



University
of Windsor

HAZARDOUS MATERIALS SPILL RESPONSE MANUAL

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Questions and comments related to this guide can be directed to:

Chemical Control Centre

401 Sunset Avenue

Windsor, Ontario N9B 3P4

E-mail: ccc@uwindsor.ca

Phone: 519.253.3000 ext. 3519

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HAZARDOUS MATERIALS SPILL RESPONSE GUIDELINES

1. PURPOSE:

The purpose of the Hazardous Materials Spill Response Guidelines is to provide faculty, staff and students of the University of Windsor with easy to follow guidelines for the cleanup of a wide variety of spills that may occur on campus, including chemical, biological and radiological spills. Hazardous materials are used in many areas on campus, the Hazardous Materials Spill Response Guidelines will help users determine the appropriate and immediate response to a wide variety of spills that may occur anywhere on campus to better prevent serious injury to others and/or the environment.

2. SCOPE:

These guidelines apply to all persons (University of Windsor employees, students, research employees or any other person) who may be involved with the transport, storage, use or disposal of hazardous materials on or between University premises.

For more information on the cleanup of spills involving **radioactive materials**, please reference the University of Windsor's Radiation Safety Manual located online at www.uwindsor.ca/ccr.

For more information on the cleanup of spills involving **biological materials**, please reference the University of Windsor's Biological Safety Program located online at www.uwindsor.ca/ccr.

3. DEFINITIONS:

Biological Spill – Any unplanned or uncontrolled release of any biological agent that can pose a potential safety or health risk to people, animals, or the environment.

Chemical Spill – Any unplanned or uncontrolled release of any solid, semi-solid, liquid, or gaseous hazardous chemical that can pose a potential safety or health risk to people or the environment.

Facilities - Facilities covered under this program include all University of Windsor owned and all leased structures and property.

Hazardous Chemical - Any solid, semi-solid, liquid, or gaseous chemical that may pose a physical hazard or a health hazard. This would include the following: corrosives (acids, bases), paints, petroleum products, poisons, oxidizers, reactives, and solvents (paint thinners, alcohols).

Health Hazard – Chemicals that may cause various acute or chronic adverse health effects such as corrosives, carcinogens, irritants, mutagens, teratogens and sensitizers.

Material Safety Data Sheet (MSDS) – A document prepared by the manufacturer of a hazardous chemical that contains information about the hazards of the chemical and the appropriate work practices required for safe use and spill response. MSDSs are available online at www.uwindsor.ca/ccs.

Major Spill - Any hazardous chemical spill that involves highly toxic, highly reactive, explosive or life-threatening chemicals. Any spill situation that presents significant fire, explosion, or other physical or health hazard risks, particularly if a person may be or has been significantly exposed, contaminated or injured to such an extent that medical or other outside assistance is required. Any spill situation that may adversely impact the external environment whether or not the spill occurred internal or external to a building.

Minor Spill - Any hazardous chemical spill that does not involve highly toxic, highly reactive, or explosive chemicals in a situation that would not constitute an immediate risk to an individual's health and wellbeing. This type of spill presents a manageable physical or health hazard to personnel who, when wearing proper Personal Protective Equipment (PPE), will not be exposed to any chemical at a level that exceeds any recognized Ontario Occupation Health and Safety Act (OHS) limit.

Physical Hazard - A hazardous chemical with physical characteristics that make it combustible, flammable, explosive, reactive, a compressed or cryogenic gas, organic peroxide, or an oxidizer.

Radioactive Spill – Involves the accidental release of radioactive isotopes to the environment. These atoms have an unstable nucleus, due to a difference between the number of neutrons and protons, which causes excess energy that can be given off in the form of ionizing radiation.

4. RESPONSIBILITIES:

4.1 Department Heads or Supervisors

For the purpose of these guidelines, "Supervisor" means a faculty member, director, manager, principal investigator, technical supervisor or any other person having direct responsibility for the activities of an employee or student. In areas or departments where hazardous materials are used, the Department Head or Supervisors shall:

1. Develop and maintain procedures for the management of spills which may occur in all areas under their direction;
2. Ensure that appropriate spill response materials and personal protective equipment are available and accessible;
3. Ensure that all spills or accidents involving hazardous materials are documented and reported to the Department, the Chemical Control Center, and Health and Safety;
4. Supervisors shall ensure that all persons under their supervision receive appropriate and adequate information and training to be able to respond safely to a hazardous materials spill or release within all areas under their direction.

4.2 Health and Safety / Chemical Control Centre

The Chemical Control Centre, shall:

1. Organize, ensure adequate training, development, and support the cleanup of a spill;
2. Enlist, as needed, external resources to assist with the management of a spill;
3. Coordinate both internal and external responders in the event of a major spill;
4. Provide consultation and assistance in the management of spills, when requested;
5. Facilitate the prevention, and elimination of the adverse effects of a spill;
6. Facilitate the restoration of the natural environment;
7. Dispose of the pollutant and things affected by the pollutant as directed;
8. Comply with any Ministry of the Environment orders related to the spill;
9. Maintain and distribute a current listing of all external resources available to assist with spill response to Campus Community Police;
10. Assist, on request, with the training of personnel and the development of departmental procedures;
11. Receive, review or prepare reports of all hazardous material spills and accidental releases, and carry out follow-up as needed;
12. Provide reports of all spills and releases, including follow-up measures to the Central Safety Committee as requested, and to external compliance bodies as required by regulation;
13. Provide general training materials, on-line training tools, poster, and laboratory safety bulletins related to the safe and effective remediation of a chemical spills;
14. Assist departments and Designates in developing site specific spill response procedures and spill kits; and
15. Investigate chemical incidents to determine direct, indirect, and root causes, and to provide preventative recommendations.

4.3 Campus Community Police

Campus Community Police is responsible for:

1. Support the cleanup of a spill by facilitating communications, restricting personnel movements during a spill, and documenting their response;
2. Act as primary point of contact for the reporting of spills on campus;
3. Coordinate individuals involved in the spill response process;
4. Establish a unified command for emergency responders, if required; and
5. Document the response of emergency responders for post-incident evaluation.

4.4 Workers, Laboratory Personnel, and Students

These individuals have a responsibility to protect their own health and safety, and that of others who are present while they are working with hazardous materials. They are also expected to cooperate with the University to protect both their own health and safety, and that of others. Specifically, these responsibilities include:

1. Take all necessary steps to minimize the chance of spills when working with chemicals;
2. Cooperate with their instructor, supervisor, the Department, and the Hazardous Materials Technician to implement a chemical spill program in their area; and
3. In case of an emergency, follow the directions provided by emergency responders.

5. SPILL MANAGEMENT PROGRAM

5.1 Spill Response Prevention

The first step in chemical spill response is to prevent the spill from happening in the first place. The laboratory or working environment should be examined to identify measures that can be taken to minimize the risk of a spill occurring.

Chemical spills occur during five types of activities: (1) transport, (2) decanting, (3) storage, (4) handling, and (5) disposal.

5.1.1 Transportation

- When transporting large, heavy, or a multitude of containers use a cart suitable for the load with high edges or spill trays that will contain any spills or leaks. Two people should be involved when transporting large amounts of chemicals.
- Carry glass containers in bottle carriers or another leak resistant, unbreakable secondary container.
- If facilities exist, transport chemicals in dumbwaiters vs. using the stairs. No riders shall be within the elevator when transporting hazardous materials.
- Appropriate personal protective equipment shall be worn while transporting chemicals, such as safety glasses and/or a lab coat.

5.1.2 Decanting

- When transferring chemicals between containers, pay careful attention to the size of the receiving container to prevent overfilling it.
- When transferring liquids from large containers, use pumps, siphoning (not initiated by mouth) or other mechanical means instead of pouring.
- Use spill containment trays to catch leaks and spills when transferring liquids.
- When transferring flammable liquid from drums, ensure that both the drum and receptacle are grounded and bonded together to avoid an explosion initiated by a static electric spark.
- Ensure proper container labeling as per the WHMIS legislation (*For more information, visit www.uwindsor.ca/ccs*).

5.1.3 Storage

- Ensure shelving units are sturdy, and not overcrowded with containers. Shelves used for chemical storage should be securely fastened to the wall or floor to provide added stability.
- Ensure chemicals are stored within easy reach of everyone in the lab. Large bottles and containers should be stored as close to floor level as possible.
- Do not store chemical containers directly on the floor where they might be knocked over and broken, unless they are in ULC approved safety cans or still in their original shipping carton and packing.
- Do not store chemical containers on top of flammable storage or acid storage cabinets, unless they are empty.
- Minimize the number of chemicals and size of containers stored in the lab. For commonly used chemicals (i.e. acids, solvents), a good rule of thumb is to keep quantities in the lab to a one-week supply.
- Ensure that lighting and ventilation is adequate in the storage area.
- Regularly inspect chemicals in storage to ensure there is no leaking or deteriorating containers, including:
 1. Keep the outside of containers clean and free of spills and stains.
 2. Check that caps and closures are secure and free of deformation. Use only screw caps on chemical containers in storage.
 3. Ensure that metal containers are free of rust, bulges or signs of pressure build-up.
- Do not store chemicals in unsuitable containers or containers made of incompatible material (e.g.: no HF in glass containers).
- Do not store incompatible chemicals together (e.g. acids with bases). Chemicals must be stored by hazard category and not alphabetically (except within a hazard group).
- Purchase solvents in containers with a plastic safety coating, where possible or recommended.

5.1.4 Handling

- In laboratories, work in a fume hood whenever possible.
- When setting up and working with laboratory apparatus:
 1. Inspect laboratory glassware for cracks or defects before using it.
 2. Do not stage experiments below heavy objects, which might fall on them. Ensure the work area is free of unnecessary clutter.
 3. Select equipment that has a reduced potential for breakage (e.g. Pyrex).
 4. Mercury spills are one of the most common lab spills. It is recommended that mercury thermometers be replaced with alcohol thermometers or other alternate types of temperature measuring devices.
- When planning experiments, anticipate possible accidents and provide controls to deal with problems that may occur.
- If you must work alone after hours it is recommended that you contact someone else in the building to notify them of your working plans for the evening/weekend. If another person cannot be located contact Campus Community Police (ext. 1234) to inform them, you are working alone and for a

specified duration of time. Campus Community Police must also be notified when you have left campus.

- Check gas cylinder valves and gas tubing for leakage before use.
- If possible, keep cylinders of highly toxic or corrosive gases in a fume hood or other ventilated enclosure.
- Ensure you have access to and know the location of a suitable chemical spill kit before you start working with chemicals.

5.1.5 Disposal

- Do not mix incompatible wastes together to avoid uncontrolled chemical reactions. Consult the MSDS for more information on the reactivity of a substance.
- Properly identify the contents of all waste containers to avoid inappropriate disposal.
- Leave at least 20% air space in bottles of liquid waste to allow for vapour expansion and to reduce the potential for spills.
- When not in use, keep waste containers securely closed or capped. Do not leave funnels in waste containers.

5.2 Spill Response Preparation

Minimizing the chance of spills is the responsibility of the user, and therefore prevention is the first step in the response to a chemical spill. When prepared for chemical spills, the proper procedures for handling the situation are more likely to be followed with fewer errors and risk to employees and the environment.

5.2.1 Training:

Chemical Spill Response Training is provided by a third party vendor every three (3) years to the Chemical Control Staff members, Campus Community Police, and other interested members of the academic, professional or technical staff.

Laboratory Personnel

Individuals who work with chemicals will be provided with online training on spill response. Educational bulletins on this topic are available on the CCC website www.uwindsor.ca/ccc.

Online Spill Response Training

The University of Windsor offers online Spill Response Training; specifically for University of Windsor employees, students, research employees, visitors, and contractors who may be engaged with a transport, decanting, storage, handling, and/or disposal of hazardous materials. The Spill Response Training will also provide a definition of minor and major chemical spills, offer guidelines to follow in case of a spill, and demonstrate the clean-up of a small laboratory spill.

All personnel who work with hazardous materials are required to complete this training. The training is strongly recommended for all individuals participating in laboratory experiments, research or transport involving hazardous materials.

Online Spill Response Training



Training Details:

- Access the training online at: www.uwindsor.ca/cc
- Enter your UWin ID and password. If you are unsure of your UWin ID, you may determine it at <http://www.uwindsor.ca/uwinid>
- Follow the on screen instruction to complete the training.
- When you have finished the course material, you must complete the quiz. To document the training you are required to pass the final quiz with a score of 80% or higher.
- Upon completion of the training, you will receive a training certification and completion code. This code is also automatically emailed to your email account.

5.2.2 Hazardous Chemical Information:

Material Safety Data Sheets (MSDSs) for all hazardous materials, which are on campus, are managed by the Chemical Control Centre. For all hazardous items that have not been acquired by the Chemical Control Centre, copies of the MSDS must be forwarded to their office and maintained within the laboratory.

MSDSs contain information on the potential hazards (health, fire, reactivity and environmental) and how to work safely with a chemical product. It also contains information on the use, storage, handling and emergency procedures all related to the hazards of the material. The MSDS contains much more information about the material than the label. MSDSs are prepared by the supplier or manufacturer of the material. It is intended to tell what the hazards of the product are, how to use the product safely, what to expect if the recommendations are not followed, what to do if accidents occur, how to recognize symptoms of overexposure, and what to do if such incidents occur.

Material Safety Data Sheets (MSDSs)	
	<p>Electronic format:</p> <p>MSDSs for all chemicals/control materials acquired by the Chemical Control Centre (CCC) are available online at: www.uwindsor.ca/cc</p> <p>For items not acquired by the CCC, electronic copies can be scanned or downloaded from suppliers and provided electronically through a computer in the area where the controlled products are used or stored. All individuals must be trained to access these files.</p> <p>Paper format:</p> <p>Paper copies must at all times be visible, and accessible in the labs that do not have a computer.</p>

5.3 Spill Planning

Personnel can safely clean up the vast majority of spills that occur. Whoever is most knowledgeable about the spill is responsible for prompt notification and proper cleanup, if safe to do so. It is the responsibility of the supervisor and/or Chemical Control Centre to have spill clean-up materials and personal protective equipment, which are appropriate for the chemicals being handled, and readily available for emergency use. They are also responsible for ensuring that spills are cleaned up as soon as possible.

The various types and quantities of hazardous materials used at the University of Windsor require pre-planning in order for accidental spills to be handled in a safe manner. Two categories of chemical spills and response procedures are identified for the purposes of this plan.

5.3.1 Developing a Spill Response Plan

A procedure for general guidelines for responding to chemical spills is provided in this guide. These procedures must be made available at all labs and worksites where chemicals are present.

An effective spill response procedure should consider all of the items listed below. The complexity and detail of the plan will depend upon the physical characteristics and volume of materials being handled, their potential toxicity, and the potential for release to the environment.

1. Review Material Safety Data Sheets (MSDSs) or other references for recommended spill cleanup methods and materials, and the need for personal protective equipment (e.g., respirator, gloves, protective clothing, etc.).

The use of a respirator or self-contained breathing apparatus requires specialized training and medical surveillance. If no trained personnel are available, please contact Campus Community Police (dial 9-1-1 from any campus phone). If respiratory protection is used, ensure there is another person outside the spill area in communication, in case of an emergency.

2. Acquire sufficient quantities and types of appropriate spill control materials to contain any spills. The equipment needed to disperse, collect and contain spill control materials (e.g., brushes, scoops, sealable containers, etc.) is available from the Chemical Control Centre. Spill kits specific to your laboratory/area can be prepared with consultation of the Hazardous Materials Technician.
3. Acquire recommended personal protective equipment and training in its proper use.
4. Place spill control materials and protective equipment in a readily accessible location within or immediately adjacent to the laboratory. Everyone in the area should know where it is and how to use it properly.
5. Develop a spill response plan that includes:
 - I. Names and telephone numbers of individuals to be contacted
 - II. Evacuation plans for the room or building, as appropriate
 - III. Instructions for containing the spilled material, including potential releases to the environment (e.g., protect floor drains)
 - IV. Inventory of spill control materials and personal protective equipment
 - V. Means for proper disposal of cleanup materials (hazardous waste) including contaminated tools and clothing
 - VI. Decontamination of the area following the cleanup
6. Discuss the spill response plans with all personnel in the area. The Chemical Control Centre offers training for the university community who work directly with chemicals and who are expected to respond outside their work area to assist with spill cleanup.

Contact the Chemical Control Centre at ext. 3519 to schedule a complementary consultation of your spill response plan for your area.

5.3.2 Risk Assessment / Spill Criteria:

The following are general guidelines to be followed for a chemical spill. More detailed procedures may be available in your laboratory/area specific Spill Response Plan.

The first part of spill response is to determine if you have the knowledge, training, and capabilities to effectively clean up the materials. The following are common questions, which should be used to determine if you can effectively and safely address the spill:

- What chemicals are typically used in your area?
- Where is the MSDS for these items? What does it say about spill cleanup?

- Is an appropriate spill kit available?
- If the chemical is flammable, do you need to turn off any equipment, heat sources, electrical panels, or other potential ignition sources?
- Will you need to notify the Principal Investigator or your supervisor about the spill?
- Is personal protective equipment needed and is it available?
- Will you need to have another person to stand by or assist during the clean up?
- Will you need to wear protective equipment?
- Does the ventilation to the area need to be improved, or the windows opened?
- Will the spill have consequences in other areas and to other people?

Table 1: Chemical spill criteria used in determining the type of response and treatment materials required to remediate a chemical spill at the University of Windsor.

Category	Size	Response	Treatment Materials
Minor	Less than 5 L	Chemical treatment or absorption	Chemical spill kit
Major	More than 5 L or immediate threat to individual's wellbeing	Outside assistance	

5.3.3 Chemical Spill Response Kit:

Each facility or Department that uses, handles, or stores hazardous chemicals will make a determination, with the assistance of the Chemical Control Centre, on the need and quantity of properly stocked chemical spill kits. It is the fiscal responsibility of each facility or Department to procure and maintain chemical spill kits. The Chemical Control Centre can provide each facility or department with a general Chemical Spill Clean-up Kit, that can be customized to account for specific hazards and conditions that could occur in each lab or worksite.

All potentially affected laboratory personnel, including faculty, staff, research assistants, students, and visiting scientists must be properly trained in the proper use of these chemical spill clean-up kits.

Each area that uses or stores hazardous chemicals must have a properly stocked chemical spill clean-up kit readily available. The chemical spill kit must be in a single, easily transported container (such as a five-gallon plastic bucket), be centrally located, be easy to get to, and must be labeled as a "Chemical Spill Clean-up Kit." Contents of this kit must be appropriate for the types of hazardous chemicals used in the area. Minimum contents may include:

- Chemical resistant gloves (neoprene, nitrile, etc.)
- Absorbent materials (spill pillows, pads, or other spill absorbent)
- Safety goggles and/or chemical resistant face shield
- Disposal bags
- Chemical resistant shoe covers
- Neutralization agents
- Hand-held brush and plastic dust pan

- 5-gallon plastic drum liners
- 5-gallon disposal container with lid

Chemical Spill Response Kits

Chemical Spill Response Kits are available from the
Chemical Control Centre
 519.253.3000.3519 (p), 519.973.7013 (f),
www.uwindsor.ca/ccc (web), ccc@uwindsor.ca (e)

5.4 Spill Reporting

Every person who spills, causes, or permits a spill of a pollutant that impacts on the natural environment, and every person having control of a pollutant that is spilled where the spill causes or is likely to cause adverse effects to the environment, shall notify the Chemical Control Centre.

Chemical Control Centre

519.253.3000.3519 (p), 519.973.7013 (f),
www.uwindsor.ca/ccc (web), ccc@uwindsor.ca (e)

The Chemical Control Centre, and Health and Safety, will determine if the spill can cause or likely to cause any of the following:

- impairment to the quality of the natural environment - air, water, or land;
- injury or damage to property or animal life;
- adverse health effects;
- safety risk;
- making property, plant, or animal life unfit for use;
- loss of enjoyment of normal use of property; and/or
- interference with the normal conduct of business.

The Chemical Control Centre will then notify:

- 24-hour Ministry of Environment (MOE) Spills Action Centre, 1-800-268-6060;
- City of Windsor – Environmental Division;
- City of Windsor Police Services; and
- Campus Community Police.

A spill incident report prepared by the Principal Investigator and submitted to the Chemical Control Centre within 24-hours of the spill, the form can be found on the CCC website at www.uwindsor.ca/ccc. The report shall be made available to an MOE inspector upon request. If the spill resulted in an injury or adverse health effects an Accident/Incident report must be prepared by the Principal Investigator and submitted to Health and Safety within 24-hours of the accident, the form can be found on the Health and Safety website at www.uwindsor.ca/safety.

DOCUMENTATION OF INCIDENTS

The incident report concerning a spill should include:

- the date, time, location and duration of the release of the pollutant;
- the identity of the pollutant released and the owner's name;
- the quantity of the pollutant released;
- the circumstances and cause of the spill;
- details of the containment and clean-up efforts and the names of the persons involved in the clean-up;
- an assessment of the success of the containment and clean-up efforts;
- the method used to dispose of or use the pollutant or any matter, thing, plant or animal or any part of the natural environment that is affected by the spill and the location of the disposal site; and
- any adverse effects observed because of the spill.

Spill Incident Reports	
	<p>Spill Incident Reporting forms must be completed and submitted within 24-hours to:</p> <p>Chemical Control Centre F: 519.973.7013 E: ccc@uwindsor.ca</p> <p>Access spill reporting forms online: www.uwindsor.ca/ccc</p>
<p>Did you know? That the Chemical Control Centre will replace all materials used to mitigate a spill at no charge if the incident is reported within 24hrs.</p>	

6. CHEMICAL SPILL RESPONSE

6.1 Minor Chemical Spills:

If based on the outcome of the spill evaluation process (5.3.2 Risk Assessment / Spill Criteria:), you believe that it is safe to clean-up a spilled chemical follow these steps:

1. Immediately alert area occupants and your supervisor that a spill has occurred, and evacuate the area, if necessary.
2. Isolate the area so that no one accidentally enters the contaminated area by: closing doors; posting other individuals at doors and/or hallways to warn others; installation of barrier tape; or any other reasonable method.
3. Increase the ventilation within the spill area. If needed, turn on chemical fume hoods and/or open exterior windows.


4. Review the spill clean-up procedures recommended on the MSDS (www.uwindsor.ca/ccc).
5. Locate the nearest Chemical Spill Kit and evaluate the contents.
6. Plan the clean-up procedure to follow.
7. Put on personal protective equipment which is appropriate for the hazards, such as safety goggles / face shield, gloves, lab coat, or apron. You should consider the need for appropriate respiratory protection, if required.

The use of a respirator or self-contained breathing apparatus requires specialized training and medical surveillance. Never enter a contaminated atmosphere without protection or use a respirator without training. If no trained personnel are available, please contact Campus Community Police (Dial 9-1-1 from any campus phone). If respiratory protection is used, ensure there is another person outside the spill area in communication, in case of an emergency.

8. Protect floor drains or other means for environmental release. Spill socks and absorbents may be placed around drains, as needed.
9. Confine the spill to a small area using absorbent materials.
10. Spill control materials should be distributed over the entire spill area, working from the outside, circling to the inside. This reduces the chance of splash or spread of the spilled chemical.
11. When spilled materials have been absorbed, collect residue using brush and scoop. Place materials in a disposal container, such as polyethylene bags, pails, or gallon drums with polyethylene liners for larger quantities.
12. Place all contaminated PPE (gloves, lab coat, etc.) into a plastic bag for disposal.
13. Complete the hazardous waste tag and affix to both the waste container and plastic bag (contaminated PPE), identifying the material as "Spill Debris".

Spilled chemical reagents and contaminated PPE must be disposed of as hazardous waste. Please contact the Chemical Control Centre for disposal information by phone (ext. 3519, or email ccc@uwindsor.ca).

14. Decontaminate reusable clean-up supplies and the spill area using a mild detergent and water and return them to the spill kit. Determine what spill response materials have been used during the spill response and request replacement materials on the Chemical Spill Report Form.
15. Submit a fully completed Spill Response Form to the Chemical Control Centre, found on the CCC website www.uwindsor.ca/ccc.

Spill Incident Reports	
	<p>Spill Incident Reporting forms must be submitted within 24hrs to the Chemical Control Centre</p> <p>F: 519.973.7013 E: ccc@uwindsor.ca</p> <p>Access spill reporting forms online: www.uwindsor.ca/ccc</p>
<p>Did you know? That the Chemical Control Centre will replace all materials used to mitigate a spill at no charge if the incident is reported within 24hrs.</p>	

6.2 Major Chemical Spills:

If an area contains large quantities of any chemical, emergency procedures for spill cleanup must be included as part of the Standard Operating Procedures for that chemical at the University of Windsor.

Employees should only attempt to clean up large or major spills after receiving Spill Response Training, and when appropriate spill clean-up materials, and personal protective equipment are readily available and are properly utilized.

Otherwise, in the event of a major spill for which personnel are not properly prepared, and particularly if any person has been significantly exposed, contaminated or injured to such an extent that medical or other outside assistance is needed, follow the E.A.R.S steps:

Evacuate the affected areas and secure areas (i.e. close doors).

Alert Campus Community Policy by calling Ext. 9-1-1 on campus from a safe location (or 519.253.3000 ext. 9-1-1 from off-campus or on a cell phone).

Remain close to the phone, if requested to do so, until contacted by emergency responders.

Stand-by to provide more information about the spill, including chemical name, quantity, hazards, and any other relevant information. Assist emergency personnel upon arrival. For any chemical spill that occurs outside a building, with potential for adversely impacting the physical environment, call Campus Community Police and request that appropriate Chemical Control Centre staff be contacted.

All 9-1-1 calls, dialed on campus phones are routed to the University of Windsor's Campus Community Police, which is staffed 24-hours/day and 7-days/week. All calls that relate to a major chemical spill will be routed by Campus Community Police to the City of Windsor's Emergency Dispatch Centre, and to the appropriate Chemical Control Centre staff.

In the event of a major chemical spill, Campus Community Police and the Chemical Control Centre will work with Windsor Fire & Rescue Services to secure the affected chemical spill area. Windsor Fire & Rescue Services -HazMat is responsible for responding to major chemical spills on campus. Specifically, they are responsible for:

1. Assessing the nature and extent of the chemical spill with assistance from the Chemical Control Centre, Campus Community Police, and appropriate personnel from the spill location.
2. Assisting in the evacuation of people and reducing the affected area of the chemical spill with assistance from Campus Community Police and appropriate personnel from the spill location.
3. Removing injured personnel and transferring them to the appropriate medical support (i.e. Paramedics and/or Emergency Response Team (ERT)).
4. Containing the chemical spill.

The Chemical Control Centre is responsible for coordination with internal and external agencies responding to a hazardous materials event on campus, including major chemical spills. Specific responsibilities include:

1. Development, implementation and maintenance of the Chemical Spill Response Program.
2. On-site coordination of major chemical spills, as appropriate.
3. Reporting the chemical spill to regulatory authorities, as appropriate.
4. Coordinating the cleanup of the major spills by responsible personnel and/or third-party contractors, as appropriate.
5. Coordinating emergency response activities with the Windsor Fire & Rescue Services, Windsor Police Service, Health and Safety, and/or Campus Community Police, as appropriate.

It is understood that Windsor Fire & Rescue Services has overall authority over hazardous material events and will be the Incident Commander when on scene, unless otherwise delegated.

6.3 Mercury Spills:

Mercury has an adverse effect to humans, animals and plant life. Hazards exist when mercury is ingested or inhaled. Methyl mercury and alkyl forms are the most toxic. When elemental mercury is exposed to air or its compounds are heated, it emits vapors.

Mercury vapor lamps (white fluorescent tubes) contain mercury and constitute a serious hazard if they are broken and the "white dust" is inhaled. Inhaled mercury vapors or compounds can be absorbed through the respiratory tract and accumulate in the brain, causing damage to the nervous system.

Mercury is a health hazard, which can cause acute poisoning, interstitial pneumonia, bronchitis, muscle tremor, irritability, gingivitis, and localized skin irritation and sensitization. Mercury is also both a neurotoxin and nephrotoxin.

Spills involving mercury should not be allowed to remain, especially on heated surfaces such as radiators, ductwork, and ovens where toxic concentration could develop.

Spill Criteria

A MINOR MERCURY SPILL is one that can typically be handled safely by laboratory personnel without the assistance of safety and emergency personnel. Minor spills include:

- Examples: thermometer

A MAJOR MERCURY SPILL is one that requires outside assistance or the individual responding does not have the training to mitigate the spill. Examples of situations that could be classified as “major” include:

- Examples: bubbler or the release of a large volume of mercury (excess of 2 tablespoons)

6.3.1 Minor Mercury Spill Response

The user is responsible for the cleanup of minor mercury spills, such as a broken mercury thermometer. However, additional assistance will be provided by contacting the Chemical Control Centre.

1. Immediately alert area occupants and supervisor that a spill has occurred.
2. Isolate the area so that no one accidentally enters the contaminated area by: closing doors; posting other individuals at doors and/or hallways to warn others; installation of barrier tape; or any other reasonable method.
3. Ventilate area.
4. Review the spill clean-up procedures are recommended on the MSDS (www.uwindsor.ca/msds).
5. Locate the nearest Chemical Spill Kit and evaluate the contents.
6. Plan the clean-up procedure to follow.
7. Put on personal protective equipment which is appropriate for the hazards, such as safety goggles / face shield, gloves, or lab coat. You should consider the need for appropriate respiratory protection, if required.

The use of a respirator or self-contained breathing apparatus requires specialized training and medical surveillance. Never enter a contaminated atmosphere without protection or use a respirator without training. If no trained personnel are available, please contact Campus Community Police (Dial 9-1-1 from any campus phone). If respiratory protection is used, ensure there is another person outside the spill area in communication, in case of an emergency.

8. Protect floor drains or other means for environmental release. Spill socks and absorbents may be placed around drains, as needed.
 9. Confine the spill to a small area using absorbent materials. Clean up any broken glass using tongs or heavy towel. *Do not pick up broken glass by hand.*
 10. Using Hg Absorbent contained within the Chemical Spill Kit, encircle and cover up the liquid mercury with the absorbent. It should be distributed over the entire spill area, working from the outside, circling to the inside. This reduces the chance of splash or spread of the spilled chemical.
 11. Dampen Hg Absorbent powder with water to facilitate the formation of a metal/mercury amalgam.
 12. Allow the Absorbent to harden. Once the amalgam is completed, carefully sweep into pan to pick up the amalgam and place into a plastic bag.
 13. Place all contaminated PPE (gloves, lab coat, etc.) into a second plastic bag for disposal.
 14. Complete the hazardous waste tag and affix to both the waste container and plastic bag (contaminated PPE), identifying the material as "Mercury Spill Debris", date of the spill along with the department name.
 15. Place the waste bag in a secured area and contact the Chemical Control Center to arrange for proper waste disposal.
- Spilled mercury and contaminated PPE must be disposed of as hazardous waste. Please contact the Chemical Control Centre for disposal information by phone (ext. 3519 or email ccc@uwindsor.ca).*
16. Decontaminate reusable cleanup supplies and the spill area using a mild detergent and water and return them to the spill kit. Determine what spill response materials have been used during the spill response and request replacement materials on the Chemical Spill Report Form, which can be found on the CCC website at www.uwindsor.ca/ccc.
 17. Submit a fully completed Spill Response Form to the Chemical Control Centre.

Spill Incident Reports	
	<p>Spill Incident Reporting forms must be submitted within 24hrs to the Chemical Control Centre</p> <p>F: 519.973.7013 E: ccc@uwindsor.ca</p> <p>Access spill reporting forms online: www.uwindsor.ca/ccc</p>
<p>Did you know? That the Chemical Control Centre will replace all materials used to mitigate a spill at no charge if the incident is reported within 24hrs.</p>	

Notes:

- Do not use an ordinary vacuum to clean up a mercury spill. Mercury can vaporize.
- Do not use general cleaning products as they may contain chlorine or ammonia. These chemicals react with mercury to emit a toxic gas.
- Do not use a broom or brush to clean up mercury, unless for broken light bulbs. It can break mercury into smaller particles and spreads it.
- Do not pour mercury down the drain.
- Do not allow people whose shoes or clothing may have been contaminated with mercury to walk around or to leave the spill area until the contaminated items are removed.

6.3.2 Major Mercury Spill Response

1. If a bubbler or other piece of equipment releases a significant quantity of mercury (more than manageable by a Mercury spill kit), isolate the area of the spill by placing a box, waste can, etc. over the spill to reduce the spread of the mercury vapors. Notify persons to remain clear of the area.
2. Immediately contact your The Chemical Control Centre, or Campus Community Police (*Dial 9-1-1 from any campus phone*) and state that you have a spill involving mercury. Provide all the relevant details of the spill including size, location, and any injured staff. (In any spill involving injuries contact the Campus Community Police first at 911).
3. The Chemical Control Centre or an outside contractor will be responsible for cleaning up major mercury spills at the University.

Note: Do not dispose of any mercury-containing items or waste in the garbage.

Please contact:

Chemical Control Centre

519.253.3000.ext. 3519

www.uwindsor.ca/cc

6.4 Broken Fluorescent Light Bulbs:

The University of Windsor utilizes a large number of compact fluorescent lights (CFLs) as a normal aspect of our operations. Carefully recycling CFLs prevents the release of mercury into the environment and allows for the reuse of glass, metals and other materials that make up fluorescent lights. Fluorescent light bulbs contain a very small amount of mercury sealed within the glass tubing.

Clean-up Procedure:

1. Have people leave the room, and don't let anyone walk through the breakage area on their way out.
2. Open a window and leave the room for 15 minutes or more.
3. Put on appropriate personal protective equipment including safety glasses and gloves.

4. Carefully scoop up glass fragments and powder using stiff paper or cardboard and place them in a sealed plastic bag.
5. Use sticky tape, such as duct tape, to pick up any remaining small glass fragments and powder.
6. Wipe the area clean with damp paper towels or disposable wet wipes and place them in the plastic bag.

Do not use a vacuum or broom to clean up spilled mercury on hard surfaces.

7. Contact housekeeping for proper disposal through the Chemical Control Centre. (Never put in regular trash).
8. Wash your hands after disposing of the jars or plastic bags containing clean-up materials.

6.5 Polychlorinated Biphenyls (PCB) Spills

Polychlorinated biphenyls, commonly known as chlorobiphenyls, or PCBs, require special consideration. Many provincial and federal environmental requirements apply. It is important for the responder to recognize and identify possible sources of contaminated PCB wastes and implement appropriate handling requirements for such wastes.

Spills of PCB liquid must be acted upon and cleanup operations commenced as soon as possible after detection. In an emergency or cleanup situation, an assessment should first be made of all possible hazards associated with the situation so that appropriate safety procedures and protective equipment may be used.

Spill cleanup procedures presented in this section address spills of PCB liquids such as askarel, decontamination flushings, and contaminated mineral oil. Spills of PCB-contaminated solid materials have less-tendency to spread and are considerably easier to clean up than spills of liquids.

Clean-up Procedure:

As mentioned previously, PCBs spilled onto concrete or a containment system can be removed using pumps, if the liquid is “pumpable”, or sorbents. Spills onto soil or into water require more complex cleanup techniques.

6.5.1. Spills into containment systems:

1. Notify Campus Community Police (*Dial 9-1-1 from any campus phone*) of spill and cleanup intentions.
2. Take precautions to avoid personal contamination.
3. Wearing appropriate personal protective equipment, such as gloves (neoprene, nitrile rubber, or vitron), boots, disposable coveralls, aprons, and eye protection, pump PCB liquids into drums. If impossible to pump, soak up PCB liquids with sorbents.

4. Wipe area clean with rags and appropriate solvent, such as Varsol, turpentine, No. 1 fuel oil, or kerosene.
5. Submit a fully completed Spill Response to the Chemical Control Centre, available on the CCC website at www.uwindsor.ca/ccc. Contact the Chemical Control to arrange for the disposal of all contaminated cleanup materials and waste PCB liquid.

6.5.2 Spills on concrete or asphalt:

1. Control the spread of the spill by building dykes to contain the PCB liquids.
2. Notify Campus Community Police (*Dial 9-1-1 from any campus phone*) of spill and cleanup intentions.
3. Take precautions to avoid personal contamination.
4. Plug or block all drains to sewers and ditches.
5. Wearing appropriate personal protective equipment, such as gloves (neoprene, nitrile rubber, or vitron), boots, disposable coveralls, aprons, and eye protection, soak up PCB liquids with an appropriate sorbents.
6. Wipe area clean with rags and appropriate solvent, such as Varsol, turpentine, No.1 fuel oil, or kerosene.
7. Take core samples to determine penetration and need to excavate.
8. If necessary remove contaminated surface material and handle as PCB waste.
9. Submit a fully completed Spill Response to the Chemical Control Centre, available on the CCC website at www.uwindsor.ca/ccc. Contact the Chemical Control to arrange for the disposal of all contaminated cleanup materials and waste PCB liquid.

6.5.3 Spills on soil:

1. Control the spread of the spill by building blocks to contain the PCB liquids.
2. Notify Campus Community Police (*Dial 9-1-1 from any campus phone*) of spill and cleanup intentions.
3. Take precautions to avoid personal contamination.
4. Wearing appropriate personal protective equipment, such as gloves (neoprene, nitrile rubber, or vitron), boots, disposable coveralls, aprons, and eye protection, transfer PCB contaminated soils to drums. If impossible to pump, soak up PCB liquids with sorbents.
5. Dispose of contaminated cleanup materials and waste PCB liquid.
6. Take core samples to determine penetration and the need to excavate.

7. If necessary remove contaminated soil and handle as PCB waste.
8. Submit a fully completed Spill Response to the Chemical Control Centre, available on the CCC website at www.uwindsor.ca/ccc. Contact the Chemical Control to arrange for the disposal of all contaminated cleanup materials and waste PCB liquid.
9. If requested by the local regulatory authority monitor wells and other waters in proximity of spill for PCB contamination.

6.5.4 PCB-solid spills:

Spills of PCB solids should be removed by shoveling or scooping the solid into drums, followed by wiping the contaminated area, where possible, with a solvent. The drummed solid waste and contaminated cleaning materials should be disposed of as PCB waste.

For more information on the management of PCBs at the University of Windsor, please see:

The University of Windsor's "PCB Management Policy" available at www.uwindsor.ca/ccc.

7. BIOLOGICAL SPILL RESPONSE

A biohazardous spill occurs anytime there is an unplanned release of potentially infectious material into the environment. Proper response to these incidents can ensure personnel and community safety while eliminating environmental contamination.

In order for a biohazardous spill response to be effective and safe for the campus community, affected work groups must:

- Refer to the biological spill response procedure for their work environment;
- Assure that spill cleanup materials are available for use; and
- Assure that all personnel are trained in the provisions of the spill response procedure.

**Please refer to the University of Windsor's
Biological Safety Program for more information:**
www.uwindsor.ca/ccc

Spills, accidents, exposures to infectious materials, and loss of containment must be reported immediately to the laboratory supervisor. Written records of such incidents must be maintained, and the results of incident investigations should be used for continuing education.

As part of the institution's Biological Safety Program, individual laboratories are to develop emergency plans and procedures, including appropriate equipment and training for emergency response to spills or accidental release of organisms (i.e., personal protective equipment, disinfectants) and for that training to be

documented. In addition, good lab practices require laboratory bench tops and surfaces are to be decontaminated after any spill of potentially infectious materials and at the end of the working day.

If there is a spill during use, surface decontaminate all objects in the cabinet; disinfect the working area of the cabinet while it is still in operation (do not turn the cabinet off).

Decontamination of the laboratory space, its furniture and its equipment requires a combination of liquid and gaseous disinfectants. Surfaces can be decontaminated using a solution of sodium hypochlorite (NaOCl); a solution containing 1 g/L available chlorine may be suitable for general environmental sanitation, but stronger solutions (5 g/L) are recommended when dealing with high-risk situations. For environmental decontamination, formulated solutions containing 3% hydrogen peroxide (H₂O₂) is a suitable substitute for bleach solutions.

Whenever possible, suitable gloves should be worn when handling biohazardous materials. However, this does not replace the need for regular and proper hand washing by laboratory personnel. All laboratories using biological agents have a hand sanitizer station mounted in a conspicuous location. In most situations, thorough washing of hands with ordinary soap and water is sufficient to decontaminate them, but the use of germicidal soaps is recommended in high-risk situations. Hands should be thoroughly lathered with soap, using friction, for at least 10 minutes, rinsed in clean water and dried using a clean paper or cloth towel.

7.1 Risk Assessment / Spill Criteria:

It is of utmost importance to know the agents you are working with. Suppliers and/or Material Safety Data Sheets (MSDSs) can provide detailed information on the characteristics of the agent as well as effective containment and cleanup procedures. Section VIII of Health Canada's MSDSs addresses the specific spill requirements for each agent. When dealing with any biological spill the degree of risk and subsequent spill response are dependent on the following:

- What was spilled? (What are the physical characteristics and potential hazards of that particular organism?)
- How much was spilled? (What is the volume and concentration of the organism?)
- Where was the spill? (In a BSC, in the lab, outside the lab, in a centrifuge?)
- What is the potential for release to the environment? (Were aerosols or droplets generated?)

A MINOR BIOLOGICAL SPILL is one that can be handled safely by laboratory personnel without the assistance of safety and emergency personnel. Minor spills include:

- The release of BSL-1 organisms without splashing or agitation
- The release of a small volume of BSL-1 organisms without splashing or agitation

A MAJOR BIOLOGICAL SPILL is one that requires outside assistance. These include:

- Any spill involving biological agent that the individual does not feel confident in their ability to effectively mitigate the spill
- The release of organisms resulting in excessive splashing and agitation

- The release of any BSL-2 organisms (or above)
- The release of a large volume of BSL-1 organisms (there is enough present to seek its own level or in other words, to run to a low point)

Material Safety Data Sheets for Infectious Substances can be found at:

www.uwindsor.ca/cc

or

www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/index-eng.php

7.2 Biological Spill Response Kit:

The kit should be maintained in a white 5-gallon leak-proof bucket and contain the following:

- Concentrated household bleach – check expiration date (alternative chlorinated absorbent beads).
- Spray bottle for making 10% bleach solution
- Forceps or tongs for handling sharps (alternative disposable scoop and scraper)
- Paper towels or other suitable absorbent
- Biohazard bags of various sizes
- Disposable gloves and foot covers
- Face protection – at a minimum safety glasses and mask

Biological Spill Response Kits	
	<p>Biological Spill Response Kits are available from:</p> <p style="text-align: center;">Chemical Control Centre 519.253.3000.3519 (p), 519.973.7013 (f), www.uwindsor.ca/cc (web), ccc@uwindsor.ca (e)</p>

7.3 Biological Spill Clean-up Procedures:

This procedure is applicable to spills on a nonporous surface such as a tile floor or concrete floor.

1. Notify others in the area immediately, to limit potential of further contamination to additional personnel or the environment.
2. Assess the situation and determine classification of the spill – either minor or major based on risk assessment, agent, and MSDS information.

7.3.1 Minor Biological Spill Response

1. Remove any contaminated clothing and lab coats. Wash exposed skin with antiseptic soap and water. Get your biohazard spill kit and review spill procedure before proceeding with cleanup.
2. Remove spill supplies from kit and line bucket/container with a biohazard bag. (Retrieve a sharps container for disposal of sharps if necessary.)

3. At a minimum, wear two pairs of disposable latex gloves and splash goggles. You should consider the need for appropriate respiratory protection, if required.

The use of a respirator or self-contained breathing apparatus requires specialized training and medical surveillance. Never enter a contaminated atmosphere without protection or use a respirator without training. If no trained personnel are available, please contact Campus Community Police (Dial 9-1-1 from any campus phone). If respiratory protection is used, ensure there is another person outside the spill area in communication, in case of an emergency.

4. If applicable, using mechanical means (i.e. dustpan/broom, tongs), pick up any contaminated sharp items (needles, broken glass, etc.) and place them in an approved sharps container for disposal.
5. Cover the spill with an absorbent material and carefully apply decontamination solution pour around the spill allowing it to mix with the material (i.e. 10% Bleach solution containing 5000-6000 parts per million (ppm) - sodium hypochlorite). If using a proprietary disinfectant product, follow the manufacturer's instructions for proper use concentration and contact time. Make sure the disinfectant is not beyond the expiration date.
6. Allow a contact time of 20 minutes.
7. Remove the absorbent material by using a mechanical means (i.e. dustpan and broom, plastic scrapers) and deposit it along with the mechanical tool into a biohazard bag.
8. Remove residual disinfectant with fresh paper towels. Dispose of the towels in the biohazard bag.
9. Repeat steps 8 and 9 for sufficient disinfection of contaminated surfaces, if necessary.
10. Clean the surface with an EPA-registered disinfectant and allow to air dry. If bleach is used, wipe up bleach residue with water.
11. Remove outer pair of gloves only and dispose of them in the biohazard bag.
12. Remove splash goggles with inner gloves still on, and clean the goggles by autoclaving.
13. Remove inner pair of gloves and place them in the biohazard bag for disposal.
14. Close the bag and dispose of as biohazardous waste. (Please refer to "Safe Operations of Autoclaves in the Treatment of Biomedical Waste" manual)
15. Wash your hands with soap & water and/or by using hand-sanitization solution as soon as possible.
16. Return spill kit to designated location. Ensure that the spill kit is restocked for next use.
17. Submit a fully completed Spill Response Form to the Chemical Control Centre found on the CCC website at www.uwindsor.ca/cc. Contact the Chemical Control Centre to arrange dispose of all contaminated cleanup materials and biological waste.

7.3.2 Major Biological Spill Response

If an area contains large quantities of any biological agent (500 mL +) or infectious materials (i.e. risk group 2 or above) emergency procedures for spill cleanup must be included as part of the Standard Operating Procedures for that agent in the University of Windsor.

Employees should only attempt to cleanup large or major spills after receiving Spill Response Training, and when appropriate spill cleanup materials, and personal protective equipment are readily available and are properly utilized.

Otherwise, in the event of a major spill for which personnel are not properly prepared, and particularly if any person has been significantly exposed, contaminated or injured to such an extent that medical or other outside assistance is needed, follow the E.A.R.S. steps:

Evacuate the affected areas and secure areas (i.e. close doors).

Alert Campus Community Police by calling Ext. 9-1-1 on campus from a safe location (or 519.253.3000 ext. 9-1-1 from off-campus).

Remain close to the phone, if requested to do so, until contacted by emergency responders.

Stand-by to provide more information about the spill, including chemical name, quantity, hazards, and any other relevant information. Assist emergency personnel upon arrival. For any chemical spill that occurs outside a building, with potential for adversely impacting the physical environment, call Campus Community Police and request that appropriate Chemical Control Centre staff be contacted.

All 9-1-1 calls, dialed on campus phones are routed to the University of Windsor's Campus Community Police, which is staffed 24-hours/day and 7-days/week. All calls that are related to a major biological spill, will be routed to both the City of Windsor's Emergency Dispatch Centre, and appropriate Chemical Control Centre staff.

In the event of a major biological spill, Campus Community Police and the Chemical Control Centre will work with Windsor Fire & Rescue Services to secure the affected biological spill area. Windsor Fire & Rescue Services-HazMat is responsible for responding to major biological spills on campus. Specifically, they are responsible for:

1. Assessing the nature and extent of the biological spill with assistance from the Chemical Control Centre, Campus Community Police, and appropriate personnel from the spill location
2. Evacuating and securing the affected area of the biological spill with assistance from Campus Community Police and appropriate personnel from the spill location.

3. Removing injured personnel and transporting them to appropriate medical facilities.
4. Containing the biological spill.

The Chemical Control Centre is responsible for coordination with internal and external agencies responding to a hazardous materials event on campus, including major biological spills. Specific responsibilities include:

1. Development, implementation and maintenance of the Biological Spill Response Program.
2. On-site coordination of major biological spills, as appropriate.
3. Reporting the biological spill to regulatory authorities, as appropriate.
4. Coordinating the cleanup of the major spills by responsible personnel and/or third-party contractors, as appropriate.
5. Coordinating emergency response activities with the Windsor Fire & Rescue Services, Windsor Police Service, Office of Occupational Health and Safety, and/or Campus Community Police, as appropriate.

It is understood that Windsor Fire & Rescue Services has overall authority over hazardous material events and will be the Incident Commander when on scene, unless otherwise delegate.

7.4 Spill on Body

1. Immediately remove contaminated clothing. All contaminated materials must be treated of as biohazardous. (Please refer to “Safe Operations of autoclaves in the Treatment of Biomedical Waste” manual)
2. Vigorously wash exposed area with soap & water for at least 10 minutes. Alternative, an approved hand-sanitizer, which contains 65% isopropanol, can be used.
3. If eye exposure occurs, use eyewash per instructions (at least 15 minutes).
4. Obtain medical attention by contacting Campus Community Police (*Dial 9-1-1 from any campus phone*), if necessary.

7.5 Spill inside a Biosafety Cabinet (BSC)

1. Allow BSC to operate unattended for five (5) minutes to facilitate aerosol purification.
2. Call for assistance if needed. It is useful to have a second person with “clean” hands get all the materials for cleanup.
3. While wearing PPE (gown, safety glasses and/or gloves) cover the spill with an absorbent material and carefully apply decontamination solution pour around the spill allowing it to mix with the material (i.e. 10% Bleach solution containing 5000-6000 parts per million (ppm) - sodium hypochlorite). If using a proprietary disinfectant product, follow the manufacturer’s instructions for proper use concentration and contact time. Make sure the disinfectant is not beyond the expiration date.

IMPORTANT: Do not place your head inside the cabinet to clean the spill. Keep your face behind the front view screen. If necessary, flood the work surface, as well as the drain pans and catch basins below the work surface, with disinfectant.

4. Spray or wipe cabinet walls, work surfaces, and inside the front view sash with disinfectant. Assume everything in the cabinet is contaminated.
 - a. Lift exhaust grill and tray and wipe all surfaces.
 - b. Discard contaminated disposable materials using appropriate biohazardous waste disposal procedures. (Please refer to “Safe Operations of Autoclaves in the Treatment of Biomedical Waste” manual)
 - c. Wipe down contaminated reusable items with disinfectant then place in biohazard bags or autoclave pans with lids for autoclaving.
 - d. Those items that are non-autoclavable should be wiped down with disinfectant and kept wet for a minimum of 20 minutes before removal from BSC.
5. After 20 minutes of contact time, soak up the disinfectant, discard the absorbent materials into a biohazard bag, and handle as regulated medical waste.
6. Remove outer pair of gloves only and dispose of them in the biohazard bag.
7. Remove splash goggles with inner gloves still on, and clean the goggles by autoclaving.
8. Remove inner pair of gloves and place them in the biohazard bag for disposal.
9. Close the bag and dispose of as biohazardous waste. (Please refer to “Safe Operations of Autoclaves in the Treatment of Biomedical Waste” manual)
10. Wash your hands with soap & water and/or by using hand-sanitization solution as soon as possible.
11. Allow the cabinet to run for 15 minutes after cleaning and before shut off or re-use.
12. If you have not already done so, notify your immediate supervisor of the spill. The supervisor should be notified if the spill overflows into the interior of the cabinet. It may be necessary to perform a more extensive decontamination of the cabinet.

7.6 Spill within a Centrifuge

1. Shut down the centrifuge
2. Wait five (5) minutes before opening the centrifuge following the end of a run with potentially hazardous biological material. This will allow any aerosols to settle prior to opening secondary containment.
3. If a tube breaks within a centrifuge bucket and the containment has not been breached, open the centrifuge bucket in a Biological Safety Cabinet and proceed to decontaminate the spill per the Minor Spill protocol.

If there is no containment of the spill or the containment has been breached:

1. If centrifuge contamination is identified after the safety bucket lid is opened, carefully close the centrifuge lid and allow aerosols to settle for at least 30 minutes.
2. Remove any contaminated protective clothing and place it in a biohazard bag. Wash hands and any exposed skin surfaces with soap and water.

3. Evacuate the laboratory for at least 30 minutes. Post a warning sign on the laboratory door. Notify your supervisor.
4. After thirty (30) minutes, enter the laboratory with personal protective equipment and spill clean-up materials. Full-face protection, a lab coat and utility gloves should be worn. A respirator may also be recommended to be worn.

The use of a respirator or self-contained breathing apparatus requires specialized training and medical surveillance. Never enter a contaminated atmosphere without protection or use a respirator without training. If no trained personnel are available, please contact Campus Community Police (Dial 9-1-1 from any campus phone). If respiratory protection is used, ensure there is another person outside the spill area in communication, in case of an emergency.

5. Transfer rotors and buckets into a biological safety cabinet. Immerse within 70% ethanol or a non-corrosive appropriate disinfectant effective against the agent in use. A one-hour contact time is recommended. Uncapped or unbroken tubes may be wiped down with disinfectant after the soak and placed in a new container. Handle broken glass with forceps and place in biohazardous sharps container.
6. Carefully retrieve any broken glass from inside the centrifuge with forceps and place in a sharps container. Smaller pieces of glass may be collected with cotton or paper towels held between the forceps. Place all broken glass within biohazardous sharps container.
7. Carefully wipe the inside of the centrifuge with papers towels soaked in an appropriate disinfectant. Spray the inside of the centrifuge with an appropriate disinfectant and allow to air dry. Avoid the use of sodium hypochlorite if possible because of the corrosive nature of sodium hypochlorite solutions. If sodium hypochlorite solutions are used, rinse thoroughly with copious amounts of water.
8. Remove outer pair of gloves only and dispose of them in the biohazard bag.
9. Remove splash goggles with inner gloves still on, and clean the goggles by autoclaving.
10. Remove inner pair of gloves and place them in the biohazard bag for disposal.
11. Close the bag and dispose of along with the biohazardous sharps container (if used) as biohazardous waste. (Please refer to “Safe Operations of Autoclaves in the Treatment of Biomedical Waste” manual)
12. Wash your hands with soap & water and/or by using hand-sanitization solution as soon as possible.

7.7 Outside the Laboratory, In Transit

This procedure is applicable to spills on a nonporous surface such as a tile floor or concrete floor.

1. Notify others in the area immediately, to limit potential of further contamination to additional personnel or the environment.
2. Assess the situation and determine classification of the spill:

A MINOR BIOLOGICAL SPILL is one that can be handled safely by laboratory personnel without the assistance of safety and emergency personnel. Minor spills include:

- The release of organisms without splashing or agitation

- The release of a small volume of organisms without splashing or agitation (i.e. few milliliters)
- Type of equipment, which is being utilized (i.e. sonication, vortex, etc.)
- Contaminated area

A MAJOR BIOLOGICAL SPILL is one that requires outside assistance. These include:

- The release of organisms resulting in excessive splashing and agitation
- The release of a large volume of biological materials (500 mL)
- Type of Agent (i.e. risk group 2 or above)

3. If minor, follow clean-up steps outlined within the Minor Spill Response Section. For major biological spills, immediately evacuate area, secure area, and contact Campus Community Police (*Dial 9-1-1 from any campus phone*) for assistance.

7.8 Biological Spills involving Prions

Prions, also referred to as “unconventional” infectious agents or “agents of transmissible spongiform encephalopathies”, are believed to contain protein only. These agents can cause diseases in humans such as Creutzfeldt-Jakob disease, scrapie in sheep, bovine spongiform encephalopathy in cattle, etc. These infectious agents are unusually resistant to inactivation by most physical and chemical agents and materials suspected of containing them require special processing before reuse or disposal.

To date, available data indicate that prions can be inactivated by a solution of 2 mol/L sodium hydroxide (NaOH) containing 4.0 mol/L guanidinium hydrochloride ($\text{HNC}(\text{NH}_2)_2\cdot\text{HCl}$) or guanidinium isocyanate ($\text{HNC}(\text{NH}_2)_2\cdot\text{HNCO}$) and sodium hypochlorite (NaOCl) (> 2 % available chlorine) followed by steam autoclaving at 132 °C for 4.5 h.

Incineration is also an effective means of dealing with prion-contaminated materials.

7.9 Disposal of Spill Response Materials:

The disposal of laboratory and medical waste is subject to various regional, national and international regulations and the latest versions of such relevant documents must be consulted before designing and implementing a program for handling, transportation and disposal of biohazardous waste. In general, ash from incinerators may be handled as normal domestic waste and removed by local authorities.

Autoclaved waste may be disposed of by off-site incineration or in licensed landfill sites.

7.10 Biological Spill Reporting:

MINOR BIOLOGICAL SPILLS: Spills and accidents that result in exposures to organisms to be immediately reported to your supervisor with an **incident report** forwarded to both the University of Windsor’s Chemical Control Centre (ext. 3519), and Health and Safety (ext. 2055). Written records are to be maintained.

Medical attention and surveillance will be provided, as appropriate.

MAJOR BIOLOGICAL SPILLS: Emergency procedures for spill clean-up, BSC failure, fire, animal escape and other emergencies must be written, easily accessible and followed. A record must be made of other people entering the facility during an emergency.

The University's Biological Safety Officer (ext. 3524) and Health and Safety (ext. 2055) must be immediately notified.

Medical attention and surveillance will be provided as appropriate.

8. RADIOLOGICAL SPILL RESPONSE:

A radiological spill involves the unplanned release of radioactive materials into the environment, including within the laboratory. Proper response to these incidents can ensure personnel and community safety while eliminating environmental contamination.

As a general precaution, inform persons in the area that a spill has occurred. Keep all personnel away from the area that a spill has occurred and cordon off the area with tape and signs. Cover the spill with absorbent paper to prevent the spread of contamination.

8.1 Radiation Spill Kit

Each facility or department that uses radiation has been issued an “**Intermediate Level Radioisotope Permit**” from the University of Windsor Research Safety Committee **must** possess a Radiation Spill Kit. It is the fiscal responsibility of each facility or Department to procure and maintain a Radiation Spill Kit within the licensed laboratory. The Chemical Control Centre can provide a general Radiation Spill Kit, which can be customized to account for specific hazards, and conditions that could occur in each lab or worksite.

All potentially affected laboratory personnel, including faculty, staff, research assistants, students, and visiting scientists must be properly trained in the proper use of the Radiation Spill Kit.

Radiation Spill Response Kits	
	<p>Radiation Spill Response Kits are available from:</p> <p>Chemical Control Centre 519.253.3000.3519 (p), 519.973.7013 (f), www.uwindsor.ca/ccc (web), ccc@uwindsor.ca (e)</p>

8.2 Minor Radiological Spills:

Defined as, less than 100 exemption quantities (EQ) of a nuclear substance; for example, P³² has an exemption quantity of 0.1 MBq. Therefore, 100 EQ of P³² is equal to 10 MBq or 270 µCi. Refer to your permit for determination of exemption quantities specific to each radioisotope.

A minor spill does not include contamination of personnel or the release of volatile material to the environment.

8.2.1. Clean-up procedure

1. Wash hands, monitor clothing, and hands to determine if contamination occurred during accident.
2. Determine the activity level of the material spilled to ensure that a clean-up can be conducted without placing responders at risk.
3. Ensure that you are wearing the appropriate protective clothing (i.e. lab coat and safety glasses) and two pairs of fresh disposable gloves prior to cleaning spill zone.
4. If the radioactive material is wet, clean up the spill using absorbent materials and transfer to a plastic bag. Place contaminated absorbent materials within radioisotope specific labeled waste container.
5. If the radioactive material is dry, moisten the material with water and clean spill as outlined in step # 2.
6. Decontaminate the spill zone using an appropriate complexing agent. Avoid spreading contamination to surrounding area by work from the outside of the spill towards the centre. Allow the complexing agent to absorb the contamination by allowing it to sit for up-to 30 minutes.
7. Perform wipe test or survey for residual contamination, as appropriate. Repeat decontamination, if necessary, until contamination-monitoring results meets the University's licence criteria for Nuclear Substances and Radiation Devices.
8. Adjust inventory records to reflect loss of radioactive material due to spillage. In addition, record wipe(s) test results and decontamination procedure within Permit Holder's Radioisotope Inventory Records logbook.
9. Prior to leaving the spill zone, utilize a contamination monitor to determine contamination level of personnel (hands) and clothing, including shoes.
10. Report the spill and cleanup to the person-in-charge (Permit Holder) and to the Radiation Safety Officer (RSO).

8.3 Major Radiological Spills:

Defined as, spills involving more than 100 exemption quantities (EQ), or contamination of personnel or release of volatile material. Refer to your radioisotope permit for determination of exemption quantities specific to your radioisotope.

8.3.1 Clean-up procedure

1. Clear the area. Persons not involved in the spill should leave the immediate area. Limit the movement of all personnel who may be contaminated until they are monitored.
2. If the spill occurs in a laboratory, leave the fume hood running to minimize the release of volatile nuclear substances to adjacent rooms and hallways.
3. Close off and secure the spill area to prevent entry. Post warning signs indicating "Radioactive Hazard".
4. From a safe area, initiate the University of Windsor's Emergency Response Plan by contacting Campus Community Police at ext. 9-1-1. Inform dispatcher of the following: your name, phone number, location of spill (room # & building), and incident involves radioactive material.
5. Inform Permit Holder of spill including notification of Campus Community Police.

6. Campus Community Police will coordinate with both the RSO and Person-In-Charge (Permit Holder) of the laboratory pertaining to decontamination procedures in the order of: personnel, laboratory, and equipment.
7. Decontaminate personnel by removing contaminated clothing and flushing contaminated skin with lukewarm water and mild soap.
8. Record the names of all persons involved in the spill. Note the details of any personal contamination. The RSO will arrange for any necessary bioassay measurements.
9. The RSO will prepare a written report for submission to the CNSC within 21 days of the incident.

9. REFERENCES

Canadian Environmental Protection Act, 1999 (CEPA 1999)
Environmental Protection Act, 1990 (R.S.O. 1990, c. E-19)
Fisheries Act, 1985 (R.S. 1985, c. F-14)
Liquid Fuels Handling Code, Technical Standards and Safety Act, 2000 (R.S.O. 223/01)
Ontario Water Resources Act, 1990 (R.S.O. 1990, c. O-40)
Transportation of Dangerous Goods Act, 1992 (TDG 1992)
University of Windsor's Biological Safety Program – "Safe operation of autoclaves" (2007).
University of Windsor's Biological Safety Manual (2007)
University of Windsor's PCB Management Policy (EHS-2009-01)
University of Windsor's Radiation Safety Manual (2007)

10. CONTACTS

For more information, please contact:

Chemical Control Centre
University of Windsor
Essex Hall, B-37
p. 519.253.3000.3519
e. ccc@uwindsor.ca
w. www.uwindsor.ca/ccc

Health and Safety
University of Windsor
Chrysler Hall North, Rooms 2128 & 2133.
p. 519.253.3000.2055
e. safety@uwindsor.ca
w. www.uwindsor.ca/safety

Campus Community Police
University of Windsor
401 Sunset Avenue
p. 519.253.3000.1234
e. cpolice@uwindsor.ca
w. www.uwindsor.ca/police

12. REVISION HISTORY

Date (yyyy/mm/dd)	Revision
2008/11/28	Creation
2010/06/10	Format change, inclusion of Spill Response Training, MSDSs, & appendix.
2014/03/25	Updated information, contacts, and policy.