Fire

5.3.1 Fire Extinguishers

- Attempt to extinguish fires only if trained. Fire extinguisher training is available to faculty and staff through SHERM.
- Fire extinguishers are typically located near the exit of the laboratories and must be unobstructed and easily accessible at all times.
- Additional signage should prominently indicate the location of the extinguisher, if necessary.
- Any use of a fire extinguisher must be reported immediately to Physical Resources so the extinguisher can be recharged or replaced.
- The type of fire extinguisher used to extinguish the fire depends on the fire itself.

- There are five classes of fires:
    - *Class A*
      Ordinary combustibles i.e. paper, wood, rubber, plastics.
    - *Class B*
      Flammable liquids i.e. any flammable and combustible liquid, oils, greases, tars, oil based paints, flammable gases, lacquer.
    - *Class C*
      Energized electrical equipment i.e. wiring, fuse boxes, circuit breakers, plugged-in electrical equipment.
    - *Class D*
      Combustible metals i.e. sodium, lithium, aluminum, titanium.
    - *Class K*
      Cooking oils/fats.
- Each laboratory has an ABC (dry chemical) and may also have a BC (CO_2) rated extinguisher, depending on the lab contents.
- Any laboratory using combustible metals has a D-rated extinguisher.

5.3.2 Equipment Fire

- Vacate the fire area and close the doors.
- Activate the nearest emergency pull station and call 9-911 and Special Constable Service.
- Attempt to extinguish the fire if you are trained and you can do so without putting your own safety or the safety of others at risk.
- Never try to extinguish a fire larger than a waste paper basket.
- Steps to take to extinguish a fire:
    - Locate a fire extinguisher
    - Position yourself between the fire and the exit so that you always have an escape route
    - Pull the pin on the fire extinguisher
    - Aim the extinguisher nozzle or hose at the base of the flame
    - Squeeze the trigger
    - Using a sweeping motion, extinguish the fire
- Most portable extinguishers contain only enough material for 8 to 25 seconds of action, depending on their size.

5.3.3 Clothing Fire

- If your clothing catches on fire:
    - Stop what you are doing
    - Drop to the floor
    - Roll around to smother the flames

- If possible, get to the nearest safety shower and rinse with copious amounts of water
- Seek medical attention

6. APPENDICES

Appendix A: Basic Spill Kit Contents

Spill kits should contain materials that are appropriate for clean-up of the type of chemicals in the lab. Suggested contents include:

- Absorbent materials – spill pigs/pads, vermiculite, etc.
- Acid/base neutralization powder
- Gloves
- Goggles or face shield
- Disposable coveralls
- Shoe covers
- Forceps
- "Do Not Enter" Signs

Appendix B: Guidelines for the Classification of a Major Spill

Note: These are guidelines only.

Material	Quantity
Air and water reactive materials	All quantities
Flammable liquids	Greater than 4L
Combustible liquids	Greater than 4L
Non-flammable organic liquids	Greater than 4L
Concentrated acids	Liquids greater than 1L Solids greater than 1kg
Concentrated bases and alkalis	Liquids greater than 1L Solids greater than 1kg
Mercury	Greater than 30mL
Oxidizers	Liquids greater than 1L Solids greater than 500g
Highly toxic, malodorous materials (e.g. phenol, mercaptoethanol, hydrofluroic acid)	Liquids greater than 100mL Solids greater than 50g
Low hazard material	At the discretion of laboratory personnel
Compressed gas leaks	If the leak cannot be stopped by closing the valve on the gas cylinder
Radioactive materials	More than 100 exemption quantites, contamination of personnel or release of volatile material

Appendix C: Relevant Standards/Legislation/Policies

Biosafety Manual, Safety, Health, Environment & Risk Management.

Canadian Biosafety Standards and Guidelines, Public Health Agency of Canada.

Laboratory Health and Safety Manual, Safety, Health, Environment & Risk Management.

7. REVISION HISTORY

Revision	*Date*	*Comments*	*Initials*
00	Aug 7/08	SOP comes into effect	SJL
01	July 11/12	Updated for Brantford labs and SHERM name change	SJL
02	June 23/15	Editorial changes/update to training frequency	SJL