

# HAZARDOUS WASTE MANAGEMENT DISPOSAL TRAINING



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Hazardous Waste Management/Gestion des Déchets Dangereux  
[www.mcgill.ca/hwm](http://www.mcgill.ca/hwm)

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### [Hazardous Waste Management](#)

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## {1} Services

- ✓ Hazardous waste disposal
- ✓ HAZMAT emergency response
- ✓ Decommissioning
- ✓ Transportation
- ✓ E-waste recycling

## {2} Identify Hazardous Materials

### ***Does the waste have any of the following characteristics?***

**Explosive:** Energy hazard, sensitive to heat, shock and friction, extremely rapid release of gas and heat (deflagration or detonation)

**Compressed Gas:** Gases under pressure. Physical hazard (violent container failure, confined space and asphyxiation, temperature and frostbite) as well as chemical characteristics (toxic, flammable, corrosive, oxidizer)

**Flammable liquid:** Liquids that are flammable have a flash point less than or equal to 60°C. Combustible liquids require heating to ignite.

**Flammable solid:** Solids that are readily combustible through friction or auto oxidation by exposure to air, pyrophoric.

**Water reactive:** React violently with water to generate flammable gas. May also generate corrosive or toxic gas.

**Oxidizer:** Causes or contributes to combustion, increases fire and explosion risk.

**Toxic:** Liable to cause death or serious injury or harm human health by inhalation, ingestion or skin contact (acute or chronic chemical exposure); also, capable of causing infection (biohazardous).

**Radioactive:** Energy hazard from ionizing radiation exposure or contamination (alpha & beta particles, gamma rays)

**Corrosive:** Corrodes metal or causes permanent damage to human tissue (acid or base)

**Other Hazardous Material:** Present a danger not covered by other classes (particulate matter, environmentally harmful)

### ***Lists And Regulations Regarding Hazardous Materials:***

- “Canadian Environmental Protection Act, 1999”  
Schedule 1: List Of Toxic Substances
- “Transportation of Dangerous Goods Regulations”, Schedule 3  
*(if a material is regulated for transport it is because it poses a risk to life, the environment or property. It is likely the waste will retain such properties)*
- “Quebec Regulation Q-2 Environment Quality Act”
- U.S.A. “CFR Title 40: Protection of Environment”  
PART 261—Identification And Listing Of Hazardous Waste

## **{3} Guidelines**

“While records will be kept of the volume produced by each department, charges will not be made against accounts within the university **when guidelines are followed** and for waste which is presented **in a proper manner.**”

General guidelines regarding hazardous materials disposal:

- ➔ 1- Properly contained
- ➔ 2- Clearly labeled
- ➔ 3- Permanently labeled

Transportation of Dangerous Goods Regulations (SOR/2001-286)  
*Part 5.1(3) Means of containment*

“A person must not handle, offer for transport or transport dangerous goods in a means of containment ..... unless the means of containment is designed, constructed, filled, closed, secured and maintained so that under normal conditions of transport, including handling, there will be no accidental release of the dangerous goods that could endanger public safety.”

Hazardous Products Act and Controlled Products Regulations  
*CPR Part 21 Legibility of Labels*

- “1- The information required to be disclosed on the label of a controlled product or container in which a controlled product is packaged shall be clearly and prominently displayed, easily legible and contrasted with other information on the controlled product or container.
- 2- A label applied to a controlled product or container in which a controlled product is packaged shall be sufficiently durable and resistant under normal conditions of transport, storage and use to remain attached and legible.”

UNIVERSITÉ McGill UNIVERSITY	
CHEMICAL WASTE DÉCHET CHIMIQUE	
ONLY / SEULEMENT	
CHEMICAL NAME	% IN SOLUTION
Name / Nom: _____	
Dept: _____	
Building / Edifice: _____	
Date: _____	
Phone #: _____	

UNIVERSITÉ McGill UNIVERSITY	
SOLVENT INFLAMMABLE	
FLAMMABLE SOLVENT	
CHEMICAL NAME	% IN SOLUTION
Name / Nom: _____	
Dept: _____	
Building / Edifice: _____	
Date: _____	
Phone #: _____	



## **{4} Chemical waste**

### ***For bulk liquid chemicals:***

White = Waste flammable, toxic solvents, aqueous organic waste, pH 7

Yellow = Waste corrosive, inorganic, oxidizing, reducing, pH1, pH14

- Complete the entire label.
- Do not overfill container (maximum 3/4 full).
- Do not contaminate the exterior of the container (funnel).
- Do not cross-contaminate containers
- Liquid waste only! No Solids!!!! (glass, sharps, blades, paper, plastics)
- Containers are reused and should not be modified.
- Avoid precipitation or polymerization of solids.
- Do not use for concentrated materials



### ***Labpacks for all other chemicals:***

- Expired or excess chemicals
- Keep the material in the original container.
- Also, Rinsed, reused and relabelled old chemical bottles
- Ensure the container is properly identified
- Fill the [online form](#) for waste pickup
- Annual or on call disposal service



## ***General Waste Segregation:***

- Keep waste as simple as possible or practicle
- Hazardous from non hazardous materials
- Liquids from solids
- Organic from inorganic
- Flammable from toxic
- Acids from bases
- Oxidizing agents from reducing agents
- Oxidizers from organics (fuel)
- Special, acutely toxic or reactive chemicals separately:
  - ✓ Compressed gas
  - ✓ Water reactive
  - ✓ Pyrophoric
  - ✓ Cyanides and Sulfides
  - ✓ Mercury
  - ✓ Explosives (Picric acid, Brady's reagent, Tollen's reagent)
  - ✓ Nanoparticles, particulate matter
  - ✓ Organic peroxides, catalysts
  - ✓ Silica and Asbestos
  - ✓ Pesticides



## ***Medication***

Expired or unused prescription drugs may be returned to a pharmacy for disposal. Remove personal information from label before disposal.

## ***Controlled drugs and substances***

Unused or expired controlled drugs and substances must be managed and disposed of in accordance with the Narcotic Control Regulations and Health Canada's Office of Controlled Substances (OCS).

Disposal must be performed by a certified individual and witnessed by a qualified person in charge (QPIC).

The following information is required for documentation and disposal of narcotics:

- Name and description (physical state, lot#)
- Quantity (Gross weight of bottle, tare weight at disposal, total usage)
- Strength or concentration (%API)

## **{5} Biomedical Waste**



### ***Classification***

- Human anatomical waste : excluding hair, teeth, nails, blood and biological liquids;
- Animal anatomical waste : excluding teeth, hair, claws, feathers, blood and biological liquids;
- Non-anatomical waste – sharps : a sharp or breakable object having been in contact with blood/ biological liquid/tissue having been used in medical, dental or veterinary care or medical or veterinary laboratory;
- Non-anatomical waste : biological tissue, cell culture microbial culture or material in contact with such tissue or culture;

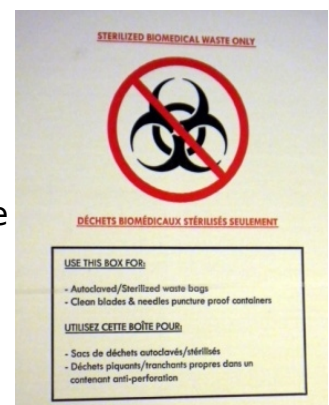
A blood container or material that has been saturated with blood;  
Live vaccine; Prions

### ***Guidelines***

- Both human and animal anatomical waste must be incinerated
- Biomedical waste that includes cytotoxic or carcinogenic hazards (chemicals, pharmaceutical drugs) must be incinerated.
- Non-anatomical waste can be treated by incineration or disinfection  
Note: Chemical disinfection does not necessarily result in sterilization
- Biohazardous liquids must be treated in the laboratory

### ***Autoclave***

- You must be trained to use the equipment.
- Steam autoclave depends on temperature and length of time. Containers used must be readily permeated by steam and resistant to high temperature (essential that air be displaced from containers).
- Identify all containers used for autoclaving procedure (separate containers for materials to and from the autoclave, no cross contamination)
- Must use chemical (temperature) and biological (temperature and duration) indicators to validate effectiveness of decontamination.
- Keep a record of time, temperature, and pressure for each load of waste as proof of treatment.
- When removing waste from autoclave, affix a “sterilized” label to package.
- Dispose through non-biomedical/autoclave waste stream.



## ***Incineration***

- Use the cardboard box or fiber drum provided by HWM
- Double bag your material
- Restrict the weight of the box to 14 kg
- Fill out the label completely
- Submit the box for disposal, place in biomedical wasteroom



## ***Sharps***

- Consists of needles, syringes, blades or laboratory glass capable of causing punctures or cuts.
- Place sharps in a plastic puncture proof container and label as “sharps”
- Container must be closed and remain so through transport and final disposal.
- Autoclave and dispose of as disinfected regular garbage or place in biomedical box for incineration.
- Sharps containers are NOT provided by HWM



## ***Blood***

- Sterilize the blood with excess 10% sodium hypochlorite (bleach, javel) solution for at least 40 minutes, preferably overnight. Don't forget PPE!
- Dispose of via a dedicated sink
- Sterilize / clean sink with a 5%-10% bleach and water solution
- Rinse well to remove bleach odor
- Bleach decomposes over time and is deactivated/consumed by organic material. Use fresh material and validate oxidative potential with starch iodide paper (before and after).

### Reference:

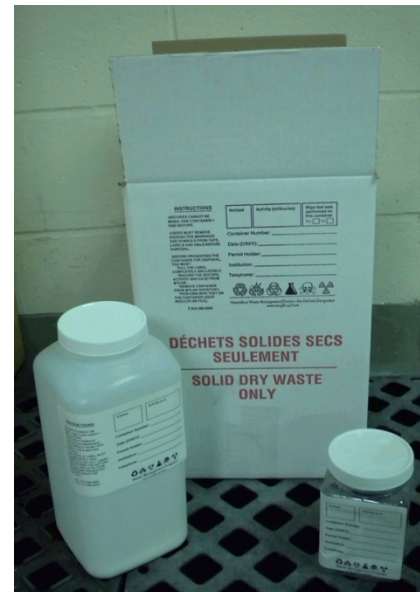
- |        |   |
|--------|---|
| Quebec | <a href="#">c. Q-2, r. 12 Regulation respecting biomedical waste</a>        |
| Canada | <a href="#">Guidelines for the Management of Biomedical Waste in Canada</a> |
|        | <a href="#">Canadian Biosafety Standards and Guideline</a>                  |
| CDC    | <a href="#">Biosafety in Microbiological and Biomedical Laboratories</a>    |
| WHO    | <a href="#">Laboratory Biosafety Manual</a>                                 |

## {6} Radioactive Waste



- Radioisotopes are purchased using McGill Market Place (MMP)
- Usage must be recorded in “myLab”
- ***All radioactive waste containers must carry the myLab container number*** and correct disposal information
- Must close waste container from “myLab” to assigned waste room.
- Must perform wipe test on waste container before removing from radioactive containment area.
- Notify HWM before generating complex waste, for example radioactive biomedical waste, so that special arrangements for handling and storage can be made.

More info <http://www.mcgill.ca/ehs/training/radiation>



### **Containers**

- 20L cardboard box for solids
- 4L or 1L plastic for liquids
- Make sure that radioactive liquid waste is solidified (silicate based product) to mitigate the consequences of a spill.
- These containers must not be used for any other purpose.

### **Liquid Scintillation Vials and Cocktails**

- Scintillation vials are collected in 20L steel pails.
- In order to standardize and better manage LSV waste, the following biodegradable scintillation cocktails are recommended to replace solvent based (xylene, toluene) cocktails.
- See [cocktail selection flowchart](#)
- BetaMax ES
- CytoScint ES
- Ecolite+
- Ecolume
- Universol



Reference: [IAEA Management of waste from the use of radioactive material in medicine, industry, agriculture, research and education](#)

## **{7} Regular waste**

### ***Empty bottles***

- Triple rinse bottle with minimum volume of appropriate solvent (water, methanol, acetone, hexane) Collect and dispose of the rinse washings as hazardous waste.
- Ensure that bottle is empty and free of flammable vapor and odour (evaporate, ventilate or flood with water)
- Remove label and / or write “rinsed bottle” on the label
- Do not replace cap upon disposal
- Place near your garbage container

### ***Broken glass***

- Cardboard box / plastic pail;
- Absorbent pad at the bottom (if needed);
- Put glass in the container;
- Sealed with tape;
- Write “broken glass / garbage” on the cover and place near your garbage container.

### ***“Household” Hazardous Waste***

- Used Oil, from vacuum pumps, motors (use white solvent container)
- Batteries (alkaline and rechargeable) drop off boxes or internal mail
- Mercury (thermometers, manometer)
- Freon (CFC's) must provide FOAPAL for removal
- Fluorescent Lights (Hg) and ballasts (PCBs)
- Gas cylinders (camping propane)
- Paint and Aerosols

### ***Electronic Waste and Old Laboratory Equipment***

A request for disposal can be made [online](#)

- Old computers and electronics
- Recycling metals
- Laboratory electronics and scientific equipment (must provide a [decontamination certificate](#) available from EHS)
- Printer and toner cartridges can be collected or sent to HWM by internal mail



## **{8} HAZMAT**

### **Emergency phone numbers**

<b>911</b>	When someone is seriously injured as a result of a spill, or external agencies are required (police, ambulance, fire department), call 911 immediately. If using a McGill internal line, you will be connected into a three-way conversation with the MUC 911 dispatch and McGill Security (main campus and MacDonald campus).
<b>3000 or 7777</b>	When the situation requires internal help during evening or silent hours, call McGill Security, local 3000 for the downtown campus or local 7777 on MacDonald campus, to initiate the HAZMAT procedure. The dispatcher will initiate response by calling HWM.
<b>5066</b>	You require information about a situation but are not in an emergency mode.
<b>55-555</b>	MNI emergency contact number. See <a href="#">MNI Laboratory Safety Manual</a> for more information.

### **Safety**

In the event of an incident, evacuate and secure the area of spill.  
Know the location of the following in regards to your laboratory or work area:

- The closest fire alarm pull stations
- Emergency exit and evacuation route
- Fire extinguishers
- The first aid kit
- The eyewash and emergency shower
- MSDS location, *MyLab* updated

#### General Purpose Spill Kit

- Must determine if clean up method is suitable before taking action!
- Must determine if materials, supplies and PPE used are physically and chemically compatible!
- General purpose spill absorbent can be prepared with:  
1 part bentonite (kitty litter): 1 part sand: 1 part sodium bicarbonate (baking soda)

## **{9} References:**

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P. Pohanish, Stanley A. Greene
- ***HazMat Data: For First Response, Transportation, Storage, and Security***  
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Brian Gallant
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Robert Burke
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A. Earnshaw, Norman Greenwood
- ***Purification of Laboratory Chemicals***  
W.L.F. Armarego, Christina Chai
- ***Sittig's Handbook of Toxic and Hazardous Chemicals and Carcinogens***  
Richard P. Pohanish
- ***A Comprehensive Guide to the Hazardous Properties Of Chemical Substances***  
Pradyot Patnaik
- ***Bretherick's Handbook of Reactive Chemical Hazards***  
P G Urben; Martin J Pitt; L Bretherick;
- ***Handbook of Hazardous Chemical Properties***  
Nicholas P Cheremisinoff
- ***CRC Handbook of Laboratory Safety, 5th Edition***  
Keith Furr
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National Institute of Occupational Safety & Health
- ***CRC Handbook of Chemistry and Physics, 93rd Edition***  
William M. Haynes (Editor)
- ***Prudent Practices in the Laboratory: Handling and Disposal of Chemicals***  
National Research Council (U.S.)
- ***Destruction of Hazardous Chemicals in the Laboratory***  
George Lunn, Eric B. Sansone
- ***Hazardous Laboratory Chemicals Disposal Guide, Third Edition***  
Margaret-Ann Armour
- ***Emergency Characterization of Unknown Materials***  
Rick Houghton
- ***Field Confirmation Testing for Suspicious Substances***  
Rick Houghton
- ***ATF List of Explosive Materials***  
Bureau of Alcohol, Tobacco, Firearms, and Explosives
- ***Wireless Information System for Emergency Responders***  
U.S. National Library of Medicine, National Institutes of Health
- ***Handbook of Laboratory Waste Disposal***  
Martin J. Pitt, Eva Pitt
- ***Laboratory Waste Management: A Guidebook***  
ACS Task Force on Laboratory and Chemical Waste Management
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by P A Carson; C J Mumford
- ***Casarett and Doull's essentials of toxicology***  
Louis J Casarett, Curtis D Klaassen, John B Watkins