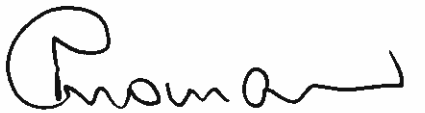



Complete Program Title: Hazardous Waste Management Program	Risk Management Manual (RMM) Number: 502
Approved by:  Vice-President, Administration  President and Vice-Chancellor	Date of Most Recent Approval: May 2019
Date of Original Approval: September 2007	Supersedes/Amends Program dated: May 2009
Responsible Executive: Vice-President, Administration	Enquiries: Environmental and Occupational Health Support Services (EOHSS) eohtss@mcmaster.ca
DISCLAIMER: <i>If there is a discrepancy between this electronic program and the written copy held by the program owner, the written copy prevails.</i>	

1 PURPOSE

- 1.1 To provide a system for the responsible management of hazardous waste that protects individuals and the environment in all research, teaching and service facilities and activities.
- 1.2 To ensure compliance with all Federal, Provincial and Regional Government Environmental Protection Acts, Regulations and By-Laws.

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2 SCOPE

- 2.1 All members of the McMaster community (Faculty, staff, students, volunteers, contractors and visitors who handle hazardous materials in McMaster University owned facilities and/or host institutions.

3 Related Documents

- 3.1 Canadian Environmental Protection Act, 1999.
- 3.2 General Waste Management, R.R.O. 1990, Reg 347.
- 3.3 City of Hamilton Sewer By-Law, 14-090.
- 3.4 Air Pollution Regulation, R.R.O. 419/05.
- 3.5 Waste Management PCB's, R.O.O. 362/ 90.
- 3.6 Ozone Depleting Substances - O.Reg. 463/10
- 3.7 Refrigerants Regulations, R.R.O. 180/07
- 3.8 Solvents Regulations, R.R.O. 717/94.
- 3.9 Nuclear Safety and Control Act, 1997.
- 3.10 Transportation of Dangerous Goods Act and Regulations, 1992.
- 3.11 C4: The Management of Biomedical Waste in Ontario.
- 3.12 Workplace Hazardous Materials Information System (WHMIS) Reg. 860 and RMM#501.
- 3.13 Ontario Fire Code, 213/07.

4 DEFINITIONS

- 4.1 **Hazardous Wastes**- For the purpose of this policy hazardous wastes includes but is not limited to the following substances; toxic agents, flammable material, oils and other petroleum products, corrosive substances, explosives, oxidizers and organic peroxides, compressed gases, pesticides and herbicides, pyrophoric materials, biohazardous agents, radioactive materials, fluorescent tubes and other lights containing hazardous materials, contaminated soil and sharps (needles blades etc.).

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4.2 **Supervisor** - Person who has charge of a workplace or authority over a worker.

4.3 **Worker** – means any of the following, but does include an inmate of a correctional institution or like institution or facility who participates inside the institution or facility in a work project or rehabilitation program:

1. A person who performs work or supplies services for monetary compensation.
2. A secondary school student who performs work or supplies services for no monetary compensation under a work experience program authorized by the school board that operates the school in which the student is enrolled.
3. A person who performs work or supplies services for no monetary compensation under a program approved by a college of applied arts and technology, university or other post-secondary institution.
4. A person who receives training from an employer, but who, under the *Employment Standards Act, 2000*, is not an employee for the purposes of that Act because the conditions set out in subsection 1 (2) of that Act have been met.
5. Such other persons as may be prescribed who perform work or supply services to an employer for no monetary compensation; (“travailleur”).

4.4 **Acronyms**

EOHSS - Environmental and Occupational Health Support Services

PBAC- Presidential Biosafety Advisory Committee

CJHSC - Central Joint Health and Safety Committee

JHSC- Joint Health and Safety Committee

HPAC- Health Physics Advisory Committee

SDS –Safety Data Sheet

HHS-Hamilton Health Sciences

WHMIS 2015 – Workplace Hazardous Materials Information System 2015

FHS – Faculty of Health Sciences Safety Office

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5 RESPONSIBILITIES

5.1 Role of Senior Managers (Deans/ Directors / Chairs):

Senior Managers shall:

- provide the resources necessary to implement and maintain the hazardous waste management program within their area of responsibility; and
- be accountable for all extraordinary costs (e.g. costs in addition to those associated with the routine hazardous waste pickup and disposal program that includes major laboratory clean up, potential explosives, etc.) where necessary.

5.2 Role of Supervisor (Administrative and Academic):

The responsible supervisor shall:

- minimize the generation of hazardous waste by following best practices for environmental stewardship (See Procedural Guidelines Section 6);
- ensure that hazardous waste is stored safely and disposed of in the required manner (See Appendix B Hazardous Waste Disposal Procedures for Designated Waste Streams);
- provide up to date Safety Data Sheets (SDS) for all WHMIS controlled products used in the workplace;
- ensure that all individuals have completed WHMIS 2015 training and have read the McMaster University Laboratory Manual - 2019 along with other health and safety training as specified by the training matrix RMM#300;
- ensure that all individuals who handle hazardous material are trained in the safe handling, separation and disposal procedures for hazardous materials. (See Appendix B Hazardous Waste Disposal Procedures for Designated Waste Streams); and
- document this training.

5.3 Role of Faculty, staff, students, visitors, volunteers, and contractors:

Faculty, staff, students, visitors, volunteers, and contractors authorized to use hazardous materials shall:

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- follow all procedures for the safe handling, use, storage, separation and disposal of hazardous materials;
- review the SDS for WHMIS controlled products used in their work environment;
- use required protective equipment and clothing when handling hazardous materials e.g. fume hoods, face shields, respirators, gloves, aprons, footwear, lab coats, etc.;
- follow all procedures directed at minimizing the production of hazardous waste;
- read the McMaster University Laboratory Manual - 2019; and
- follow McMaster University health and safety programs that are relevant to their work environment.

5.4 **Role of Environmental and Occupational Health Support Services:**

The EOHSS Office shall

- manage the pickup and removal of all non-radioactive hazardous wastes from various locations on campus and off campus locations when required;
- coordinate the pickup and removal of biomedical waste on campus;
- communicate with government regulators on environmental issues when required;
- provide direction and training as required to facilitate best practices in the handling, storage disposal and reduction of hazardous waste on campus; and
- coordinate the pickup and removal of batteries on campus;
- monitor the effectiveness of the Hazardous Waste Management Program;
- provide input based on changing legislation and/or best practices for program updates; and
- review all hazardous waste best practices and handling procedures annually for legislative compliance and safety-related processes.

5.5 **Role of Faculty of Health Sciences Safety Office:**

The FHS Safety Office shall:

- provide direction and training as required to comply with environmental regulations and best practices in the handling, storage and disposal of chemical

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and biomedical waste in FHS laboratories on campus and at off campus locations;

- be consulted on the pickup and removal of McMaster biomedical waste from HHS and off campus locations in cooperation with the host institutions; and
- co-ordinate the pick-up and disposal of chemical waste from FHS laboratories located at HHS and off campus locations.

5.6 **Role of Health Physics:**

Health Physics shall:

- provide direction and training as required to comply with the Nuclear Safety and Control Act facilitate best practices in the handling, storage and disposal of radioactive materials; and
- coordinate the pickup, interim storage and disposal of radioactive materials.

5.8 **Role of PBAC – Presidential Biosafety Advisory Committee:**

The PBAC shall:

- review and approve the biomedical waste disposal procedures.

5.9 **Health Physics Advisory Committee:**

The HPAC shall:

- review and approve the radioactive waste disposal procedures outlined in all teaching, research and production initiatives involving radioactive materials.

5.10 **Joint Health and Safety Committee:**

The JHSC's shall:

- review the effectiveness of the Hazardous Waste Management Program as part of the workplace inspection process.

5.11 **Central Joint Health and Safety Committee:**

The CJHSC shall:

- review the Hazardous Waste Management Program on a scheduled basis; and
- document this review.

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6 Procedural guidelines

6.1 Hazardous Waste Minimization

- 6.1.1 Choose non-hazardous materials where feasible (e.g. substitute spirit or digital thermometers for mercury thermometers).
- 6.1.2 Segregate hazardous from non-hazardous wastes.
- 6.1.3 Purchase hazardous materials in smaller quantities to avoid wastage.
- 6.1.4 Return unused materials to supplier (e.g. compressed gas cylinders) and avoid purchasing materials that cannot be returned (e.g. lecture bottles).
- 6.1.5 Redistribute usable materials within the campus community where possible
- 6.1.6 Reuse or re-distill materials when this can be done safely and in a cost-effective manner.

6.2 Separation of Hazardous Waste Streams

- 6.2.1 Separate incompatible waste streams
- 6.2.2 Always consult the SDS to identify materials that are incompatible with the material that you are working with. The McMaster University Laboratory Manual - 2019 also provides a list of incompatible materials.
- 6.2.3 Be aware of hazardous waste streams currently in use at the University
(See Section 8).

6.3 Hazardous Waste Removal Services

- 6.3.1 Coordinated hazardous waste removal services for the various waste streams are provided by EOHSS and FHS Safety office.
- 6.3.2 Removal procedures for the various waste streams are identified in Appendix B.
- 6.3.3 The cost for removal and disposal of hazardous waste generated by major facility cleanups resulting from unusual projects, decommissioning of labs, major spills, and accidents are the responsibility of the generating department. This also includes the cost of disposal for specialized materials such as explosives/potential explosives, lecture bottles and any other materials that require specialized disposal procedures.

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7 Records

- 7.1 The responsibility for maintaining records of hazardous waste shipments is assigned to the appropriate office i.e. Health Physics retain records of all shipments of radioactive waste material and EOHSS and FHS Safety Office retain records of all chemical and biohazardous waste shipments.

8 Sample Hazardous Waste Streams:

The following are examples of incompatible waste streams that must be separated to avoid serious accidents that can result from the mixing of incompatible waste, even in small quantities. Outlined below are examples of chemicals which should not be stored together. The McMaster University Laboratory Manual - 2019 also provides a list. Always read the Safety Data Sheet (SDS) of the chemical(s) you are working with to identify safe handling, storage and disposal.

8.1 Liquid Wastes

- halogenated solvents (e.g. chloroform, methyl chloride etc.);
- non-halogenated solvents and oil (e.g. vacuum pump oil, varsol, turpentine, acetone ethyl alcohol, toluene etc.)
- “lean” solvents (solvents containing more than 50% water, e.g. formalin, glycol);
- aqueous wastes (water-based materials that cannot be disposed of in the sanitary sewer e.g. heavy metal wastes, dyes and stains);
- hydrochloric acid wastes;
- nitric acid wastes;
- caustic wastes (e.g. sodium hydroxide solutions);
- ammonia wastes (e.g. solutions from blue print machines);
- liquid pesticides;
- some other liquid wastes that cannot be mixed include strong oxidizing acids such as perchloric acid and chromic acid and water-reactive materials such as acetic anhydride, and cyanide solutions.

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8.2 Special Wastes

- flammable solids (e.g. sodium dithionite, zinc dust);
- cyanides;
- water-reactive materials;
- air-reactive materials
- compressed gases;
- explosives;
- radioactive wastes.

8.3 Solid Wastes

- any inorganic or organic solid.

8.4 Biomedical and Infectious Wastes

8.4.1 Liquid waste

- tissue culture fluid and supernatant at Biohazard Level 2;
- liquid state blood components; and
- bodily fluids

8.4.2 Solid wastes

- glassware contaminated with infectious agents;
- plastic disposables in contact with infectious agents

8.4.3 Biological waste

- live vaccines;
- toxins

Appendix A

Hazardous Waste Disposal Procedures:

All Campus Locations

1. Wear proper personal protective equipment when handling waste (e.g. safety goggles, lab coat, and gloves)
2. Choose the proper container for the chemical content. Do not completely fill the container, leave 20 % room. Close with a tightly fitted lid.
3. Do not mix incompatible waste chemicals
4. Do not store incompatible chemicals together (e.g. oxidizers and flammables).
5. Every chemical waste container must be clearly labeled using the yellow McMaster University waste label. These yellow waste labels are free and available through EOHSS or Stores. Fill out the label completely and place onto to the waste container.
6. Copy the item number from the chemical waste label onto the Chemical Waste Disposal Record Form (Appendix D)
7. Complete the Chemical Waste Disposal Record Form and email to waste@mcmaster.ca.
8. Chemical Waste Disposal Record Forms received by Friday will be scheduled for pick up the following Tuesday.
9. Someone must be available in the lab or pick up location on the date of collection.

All Faculty of Health Sciences Locations

The following process must be followed for chemical waste removal.

1. All waste containers must be securely closed and not present a potential spill hazard during movement.
2. Each waste container must bear a yellow chemical waste label. These labels are available from HSC Stores (Room 1G1). Each label must be filled out in its entirety and the information must correspond with the FHS Chemical Waste Disposal Record.

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3. Chemical waste must be classified according to the primary component in the waste container. Secondary components must be identified on the yellow chemical waste label.
4. Once the FHS Safety Office receives the Chemical Waste Disposal Record, arrangements will be made for the waste disposal company to come to your area and remove the chemical waste. Do not transport the waste to the FHS Safety Office.

To Complete the Form:

1. Complete the series of boxes at the top of the page inserting the information requested. All information has to be completed in order to move the process along.
2. The unique number that appears on the yellow waste label goes into the first column titled "Item #".
3. Identify in the second column if the chemical is an acid or a base. If the chemical is neither write "N/A" in this column.
4. Write the chemical name in the third column with as complete as is available to you. It is good to list all the chemicals in this column that are associated with a single Item #.
5. Identify if the chemical is a liquid or solid in the "Physical Form" column.
6. Identify the volume of the container in the final column.

This is covered in Appendix G

General Information

Special requests can be made for lab decommissioning. Depending on the size of the decommissioning this may be a dedicated collection from the lab. The FHS Chemical Waste Disposal Record must be used for this purpose.

All chemical waste must be identified before being processed. If you have a chemical that you cannot identify contact the FHS Safety Office. There will be a cost associated with the process to identify the material.

Chemicals waiting for transport must be stored properly in a secure and appropriate location. All incompatible chemicals must be stored separately. Consult the MSDS for specific storage needs.

Chemical waste must be removed from the laboratory at least every 90 days. Scheduled pickups occur on the last Tuesday of every month. Chemical Waste Disposal Records should be sent to the FHS Safety Office by the Thursday before the scheduled pickup.

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Appendix B

RADIOISOTOPE DISPOSAL PROCEDURES

- Solid wastes contaminated with radioactivity - are to be segregated by researchers according to short-lived and long-lived isotopes, and placed in radioactive waste bins identified with the RWS (radiation warning symbol). An inventory of the radioactive content shall be maintained for each container.
- Radioactive sharps - are to be placed in approved sharps containers, labeled with the RWS and then placed in the appropriate waste bin. Contaminated broken glass should be placed into a plastic container and sealed prior to disposal into a radioactive waste bin.
- Aqueous wastes – high level waste is collected by Health Physics. Please mark isotope and date of last entry on container. Short-lived aqueous waste should be stored in a safe location in the lab to allow several half lives of decay to occur. Activity levels should be tracked by assaying aliquots. When activity levels have diminished below release limits assigned to each lab or research group, the waste liquid can be disposed of in the lab sink, provided that it is free of chemicals and biologically hazardous materials. A record of disposal must be kept.
- Radioactive liquid organics - should be assayed for radioactive content. These results should be provided to Health Physics to determine the best disposal methods.
- Waste liquid scintillation sample vials - should be stored closed and upright in fume hoods or fume cabinets. These will be collected for disposal by Health Physics. Do not dispose of these samples into sink drains even if they are classed as biodegradable by the manufacturer.
- Radioactive path waste - is to be packaged, labeled, and placed in the Health Physics freezer in the Central Animal Facility. Record the radioactive content on the inventory sheet attached.

Contact Health Physics concerning any other radioactive wastes.

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Appendix C

BIOMEDICAL/BIOHAZARDOUS WASTE DISPOSAL PROCEDURES

All Campus Locations

1. To set up the initial process and to arrange for initial *and* on-going supplies, contact EOHSS, (ext. 24352) oreohss@mcmaster.ca
2. Non- Anatomical Biomedical/Biohazardous waste must be disposed into designated “yellow” bags, a biohazardous waste box (available in medium and large sizes) or appropriate sharps container.
3. Anatomical Biomedical/Biohazardous waste must be disposed into designated “red” bags, a biohazardous fibre drum
4. All biohazardous boxes and fibre drums must be double lined/bagged to control leakage.
5. Leaking boxes and spills clean up is the responsibility of the individual who packaged the contents.
6. All Biohazardous boxes, containers and bags must be marked with: Generator’s Name, Building, Room Number and Date. (See Appendix F).
7. To meet environmental compliance, biohazardous waste cannot remain in your lab longer than four days. To arrange for a pickup of your Biohazardous waste, contact Logistics and Mail Services. An external provider will pick up all Biohazardous waste from Life Science Building on Mondays, Wednesdays and Fridays.

[For occupants in Life Science Building (LSB), please follow the schedule and process provided in your orientation. This includes recording your waste in the log book located in LSB, Room B110].
8. All animals, such as mice, must be disposed of as per the Animal Utilization Protocol of the Animal Review Ethics Board. All insects must be euthanatized before disposal.

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All animals must be segregated from all other biomedical waste for disposal, bag these separately.

Biowaste will be checked periodically by Health Physics for radioactive materials so the definition of biomedical waste must be adhered to.

You must have approval from the Biosafety Committee for conducting any biomedical work, submit the application to the Biosafety Office before your work begins.

All Faculty of Health Sciences Locations

1. Disposal of biomedical waste will be into red bags or appropriate sharps containers. Double bagging and placing bags in a cardboard incineration box or recyclable plastic container is mandatory.
2. Biomedical waste boxes are provided. Two red biomedical waste bags are to be placed inside the boxes before waste is generated.

Biomedical waste should be moved to a central waste station no more than four days after disposal.

3. The boxes must be closed and labeled according to posted directions.
4. All animals must be disposed of as per the instructions provided by the Animal Review Ethics Board.

A system for monitoring radioactivity in animals is in place under the Radiation Program protocols.

5. Individuals are responsible for cleaning up any spills/leaks from their biomedical waste containers.

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Appendix E

Preparing Biohazardous Waste Boxes (campus locations only)

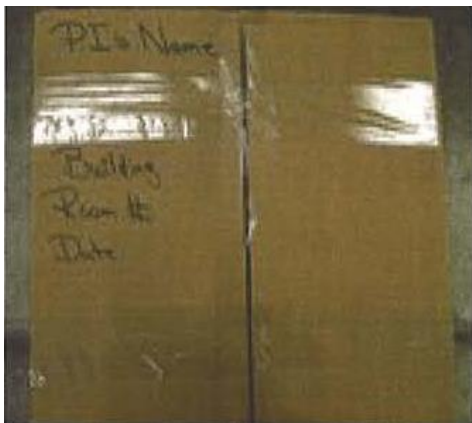


Orientation arrows must be facing up Bottom flaps must be taped closed

Boxes must be lined with two liners/bags

Observe the weights for small and/or medium. If over weight they will not be accepted.

If box is leaking or damaged it will not be accepted.



Label each box with:

Professional Investigator or Group Name

Building

Room Number

Date

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Close box and tape down the centre then run two lines of tape across the width for support.

Please ensure boxes are completed in this manner or they will not be picked up.

For delivery of boxes and liners, please contact [EOHSS at ext. 24352](#) or

For pick up of biological waste, contact Materials Handling and Trucking at ext 27721

Appendix F

Disposal of Clean Broken Glass

Clean broken glassware:

1. Ensure the glass is residue free by following the procedure for chemical glassware (Appendix A)
2. Glass may be packed into broken glass boxes purchased from ABB Stores located in ABB; or
3. Glass may be packed into a strong box lined with plastic bag.
4. Ensure the box is not overflowing and that pieces of glass will not protrude when the plastic liner is closed. Close the bag and box. Tape all openings with packing tape to ensure glass will not fall out of box.
5. Box may be placed in the dumpster located at the rear of most buildings (off the loading dock)

For: Radioactive Broken Glassware, call Health Physics 24226 or Biological call Biosafety office 23453

Broken glass containing residue but not enough of a substance either solid or liquid where it will come off or flow out/off of the broken glass:

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1. Pack broken glassware in box lined with a plastic bag.
2. Close bag and tape box with packing tape.
3. Label for chemical waste filling in the appropriate paperwork and label for the box.

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Appendix G

Attention

Safe Disposal of Empty Chemical Bottles

1. If the content is WATER SOLUBLE:

- Remove the lid and ensure that the container is **triple-rinsed**. Collect the initial concentrated rinse and discard the chemical via the Hazardous Chemical Waste Stream (RMM# 502).
- Ensure the bottle is dry and deface/remove the chemical label. Place **green** 'Notice' label on container.
- Place bottle with your chemical waste for the Hazardous Waste Disposal company to delist the barcode from your inventory OR removed the barcode and place on a HECHMET Barcode Disposal sheet (EOHSS website)
- Place the bottle in the hallway for custodial pick up (campus only-FHS package as appropriate and take to waste closet).

2. If the content is TOXIC:

- Remove the lid and ensure that the container is **triple-rinsed**. Collect the initial concentrated rinse and discard the chemical via the Hazardous Chemical Waste Stream (RMM# 502).
- Place bottle in fume hood until all liquid has evaporated.
- Ensure the bottle is dry and deface/remove the chemical label. Place **green** 'Notice' label on container.
- Place bottle with your chemical waste for the Hazardous Waste Disposal company to delist the barcode from your inventory OR removed the barcode and place on a HECHMET Barcode Disposal sheet (EOHSS website)
- Place the bottle in the hallway for custodial pick up (campus only-FHS package as appropriate and take to waste closet).
- **Note – Empty containers of highly toxic materials (ex. Hydrogen Fluoride) should be disposed of as hazardous waste.**

3. If the content is a SOLVENT:

- Remove lid and place bottle in fumehood until all liquid has evaporated.
- Ensure the bottle is dry and deface/remove the chemical label. Place **green** 'Notice' label on container.

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- Place bottle with your chemical waste for the Hazardous Waste Disposal company to delist the barcode from your inventory OR removed the barcode and place on a HECHMET Barcode Disposal sheet (EOHSS website)
- Place the bottle in the hallway for custodial pick up (campus only-FHS package as appropriate and take to waste closet).

****NOTE – If procedure is not followed, containers will not be collected and a red ‘Notice’ label will be attached by Facility Services. The green ‘Notice’ label is available at ABB Stores or by contacting EOHSS.**

All bottles left for pick up must have the lid removed.

Do not place any empty chemical bottles in the recycling.

Need help? Call EOHSS (ext. 24352) or FHS Safety Office (ext. 24956)