Hazardous Waste Management
Document No. LAB-008-04

1. INTENT

This Standard Operating Procedure (SOP) applies to all faculty, staff and students at Wilfrid Laurier University. It was developed by the Safety, Health, Environment and Risk Management (SHERM) Department to ensure that proper procedures for the safe collection, packaging and labelling of hazardous waste are followed. Any questions regarding this SOP can be directed towards the SHERM Department at extension 3108.

2. DEFINITIONS

Biological Waste
Any human or animal anatomical waste, cytotoxic waste or waste that has come into contact with a human or animal being treated for, or suspected to be infected with an infectious substance. It also includes any waste that contains or has been contaminated with a biological agent.

Chemical Waste
Waste that is or has been contaminated by chemicals.

Hazardous Waste Label
The label that must be affixed to all hazardous waste, see Appendix D.

Mixed Waste
Waste that contains two or more of biological, chemical or radioactive waste.

Radioactive Waste
Waste that is or has been contaminated by a radioactive substance.

Sharps
Syringes, needles, scalpels, blades and broken glassware; any item having corners, edges, or projections capable of cutting or piercing the skin is considered a sharp. Sharps can either be clean and free of contamination, or contaminated with biological, chemical or radioactive materials. See document LAB-001, Sharps Waste Management for more details.

3. ROLES AND RESPONSIBILITIES

Supervisors/Principal Investigators

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

- Full compliance with the SOP exists at all times
- Employees have been given adequate supervision and instruction on the hazards associated with the disposal of hazardous waste
- Everyone working in the lab under the PI's authority follows the procedures outlined within this SOP

Staff/Students Working In Labs

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

- Are familiar with the hazards of waste disposal
- Are familiar with this SOP as it relates to the disposal of hazardous waste
- Dispose of waste properly, as per this SOP, and ask if any questions arise
- Promptly report any known accidents or unsafe conditions to their supervisor

4. GENERAL GUIDELINES

- All sharps must be separated from regular waste streams to prevent unnecessary needlestick, glassware, scalpel, etc. injuries or contamination. See document LAB-001, Sharps Waste Management, for proper disposal of sharps.

- Always wear personal protective equipment (PPE) that is appropriate for the hazard involved in handling the waste. Wear safety glasses and a lab coat and the correct type of gloves to protect hands against contamination.

- The waste generator assumes responsibility for proper packaging and labelling.

- Only chemical waste packaged and labelled properly as described within this document will be removed from the lab for disposal.

- Waste volumes should be minimized whenever possible. See Appendix B for suggestions on waste minimization.

- **Unknown substances and household hazardous waste will not be accepted.**

5. PROCEDURES

5.1 Schedule of Waste Pickups

- Waste pickup will occur according to the schedule posted on the SHERM webpage at www.wlu.ca/sherm under the heading "Laboratory Safety". Click on your location to view the pickup schedule.

5.2 Packing Hazardous Waste

Waste must be packed according to the following:

1. Do not mix waste types. Always use a separate container for each type of waste.
2. All material must be placed in a compatible container that will not be degraded by the waste contents.
3. Cap/seal all containers. Leaky containers will not be accepted.
4. Containers with liquid material should only be 80% full.
5. Containers must be labelled with 100% of the components of the waste.
6. **Unknown materials will not be picked up.**

5.3 Labelling Hazardous Waste

All containers in a laboratory must be appropriately labelled. Labelling is the responsibility of the individual laboratory or department. Each individual item (bottle, bag, box, etc.) must be clearly labelled with a hazardous waste label (see Appendix D).

All required information must appear on the label to ensure safe handling and to enable proper disposal. Ensure that 100% of the components of the waste are listed, even if one component is a non-hazardous substance such as water. Full chemical names must be used, as short forms or acronyms do not provide accurate identification. For example, use trichloroacetic acid instead of the abbreviation "TCA". **Unknowns will not be accepted for disposal.**

5.4 Acceptable Materials for Disposal

The table below outlines waste categories that will be accepted for pick up.

Waste Category	Type	Description	Examples
Hazardous Chemical Waste (Bulk)	Non-Halogenated	• Non halogenated solvents mixed with less than 20 % water	• Acetone • Alcohols • Hexane • Tetrahydrofuran (THF) • Acetonitrile
	Halogenated	• Halogenated solvents mixed with less than 20% water	• Perchloroethylene • Methylene chloride (DCM) • Chloroform
	Aqueous	• Water contaminated with non-halogenated solvents • Non-halogenated solvents mixed with more than 20% water	• Water contaminated with toluene
Hazardous Chemical Waste (Small vials/bottles)	Halogenated	• Organic compounds dissolved in halogenated solvents • Specify solvent and class of compound	
	Non-Halogenated	• Organic compounds dissolved in non halogenated solvents • Specify solvent and class of compound	
	Aqueous	• Inorganic compounds dissolved in water • Specify class of compound: • Heavy Metals (dissolved in water, please specify pH) • Inorganic salts (dissolved in water) • Cyanides (solutions of cyanide compounds) • Organic Material	• Solutions containing arscenic • Ferric chloride, sodium sulphate solutions • Potassium Cyanide • Ethidium Bromide

	Solid	• Organic compounds used for testing	• Organic lab samples
Batteries		• Alkaline, lithium ion, nickel cadmium batteries	
Aerosol cans		• WHMIS controlled substances, full or empty	
Oxidizers			• Potassium nitrate • Hydrogen peroxide • Potassium permanganate • Bleach
Acids	Mineral Acids		• Hydrochloric acid • Nitric acid • Sulfuric acid • Perchloric acid
	Organic Acids		• Formic Acid • Acetic Acid • Propionic Acid
Bases			• Sodium hydroxide • Potassium hydroxide • Ammonia
Metals			• Mercury • Arsenic • Lead • Silver
Air reactive		• Material that produces flammable gases when mixed with air	• Alkyl metals • Phosphorus • Azides
Water reactive		• Material that produces flammable gases when mixed with water	• Sodium • Lithium
Paints	Latex paints		• Paints or stains
	Oil based or alkyd paints		• Paints or stains

	Paint solvents		• Varsol
Silica		• Silica with minimal amounts of sand, no filter paper or resins	• Silica contaminated with hexanes, ethyl acetate, etc. • Alumina contaminated with acetone
Solid Waste	Contaminated with organic compounds	• Solid material contaminated with organic compounds	• Filter paper or alumina contaminated with solvents • Ethidium bromide gels
	Contaminated with inorganic compounds	• Solid material contaminated with inorganic compounds	• Filter paper contaminated with sodium sulfate
Biohazardous Waste	Sharps, anatomical waste	• Waste used that is contaminated, or could be possibly contaminated with an infectious animal, human or plant pathogen, including tissues, blood and other body fluids • Carcasses	• Needles used to draw blood • Euthanized animals used for research • Pippettes used to transfer *E. Coli*

5.5 Waste Disposal Costs

The SHERM Department will cover the disposal cost of hazardous waste generated through normal research activities. The SHERM Department does not cover the cost of laboratory decommissioning, large laboratory cleanups, or large amounts of chemicals classified as “specials”. These include shock sensitive, water and air reactive chemicals, cyanides, explosives, gas cylinders and other wastes that require specialized disposal. The cost of these disposals must be covered by the researcher’s grant or department.

6. APPENDICES

Appendix A: Relevant Standards/Legislation/Policies

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

"Code of Practice for the Management of Biomedical Waste in Canada", Canadian Council of Ministers of the Environment (CCME), February 1992.

Environmental Protection Act - R.R.O. 1990, Reg. 347.

Canadian Biosafety Standard, 2nd Edition, 2015.

Canadian Biosafety Handbook, 2nd Edition, 2016.

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

Radiation Safety Manual, Laurier Safety, Health, Environment & Risk Management Department.

Transportation of Dangerous Goods Act, 1992.

Appendix B: Waste Minimization Tips

Minimizing hazardous waste wherever and whenever an opportunity arises will result in a safer workplace, disposal cost savings, reduced liability and a cleaner environment.

The following is a list of suggestions on how to minimize hazardous waste:

- **Buy only what you need**
  - Ensure a chemical is not already in storage before placing an order
- **Substitute hazardous materials with less hazardous or non-hazardous materials**
  - For example, use a digital or ethanol thermometer instead of a mercury thermometer
- **Reduce the scale of experiments**
  - Use the minimum volume of chemicals possible to achieve research objectives
- **Redistribute/recycle/recover**
  - Substances such as solvents can sometimes be reused for multiple experiments
- **Waste segregation**
  - Do not mix non-hazardous materials with hazardous materials
  - Collect halogenated and non-halogenated solvents in separate containers

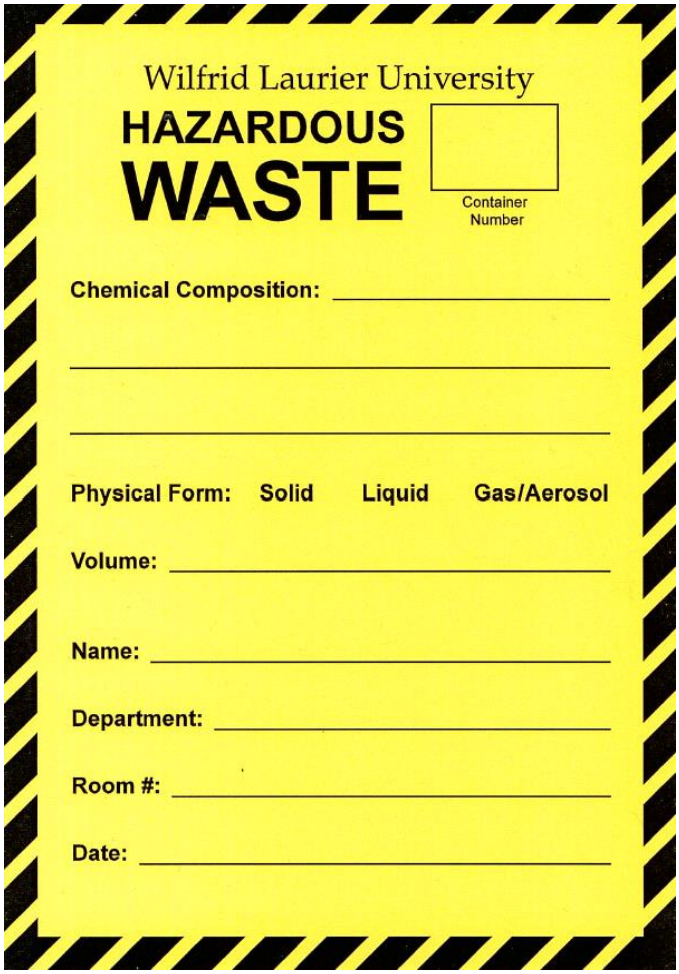
Appendix C: Laboratory Waste Disposal Table

This table should be displayed in all laboratories to aid in proper segregation and handling of laboratory waste. The table can be downloaded in .pdf format on the SHERM website, www.wlu.ca/sherm , under "Laboratory Safety."

Waste Category	Radioactive Waste	Hazardous Chemical Waste	Biological Waste	Mixed Waste		
				Biological & Chemical	Biological & Radioactive	Chemical & Radioactive
Liquid	-use 5L plastic containers pre-filled with gel/celite as provided by waste management company -label with isotope and activity and radiation symbol -user proper shielding depending on isotope -call SHERM at extension 3108 to arrange for pickup	-collect in a chemical resistant container that is compatible with the waste -complete a hazardous waste label and attach to waste container -list container on waste inventory form when full and await pickup from lab	-collect in leak-proof, autoclavable containers -autoclave at 121°C for 30 min and according to Autoclave SOP -decontaminate using appropriate disinfectant	-disinfect first as biological waste, ensuring that the disinfectant is compatible with the chemicals in solution -handle remaining waste as chemical	-disinfect to eliminate biological component -handle as liquid radioactive waste	-collect waste in a compatible container -label with name of isotope and chemical(s) -call SHERM at extension 3108 to arrange for pickup
Solid	-use a designated container lined with a polyethylene bag -label with isotope and activity and radiation symbol -use proper shielding depending on isotope -call SHERM at extension 3108 to arrange for pickup	-collect in a chemical resistant container that is compatible with the waste -complete a hazardous waste label and attach to container -list container on waste inventory form when full and await pickup from lab	-collect in plastic bag labelled "Biological Waste" and autoclave at 121°C for 30 min and according to Autoclave SOP -when autoclave is complete, transfer into regular garbage bag and dispose into municipal garbage	-call SHERM at extension 3108 for instruction	-call SHERM at extension 3108 for instruction	-call SHERM at extension 3108 for instruction
Sharps	-place in an approved sharps container with the radioactive label affixed -container must be monitored and shielded if necessary -call SHERM at extension 3108 to arrange for pickup	-use a puncture and leak proof sharps container -label container with contents and identify chemical contaminants -discontinue use of container when 3/4 full -list container on waste inventory form when full and await pickup from lab	-contact SHERM at extension 3108 to obtain a puncture and leak proof sharps container with a biohazard label -discontinue use of container when 3/4 full -call SHERM at extension 3108 for instruction	-collect in a leak-proof, puncture resistant container -disinfect biological agents present and dispose of as chemical waste	-call SHERM at extension 3108 for instruction	-collect in a leak-proof, puncture resistant container -label with radioactive symbol, name of isotope and chemical(s)
Animal & Human Pathological	-keep frozen until ready for removal -identify the isotope on the container label -call SHERM at extension 3108 to arrange for pickup	-call SHERM at extension 3108 for instruction	-keep frozen until ready for removal -call SHERM at extension 3108 for instruction	-keep frozen until ready for removal -clearly label the waste with the name of the chemical it contains -call SHERM at extension 3108 for instruction	-keep frozen until ready for removal -label with the isotope -call the SHERM at extension 3108 to arrange for pickup	-keep frozen until ready for removal

Appendix D: Hazardous Waste Label

Labels are available from the EOHS Department by contacting extension 3108.



7. REVISION HISTORY

Revision	*Date*	*Comments*	*Initials*
00	Sept/05	SOP comes into effect	SK
01	Mar 27/09	Updated pickup schedule, new format	SJL
02	Nov 30/10	Updated for lab to lab pickup	SJL
03	Jan 2012	Updated for Brantford labs	SJL
04	Oct 2018	Updated WHMIS table, references, SHERM department, added in biohazardous waste section, small format/spelling updates	VB