

HANDLING AND DISPOSAL OF LABORATORY GENERATED WASTES WORK INSTRUCTION #13

PREPARED BY: SAINT MARY'S UNIVERSITY			
CREATED: 02/10/2006	APPROVED: 03/10/2006	REVISED: 04/11/2014	V-10

1. SCOPE

- 1.1. Enforcement of these instructions is the responsibility of the department and the Faculty of Science producing laboratory waste.
- 1.2. It is the responsibility of the researchers, instructor(s), students and departmental technician(s) to exercise these instructions for their respective duties.
- 1.3. These instructions apply to all students and employees in laboratories within the Faculty of Science.
- 1.4. These instructions provide a means of assessing and managing laboratory generated waste to ensure that activities in teaching and research labs do not result in unacceptable exposures nor releases into the environment.

2. HEALTH, SAFETY AND ENVIRONMENT

- 2.1. The health of persons can be affected from exposures via route of entry.
- 2.2. Exposure controls and/or monitoring devices recommended by the MSDS or the manufacturer shall be present and used as required.
- 2.3. All personal protective equipment mandated by policy and/or this instruction shall be worn from start to finish during the handling of waste. The Science Safety Technician shall be consulted prior to any decision to not use protective equipment.
- 2.4. The "Prohibited activities within laboratories (research and teaching) safety policy" shall be adhered to during the handling of waste.

3. DEFINITIONS

- 3.1. **Waste:** Any substance or item designated as no longer useful to the laboratory activities.
- 3.2. **Contaminated solids:** Any material with visible or known amounts of chemical or biological materials of the type which cannot be placed in the regular waste bins. Examples include chemical bottles, equipment, absorbent pads/paper towels, gloves, pipette tips, lab coats, gels/membranes/resins etc.
- 3.3. **Route of entry** shall reflect those definitions provided by WHMIS: <http://www.hc-sc.gc.ca/ewh-semt/occup-travail/whmis-simdut/exposure-exposition-eng.php>
- 3.4. **Non-halogenated solvent:** For the purposes of this Work Instruction, shall be defined as such liquids capable and normally used for the solvation of compounds, their molecular structure not containing any halogen atoms. Examples include acetone, methanol, xylene.
- 3.5. **Halogenated solvent:** For the purposes of this Work Instruction, shall be defined as such liquids capable and normally used for the solvation of compounds, their molecular structure containing halogen atoms. Examples include dichloromethane.
- 3.6. **Inorganic cations:** For the purposes of this Work Instruction, shall be defined as those cations that are recognized to be detrimental to the environment. Examples include Period 4 and higher elements, excluding K and Ca.
- 3.7. **Isotopes ("heavy atoms" – non radioactive):** Examples include deuterated solvents for NMR, ¹³C – containing compounds used as internal standards etc.
- 3.8. **Organic acid:** Examples include acetic acid, citric acid.

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- 3.9. Inorganic acid:** Examples include nitric acid, sulfuric acid, hydrochloric acid etc.
- 3.10. Organic base:** Examples include organolithiums, Grignard Reagents, Amines, N-Heterocyclic Compounds, Tetraalkylammonium and phosphonium hydroxides, Metal Alkoxides and Amides, Metal Silanoates.
- 3.11. Synthesized Products & Extracted Biologicals:** For the purposes of this Work Instruction, shall be defined as such compounds deemed “novel” and not having a corresponding CAS # nor MSDS.
- 3.12. Sharp:** any device/item having corners, edges, or projections designed to be or capable of cutting or piercing the skin. Examples include hypodermic needles, syringes with attached needle, scalpel blades, needles with attached tubing, suture needles, razor blades, discarded dissection kit components etc.
- 3.13. Laboratory Glassware:** any item that is not a sharp and made of glass. This includes slides, cover slips, vials, Pasteur pipettes, empty chemical reagent bottles and any broken or unbroken (fragile) glass.
- 3.14. Dissection waste:** For the purposes of this Work Instruction, shall be defined as tissues and bodily fluids derived from animal origins. Examples include fetal pigs, organs, blood, feces etc.
- 3.15. Biohazardous waste:** any substance or item which has come into contact with a (potentially) pathogenic organism, as defined by the Canadian Biosafety Standards and Guidelines. Examples include growth media, petri dishes, slants, inoculation broths, dissection materials, contaminated gloves and paper towels.
- 3.16. Pyrophoric:** any compound which is extremely reactive (may spontaneously ignite) towards oxygen, and in most cases, water, and must never be exposed to the atmosphere. Examples include organolithium reagents (tert-butyllithium), boranes, methyl alkyls.
- 3.17. Dangerously Reactive:** a product, material or substance which a) undergoes vigorous polymerization, decomposition or condensation b) becomes self-reactive under conditions of shock or increase in pressure or temperature or c) reacts vigorously with water to release a gas that has an LC50 not exceeding 2500 parts per million by volume of gas, when tested for four hours (as defined by WHMIS: http://www.hc-sc.gc.ca/ewh-semt/pubs/occup-travail/ref_man/ref_manual_index-eng.php#cpr-rpc_66-eng.php). Examples include sodium metal, picric acid.

4. PROCEDURE

- 4.1.** For teaching activities which regularly produce a particular waste stream, departmental technicians will provide appropriate waste containers with labels. Technicians will also be responsible for collecting such wastes, their inventory, and removal.
- 4.2.** Lab instructors (and when required, the Science Safety Technician) are responsible for providing instruction and enforcing that the waste products from the experiments are properly collected for disposal.
- 4.3.** For research activities, the researcher or delegate shall be responsible for the proper collection and labeling of all wastes generated by research activities.
- 4.4.** In accordance with Work Instruction #10, there shall be no encroachment of research generated waste into teaching areas without prior approval from the Dean of Science.

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- 4.5. Wastes shall be inventoried electronically and accessed by appropriate departmental personnel through a designated SMUport group. A numbering system reflecting departmental origin shall be used for each item surrendered to a disposal room (ie. Biology B#, Chemistry C#, Geology/Geography G#, Physics P#, ENV5 E#).
- 4.6. The Science Safety Technician is responsible for securing an appropriate waste disposal company (Newalta, Clean Harbors, Stericycle etc.). Proper training must be provided to all potential waste generators/handlers.

Labeling

- 4.7. The waste container label must clearly identify all of the waste's contents using either IUPAC (International Union of Pure and Applied Chemistry) nomenclature <http://www.iupac.org/home/publications/e-resources/nomenclature-and-terminology.html> or the naming taken directly from the supplier bottle, waste bottle #, the generating lab room number, surrender date, bottle size, known hazards, and the name(s) of the research or academic lab personnel responsible for the bottle.

Handling

- 4.8. To allow for volume expansion and pressurization, waste bottles containing liquids should be filled no more than within 2 inches of the container lid.
- 4.9. Waste must always be transported using the rubber totes or carts.
- 4.10. As soon as waste receptacles are filled, they should be removed from the laboratory and taken to the appropriate waste location (S121, S324 or basement walk-in fridge).

Segregation of Wastes

- Wastes may be combined (or likewise separated) by means of compatibility.
- Compatibility will be guided by the following documents
 - Material Safety Data Sheet (MSDS) (when available)
 - EPA's Chemical Compatibility Chart EPA-600/2-80-076 April 1980 "A method for determining the compatibility of chemical mixtures"



EPACChemicalCompati
bilityChart.pdf

- "Prudent Practices in the Laboratory – Handling and Disposal of Chemicals"
- Where compatibility cannot be determined or is questionable, the material is to be contained in a separate waste container.

A – Solvent and Organic Base Wastes

- These wastes are to be segregated into glass bottles labelled as: Halogenated, Non-Halogenated and Organic Base waste.

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B – Organic and Inorganic Acid Wastes

- These wastes are to be segregated into glass bottles: Organic Acid and Inorganic Acid waste in instances where contaminants are present. Otherwise, where there are no environmental concerns such materials may be poured down the sink and flushed with copious amounts of water.

C – Inorganic Cations

- These wastes are to be collected in UL rated containers. There shall be no pre-treatment (ie. Precipitation methods or neutralization) of the waste to produce a “sludge” in order to minimize volumes.

D – Isotopes

- These compounds, which are usually already present in mixtures, are to be disposed of in the same manner as their naturally abundant counterparts.

E - Synthesized Products, Extracted Biologicals (research activities)

- The researcher shall, at their own discretion, dictate when such items are ready for disposal. Where specific hazards are known, it shall be noted on the inventory information.

F - Pyrophoric and Dangerously Reactive

- These compounds must be contained in a secondary container (either plastic zip-lock bag, jar etc.) prior to placement in S121. The inventory information must contain reference to these hazards as not all discard companies deal with such materials.

G - Sharps

- Sharps may be placed within specially designed puncture-resistant plastic disposal containers available through many of the lab supply companies. They are usually designed with transparent locking lids with needle-removal ports and controls to restrict hand entry.

H - Laboratory Glassware (relatively free from contaminants)

- All glassware for disposal must be packaged in a secure GLASS DISPOSAL/BROKEN GLASS/LABORATORY GLASSWARE box which is lined with a 2 mm poly bag. The purpose of the poly bag is to prevent any residual liquids from leaking onto the cardboard surface and thus compromising its structure and safety. NEVER throw glassware of any type in along with the regular trash and never throw sharps or regular lab trash inside a broken glass box. Never throw bottles containing any appreciable amount of liquids in the boxes either. When boxes are full (and not over-encumbered) seal the top with packaging tape to indicate that it is ready for disposal.

I – Miscellaneous (discard equipment, spent oil and contaminated solids)

- Must be contained in a secondary container.

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WORK INSTRUCTION #13****PREPARED BY: SAINT MARY'S UNIVERSITY****CREATED: 02/10/2006****APPROVED: 03/10/2006****REVISED: 04/11/2014****V-10*****K– Dissection waste (non-biohazardous)***

- These wastes are to be collected in appropriate containers and stored in the basement walk-in fridge for disposal. For those specimens fixed in a preservative (ie. Formalin), it shall be noted on the container and the inventory sheet. Supplier containers of such materials shall not be discarded within public view.

K– Biohazardous materials

- These materials (keeping in consideration that only Risk Group 1 (RG1) organisms are allowed) must be inactivated and disposed of in accordance with the information provided in Section IV of their respective Pathogen Safety Data Sheets, as set out by the PHAC: <http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/index-eng.php>
- Autoclave inactivation must be validated by regular use of appropriate biological/chemical indicators and heat tape. A log book must also be maintained of personnel autoclave usage.
- Where in-house inactivation and/or disposal is not feasible, then such materials must be placed in a sealed disposal container or bag labelled as “biohazardous” and sent to an appropriate disposal facility.
- Under no circumstances shall explicitly labelled biohazardous bags or signage be used for non-conforming waste.
- Waste awaiting inactivation/disposal shall be kept in a secure area (either S324 or basement walk-in fridge) and access shall be limited to only trained personnel. Such areas will have appropriate signage posted alerting to the hazards within.

5. LABORATORY CLOSINGS

- 5.1** Waste disposal related to closing a laboratory upon retirement or resignation, requires written confirmation (Form 11.3) from the faculty member stating that arrangements have been according to the protocols set out by the Faculty of Science.