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1.0 Introduction

At an institution as diversified as Western there are many types of material that require special handling. These requirements are legislated by the municipal, provincial and federal governments, so proper waste disposal is not only the safe and responsible thing to do, but is also a legal requirement.

The Canadian Environmental Protection Act and the City of London's Waste Discharge Bylaw, prohibit the discharge of toxic chemicals into the sewer system. Organizations and individuals can be, and have been, held responsible for environmental damage as well as any injuries to individuals working on plumbing or sewer lines. Convicted violators of the abatement regulations could face individual penalties plus jail terms.

All hazardous materials will be accepted for disposal provided they meet the requirements covered in this handbook. The waste disposal program at Western is convenient, flexible, and easy to use.

This guide addresses the most common types of hazardous waste generated on campus. It is recognized that there will always be unique situations that will require the assistance of the specialists in Western's Occupational Health & Safety (OHS) office.

2.0 Chemical Management

A high percentage of chemical waste at Western consists of unopened containers, so try to resist the temptation of large volume purchases. Before purchasing chemicals, estimate your maximum possible use and buy accordingly. Sharing chemicals that might otherwise be sent for disposal, minimizes waste volume and provides an inexpensive source of chemicals.

Some chemicals have characteristics that preclude long-term storage. Therefore, purchase chemicals in volumes that will ensure usage within the manufacturer's recommended shelf life. Date chemicals that have characteristics that cause them to become hazardous with age and dispose of them before they become a dangerous item to handle (i.e. peroxide formers, certain compressed gas cylinders).

Unknown chemicals create an unsafe situation in the laboratory. Be sure to replace aging labels. Also ensure that all products made in the lab are clearly identified; it is the safe thing to do as well as being the law.

3.0 Labelling Containers for Disposal

All containers in a laboratory must be completely labelled. The appropriate labelling is the responsibility of the individual laboratory or department. Each item must be labelled with one of the following:

- Original Supplier's (manufacturer) Label
- WHMIS Workplace Label
- Any label with the Full Chemical Name (for containers less than 100ml)
- OH&S Material for Disposal Label.
One of the following labels must appear on the container when disposing of hazardous waste unless its original manufacturer’s label is an accurate reflection of its contents. All required information must appear on the label. Use the full chemical name, as short forms or acronyms are confusing for proper identification. For example, use trichloroacetic acid instead of the abbreviation “TCA”.

Material for Disposal – Package and Container Label
To be used on each container of generated waste and on exterior of all packaged waste cartons.

WHMIS Workplace Label
To be used on stock solution containers and for decanted materials.

Waste Material for Incineration
To be used on any material bagged for incineration. These are primarily used for biohazardous waste.
4.0 Packaging

All hazardous waste containers must be packaged to ensure that the material cannot spill in the case of an accident.

- All chemicals for disposal must be in intact containers, suitable for holding the chemical, with a tightly fitting lid that prevents leakage. Gas cylinders must first be checked for leaks.

- Each container must be labelled appropriately (see previous page).

- All containers of less than 22 litres (5 gal) must be packed upright in a cardboard strong enough to support the contents. Sufficient packing material must be used to prevent the containers from tipping or breaking against each other. Finally, the box must be taped closed.

- Each box must have an attached waste inventory chart. (Appendix A)

- Each box must be small enough to be easily carried by one person.

- Incompatible and highly reactive chemicals must always be packaged separately to minimize fire and explosion hazards in case of accidental breakage. (see Section 5.0)

Example: Inorganic salts which liberate poisonous gases must be separated from:

- acids - e.g. Potassium Cyanide
- oxidizing agents - e.g. Potassium Permanganate
- pyrophoric chemicals - e.g. Phosphorus

- All sharps contaminated with hazardous chemicals must be placed in a Western approved sharps container with a 'Hazardous Material for Disposal' label completed and affixed to the container. Submit for collection as per Hazardous Waste Disposal Procedures.

- Each box must contain only one stream of waste material. Chemical, biohazardous and radioactive waste streams are handled in different areas on campus and cannot be stored together.

- Some items do not require special packaging:

  - Gas cylinders (check for leaks).
  - Twenty litre pails must be sealed. Pour-spout must have an intact cap.
5.0 Chemical Compatibility

Chemical compatibility is an important factor when handling chemicals and packaging chemical wastes. Unexpected reactions due to incompatibility have caused serious injuries and severe damage to equipment and buildings in the past. A well maintained inventory and labelling system is the best method of ensuring hazardous materials are being managed effectively and safely. The inventory process allows one to check whether chemicals are being stored properly, and if not, provides an opportunity to segregate according to their respective hazard classes.

Container labels and SDS’s are the principal source of information on hazard classes and storage practices. One technique to convey this hazard information is the use of colours to categorize materials. This method places chemicals with a similar hazard class in the same colour-code group. All materials of the same colour-code may be stored together without fear of an incompatible reaction occurring should the materials become accidentally mixed. Several chemical manufacturers (e.g. JT Baker, Fisher, and BDH) use this method to convey hazard information.

Chemical Classes

In general, chemicals can be separated into the following hazard classes:

1. Flammable liquids
2. Oxidizers
3. Reducers
4. Concentrated acids
5. Concentrated bases
6. Water-reactives
7. Toxic
8. Peroxidizables
9. Pyrophorics
10. Compressed gas cylinders
11. Inorganic solids
12. Organic solids

Ideally, each group above should be stored on a separate shelf with the most hazardous combinations spaced well apart. Flammable liquids must be stored in an approved flammable storage cabinet or explosion proof refrigerator.

Segregation of Waste Classes

It is critical that incompatible materials are kept segregated in the waste disposal process as well. Waste classes must be kept separate by placing waste in the properly labelled container and submitted for disposal.

Do not collect the wastes from a series of different experiments or procedures into one large container. This increases the risk of mixing incompatible chemicals together. There are numerous examples of incompatible chemical reactions between relatively unreactive materials (i.e. oxidizer + organic solvent, DMSO + halogenated solvent).
6.0 Organic Solvents

If possible, separate your organic solvent waste into halogenated solvents and non-halogenated solvents. The reason for this request is that halogenated solvents disposal costs are almost ten times higher than non-halogenated.

7.0 Unknown Chemicals

For safety and transportation reasons, our chemical waste contractor will not accept any unidentified substances at any time. Every effort must be made to properly identify all waste before submitting for disposal. If identification of the "unknown" cannot be made, then a characterization of the waste based on physical and chemical properties is required prior to acceptance of the material by the chemical waste contractor. Please contact Ryan Das at extension 84746 or at rdas22@uwo.ca if you require assistance with an unidentified substance.

Any information on the unknown material is critical. This information may greatly reduce the hazards involved in handling and testing the material. Examples of useful information: name of research group, telephone number, type of research, storage method, approximate age of container, your best guess (i.e. organic, acid, air reactive, pH, oxidizer etc).

Unknowns are extremely dangerous and expensive to handle. Each unknown must be subjected to a series of analytical tests by the chemical waste contractor until an appropriate identification is accomplished.

8.0 Controlled Substances and Goods

Due to special handling procedures, substances controlled under the Controlled Drugs and Substances Act, and Defence Production Act, specifically, the Controlled Goods Regulations will continue to be handled directly by OHS. If you require disposal of any controlled substances, please contact Ryan Das at extension 84746 or at rdas22@uwo.ca so that a special pickup can be arranged.

9.0 Shock-Sensitive / Explosive Materials

These compounds must be handled with the utmost care to protect them from shock, friction and heat. Compounds that are suspected of containing unstable peroxides should be considered extremely dangerous. DO NOT OPEN a suspect container. Contact OHS for disposal arrangements.

There are two main factors in the creation of a shock sensitive or explosive material, time and desiccation. Many types of ether have the tendency to slowly form organic peroxides once exposed to air. To prevent the formation of explosive peroxides, determine the recommended disposal date and write it on the container. This container must be submitted for disposal prior to this date. If this date has been exceeded the assumption must be made that it is now unstable and should be handled as a shock sensitive item. Items such as picric acid must be kept wet and should be inspected monthly and additional water should be added if the level appears to be dropping.
NEVER attempt to open a dry container of picric acid or a container with dry picric acid on the lid.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 months after opening</td>
<td>Isopropyl ether, Divinyl acetylene</td>
</tr>
<tr>
<td>12 months after opening</td>
<td>Diethyl ether, Tetrahydrofuran, Dioxane</td>
</tr>
<tr>
<td>Substance has been allowed to dry out</td>
<td>Picric Acid, Dinitrophenylhydrazine</td>
</tr>
</tbody>
</table>

10.0 Radioactive Waste

Disposal of all radioactive wastes must be in accordance with regulations under the NSC Act. Waste must be handled and disposed of in a way that prevents unreasonable risk to the public or the environment. CNSC Regulations and Internal Permit Conditions require appropriate and specific disposal for each radio nuclide, and that records be retained for each method of disposal. Annual reporting of usage and waste disposal quantities is required.

Radioactive waste must be kept secured while in the laboratory (e.g. do not leave any container labeled as radioactive waste at the loading dock or any public area, unattended while waiting for pick-up). It is the responsibility of a Permit Holder to release all nuclear substances for disposal from his/her designated laboratories.

Estimate the quantity of radioactivity used and disposed of according to experiment protocols. Record the quantity and method of disposal, date of disposal and the user name on the Inventory & Waste Record Form. The Inventory & Waste Record Forms must be completed and kept current at all times. The Inventory & Waste Record Form must be signed and dated when disposal is complete.

Radioactive wastes (liquid scintillation vials, solids, liquids, etc.) are normally submitted to OHS personnel in the radioactive pail for disposal. All wastes must not contain any viable bio-hazardous agents. Each radioactive pail must have the following:

- A completed Radioactive Waste Label on liquid waste container, solid waste bag or liquid scintillation vials bag. The radioactive labeled waste container or radioactive labeled bag must be contained in a radioactive pail.

- A radioactive pail must be checked for non-fixed contamination on surfaces (mainly outside) using a wipe test procedure then complete a Safe Transport of Radioactive Material form.

- A completed Material for Hazardous Waste Disposal form.

No radioactive waste shall be disposed to a sewer or regular campus garbage.

Liquid Scintillation Vials

Solvent liquid scintillation vials and environmental biodegradable scintillation vials must be collected separately in the laboratory. Vials must be placed in a clear plastic bag in the radioactive waste pail. Vials must have caps that are securely fastened. Vials must not be leaking or show evidence of leaking.
Non-contaminated solvent vials from wipe test can be submitted to OHS personnel as regular chemical waste.

Environmentally safe biodegradable scintillation fluid is highly recommended for wipe test and experimental procedures if possible.

Vials are disposed of via chemical waste company by OHS personnel if they are within the CNSC limit for solid waste.

**Liquid Radioactive Waste**

Aqueous (water soluble) liquid waste and organic solvent liquid waste must be collected separately in the laboratory. All liquid radioactive wastes must be collected in 4 litre plastic containers with a Radioactive Waste Label on it. Close the cap tightly on the container when not being used and place it behind an appropriate shielding material if required.

When close to full and/or prior to disposal, count an aliquot of the solution and determine the activity in mCi or MBq. The outside of containers must be free of any contamination before submitted to OHS personnel.

The wash water from the normal, daily, clean-up of radioactive-use utensils, glassware may be disposed via the sewer. No liquid containing radioactive materials shall be discharged to the laboratory sanitary sewer.

**Radioactive Stock Shipment Vials**

All stock vials must be collected and submitted to OHS personnel. Ensure that the bar code number is on the vial at the time of disposal. All shipment vial radioactive labels must be defaced or destroyed. All environmentally hazardous materials such as lead, used in shielding containers should be disposed via OHS personnel.

All vials with some residual activity must have a radioactive waste label, indicating the date and the amount of activity remaining in the vial.

**Solid Combustible Radioactive Waste**

All solid combustible radioactive waste must be collected in a clear plastic bag and contained in a radioactive pail or behind an appropriate shielding material (if required).

Radioactive warning signs/labels must be destroyed or defaced before discarded into the clear plastic bag.

No sharp waste (glassware, needles and blades) shall be discarded into combustible waste containers. Non-contaminated materials must not be discarded into solid waste containers.

**Radioactive Sharps (needles and syringes)**

All sharps used for dispensing radioactive materials must be placed in a Western approved sharps container with a Radioactive Waste Label on it. The container must be monitored and shielded if necessary.
The outside of sharps containers must be free of any contamination before submitted to OHS personnel.

**Radioactive Glass**

All radioactive glass waste (glass test tubes, glass pipettes, etc.) from radioactive experiments must be collected in a clear plastic bag and contained in a radioactive pail.

Radioactive warning signs/labels must be destroyed or defaced before discarded into the clear plastic bag.

**Radioactive Animal Carcasses and Tissues**

All radioactive contaminated animal carcasses and tissues must be frozen, held for the appropriate decay period and then incinerated. It is the responsibility of the researcher to provide freezer space for the animal material during this decay period. Animal materials may be incinerated when the activity is decayed or well below CNSC regulatory limits. For more information, contact the Radiation Safety Coordinator.

At disposal, the animal material must be double bagged in an opaque bag and labelled with a "Waste Material for Incineration" label. Bags must not weigh more than 20 kg each.

**Sealed Sources**

Contact the Radiation Safety Coordinator for the disposal of all sealed sources and radiation devices containing sealed sources. Permit Holders must inform the Radiation Safety Coordinator after the disposal of sealed sources. Sealed sources are normally transferred to radioactive waste company.

**Smoke Detectors**

A smoke detector contains a small radioactive source. For disposal, submit to the Western hazardous waste collection service. Do not place the detectors into the regular laboratory garbage.

**Mixed Biological / Radioactive Contaminated Waste**

Prior to submitting as Radioactive Waste any biological hazard must be treated first. The waste must be decontaminated by DISINFECTION. For additional information, please refer to DISINFECTION in Section 11.0.

In some special cases it may be necessary to INCINERATE contaminated solid, biological/radioactive hazardous waste. These wastes may be only incinerated when the activity has to below the CNSC regulatory limits for solid waste. For more information, contact the Radiation Safety Coordinator.

**Note:** Never autoclave contaminated radioactive, biological waste.
11.0 Hazardous Biological Waste

Health Canada requires that “all contaminated materials, solid or liquid, must be decontaminated before disposal or reuse”; Canadian Biosafety Standard, 2nd edition, 2015. Disposal must also comply with existing federal, provincial and local municipal legislation.

The purpose of this section is to instruct individuals on disposal of biohazardous wastes using the facilities available to personnel on campus.

Waste material treated correctly is rendered non-infectious and may be discarded through the sewer, in the case of liquids, or through the regular garbage disposal for solid wastes. Should any unusual situations arise, please call the Biosafety Officer in Occupational Health and Safety.

It is the responsibility of the research unit to develop suitable procedures for treating the biohazardous waste it produces, bearing in mind that each research program has unique requirements and problems. The method used in each lab should be proven effective in that lab, rather than assumed correct because it is satisfactory in another lab using another agent.
Definitions

Hazardous Biological Material
Hazardous biological materials include biotoxins and biomaterials capable of infecting or causing harm to persons, animals or plants. A new category that falls under this classification are some genetically modified organisms.

Infectious
Infectious agents are any biomaterial capable of transmitting disease to persons, animals or plants.

Decontamination Methods

Autoclaving
All autoclave users must first be trained by their supervisor or designate. Detailed Western Standard Operating Procedures are posted at each autoclav and must be closely adhered to.

For autoclaving to be effective, the steam must be saturated, penetrate the load and the temperature must reach a minimum of 121°C (250°F) for a minimum of 15 minutes.

Although autoclaving is generally regarded as the most reliable method of sterilizing biological wastes, the efficiency of autoclaving routines should not be taken for granted. The time necessary to achieve decontamination will vary with the volume of the material and the density and nature of the biological agents in the sample. Acceptable decontamination will be confirmed with the results from the spore test vial placed in the waste container. Waste cannot be discarded unless test results are negative. Bags must be stored in an appropriate place until test is complete.

Prior to disposal as solid waste, the autoclave bag must be placed in a clear garbage bag specifying biohazard waste or an opaque garbage bag with a label affixed indicating that the bag contains treated biomedical waste. It can then be placed in the regular garbage.
Note: Biohazardous and Radioactive Waste

Hazardous biological waste that is also radioactive MUST NOT BE AUTOCLAVED. This can result in radioactive contamination of the autoclave. These wastes may be AUTOCLAVED only when the activity is below the CNSC regulatory limits. Contact the Radiation Safety Officer in these cases. See:

1. Appendix B: Autoclaving Standard Operating Procedure
2. Appendix C: Autoclave Cycle

Disinfection

Definition:
Disinfection is the use of germicidal (germ-killing) chemicals to destroy the infectivity of the material. This may not imply sterilization. Chemical agents often provide the only practical means of effective inactivation of biological material.

When used with knowledge of mode of their action and limitations, chemical disinfectants are recommended in the following situations:

- Decontamination of reusable glassware before washing and reuse;
- Decontamination of surgical instruments before washing and reuse;
- Decontamination of waste biohazardous liquids if an autoclave is not available;
- Spill or accident clean up;
- Cleaning and decontamination of work surfaces;
- Cleaning and decontamination of equipment which cannot be autoclaved;
- Decontamination of radioactive or carcinogen containing liquids.

You must determine the recommended disinfectant for your particular situation based on Safety Data Sheets, literature or recommendations from such groups as Health Canada. Disinfectant must be proven to be effective against organism or cells in use. The correct dilution must be used and sufficient contact time must be allowed.

After decontamination by suitable disinfectants, wastes are rendered non-hazardous and may be disposed of in the normal waste stream: liquids into the sanitary sewer provided that the concentration of disinfectant is not toxic and solids can be handled by standard garbage disposal. Safety precautions should be taken by personnel when handling concentrated solutions of disinfectants, as these can be very toxic and corrosive. These precautions include wearing protective gloves and eye protection.
Incineration

Biohazardous Waste Categories for Incineration

The following categories of biohazardous waste should be disposed of by incineration:

- All human tissues
- All small animal carcasses, both infected and non-infected
- Disposal of large animal carcasses must be according to the instructions of the Animal Care Facility.
- Animal tissue and body parts, both infected and non-infected
- Sharps (contaminated) - needles, syringes, blades, special arrangements must be made for any glass items that need to be incinerated (i.e. Vacutainers)

NOTE: Needles, syringes and blades must be placed in an approved sharps container prior to disposal and this must be securely closed before it leaves the laboratory.

Bagging Procedures for Incineration

1. Materials to be incinerated must be securely bagged in an opaque plastic bag or a clear garbage bag specifically for biohazardous waste and double bagged to prevent leakage before leaving the laboratory or animal housing area.

2. The bags must be taped with coloured tape according to the waste class of the material inside. Waste classes must be bagged separately. Coloured tapes (red, orange, yellow, blue) are available from Western’s Chemistry/Bio Stores.

3. The bags must be labelled with a fully completed “Waste Material for Incineration’ label on the outside. These labels are provided by Western’s Occupational Health and Safety office.

Preparation Procedures for Incineration

Carcasses and Anatomical Wastes: These must be frozen or refrigerated if disposal is not to be immediate. For preserved carcasses, the preserving liquid must be separated and submitted as chemical waste. Material must be double bagged and taped according to the classification table. Bags must not weigh more than 20 kilograms unless approved by Occupational Health and Safety.
<table>
<thead>
<tr>
<th>Waste Material</th>
<th>Tape Colour</th>
<th>Waste Class</th>
<th>Disposal Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human anatomical plus swabs, etc. in contact with above.</td>
<td>RED</td>
<td>A1</td>
<td>Submit to hazardous waste collection service. Times and locations can be found at <a href="https://www.uwo.ca/hr/safety/topics/hazardous_waste.html">https://www.uwo.ca/hr/safety/topics/hazardous_waste.html</a></td>
</tr>
<tr>
<td>Infected animal carcasses and anatomical wastes, bedding, and lab ware in contact with above.</td>
<td>ORANGE</td>
<td>A2</td>
<td>Submit to hazardous waste collection service.</td>
</tr>
<tr>
<td>Biohazardous lab wastes, not autoclaved, non-anatomical plastic and paper, no glass.</td>
<td>YELLOW</td>
<td>A3</td>
<td>Submit to hazardous waste collection service.</td>
</tr>
<tr>
<td>Biohazardous contaminated sharps in containers, no glass.</td>
<td>YELLOW</td>
<td>A3</td>
<td>Submit to hazardous waste collection service.</td>
</tr>
<tr>
<td>Non-infected animal carcasses and anatomical waste.</td>
<td>BLUE</td>
<td>B1</td>
<td>Submit to hazardous waste collection service.</td>
</tr>
</tbody>
</table>
12.0 Glassware and Empty Chemical Glass Containers

Empty glass containers of water soluble inorganic acids and caustic residues must be rinsed prior to disposal. Rinsing must be performed three times with water to eliminate residues.

Refer to the organic solvent compatibility for guidance. Prior to disposal, empty, uncapped bottles must be placed in the fume hood for at least 24 hours to allow remaining residues to evaporate.

All glassware contaminated with a biohazardous agent must be rendered non-infectious before disposal.

Containers that have small amounts of highly toxic liquids or solids, not eligible for treatment as above, should be handled by following labelling and packaging requirements in sections 3 & 4; these will be accepted by the Department of Occupational Health and Safety.

Each laboratory must have a labelled plastic or metal pail or an approved glass disposal box to dispose of broken glassware and empty glass containers. The objective of isolating glass from regular garbage is to protect caretaking staff from possible glass cuts and injuries.

Labelling for Disposal Pail
Available from Occupational Health and Safety.
13.0 Asbestos

Asbestos Containing Materials (ACM) may be found in many locations on campus. Due to its unique properties, it was used in numerous and varied applications. However, ACM is only hazardous when it becomes friable (breaks apart releasing fibres). ACM is best left undisturbed unless it has become friable and is releasing fibres or could release fibres.

It is important that ACM be treated with caution. In addition, users must be familiar with the location of asbestos in instruments and other materials. Asbestos may be found in insulation. It may be sprayed on ceilings or on walls. It has also been used in offices and laboratories in many different applications.

Fume hood enclosures  Furnace insulation  High temperature gloves
Heating mantels and pads  Lab bench tops  Pipe insulation
Ceiling tiles  Floor tiles  Drywall compound

Small quantities of ACM (that can be removed and packaged without releasing asbestos fibres) can be submitted as hazardous waste. More unstable asbestos insulation or larger quantities of material must be removed by professional asbestos abatement individuals. Western Facilities has an in house abatement team that is trained and equipped to handle most asbestos removal procedures that will occur on campus.

Contact Facilities Management Client Services at x83304 to arrange for disposal.

14.0 Electronics, Fluorescent Light Bulbs, Batteries

With the introduction of new waste classification testing, several types of waste that traditionally went to the landfill are now considered hazardous waste. Old computers, monitors, fluorescent light bulbs, batteries and other electronic equipment are now classified as hazardous waste and have to be diverted from the regular landfill garbage. These items are collected through Western’s recycling program and shipped for recycling and/or treatment of all the hazardous components.

Contact Facilities Management Client Services at 83304 to arrange for disposal.

15.0 Sharps Disposal

- Chemically contaminated sharps – as per Section 3.0 and Section 4.0
- Radioactively contaminated sharps – as per Section 10.0
- Biohazard contaminated sharps - as per Section 11.0
- Non-contaminated sharps (not contaminated by chemical, biological, radioactive agents) are not considered as hazardous waste. Such sharps must be placed in an approved sharps container prior to disposal, securely closed and labelled as ‘Sharps – Non-contaminated’. These may be disposed of in the regular waste stream.
16.0 Spill Emergencies

Before using any hazardous material, you should carefully read the label and safety data sheet (SDS). Understanding your material will allow you to make any emergency decisions should an accident occur.

Your priorities in the event of a spill are:

1. The prevention and treatment of **injuries**
2. The prevention of **environmental** contamination
3. The protection of **property**

Your response to the spill should proceed as follows:

**Step 1**

Immediately alert all lab occupants that you have had a spill.

If in your opinion there is an immediate risk to room occupants, **EVACUATE** the laboratory and close the door behind you.

If you feel the spill presents an immediate risk to individuals outside the laboratory do not hesitate to use the nearest Fire Alarm pull station to **EVACUATE** the building.

Wait outside the building and make the emergency responders aware that you were the one who activated the alarm and inform them of the nature of the emergency.

Assist any injured individuals from the area only if it does not place you at risk. If it is necessary to leave anyone behind, make certain that the emergency responders are aware of the individual’s location and condition.

**Step 2**

When you are certain you are in a **SAFE AREA**, ensure any injured individuals receive appropriate first-aid.

Contact Campus Police at 911 to request any necessary help (Hazmat, ambulance, first aid, etc.).

**Step 3**

**NEVER** open a window in your lab. While this will clear the atmosphere in your lab, it will allow any gasses or vapours to be distributed throughout the entire building. If available, place your lab fume hoods into emergency mode.

**Step 4**

If it is safe to remain in the lab, **ELIMINATE** any sources of ignition near the spill. Take measures to prevent the spill from entering the floor or sink drains.
Step 5

Use your nearest spill kit to control and clean up the spill ONLY if you have the necessary personal protective equipment. If not, ask Campus Police to contact the Hazardous Materials Spill Response Team.

Spill Control Kits

A spill control kit for a typical spill would include the following items:

- Universal Spill pads
- Universal Spill sock
- Mercury sponge
- A bag of universal sorbent
- Latex gloves
- Rubber gloves
- Dust pan and brush
- Paint scraper
- Roll of paper towel
- Garbage bags
17.0 Hazardous Waste Disposal Procedures

The Western hazardous waste collection program is handled by RPR Environmental. RPR Environmental provides Western with the services of technical and environmental specialists who provide a unique, hands-on approach to waste management.

RPR requires the submission of an inventory form with all hazardous waste for it to be accepted. Proper packaging, segregation, labelling and delivery by a knowledgeable representative from the lab is required.

For safety reasons, RPR will not accept "unknowns", at any time, so every effort must be made to properly identify all waste before submitting for disposal. If identification of the "unknown" cannot be made, then a characterization of the waste based on physical and chemical properties is required prior to acceptance of the material by RPR. Please contact Ryan Das at extension 84746 or at rdas22@uwo.ca if you require assistance with an unidentified substance.

Due to special handling procedures, substances controlled under the Controlled Drugs and Substances Act, and Defence Production Act, specifically, the Controlled Goods Regulations will continue to be handled directly by Occupational Health and Safety. If you require disposal of any controlled substances, please contact Ryan Das at extension 81181 or at rdas22@uwo.ca so that a special pickup, by the department, can be arranged.

<table>
<thead>
<tr>
<th>Pick-up Location</th>
<th>Pick-up Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siebens-Drake Research Loading Dock</td>
<td>9:00 am</td>
</tr>
<tr>
<td>Robarts Research Institute</td>
<td>9:25 am</td>
</tr>
<tr>
<td>Biological &amp; Geological Sciences Loading Dock</td>
<td>9:40 am</td>
</tr>
<tr>
<td>North Campus Building Loading Dock</td>
<td>10:00 am</td>
</tr>
<tr>
<td>Medical Sciences - Room M003 (basement)</td>
<td>10:15 am</td>
</tr>
<tr>
<td>Chemistry Building Loading Dock</td>
<td>10:55 am</td>
</tr>
<tr>
<td>Engineering Sciences Loading Dock</td>
<td>11:30 am</td>
</tr>
</tbody>
</table>

In the event a pick-up is required at a location other one on the regular schedule, a copy of the completed inventory form must be emailed to Occupational Health and Safety (rdas22@uwo.ca) so pick-up can be scheduled. Special requests must be received no later than 5:00 pm on the Tuesday preceding the next Thursday pick-up.

**NOTE**: All hazardous waste must be submitted in person and never left unattended at the loading docks.
18.0 Appendix A: Waste Inventory Form

The Material for Hazardous Waste Disposal Form is available as a fillable form. Below is a screenshot of the form.
19.0 Appendix B: Autoclaving Standard Operating Procedure

Standard Operating Procedures for Autoclaving

Human Resources, Occupational Health and Safety
Western University - October 2003

DO NOT autoclave liquids containing bleach, formalin or glutaraldehyde.

Steps

1. Check that steam is on.
2. Check that jacket temperature has reached 121° Celsius.
3. Check cycle type:
   ♦ Liquids or dry goods
   ♦ Liquids need slow venting to avoid boiling
   ♦ Do not process dry goods with liquids
4. Set cycle time or select pre-set cycle - previously verified by biological ampoules.
5. Load autoclave correctly:
   ♦ Liquid containers MUST be inside a container to hold entire contents.
   ♦ Bags MUST be placed in a plastic tray.
   ♦ Bags should be loosely sealed or open.
6. Close autoclave door
   ♦ Ensure that radial arms engage firmly - do not wrench.
7. Start Cycle
   ♦ Wait until autoclave reaches 121° Celsius. The autoclave may then be left unattended until the end of the cycle. If door is leaking steam, abort cycle, re-close and tighten door further.
8. At completion of cycle
   ♦ Ensure that the pressure in the chamber is zero before opening door.
   ♦ Stand behind door and loosen radial arms slowly.
   ♦ Crack door open and wait for steam to dissipate before opening door wide.
   ♦ Use insulated gloves to remove goods.
   ♦ Use CAUTION when removing liquids.
   ♦ Ensure that the liquids have cooled so that bumping does not occur.
9. Spills and breakage in autoclave:
   ♦ Remove pan containing spilled contents. Remove broken glass with tongs.
   ♦ Re-autoclave spilled or broken items before disposal.

Departmental autoclave contact: Click or tap here to enter text.
Western phone extension: Click or tap here to enter text.
20.0 Appendix C: Autoclave Cycle Verification

Autoclave Cycle Verification Testing Using Biological Indicator Ampoules

Western Human Resources
Occupational Health & Safety, October 2003

Tests using biological indicator ampoules to prove that autoclaving has rendered the laboratory waste non-hazardous must be conducted at least every six days or before any waste is placed into the municipal waste stream as specified in Guideline C - (Non-incinerated Technologies for Treatment of Biomedical Waste, Ministry of the Environment, Ontario, December 2001).

Instructions:

1. **Place ampoules in waste:**
   - Solid waste: place ampoule in the middle of the contents.
   - Liquid waste: (e.g. flasks containing liquid) ampoule must be suspend in such a way that the ampoule is not in the liquid.

2. **Autoclave wastes** as per Standard Operating Procedures for Autoclaving.

3. **On Completion of autoclave cycle:**
   - Retrieve the ampoules from waste and allow to cool
   - Follow instructions on Verify™ Wall Chart
   - Incubate at 55 – 59°C, for 24 hours (minimum).

   **Important Note:** A control ampoule (an ampoule that has not been autoclaved) MUST be incubated with test ampoules.

4. **Checking the Results:** After 24 hours, check for a color change in ampoules. Refer to Verify™ Wall Chart to determine if positive or negative growth has occurred.
   - Negative growth in test ampoule: autoclaved waste can now be discarded as non-hazardous waste.
   - Positive growth in test ampoule: autoclaved waste NOT to be thrown out. The waste must be re-autoclaved for a longer cycle time and must be re-tested with ampoules, using the procedures above, until a negative test is reached.
   - Control ampoule: must show positive growth, if it does not, check the expiry date of the ampoules. Re-test the waste before discharging.

5. **Keeping the Records:**
   - Document test results on the Biomedical Waste Decontamination Record Sheet provided. Save cycle printout (if available).
21.0 References


5. L. Bretherick, **Handbook of Reactive Chemical Hazards**, The Butterworth Group, Toronto: 2265 Midland Avenue, Scarborough, Ontario, M1P 4S1.

6. **Ontario Regulation 558/00 amendment to Regulation 347** of the revised regulations of Ontario, 1990 made under the Environmental Protection Act
