



THE UNIVERSITY OF WESTERN ONTARIO

HUMAN RESOURCES  
OCCUPATIONAL HEALTH & SAFETY

HAZARDOUS MATERIALS MANAGEMENT HANDBOOK

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## 1.0 INTRODUCTION

From 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 at UWO Occupational Health & Safety (OHS) [www.uwo.ca/humanresources](http://www.uwo.ca/humanresources)

## 2.0 CHEMICAL MANAGEMENT

A high percentage of chemical waste at UWO 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.



## 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 form](#). ([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 UWO 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, however check to see if it is leaking.
    - 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 MSDS'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
13. Non Flammable Liquids.

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 Michael Mosley at extension 84747 or at [scimjm@uwo.ca](mailto:scimjm@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 Mike Mosley at extension 84747 or at [scimjm@uwo.ca](mailto:scimjm@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 the 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.

CONDITION	EXAMPLES
3 months after opening	Isopropyl ether, Divinyl acetylene
12 months after opening	Diethyl ether, Tetrahydrofuran, Dioxane
Substance has been allowed to dry out	Picric Acid, Dinitrophenylhydrazine

## 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 Environmental Safety 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 Environmental Safety 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 Environmental Safety 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 Environmental Safety 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 Environmental Safety 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 Environmental Safety 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 UWO 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 Environmental Safety 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 & 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 Hazardous Materials Specialist 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 UWO 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”; Laboratory Biosafety Guidelines 3<sup>rd</sup> edition, 2004. 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**

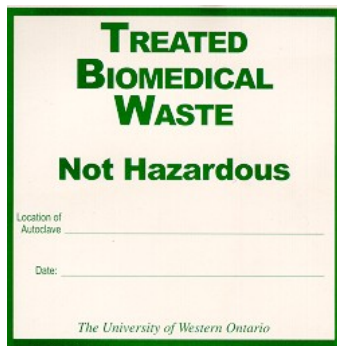
#### **Autoclaving**

All autoclave users must first be trained by their supervisor or designate. Detailed UWO Standard Operating Procedures are posted at each autoclave 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.

[APPENDIX B](#): Autoclaving Standard Operating Procedure

[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 Material 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 UWO Chemistry Stores.

- The bags must be labelled with a fully completed "Waste Material for Incineration" label on the outside. These labels are provided by UWO Occupational Health and Safety

**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.

**CLASSIFICATION FOR ON SITE WASTE DISPOSAL BY INCINERATION**

WASTE MATERIAL	TAPE COLOUR	WASTE CLASS	DISPOSAL MED/SCI, DSB	DISPOSAL OTHER AREAS
HUMAN ANATOMICAL PLUS SWABS ETC. IN CONTACT WITH ABOVE	RED	A1	SPECIAL ARRANGEMENTS	SUBMIT TO HAZARDOUS WASTE COLLECTION SERVICE
INFECTED ANIMAL CARCASSES AND ANATOMICAL WASTES, BEDDING, AND LAB WARE IN CONTACT WITH ABOVE	ORANGE	A2	TAKE TO ROOM MSB 605	SUBMIT TO HAZARDOUS WASTE COLLECTION SERVICE
BIOHAZARDOUS LAB WASTES NOT AUTOCLAVED NON ANATOMICAL PLASTIC AND PAPER NO GLASS	YELLOW	A3	TAKE TO DSB RM 6039	SUBMIT TO HAZARDOUS WASTE COLLECTION SERVICE
BIOHAZARDOUS CONTAMINATED SHARPS IN CONTAINERS, NO GLASS	YELLOW	A3	TAKE TO DSB RM 6039	SUBMIT TO HAZARDOUS WASTE COLLECTION SERVICE
NON INFECTED ANIMAL CARCASSES AND ANATOMICAL WASTE	BLUE	B1	TAKE TO MSB RM 510A	SUBMIT TO HAZARDOUS WASTE COLLECTION SERVICE

**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.

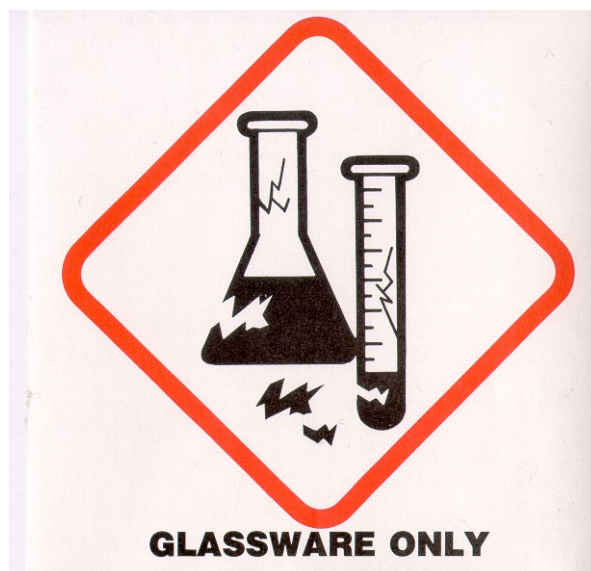
Refer to the organic solvent compatibility for guidance. Prior to disposal, empty, uncapped bottles must be placed in the fumehood for at least 24 hours to allow remaining residues to evaporate.

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.

Fumehood 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. UWO's Physical Plant and Capital Planning Services has an in house abatement team that is trained and equipped to handle most asbestos removal procedures that will occur on campus.

Contact the Physical Plant Communication Centre at 83304 to arrange for disposal.

### 14.0 ELECTRONICS, FLOURESCENT LIGHT BULBS

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 and other electronic equipment are now classified as hazardous waste and have to be diverted from the regular landfill garbage. These items are now collected through the UWO recycling program and shipped for recycling and/or treatment of all the hazardous components.

Contact the Physical Plant Communication Centre 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.

# SPILL EMERGENCIES

Before using any hazardous material, you should carefully read the label and material safety data sheet (MSDS). 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 UWO Police at 911 to request any necessary help (Hazmat, Ambulance, First Aid, etc).

## Step 3

**NEVER** open a window in you 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 fumehoods 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 UWO 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

## 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 Michael Mosley at extension 84747 or at [scimjm@uwo.ca](mailto:scimjm@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 Mike Mosley at extension 84747 or at [scimjm@uwo.ca](mailto:scimjm@uwo.ca) so that a special pickup, by the department, can be arranged.

<u>Pick-up Location</u>	<u>Pick-up Time</u>
Siebens-Drake Research Loading Dock	9:00 am
Biological & Geological Sciences Loading Dock	9:15 am
Chemistry Building Loading Dock	9:30 am
North Campus Building Loading Dock	9:45 am
Medical Sciences - Room M003 (basement)	10:00 am
Robarts Research Institute	10:30 am
Engineering Sciences Loading Dock	11:00 am

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 faxed to Occupational Health and Safety (ext. 83420) 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

APPENDIX A: Waste Inventory Form



Date: \_\_\_\_\_

**MATERIAL FOR HAZARDOUS WASTE DISPOSAL**

**1) Source:**

Bldg: \_\_\_\_\_ Room \_\_\_\_\_ Lab Supervisor: \_\_\_\_\_

Submitted by: \_\_\_\_\_ Phone: \_\_\_\_\_

**2) Package Contents: (check all that apply)**

**Physical Forms:** Solid  Liquid  Gas

**Container Materials:** Plastic  Glass  Metal  Other \_\_\_\_\_

**Hazards:** Flammable  Oxidizer  Corrosive  Toxic  Air/Water Reactive

Biohazard  Name of organism: \_\_\_\_\_

Disinfection?

YES, Autoclaved (each container tagged with 'Treated Biomedical Waste')

YES, Chemical (indicate chemical used \_\_\_\_\_)

NO, Bag must have UWO Incinerator label with appropriate coloured tape

Radioactive  Attach "Safe Transport of Radioactive Material Form"

**3) Individual containers:**

**Please note that each individual container in the package must have a label listing its contents (including water) in order of decreasing concentration. These labels are available from UWO Health & Safety.**

ITEM #	DESCRIPTION OF CONTENTS	CONTAINER SIZE
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____
7.	_____	_____
8.	_____	_____
9.	_____	_____
10.	_____	_____

**4) Special Handling/Warnings:** \_\_\_\_\_

## STANDARD OPERATING PROCEDURES FOR AUTOCLAVING



Human Resources, Occupational Health and Safety  
The University of Western Ontario, October 2003



**DO NOT** autoclave liquids containing bleach, formalin or glutaraldehyde

**1** CHECK THAT STEAM IS ON

**2** CHECK THAT JACKET TEMPERATURE HAS REACHED 121<sup>0</sup> C

**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<sup>0</sup> C. 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: \_\_\_\_\_ UWO Ext.: \_\_\_\_\_

## APPENDIX C: Autoclave Cycle Verification

# Autoclave Cycle Verification Testing Using Biological Indicator Ampoules

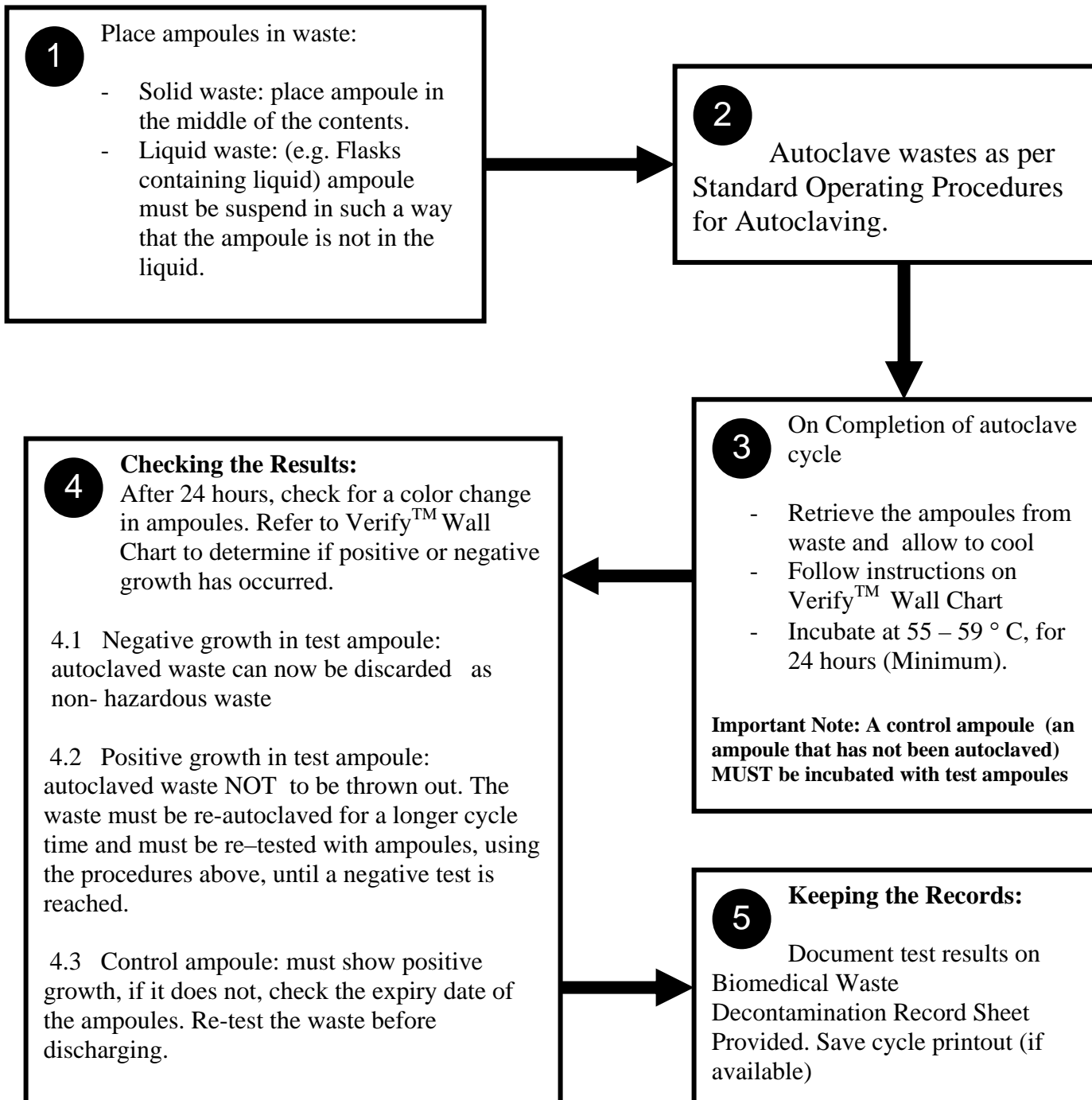


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Tests using biological indicator ampoules to prove that autoclaving has rendered the laboratory waste non-hazardous must be conducted at least every 6 days or before any waste is placed into the municipal waste stream as specified in Guideline C - (Non – Incinerated Technologies for Treatment of Biomedical Waste, Ministry of the Environment, Ontario, December 2001).

### INSTRUCTIONS:



## REFERENCES

1. **Safety in Academic Chemistry Laboratories**. 3rd ed., Committee on Chemical Safety, American Chemical Society: Washington, DC., 1979.
2. M. A. Armour, et. al., **Hazardous Chemicals Information and Disposal Guide**, Terochem Labs. Ltd., Third Edition Edmonton, Alberta, 1987.
3. **Prudent Practices for Disposal of Chemicals from Laboratories**, National Research Council, National Academy Press: Washington, DC., 1983.
4. **Prudent Practices for Handling Hazardous Chemicals in Laboratories**, National Research Council, National Academy Press: Washington, DC., 1981.
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
7. Transportation of Dangerous Goods Regulations written in Clear Language, Transport Canada, Government of Canada, 2002.
8. Laboratory Biosafety Guidelines, Health & Welfare Canada and Medical Research Council of Canada, 1990.