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Introduction

Research laboratories may house and utilize chemicals, radio-nuclides and biohazardous material that are potentially hazardous to people. It is therefore important to render the laboratory a safe area, called decommissioning, when a laboratory space will no longer be utilized, or where renovation or remodelling will take place. It is the responsibility of the principal investigator (PI) for ensuring their laboratory is free from hazardous materials and contamination.

Associated Procedure

1. At least 30 days prior to the expected date of vacating a laboratory, the Principal Investigator (PI) must notify the Research Biosafety Committee (RBC)
2. The PI is responsible for decommissioning the laboratory so that it is safe and free from hazards
3. Decontamination of equipment and work surfaces (See Appendix A for list of laboratory equipment) should be in accordance to the guidelines outlined in the **Canadian Biosafety Standards and Guidelines** published by the Public Health Agency of Canada (or an equivalent agency)
4. The PI shall maintain a detailed report outlining the decommissioning activities for the RBC to review
5. Chemical wastes are identified and segregated by the PI or designate using the associated procedures outlined below (under the section "Associated Procedures")
6. Biohazardous wastes are identified by the PI or designate using the associated procedures outlined below (under the section "Associated Procedures")
7. Radio-nuclide wastes are identified by the PI or designate using the associated procedures outlined by the Radiation Safety Officer (RSO)
8. Any invalid warning signs will be removed or defaced from equipment, doors and other surfaces by members of the RBC after reviewing decommissioning records
9. The PI or designate will call Environmental Services (extension 5023) to remove decontaminated equipment not destined for recycling or reuse

Disposal of Chemical Waste

Hazardous waste must not be flushed down drains. This practice is illegal and may lead to cross

reactions and situations dangerous to the health and safety of workers; and it may also damage the drains. Example of chemicals that may be safely disposed of in normal trash or sanitary sewer system is outlined in Appendix B. Groups should contact the Research Core Facility Coordinator to arrange for pick-up after the chemical waste has been identified and segregated into appropriate containers for disposal. Following these two steps are important for safety and for minimizing cost to the hospital:

A. Identification of Chemical Waste

1. Wastes must be properly identified – chemical formulae or acronyms are not permitted
2. Accurate record of chemical wastes and their respective volume and concentration for disposal should be recorded

B. Segregation of Chemical Waste

Segregation of chemical waste is necessary to prevent cross-reactivity. This will allow for safe collection and disposal. The following table may be used as a guideline for segregating chemical

wastes into chemically compatible waste streams:

Waste Category Examples:

Flammable Solvents: Acetone, methanol, ethanol, toluene, xylene, acetonitrile, benzene, etc.

Halogenated Solvents: Halothane, methylene chloride, chloroform, carbon tetrachloride, trichloroethane, trichloroethylene

Heavy Metal Solutions: Aqueous solutions containing arsenic, barium, cadmium, chromium, copper, lead, mercury, osmium, selenium, silver, etc. (do not mix together, keep each chemical species separate)

Mineral Acids: Hydrochloric acid, nitric acid, sulphuric acid, perchloric acid (do not mix together, keep each type of acid separate)

Organic Acids: Formic acid, acetic acid, propionic acid

Bases: Sodium hydroxide, potassium hydroxide, potassium permanganate, bleach (do not mix together, keep all separate)

Oxidizers: Potassium nitrate, hydrogen peroxide, potassium permanganate, bleach (do not mix together, keep all separate)

Reactive Waste: Phosphorus pentoxide, sodium hydride, sodium methoxide, dry picric acid (do not mix together, keep all separate)

C. Waste Containers

- Chemical wastes are to be contained in sealable, leak-proof, compatible plastic or glass containers (note that rubber stoppers, corks, parafilm, etc. are not acceptable lids or forms of seal)
- Chemical waste containers should be closed and secured at all times except when adding or removing waste
- Unused chemicals in original containers with intact labels are acceptable for disposal
- Outside of container must be free of contamination
- Do not completely fill containers to the top – leave at least 10% headspace to allow for expansion
- Do not mix liquid and solid waste

. Waste containers should be identified with a clear label with the above information outlined in part A

Disposal of Biohazardous waste

Biohazardous waste includes:

1. Liquids used in cell culturing media, supernatant, blood or blood fractions (serum), etc which contain viable biological agents
2. Materials considered pathological, including any part of the human body, tissues and body fluids, but excluding fluids, extracted teeth, hair, nail, bone and the like that are not infectious
3. Any part of an animal infected or suspected to be infected with a communicable disease
4. Non-sharp, solid laboratory waste which may be, or is known to be, contaminated with viable biological agents
5. All sharp and pointed items used in medical care, diagnosis, and research, including the manipulation and care of laboratory animals, which should be considered potentially infectious
6. Laboratory glassware which is known or suspected to be contaminated with hazardous biological agents

Biohazardous material must be collected in the appropriate yellow container

Waste Disposal for Research Facilities

For sanitary sewage disposal of liquids containing biohazardous material, the liquid must first be sterilized by chemicals or autoclaving

Decontamination of Laboratory Equipment and Surfaces

- . All equipment and working surfaces should be decontaminated with a mild soap solution and rinsed with water
- . However, if any of the surfaces have come in contact with biohazardous agents then they are to be chemically disinfected by the most appropriate means. Metal surfaces should not be disinfected with Bleach as this caused pitting and corrosion of the surface

Definitions

Definitions and Abbreviations

PI: Principal Investigator

RBC: Research Biosafety Committee

RSO: Radiation Safety Officer

BSO: Biological Safety Officer

References

Public Health Agency of Canada: Canadian Biosafety Standards and Guidelines, 2013

University of Toronto Environmental Health and Safety: *Laboratory Decommissioning: Laboratory* (<http://www.ehs.utoronto.ca/resources/wmindex/wm6.htm>)

Appendix

Appendix Document

Appendix A. Laboratory Equipment to be decontaminated

Appendix B. Chemicals for Normal Trash or Sanitary Sewer System

Appendix A. Laboratory Equipment to be decontaminated

Laboratory equipment requiring decontamination includes but is not limited to:

- . Refrigerators
- . Freezers
- . Water baths
- . Incubators
- . Animal cages

- . Centrifuges
- . Chemical fume hoods
- . Biological safety cabinets
- . Microscopes

Appendix B. Chemicals for Normal Trash or Sanitary Sewer System

The following lists some chemicals, of low-toxicity, that may be safely disposed in normal trash or sanitary sewer system provided that they are not contaminated with hazardous chemicals.

Please contact the Research Biosafety Committee or BSO for more information.

Acid waste, pH > 5

Agarose

Albumin

Aluminum (sheet)

Amylase

Aqueous alcohols (<24%)

Base, blood agar

Base waste, pH < 10

Beef extract

Broth, nutrient

Buffer powders

Calcium carbonate

Calcium chloride

Calcium lactate

Charcoal (granular)

Dextrose

Extract, malt

Extract, yeast

Galactose

Gelatin

Graphite

Gum, Arabic

Kaolin

Lactose

Litmus paper

Maltose

Paraffin

Pepsin

Peptone

Petroleum jelly

Pumice

Sucrose

Talcum powder

Tin (foil, sheet)

Urea

Wax, bee's

Strong bases or acids are not to be poured down the drain unless they have been neutralized.

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Contact

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