

Laboratory Hazardous Waste Management

UBC Life Sciences Centre

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About this manual

This manual is an adaptation of Part Two of the “*UBC Laboratory Pollution Prevention and Hazardous Waste Management Manual*”. It has been created to provide detailed and easily-accessible procedures for the proper management and disposal of hazardous laboratory waste at the Life Sciences Centre.

The comprehensive *UBC Laboratory Pollution Prevention and Hazardous Waste Management Manual* can be referenced at:

<http://riskmanagement.ubc.ca/sites/riskmanagement.ubc.ca/files/uploads/Documents/Laboratory%20Pollution%20Prevention%20and%20Hazardous%20Waste%20Management.pdf>

Emergency Contact Information

Emergency Numbers UBC Campus

Fire, Police, Ambulance.....	911
First Aid (staff & faculty).....	604-822-4444
UBC Hazardous Materials (HAZMAT) Response.....	911
Poison Control Centre.....	800-567-8911
Campus Security.....	604-822-2222
Plant Operations Trouble Calls.....	604-822-2173
UBC Hospital Urgent Care Department.....	604-822-7222

Non-Emergency Numbers

UBC Risk Management Services.....	604-822-2029
Campus Security.....	604-822-8609
Campus Fire Department.....	604-665-6010
R.C.M.P. Non-emergency.....	604-224-1322
UBC Occupational and Research Safety Office	604-822-4353
UBC Biosafety Office.....	604-822-9527
UBC Emergency Planning Office.....	604-822-1237
UBC Radiation Safety Office.....	604-822-7052
UBC Chemical Safety Office.....	604-822-2273
UBC Occupational Hygiene Office.....	604-822-6098

Ensure all relevant emergency information (i.e. nature of emergency, building name and address, phone number, and exact location of the emergency in the building) is provided to the operator before hanging up.

Situations requiring immediate emergency response may include:

- First aid emergency
- Hazardous materials spill
- Bomb threat
- Fire
- Civil demonstration
- Natural disaster (e.g. earthquake, flood)

In the event of an emergency, contact the appropriate response agency (using phone numbers from this manual) and initiate response activities if it is safe to do so.

1. Laboratory Hazardous Waste Management

Introduction

Hazardous waste is any product, substance, or organism that is dangerous to the environment and/or to human health, and that is no longer used for its original purpose at the time of disposal, or in storage/transportation prior to treatment or disposal. Hazardous waste is dangerous because of its quantity, concentration, physical, chemical, or infectious characteristics. Thus it may require special disposal techniques to eliminate or reduce the hazard. The disposal of hazardous waste is governed by strict local, provincial, and federal regulations as well as UBC policies and procedures. Canada's current Transportation of Dangerous Goods (TDG) Regulations, section 2, is used to classify the hazardous waste in this manual.

The manual and procedures can be found under the RMS Environmental Resources.

RMS operates the Environmental Services Facility (ESF) which manages and handles the hazardous waste generated by UBC core research, education and operational activities. The facility safely manages hazardous waste in accordance with local, provincial, and federal regulations. For more information, please contact the Advisor, Environmental Services at 604-822-9840.

Disclaimer

This manual is intended for use by those who produce hazardous waste as a result of their work at the University of British Columbia. The material contained in this manual is correct to the best of knowledge of the UBC Risk Management Services. The disposal procedures are compliant with applicable local, provincial, and federal legislation.

Updates to procedures are made occasionally. If you use procedures older than two years, please check with RMS for the most current update.

UBC Risk Management Services Contacts

Noga Levit	Manager, Environmental Services	604-822-9280
Ligia Gheorghita	Advisor, Environmental Services	604-822-9840
Bang Dang	Technician, Environmental Services Facility	604-822-1285
Valeriy Kichenko	Technician, Environmental Services Facility	604-822-6306
Wegland Sit	Technician, Environmental Services Facility	604-827-5389
Satish Maharaj	Technician, Environmental Services Facility	604-822-1281

UBC Environmental Services Facility (ESF)

The Environmental Services Facility (ESF), located at the South Campus of UBC manages the transportation, storage, disposal and recycling of hazardous materials. ESF deals with over 1000 waste generators and handles approximately 100 tonnes of solid hazardous waste and 30,000 L of liquid hazardous waste per year. This waste includes biological waste, hazardous chemicals, solvents, photographic waste, batteries and waste oil. As much as possible, hazardous waste is diverted to ESF's waste minimization program which includes solvent recovery, chemical exchange and silver recovery from photographic waste. Otherwise, waste is stored or treated on-site prior to disposal via outside contractors. Total waste disposal costs are around \$150K per year and waste minimization reduces the cost by approximately 10%.

2. Laboratory Waste Generators

Permissible Generators

ESF is approved by the Ministry of Environment to handle and manage *only wastes which originate from generators and independent companies affiliated with UBC activities*. All waste generators are required to apply to ESF for confirmation of their official waste generator status. Approved waste generators will be assigned a waste generator number that is to be associated with all shipments of waste originating from their respective locations.

UBC's permissible waste generators may be located on-campus or off-campus (e.g. research centres located at the various hospitals). Although these waste disposal procedures apply in all their details to the on-campus facilities, the general methods described in the procedures are applicable to all facilities. Off-campus generators dispose of their biohazardous and biomedical wastes directly via the hospital waste streams. For all other wastes (i.e. chemicals, solvents, oils, non-regulated solids and photographic) they have to contact ESF for disposal. ESF then arranges for an external contractor (e.g. Sumas Environmental Services) to pick-up the waste.

Non-Core UBC Waste Generators

The Environmental Services Facility also offers for-fee disposal services to Non-Core UBC waste generators, to non-UBC generators located on the Point Grey Campus, and to tenants of UBC property.

Hazardous waste disposal costs for these generators will be charged as per price list in Appendix C. The invoice will also include a charge for transportation, chemist, and manifest. For an accurate quote, a complete chemical inventory must be submitted to ESF. Due to the nature of the environmental services industry and factors beyond our control, prices may be subject to change without notice.

For more information on the disposal, recycling, treatment, or exchange of your hazardous waste, please contact an ESF technician at 604-822-1285 or 604-822-6306.

3. Laboratory Waste and Waste Pick-Up

Acceptable Hazardous Waste

General hazardous waste classifications, as per current Transportation of Dangerous Goods (TDG) Regulations, permitted at ESF are as follows:

- Class 2.1 – Flammable Gases (propane & butane only)
- Class 3 – Flammable Liquids
- Class 4
- Class 4.1 – Flammable Solids
- Class 4.2 – Substances Liable to Spontaneous Combustion
- Class 4.3 – Water Reactive Substances
- Class 5 – Oxidizing Substances
- Class 5.1 – Oxidizers
- Class 5.2 – Organic Peroxides
- Class 6 – Toxic and Infectious Substances
- Class 6.1 – Toxic Substances
- Class 6.2 – Infectious Substances
- Class 8 – Corrosives
- Class 9 – Miscellaneous Products, Substances or Organisms

Hazardous Waste Not Accepted by ESF

IMPORTANT: There are some wastes that are outside of ESF's mandate or cannot be accepted because of the restrictions in its operating plan. The cost of disposal for these wastes must be borne by the generator (e.g. gases not specified, unknowns, explosives).

ESF cannot manage or handle the following, and therefore, these procedures do **NOT** include:

- 1. Unknown solid or liquid chemicals** (any TDG class).
Refer to "Disposal of Unknown Chemicals" UBC.RMS.ENV.015.PRO for further instructions.
- 2. Compressed gases** (TDG class 2).
Send returnable cylinders to suppliers; see Section A – 2.3.3 Lecture Bottles of Hazardous Gases for lecture bottles approved contractor contact information.
- 3. Explosives and potential explosives** (TDG class 1).
Refer to "Disposal of Explosive Chemicals" UBC.RMS.ENV.016.PRO for further instructions.
- 4. Radioactive chemicals** (TDG class 7).
Refer to Management of Radioactive Waste for further instructions.

Segregation of Non-Hazardous and Non-Regulated Waste

Many laboratories do not distinguish between waste that is hazardous and waste that neither poses a hazard nor is regulated as hazardous. If these different types of waste are combined, then the total must be treated as hazardous waste and the price for disposal of the non-hazardous portion increases markedly.

When safe and allowed by regulation, disposal of non-hazardous waste via the normal trash or sewer can substantially reduce disposal costs. This is the kind of waste segregation that makes economic as well as environmental sense.

The common wastes usually not regulated as hazardous include: certain salts (e.g., potassium chloride and sodium carbonate), many natural products (e.g., sugars and amino acids), and inert materials used in a laboratory (e.g., non-contaminated chromatography resins and gels). These materials can be disposed of safely and legally in the normal trash or down the drain. This type of waste is not regulated because it does not exhibit any of the hazardous characteristics (ignitability, corrosivity, reactivity, or toxicity) as defined by BC Hazardous Waste Regulations 2009, and is not listed as restricted or prohibited by the Metro Vancouver Sewer Use By-law Consolidated.

For a list of chemicals that are considered non-hazardous visit the Non-Hazardous Chemical Disposal Guide.

Regularly Scheduled Hazardous Waste Pick-up

ESF picks up hazardous waste throughout UBC on a scheduled basis. Pick-ups are scheduled Monday to Friday. Each building has a designated location for hazardous waste storage and pick-up. These areas should be secured (such as locked rooms or cages).

Most buildings are on a schedule for routine collection. If you are unsure as to whether your building is on this schedule or if you require special pick-up, contact ESF at 604-822-1285 (general), 604-822-6306 (chemicals) or 604-827-5389 (biological waste).

IMPORTANT NOTE: In order to comply with the BC Hazardous Waste Regulations, all hazardous waste accumulation/storage areas must be regularly inspected.

4. Recycling Programs

Solvent Recovery

The Solvent Recovery Program identifies, segregates, and purifies organic waste solvents for re-use on campus. The purified, distilled product is technical grade. Solvent wastes that are acceptable at the facility for recovery include methanol and acetone. Prior to waste solvents being sent to ESF for recovery, segregation procedures must be set up with the solvent recovery technician to ensure waste streams are compatible for recovery. Contact the ESF Solvent Recovery Technician at 604-822-1285 for more information.

Chemical Exchange

The Chemical Exchange Program was developed to share chemicals on campus that are no longer of use to the original user and divert them from disposal. Instead, these chemicals are tracked and marketed to other potential users on campus. See the **list of free chemicals** available to any UBC laboratory. This is a free service provided to the campus and not only reduces purchasing costs, but also disposal costs. Contact the ESF Technician at 604-822-6306 for more information.

Silver Recovery

Photographic waste containing greater than 5 ppm of silver is considered hazardous waste and prohibited from entering the sewer system. Silver, if introduced to the water system, is toxic to fish. ESF developed the Silver Recovery Program to comply with the Metro Vancouver Sewer Use Bylaw No. 299, 2007 Consolidated. Silver is recovered by running the photographic fixer through an ion exchange column. Contact the ESF Silver Recovery Technician at 604-822-1285 for more information.

Other Recycling Programs

Recycling programs for batteries, oil, paint, as well as laboratory plastics, are available through ESF.

5. Sink and Normal Garbage Disposal

Corrosive chemicals (including bleach) displaying no other hazard characteristics, MUST be neutralized (pH = 5.5-10.5) and then poured down the drain with copious amounts of water.

Toxic chemicals (e.g. ethidium bromide) or biological materials that have been deactivated using bleach MUST also be neutralized for sink disposal.

Waste that is not regulated as hazardous waste as defined by BC Hazardous Waste Regulations, 2009, and is not restricted or prohibited by Metro Vancouver bylaws, WHMIS, and NFPA can be disposed of via the normal trash or sewer. Refer to Section A - 3.1 Segregation of Non-Hazardous and Non-Regulated Waste for more details and to see a list of non-hazardous chemicals.

6. Spill Reporting

As required by law, RMS Environmental Services alerts the appropriate authority to external releases of dangerous goods to air, water and/or land. More detailed information can be found in the Spill Reporting Procedures. Report any hazardous spills to RMS by completing the UBC Spill Reporting Form as soon as possible. This ensures that all hazardous material spills are reported as required. In the event of a spill or release of hazardous material, persons in the immediate area should act to ensure their personal safety. Refer to the RMS Spill Clean Up Procedure for details on cleaning up a spill.

7. Frequently Asked Questions

What types of waste does the Environmental Services Facility handle?

ESF only disposes of hazardous wastes produced by registered waste generators. Non-hazardous wastes (such as garbage, glass, scrap metal, wood, packaging, etc.) are handled by UBC Waste Management at 604-822-3827. Procedures for the wastes that ESF can manage are included in this manual. If you have any questions, please contact the RMS Environmental Advisor 604-822-9840 or an ESF Technician 604-822-1285.

What are UBC hazardous waste tags and generator barcode stickers and how do I get them?

For repeated waste streams such as: solvents, oils, non-regulated contaminated solids, and biological waste UBC has implemented a serialized, colour-coded, tag system that identifies the type of waste and allows for specific waste package or container tracking. The barcode sticker is a self-adhesive label that must be affixed to the UBC Hazardous Waste Tags on each container of waste sent to ESF. The barcode allows ESF to identify the Hazardous Waste Generators for waste tracking and legal purposes. Without the barcode sticker affixed to the tag, ESF may refuse collection and disposal of hazardous waste. In order to register as a UBC Hazardous Waste Generator and receive barcode stickers, tags, or waste containers, contact an ESF Technician at 604-827-5389.

How should I dispose of pharmaceutical drug waste?

ESF does handle pharmaceutical drug waste as per the requirements of “Disposal of Pharmaceuticals and Controlled Substances” (UBC.RMS.ENV.005.PRO) in this manual.

What should I do with empty solvent bottles?

Empty solvent bottles should be triple rinsed and disposed of as laboratory glass waste.

What should I do with liquid phenol-contaminated waste?

If you need to dispose of phenol-contaminated glass waste, you must triple rinse the glass carefully with an organic solvent and dispose of the glass as laboratory glass waste. However, the rinsate must be put into a solvent waste can and disposed of as an organic solvent according to the procedure outlined in this manual (“Disposal of Organic Solvent Waste” UBC.RMS.ENV.010.PRO). If you need to dispose of another material that has been contaminated with phenol, contact an ESF Technician at 604-822-6306.

What are the procedures governing the disposal of propane cylinders?

For information on how to dispose of empty propane cylinders, refer to “Disposal of Propane and Butane Gas Cylinders” (UBC.RMS.ENV.017.PRO) or, call an ESF Technician at 604-822-6306.

Can I send “road-kill” to ESF for disposal?

No, please contact Tariq Din at 604-822-1885 to arrange for pick-up.

8. Laboratory Hazardous Waste Disposal Procedures

All waste sent to the UBC Environmental Services facility (ESF) must be accompanied by waste identification information as summarized below. For a quick reference guide, please also refer to the **UBC Hazardous Waste Management Procedures Poster** in Appendix A. If you have any questions, please contact an ESF Technician at 604-822-1285 or 604-822-6306.

Biological Waste and Sharps Waste

All biological waste (which includes biohazards, sharps, human blood/fluids, and pathological waste) must be accompanied by a serialized Biological Waste Disposal tag (obtained from ESF) attached to each bag. A generator barcode sticker (obtained from ESF) must be affixed to the tag and the waste composition completed.

For more information of Biological Waste, please see pages 10-12 of this manual.

For more information on Sharps (and Syringe) Waste, please see pages 13-14 of this manual.

For more information Biomedical Waste, please see pages 15-16 of this manual.

At the Life Sciences Centre, **Biological Waste and Sharps Waste** is to be stored in the dedicated Biological Waste Room, room B2.213, located on B2 Level.

Chemical Waste

All shipments of chemical wastes must be accompanied by a completed Chemical Waste Inventory Form (approved forms are e-mailed to generators by ESF technician). This inventory must identify the generator, their location, phone number, chemicals to be disposed and hazard classes.

For more information on Chemical Waste, please see pages 28-29 of this manual.

Flammable Liquids

All transport of solvent wastes must be accompanied by a serialized Flammable Liquids Disposal tag (obtained from ESF) attached to each container. The generator barcode sticker (obtained from ESF) must be affixed to the tag and the waste composition completed.

For more information flammable Liquid Waste, please see page 30 of this manual.

At the Life Sciences Centre, **Chemical Waste (including flammable liquid waste)** is to be stored in the dedicated Chemical and Glass Waste Room, room B2.211, located on B2 Level.

IMPORTANT NOTE:

In consideration of the health and safety of the workers handling the hazardous waste, labelling and packaging requirements are **strictly** enforced.

If the packages are not prepared as specified, ESF staff will refuse collection of the waste.

In the event that a shipment is not suitable, all attempts will be made to contact the generator from the information provided on the package. If ESF is unable to pick-up packages due to non-compliance with packaging requirements, ESF technicians will leave a tag explaining the reasons for refusal (see below).

Radioactive Waste

Prior to the storage for decay and the subsequent disposal of radioactive waste from research laboratories, waste is to be properly packaged, shielded (where necessary) and labelled according to UBC guidelines.

For more information on Radioactive Waste, please refer to the UBC Radionuclide Safety Manual, available on the LSC Safety Page (Resources and Publication section) on the Life Sciences Centre Website

At the Life Sciences Centre, Radioactive Waste is to be stored in the dedicated Radioactive Waste Decay Room, room B2.212, located on B2 Level.

Disposal of Biohazardous Waste

Scope

This procedure applies to all biohazardous materials/agents in Risk Groups 1 and 2, which may include the following:

- Human or animal cell cultures used in research
- Stocks of specimens of micro-organisms including Bacteria, Viruses, Fungi, Rickettsiae and Chlamydiae
- Live or attenuated vaccines
- Parasites
- Allergens
- Extracted tissues from experimental animals including animal dander
- Plant viruses, bacteria and fungi
- Laboratory material that has come into contact with any of the above

The BC Hazardous Waste Regulations define this waste stream as **Microbiological Laboratory Waste**.

IMPORTANT NOTES:

- For the disposal of **toxins of infectious substances** (including toxins defined by the Human Pathogens and Toxins Act, 2009 and listed under Schedule 1) contact the Advisor, Environmental Services at 604-822-9840.
- Laboratory plastic containers that **have not** come into contact with biohazards and are acceptable for recycling should be recycled according to the Lab Plastic Recycling Guidelines.
- This procedure does **NOT** apply to the disposal of:
 - o Biohazardous waste of Risk Group 3 biological agents, as defined in the Laboratory Biosafety Guidelines, 3rd Edition 2004, published by the Public Health Agency of Canada, for which special procedures apply (for more information contact the Biosafety Advisor at 604-822-9527).
 - o Biomedical waste, which consists of human anatomical parts, or human blood and body fluids, as defined in the Laboratory Biosafety Guidelines, 3rd Edition 2004, published by the Public Health Agency of Canada (refer to the “Disposal of Biomedical Waste” UBC.RMS.ENV.003.PRO)
 - o Pathological waste (refer to the “Disposal of Uncontaminated Pathological Animal Waste” UBC.RMS.ENV.006.PRO)
 - o Laboratory glass waste (refer to the “Disposal of Laboratory Glass Waste” UBC.RMS.ENV.021.PRO)

Purpose

This procedure specifies the safe and proper disposal of the biohazardous materials classified above, in accordance to federal and municipal guidelines.

Background

- In contrast to chemical agents, infectious biological agents have the ability to replicate, thus giving rise to the potential of large populations in nature when small numbers may be the norm.
- Unlike chemicals, where "safe" levels are often allowed to be released into the environment, there is no "safe" level of a non-contained pathogenic organism. This procedure follows the guidelines set by the Laboratory Biosafety Guidelines, 3rd Edition 2004, published by the Public Health Agency of Canada. Refer to UBC Risk Management Services, Laboratory Biosafety Reference Manual, 6th Edition, 2009 for further details on definitions, procedures, management of biohazardous materials, and Risk Group classifications, or contact the Biosafety Advisor at 604-822-9527.
- Disposal of untreated biohazardous waste to landfills is prohibited by the BC Hazardous Waste Regulations, 2009 and the Metro Vancouver Tipping Fee and Solid Waste Disposal Regulation Bylaw No. 263, 2012.
- All biohazardous organisms **MUST** be rendered harmless by approved methods before being released into the environment.

Procedure

- Laboratory waste that is **NOT** biohazardous, as defined in this procedure, can be disposed of in the regular garbage. Examples of such waste include uncontaminated gloves, wrappers, packaging material, plastics and labware.
- Proper segregation of biohazardous versus non-biohazardous waste is essential in reducing the volume and the cost of handling biohazardous waste.

NOTE: Labware made of the following plastics is not autoclavable under any conditions: polystyrene, polyvinyl chloride (except PVC tubing), styrene acrylonitrile, acrylic, low-density and high-density polyethylene and polyurethane.

A. Waste Containing Risk Group 1 Agents

Risk Group 1 Agents are considered by Health Canada to be of low individual and community risk. If you have any questions, contact the Biosafety Advisor at 604-822-9527.

1. All Risk Group 1 waste **MUST** be contained in **CLEAR and UNLABELLED** autoclave bags. Bags **MUST NOT** be marked with any biohazardous warning symbols or warning labels. The bags **MUST** then be autoclaved sufficiently to render the organism in question harmless. Autoclaved bags **MUST** be leak proof. To prevent leaks and breakage during storage or transportation, double bagging with a **clear plastic bag** is required.
2. Each bag **must not** weigh more than **10 kg**.
3. Do not put glass or sharps in with Risk Group 1 waste.
4. After autoclaving, bags must be tagged with the UBC Environmental Services Facility (ESF) **Biological Waste Disposal tag (Red)**, as seen at the end of this procedure. Affix your waste

generator number sticker where indicated. On the tag, check the box marked “**Autoclaved Risk Group 1**”.

5. Place bags in Room B2.213 for pick-up by ESF.

B. Waste Containing Risk Group 2 Agents

Risk Group 2 Agents are considered by Health Canada to be of moderate individual and limited community risk.

1. All Risk Group 2 waste **MUST** be contained in **ORANGE** autoclave bags. (Bags may be purchased from any laboratory supplies vendor). The bags **MUST** then be autoclaved sufficiently to render the organism in question harmless. Autoclaved bags must be leak proof. To prevent leaks and breakage during storage or transportation, double bagging with a clear plastic bag is required.
2. ESF must be able to package the **ORANGE** bag into a box (length=22”, height=22”, width=22”) available from UBC’s disposal supplier. Therefore, the maximum size of the bags must be smaller than the aforementioned box dimensions.
3. Each bag must not weigh more than **10** kg.
4. Do not put glass or sharps in with Risk Group 2 waste.
5. Bags must be tagged with the **Biological Waste Disposal tag (Red)**, shown below. Affix your waste generator number sticker where indicated. On the tag, check the box marked “**Autoclaved Risk Group 2**”.
6. Place bags in Room B2.213 for pick-up by ESF.

Biological Waste Disposal Tag



The image shows a 'Biological Waste Disposal' tag form. At the top, it says 'BIOLOGICAL WASTE DISPOSAL' and 'The University of British Columbia, Environmental Services Facility'. Below this is a grey box for 'Panel Identification No.' with a barcode. The main body of the tag is red and contains the following sections:

- GENERATOR TO COMPLETE THIS SECTION ONLY**
- WASTE CONTENT (Phase 1)**
- WASTE CHARACTERISTICS**
- WASTE CLASSIFICATION**
- WASTE WEIGHT**
- CONTACT ESF**

At the bottom, there is a white box for 'Office use only' with a 'Weight' field and a unit of 'kg'.

Disposal of Sharps (and Syringes)

Scope

This procedure applies to the disposal of sharps that may be contaminated or uncontaminated by biohazardous agents (refer to scope defined in procedure UBC.RMS.ENV.001.PRO).

Definition

Sharps waste is a form of biomedical waste and, as defined in Part 1 (j) of the BC Hazardous Waste Regulation, *clinical and laboratory sharps waste consists of: needles, syringes, blades or laboratory glass capable of causing punctures or cuts.*

Thus, to avoid injuries sharps waste must be carefully handled.

Purpose

This procedure specifies the method for proper disposal of sharps and needles to ensure the safety of disposal workers.

Background

Disposal of sharps and needle waste to landfills is prohibited by Metro Vancouver and under the BC Hazardous Waste Regulation 2009.

Procedure

A. Sharps

Sharps (including needles) present both a physical and potentially infectious hazard. To control these hazards, sharps waste **must** be collected in **APPROVED** red or yellow containers made of a rigid, puncture-resistant and impervious plastic that can be autoclaved. The containers **must** be labeled with a bio-hazardous label on the outside and they must be closable / lockable.

Only APPROVED containers may be used for these wastes and they must not be used for any other purpose. These containers must comply with Canadian standards CAN/CSA-Z316.6-07 (2007). Examples of acceptable brands include BD and COVIDIEN (formerly KENDALL/DEVON/TYCO). Approved, autoclavable containers can be purchased from Campus Stores (LSC, Chemistry, Zoology), laboratory suppliers or local medical products distributors (e.g. Bowers Medical Supply or Stevens Co.).

IMPORTANT NOTE: Not ALL commercially available sharps containers are autoclavable! For example, BD yellow sharps containers are autoclavable, but the red ones are not. Waste generators **MUST** ensure that the sharps containers they are using are autoclavable.

Sharps disposal procedures are as follows:

1. Collect all sharps (including needles) in **approved plastic "sharps containers"**.
2. Do not fill the container past the indicated "Full" line (i.e. **3/4 full**).
3. Chemically decontaminate (e.g. bleach) all infectious items prior to disposal into the container, **OR** autoclave the entire container once it is full.
4. Ensure that the pH is neutral after the chemical decontamination, by either rinsing with water or neutralizing the decontamination solution.

5. Securely close and snap the lid in place.
6. Take the full container to the building's designated area for pick-up and disposal.
7. Do **NOT** put sharps into plastic bags.
8. If there is more than one sharps container, place the containers in an unsealed open cardboard box.
9. Containers must be tagged with the **Biological Waste Disposal Tag (Red)** (shown below). Affix your waste generator barcode sticker (contact 604-827-5389 for either of these supplies). Identify waste content by checking the appropriate box on the tag and fill out the requested information.
10. Sharps containers **MUST NOT** be placed into the "Glass Waste Only" cans; they are to be taken to Room B2.213 for pick-up by ESF..

B. Uncontaminated Plastic Syringes (with needles removed)

1. Syringe bodies (with needles removed) should be collected in clear plastic bags and will become Risk Group 1 waste. (For needles, refer to Sharps procedure above).
2. All Risk Group 1 waste must be contained in **CLEAR and UNLABELLED** autoclave bags. Bags **MUST NOT** be marked with biohazardous warning symbols or warning labels. The bags must then be autoclaved sufficiently to render the organism in question harmless. Autoclaved bags **MUST** be leak proof. To prevent leaks and breakage during storage or transportation, double bagging with a clear plastic bag is required.
3. Each bag must not weigh more than **10** kg.
4. Do not put glass or sharps in with Risk Group 1 waste.
5. After autoclaving, bags *must*:
 1. Be tagged with the UBC Environmental Services **Biological Waste Disposal Tag (Red)** (shown below).
 2. Affix your waste generator number sticker where indicated.
 3. On the tag, check off the box marked "**Autoclaved Risk Group 1**" and
 4. Place waste in room B2.213 for pick-up by ESF
(Contact an ESF Technician at 604-827-5389 if you require any of these supplies).

Biological Waste Disposal Tag

The image shows a red rectangular tag for biological waste disposal. At the top, it has the text "BIOLOGICAL WASTE DISPOSAL" and a biohazard symbol. Below this, there are several sections with checkboxes and text boxes for recording information. The checkboxes include "Autoclaved Risk Group 1" and "Autoclaved Risk Group 2". There are also fields for "Waste Generator Name", "Waste Generator Number", "Date", "Time", and "Signature".

Disposal of Biomedical Waste

Scope

This procedure describes the handling, packaging and treatment required by the Environmental Services Facility (ESF) for disposal of all biomedical waste.

Biomedical waste at UBC includes the following:

- Human anatomical waste: This consists of human tissues, organs and body parts, but does not include teeth, hair and nails.
- Human blood and body fluid (BBF) waste: This consists of human fluids, blood and blood products, items saturated or dripping with blood, body fluids contaminated with blood and body fluids removed for diagnosis during surgery, treatment or autopsy. This does not include urine or feces.
- Contaminated animal pathological waste (including animal carcasses)

NOTE: This disposal procedure **does not** apply to:

- Primate Anatomical Waste** (Refer to “Disposal of Non-Human Primate Pathological Waste” UBC.RMS.ENV.004.PRO)
- Animal Bedding** (Refer to new procedure “Disposal of Animal Bedding”, UBC.RMS.ENV.008.PRO)
- Sharps Waste** (Refer to “Disposal of Sharps Waste” UBC.RMS.ENV.002.PRO)
- Uncontaminated Pathological Animal Waste** (Refer to “Disposal of Uncontaminated Pathological Animal Waste” UBC.RMS.ENV.006.PRO)

Purpose

This procedure specifies the requirements for the handling and disposal of biomedical waste in accordance with all legislation and observing all safety precautions.

Background

This procedure is based on the Guidelines for the Management of Biomedical Waste in Canada, written by the Canadian Council of Ministers of the Environment in February 1992. These guidelines define what biomedical waste is, and how it should be handled.

Procedure

A. Biomedical Waste

The procedure for the disposal of biomedical waste is as follows:

1. All biomedical waste **MUST** be contained in autoclavable **RED** bags bearing the **biohazard** symbol, which can be obtained from a laboratory supplier. The bag cannot leak. All packages must be **double bagged** to ensure that there is no possibility of leakage. Leaking bags will be refused for pick-up.
2. ESF must be able to package the red bag into a box (length=24”, height=18”, width=13”)

available from UBC's disposal supplier. Therefore, the maximum size of the bags must be less than the aforementioned box dimensions.

3. Note: **Blood Tubes** and **Blood Bags** must be contained inside a **plastic sharps container** to prevent accidental leaking and spillage during transportation.
4. Each bag must not weigh more than **10 kg**.
5. Complete all the required information on the **Biological Waste Disposal Tag (Red)** (shown below), affix the barcode sticker, check the appropriate box, and fill out all requested information. Attach the tag to the bag.
6. Store in the freezer located in Room B2.213 for scheduled pick-up by ESF.

B. Contaminated Animal Pathological Waste

The procedure for the disposal of contaminated animal pathological waste (including animal carcasses) is as follows:

1. Collect chemically contaminated animal carcasses or pathological waste in a black polypropylene bag (6 mil thick, 40 cm x 40 cm - available through Plant Operation Stores). These heavy duty black bags are used because this waste is typically too heavy for the red bags. **All tubing, catheters, plastic clips, tags, etc. must be removed from the animal before packaging.**
2. Each bag must not weigh more than **10 kg**.
3. Bags **MUST** be tagged with the UBC Environmental Services **Biological Waste Disposal tag (Red)** (as shown below). Affix your waste generator number sticker where indicated. On the tag, check the box marked "**Pathological**" and place bags in the building's designated area for pick-up by ESF.
4. Bagged materials must be fully frozen prior to pick-up.
5. Bagged materials must be stored in the freezer in Room B2.213 for pick-up by ESF.

Biological Waste Disposal Tag

The image shows a red 'Biological Waste Disposal Tag' form. At the top, it says 'BIOLOGICAL WASTE DISPOSAL' and 'The University of British Columbia Environmental Services Facility'. Below this is a section for 'WASTE GENERATOR INFORMATION' with a greyed-out box. The main body of the form is red and contains a grid of checkboxes for waste types: 'Anatomical Disposal', 'Blood', 'Body Fluids', 'Cultures', 'Embryos', 'Feces', 'Hazardous Waste', 'Infectious Waste', 'Microorganisms', 'Plant Material', 'Sharps', 'Tissues', 'Vaccines', 'Viral Cultures', and 'Waste from Autoclave'. There are also fields for 'Waste Generator Name', 'Waste Generator Number', 'Waste Generator Address', 'Waste Generator Phone', 'Waste Generator Email', and 'Waste Generator Fax'. At the bottom, there is a 'Waste Generator Signature' field and a 'Date' field.

Disposal of Non-Human Primate Pathological Waste

Scope

This procedure applies to the disposal of non-human primate pathological waste such as tissue, blood and body fluids of Macaques (monkeys of the genus *Macaca*).

Purpose

This procedure specifies the requirements for the handling and disposal of non-human primate pathological waste, the entire carcass or parts, in accordance with all legislation and observing all safety precautions.

Background

Macaques are widely used in biomedical research because of their genetic, anatomic, and physiologic similarities to humans. In this setting, human contact directly with macaques or with their tissues and fluids sometimes occurs. Cercopithecine herpesvirus 1 (herpesvirus simiae, B virus), an alphaherpesvirus endemic in Asian macaques, is classified as a Risk Group 4 biohazard in its pure form. Most macaques naturally carry B virus without overt signs of disease. However, zoonotic infection with B virus in humans usually results in fatal encephalomyelitis or severe neurologic impairment. Although the incidence of human infection with B virus is low, a death rate of >70% before the availability of antiviral therapy makes this virus a serious zoonotic threat.

Stericycle is the UBC medical waste disposal contractor that collects and treats all of UBC's biohazardous and biomedical waste. Stericycle requires non-human primate pathological waste to test negative for Cercopithecine Herpesvirus 1 prior to disposal and may also require a special license and ERAP from Transport Canada because the waste may contain this virus. However, if the non-human primate has tested negative by serological testing within one year of death, then it can be disposed of as biomedical waste. A copy of the tests results and a completed Principal Investigator (PI) or veterinarian declaration form should be forwarded to the ESF Technician prior to disposal.

Procedure

1. Generators of primate waste must have a serological test result for Cercopithecine Herpesvirus 1 (B virus) for the animal dated within one year of animal death.
2. If the non-human primate has tested **negative** the waste generator must complete and sign the declaration form confirming that the animal was tested and shown to be negative for Cercopithecine Herpesvirus 1. Fax the form to ESF at 604-827-5087. This form and a copy of the most recent test results must be received by ESF staff prior to pick up arrangement. Refer to form at the end of this procedure.
3. All primates testing **positive** for Cercopithecine Herpesvirus 1, should be euthanized and autoclaved to be acceptable for disposal through Stericycle as anatomical waste. Waste generator must complete the declaration form, check the second option and fax form to ESF at 604-827-5087. This form must be received by ESF staff prior to pick up arrangement. Refer to form at the end of this procedure.
4. Animals that were not tested will be treated as if contaminated and will require autoclaving

prior to disposal. Waste generators must complete the declaration form, check the third option and fax form to ESF at 604-827-5087. This form must be received by ESF staff prior to pick up arrangement. Refer to form at the end of this procedure.

5. Primate anatomical waste must be double-bagged securely in red bags.
6. ESF will provide a lined box or red pail. The bags must be placed in the lined box or red pail for storage.
7. On the Biological Waste Disposal tag, affix a barcode sticker and check the "Primate" box.
8. Place box in freezer in room B2.213. Contact ESF at 604-827-5389 for pick-up.

Primate Disposal Declaration Form

Generator name _____

Generator ID _____

Contact phone number _____

I hereby declare that the primate waste for disposal:

Was tested negative for Cercopithecine Herpesvirus 1

A copy of the most recent test result (must be within one year of disposal) is attached

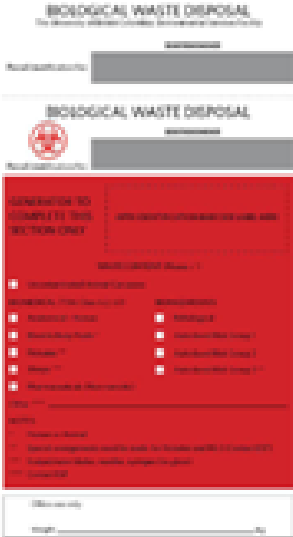
Was tested positive for Cercopithecine Herpesvirus 1 and was autoclaved prior to disposal

Was **not** tested for the virus but autoclaved prior to disposal

Signature _____

Date _____

Biological Waste Disposal Tag



The image shows a 'Biological Waste Disposal Tag' form. At the top, it says 'BIOLOGICAL WASTE DISPOSAL' and 'The University of British Columbia Environmental Health Services'. Below this is a section for 'Generator Information' with a greyed-out box. The main part of the form is a red box with white text. It says 'BIOLOGICAL WASTE DISPOSAL' and 'Generator Information'. There are several checkboxes for waste types: 'Primate Anatomical Waste', 'Primate Blood', 'Primate Tissue', 'Primate Urine', 'Primate Feces', 'Primate Saliva', 'Primate Semen', 'Primate Milk', 'Primate Placenta', 'Primate Embryo', 'Primate Fetus', 'Primate Skull', 'Primate Horns', 'Primate Antlers', 'Primate Hooves', 'Primate Claws', 'Primate Teeth', 'Primate Bones', 'Primate Cartilage', 'Primate Skin', 'Primate Hair', 'Primate Nails', 'Primate Fur', 'Primate Feathers', 'Primate Eggs', 'Primate Embryos', 'Primate Larvae', 'Primate Pupae', 'Primate Spores', 'Primate Fungi', 'Primate Bacteria', 'Primate Viruses', 'Primate Parasites', 'Primate Insects', 'Primate Mollusks', 'Primate Arachnids', 'Primate Nematodes', 'Primate Protozoa', 'Primate Helminths', 'Primate Plasmids', 'Primate Plasmids', 'Primate Plasmids', 'Primate Plasmids'. There are also checkboxes for 'Autoclaved' and 'Not Autoclaved'. At the bottom, there is a section for 'Generator Signature' and 'Date'.

Disposal of Pharmaceuticals and Controlled Substances

Scope

This procedure applies to disposal of Pharmaceuticals and Controlled Substances.

Purpose

This procedure specifies the safe and proper disposal of pharmaceuticals and controlled substances. Controlled substances are regulated under the Canadian Controlled Drugs and Substances Act (1996) and the Food and Drugs Act (1985) in accordance with federal guidelines.

Background

A pharmaceutical drug (pharmaceutical) is any chemical compound used in the diagnosis, treatment, or prevention of diseases or other abnormal conditions. Pharmaceuticals can be non-narcotic or narcotic. Narcotics or hallucinogens affect the central nervous system causing changes in behaviour and often addiction.

A “**Controlled Substance**” is a drug or therapeutic agent which has been declared by federal law to be illegal for sale or use, but may be dispensed under a physician's prescription. Controlled substances, commonly understood to include (but not limited to) narcotics, are held under strict governmental control. The basis for control and regulation is the danger of addiction, abuse, physical and mental harm (including death), the trafficking by illegal means, and the dangers from actions of those who have used the substances.

Controlled substances are included in Schedule I, II, III, IV, V of the Controlled Drugs and Substances Act (1996, c. 19):

- Schedule I
- Schedule II
- Schedule III
- Schedule IV
- Schedule V

Disposal of controlled substances must comply with the Controlled Drugs and Substances Act , and Parts G (Controlled Drugs) and J (Restricted Drugs) of the Food and Drug Regulations (C.R.C., c. 870). Health Canada sets the requirements for their disposal. In general, if generators had to obtain a Health Canada permit in order to purchase the controlled substance then a permit is also required to dispose of it.

Procedure

A. Pharmaceuticals (Not Regulated as Controlled Substance)

The procedure for the disposal of non-narcotic pharmaceutical waste is as follows:

1. Generators must determine if the waste is regulated under controlled substances or not regulated. **This procedure refers only to pharmaceuticals not regulated as controlled substances.**

2. ESF collection strictly applies to pharmaceutical waste that is not ignitable, corrosive, or reactive. Pharmaceutical waste classified as any of the above will be forwarded to a licensed hazardous waste company for disposal as chemical waste.
3. Generators must determine the technical name of the most dangerous substance and must clearly print it on the Biological Waste Disposal Tag.
4. Pharmaceuticals waste failing to comply with any of the above requirements will not be collected.
5. Ensure pharmaceutical drugs are inside a leak-proof glass or plastic container (jar). If there is more than one container, package the pharmaceuticals in a cardboard box, like for chemical waste. For large quantities of pharmaceuticals generators can phone ESF at 604-827-5389 to request proper pharmaceutical waste containers (5 gallon white pails).
6. Complete all the required information on the **Biological Waste Disposal Tag (Red)** (shown below), affix the barcode sticker, check the “Pharmaceuticals” box, and fill out all the other requested information. Attach the tag to the container and place for disposal in room B2.213.

B. Controlled Substances

The procedure for the disposal of controlled substances (including narcotics) waste is as follows:

1. Obtain an AUTHORIZATION TO RETURN form from the manufacturer, if they will supply these forms, and then return the controlled substance to the manufacturer for credit. There is no need to obtain authorization from Health Canada if this method is used. Keep “Authorization to Return” records of materials that have been returned to the licensed dealer for a period of five years.
2. Alternatively, obtain an AUTHORIZATION FOR DESTRUCTION of the controlled substance from Health Canada. You will have to send Health Canada the request for authorization in writing, by contacting:
 - Health Canada
 - Office of Controlled Substances
 - Compliance Monitoring and Liaison Division
 - Drug Strategy and Controlled Substances Program
 - Address Locator: 3502B
 - Ottawa, ON, K1A 1B9
 - Tel: 613-954-1541
 - Fax: 613-957-0110
3. Once authorization is received you will need to “denature” the substances by creating a slurry of the drug with soap and water. Add kitty litter if you have too much liquid. This process must be witnessed by another researcher (record the date/ time, the person performing the destruction and the person witnessing it) and keep your records.
4. Contact an ESF Technician at 604-827-5389 and request the proper pharmaceutical waste container (white pail). You will have to provide the ESF Technician with a copy of:
 - Authorization letter
 - Destruction record
5. Place the destructed controlled substances in a leak-proof container. Put a **Biological Waste Disposal Tag (Red)** with generator barcode on the container. Check-off the “**Pharmaceutical**” waste box and place in Room B2.213 for disposal. The waste will be shipped out as pharmaceutical waste for incineration.

Disposal of Uncontaminated Pathological Animal Waste

Scope

This procedure applies to *uncontaminated* animal pathological waste. As defined in the federal Transportation of Dangerous Goods regulations (TDG), Part 1 (1) (g) and (p), *this animal waste MUST not contain any viruses or agents listed in Risk Group 2, 3 or 4.*

This type of animal waste includes:

- Animal carcasses
- Animal body parts
- Animal organs
- Animal tissues

This procedure does **NOT** apply to the disposal of **contaminated animal pathological waste** (refer to the “Disposal of Biomedical Waste” UBC.RMS.ENV.003.PRO).

Purpose

This procedure specifies the safe and proper disposal of uncontaminated animal pathological waste, in accordance to federal, provincial and municipal guidelines.

Procedure

1. Ensure that this animal waste does not contain any Risk Group 2, 3 or 4 viruses or agents (note that contaminated animals are treated as biomedical waste).
2. Collect uncontaminated anatomical animal waste in a black polypropylene bag (6 mil thick, 40 cm x 40 cm, available through Plant Operation Stores). All tubing, catheters, plastic clips, tags, etc. must be removed from the animal before packaging.
3. Each bag must not weigh more than **10** kg.
4. Bags **MUST** be tagged with the UBC Environmental Services **Biological Waste Disposal tag (Red)** (as shown below). Affix your waste generator number sticker where indicated. On the tag check the box marked “**Uncontaminated Animal Carcasses**”.
5. Bagged materials must be fully frozen prior to pick-up.
6. Bagged materials must be stored in the freezer in room B2.213 for pick-up by Environmental Services.

Biological Waste Disposal Tag



The image shows a red biological waste disposal tag. At the top, it features a biohazard symbol and the text "BIOLOGICAL WASTE DISPOSAL". Below this, there are several fields for information, including "Waste Generator Name", "Waste Generator Number", "Date", "Time", "Room", "Building", "Address", "City", "Province", "Country", and "Phone". There are also checkboxes for "Uncontaminated Animal Carcasses" and "Other". The tag is designed to be affixed to a waste bag.

Disposal of Non-Indigenous Species

Scope

This protocol is applicable to all departments and administrative units with laboratories where non-indigenous species are used for research purposes.

Non-indigenous species can be defined as species that are not native (indigenous) to an area and have been introduced through human activities either on purpose or by accident. The term includes targeted species of organisms whether from a distant or nearby source (e.g., the Fraser Valley). Although a species of organism may occur naturally at a UBC site, the introduction of foreign populations of the same species can have a negative impact on local populations. Therefore, these organisms are also regarded as non-indigenous.

Materials that may contain non-indigenous species include:

- Soils – all types
- Single pass and re-circulating fresh and saltwater cooling or aquarium systems
- Algae and plants
- Terrestrials and aquatic plants and animals including those on baits, nets and sampling equipment
- Cultured organisms, microorganisms, and plants
- Cloned and genetically altered organisms – all types

Purpose

This procedure provides a protocol for the disposal of non-indigenous organisms or materials containing or potentially containing these organisms.

Background

Numerous species and clones of microorganisms, plants and soils are used in research projects and in student laboratories at the University of British Columbia (UBC). Many are not native to this area and are classified as “Non-Indigenous” or “Exotic”. Currently, there is very limited regulation of non-indigenous species or biological materials which have the potential to introduce non-indigenous species. Many potential non-indigenous species are tolerated in a wide range of environments and when accidentally or intentionally introduced, have the ability to colonize and displace existing native species. Since indigenous species are essential in maintaining a healthy, balanced ecosystem, non-indigenous species have the potential to cause significant ecological or financial damage.

There are many examples which clearly demonstrate the extensive damage that non-indigenous invaders may have on an ecosystem, such as purple loosestrife and the Norway maple. Purple loosestrife, introduced during the 19th century, made an explosive migration across the continents through marshy environments, displacing many native plants. The Norway maple was first introduced to North America from Europe in the mid-1700s for cultivation as an ornamental tree. It is a fast growing species, adaptable to a wide variety of urban sites and more tolerant to urban stresses than many native trees. Its ability to grow in deep shade makes it particularly threatening to native forest habitats. Examples such as these have resulted in increased regional, national, and international concern about the effects of non-indigenous species. As a result UBC has established a series of protocols for the disposal of non-indigenous organisms or material containing or potentially containing these organisms.

Procedure

Non-indigenous species will be sent for incineration in the the same way as **Uncontaminated Animal Waste**, and therefore will be treated as such.

1. All Non-Indigenous Species **MUST** be contained in a black polypropylene bag (6 mil thick, 40 cm x 40 cm - available through Plant Operation Stores). Double bag to prevent leakage.
2. Ensure that each bag does not weigh more than **10 kg**.
3. Do not put glass or sharps in with this waste.
4. Bags must be tagged with the UBC Environmental Services **Biological Waste Disposal tag (Red)** (as shown below). Affix the waste generator number sticker where indicated. On the tag, check off the box marked "**Uncontaminated Animal Carcasses**" and in the Other Section describe the waste (e.g. "non-indigenous plant"). Place bags in room B2.213 for pick-up by ESF. (Contact the ESF Technician at 604-827-5389 if you require more barcodes or Biological Waste Disposal Tags).

Biological Waste Disposal Tag

BIOLOGICAL WASTE DISPOSAL
The University of British Columbia, Environmental Services Facility

Parcel Identification No: **808110000001**

BIOLOGICAL WASTE DISPOSAL
Parcel Identification No: **808110000001**

GENERATOR TO COMPLETE THIS SECTION ONLY

APFN IDENTIFICATION BARCODE LABEL HERE

WASTE CONTENT (Please ✓)

<input type="checkbox"/> Uncontaminated Animal Carcasses	
BIOLOGICAL (TDG Class 6.2, 6.3)	BIOHAZARDOUS
<input type="checkbox"/> Anatomical - Human	<input type="checkbox"/> Pathological
<input type="checkbox"/> Blood & Body Fluids **	<input type="checkbox"/> Autoclaved Risk Group 1
<input type="checkbox"/> Primates ***	<input type="checkbox"/> Autoclaved Risk Group 2
<input type="checkbox"/> Sheep ****	<input type="checkbox"/> Autoclaved Risk Group 3 ***
<input type="checkbox"/> Pharmaceuticals (Non-morotcic)	

Other ***** _____

NOTES

* Human or Animal
** Special arrangements must be made for Primates and RG 3 (Contact ESF)
*** Scalp/razor blades, needles, syringes (no glass)
**** Contact ESF

Office use only:

Weight _____ Kg

Disposal of Animal Bedding (NEW)

Scope

The following guidelines address the proper disposal of animal beddings, generated from animal facilities and laboratories at UBC. Guidelines are provided for the proper disposal of non-contaminated beddings, beddings contaminated with Risk Group 1 and Risk Group 2 Biohazards, and bedding contaminated with toxic materials.

Purpose

The following guidelines are intended for animal facilities and laboratories generating animal bedding waste at UBC. They are designed to ensure compliance with BC Hazardous Waste Regulations bedding disposal requirements.

Background

The guidelines are based on the following regulations:

1. BC Hazardous Waste Regulations
 - Part 1- Biomedical Waste (g) (i) and (p)
 - Part 1- Hazardous Waste (a) (i), (ii) and (b.1)
2. TDG regulations Part 2.31

Guidelines

Responsibility for Classification and Certification

Waste classification prior to disposal is the responsibility of the area supervisor or Principal Investigator (PI) and the waste generator.

All animal beddings are considered by the regulations as biomedical waste unless a “medical or infection control professional has certified that the waste does not contain a virus or agent listed in Risk Group 2”. To comply with the certification requirement the area supervisor needs to certify **that each load of bedding generated, to be disposed as solid waste, is not contaminated**. The “Non Contaminated Waste Certification Log” in Appendix 1 of this procedure, may be used for this purpose.

A. Uncontaminated Beddings

- After the certification log is signed by the area supervisor dispose as solid waste. For more information contact UBC Building Operations Service Centre (604-822-2173).

B. Beddings Contaminated with Toxic Waste

- Depending on the toxicity level of the contaminating chemicals; these beddings may need to be disposed as toxic waste through the Environmental Services Facility. For more information contact an ESF Technician (604-822-6306).
- Review the contaminant’s MSDS. The following calculation needs to be implemented if:
 - i) The material is listed as a TDG 6.1 substance (toxic)
 - ii) The material LD₅₀ is ≤ 1000 mg/kg (1000 mg/kg is the toxic limit as per TDG Regulation sec. 2.31)

To assess the level of contamination:

- Find the chemical's LD₅₀ value in the MSDS
- Estimate the total weight of the chemicals in the bedding/chemical mixture
- Estimate the total weight of the beddings batch to be disposed
- Calculate the LD₅₀ value of the mixture using the following equation:

$$\text{LD}_{50} \text{ Mix} = \text{LD}_{50} \text{ chemical} / (\% \text{ chemical in bedding by mass})$$

- If the resulted LD₅₀ > 1000 mg/kg the mixture can be disposed as solid waste
- If the resulted LD₅₀ ≤ 1000 mg/kg the mixture should be treated for disposal as toxic chemical waste, and disposed as such through the Environmental Services Facility (See Appendix 2 of this procedure)
- In order to be accepted, the detailed calculation needs to be submitted as part of the request for disposal approval.

C. Risk Group 1 (RG1) Contaminated Beddings

After the certification log is signed by the area supervisor dispose as solid waste.

D. Risk Group 2 (RG2) Contaminated Beddings

All beddings contaminated with Risk Group 2 agents **MUST** be autoclaved prior to disposal.

After the certification log is signed by area supervisor autoclaved waste can be disposed as solid waste.

To ensure and demonstrate autoclave efficiency, quality assurance testing (i.e. using both chemical and biological indicators) needs to be routinely performed and related records need to be kept as per the Laboratory Biosafety Guidelines 3rd Edition 2004, published by the Public Health Agency of Canada.

Landfill Disposal

While currently most of the animal beddings waste is accepted for disposal through the Metro Vancouver landfills, certain landfill restrictions may result in landfill refusal to accept the waste. In these cases alternative disposal arrangements will have to be evaluated.

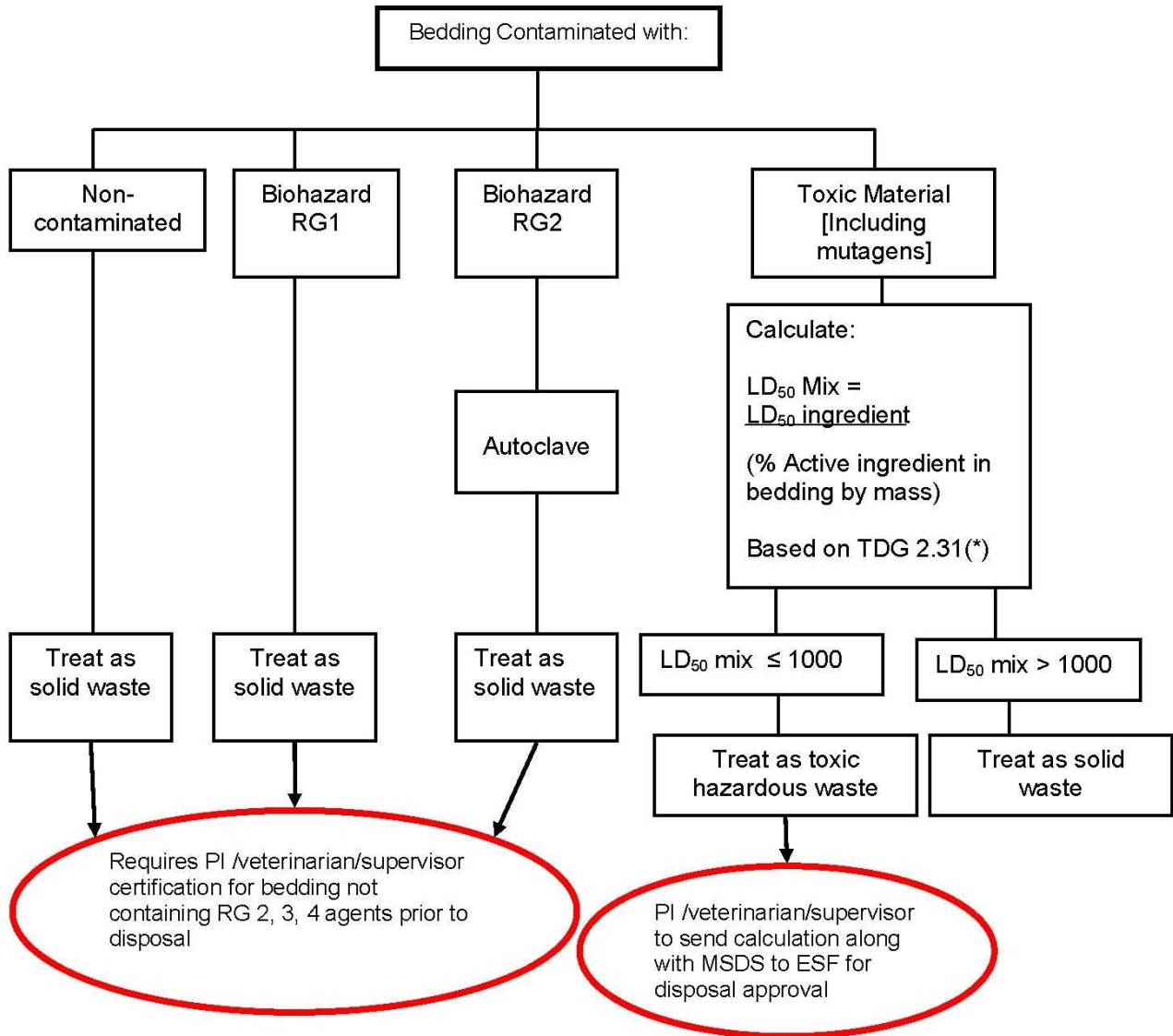
Refer to Metro Vancouver's Solid Waste "Banned & Prohibited Materials" or Metro Vancouver Tipping Fee and Solid Waste Disposal Regulation Bylaw No. 263, 2012.

Appendix 1: Non-Contaminated Waste Certification Form

I _____ (enter name and position, print clearly) certify that the bedding disposed per description below contained no Risk Group 2, 3, or 4 virus or agent.

Date of Disposal	Waste Description	Estimated Weight	Area Supervisor Initials

Appendix 2: Bedding Disposal Decision Making Chart



Disposal of Laboratory Chemical Waste

Scope

This disposal procedure applies to hazardous laboratory chemicals in solid or liquid form which can be managed by the Environmental Services Facility (ESF). Hazardous laboratory chemicals may include the following:

- Waste Containing Polycyclic Aromatic Hydrocarbons
- Flammable Liquids
- Spontaneously Combustible
- Dangerous When Wet
- Oxidizers
- Poisonous/Toxic Substances
- Corrosives
- Environmentally Hazardous Substances
- Waste Containing Tetrachloroethylene
- Waste Pest Control Products
- Leachable Toxic Waste

Purpose

This procedure ensures that chemicals are identified according to their chemical hazards and compatibilities, and then packaged safely for transportation to ESF.

Background

Hazardous Waste is defined as dangerous goods that are no longer used for their original purpose, and meet the criteria for Class 2, 3, 4, 5, 6, 8, or 9 of the Transportation of Dangerous Goods Regulations (TDG).

- Chemical packaging classes are based on the current Transport Canada Transportation of Dangerous Goods (TDG) Regulations Part 2, substances classification.
- Disposal of hazardous chemicals in the sewer or landfill is prohibited by Metro Vancouver Sewer Use Bylaw No. 299, 2007 Consolidated and by BC Hazardous Waste Regulations, 2009.

Procedure

IMPORTANT NOTE: ESF cannot manage or handle the following, and therefore, this procedure does not include:

- Unknown solid or liquid chemicals
- Gas cylinders and lecture bottles
- Radioactive chemicals

ESF reserves the right to refuse handling and disposal of improperly packaged and unidentified chemicals.

Procedures for the disposal of surplus hazardous chemicals or experimental by-products

1. Check to see if the chemicals you are disposing of are non-hazardous and non-regulated. These chemicals may be disposed of down the drain or in the normal garbage.
2. All chemicals for disposal must be pre-approved for disposal by an ESF Technician. Generator contact information and full chemical names (no abbreviations), must be listed through the online Chemical Waste Inventory System. *For details on how to enter this information see below.
3. ESF will process disposal requests and approved forms will be e-mailed back to generators. These forms include disposal authorization number, chemical hazard classification and date by which chemicals must be prepared for disposal.
4. After the coded form has been returned, package chemicals in strong cardboard boxes according to the chemicals hazard codes. Only chemicals with the same code are to be packed in the same box. Package all the chemicals as per their code.
5. The weight of each box of chemicals must not exceed 10 kg.
6. Once the box is full, secure the containers with appropriate packing material to prevent breakage and tape the box closed to prevent chemicals from spilling or falling out during transportation.
7. Place the approval form in an envelope and tape the envelope to the box. Write the department name, generator name, and contact information on the envelope. The inventory form must include all chemicals that are in the boxes. Write the chemical hazard classification code on the top of the box in large letters.
8. Place the boxes in room B2.211 for pick-up by ESF.

* Notes on Using the Chemical Waste Inventory System:

- Email addresses of generators and/or PI's are required. Use UBC email addresses.
- Find the best match to the name of your chemical from in the online inventory list and only add a new name/description if there is no entry.
- Complete chemical information includes: full chemical names, physical state, volume, quantity.
- Do not use abbreviations, formulae, acronyms, trade names, foreign names. **Remember** that chemicals often have synonyms, including IUPAC names.
- Do not include "waste" in the chemical name.
- List the most hazardous component of highest concentration first.

Disposal of Organic Solvent Waste

Scope

This procedure applies to organic solvent classified as Class 3 (Flammable Liquids) or Class 6.1 (Toxic Substances) by the current Canada Transportation of Dangerous Goods (TDG) Regulations. It specifies their handling by reuse through the Solvent Recovery Program or disposal through the Environmental Services Facility (ESF).

Purpose

Most organic solvents are flammable and toxic. Waste solvents must be contained and segregated properly for recovery and disposal such that they do not pose a safety hazard during transportation or storage.

Background

Organic solvents may be classified as Class 3 (Flammable Liquids) or Class 6.1 (Toxic Substances) as defined by the current TDG regulations and the BC Hazardous Waste Regulation, 2009.

Metro Vancouver Sewer Use Bylaw No. 299, 2007 Consolidated prohibits the disposal of organic solvents in the sewer or landfill.

Procedure

A. Organic Solvents for Recovery

Solvents suitable for recovery can be recycled at the ESF for reuse.

ESF is able to redistill acetone and methanol solvents for reuse (only more than 50% concentrations are useful for recovery). UBC's solvent recovery program operates spinning band distillation units, which can provide labs with re-distilled solvents of technical grade (purity analysis is provided upon request). For more information on the Solvent Recovery Program call 604-822-1285.

1. Segregate and collect each solvent in its own UBC waste solvent containers, typically these are plastic red "Jerry" cans. **Segregate!** Do not mix two different solvents together. Use only containers that have been used for the same solvent stream.
2. Do not mix oil with solvents.
3. Do not pour sludge, grit, paper, or inorganic chemicals into the waste solvent.
4. Complete the required information and affix the generator bar code to the **Solvent - Recovery (Green)** tag (as shown below). Give a brief history of the solvent. Identify all contaminants.
5. Affix the tags to the appropriate containers.
6. Tighten all caps before shipping.
7. Place the containers in room B2.211 for pick-up by ESF.

B. Halogenated and Non-Halogenated Organic Solvents

Halogenated solvents are organic solvents which contain halogen atoms: chlorine (Cl), fluorine (F), bromine (Br) or iodine (I). They are widely used because they are essentially non-flammable. Some common halogenated solvents include: chloroform, dichloromethane (methylene chloride), carbon tetrachloride, and chlorobenzene.

Non-halogenated solvents do not contain halogen atoms and include: alcohols (methanol, ethanol, isopropanol), acetone, xylenes, ethyl acetate, hexanes and toluene.

Halogenated and non-halogenated solvents are treated differently in terms of disposal. Non-halogenated solvents are used as fuel additives in cement kilns (essentially recycled). Halogenated solvents are incinerated at high temperatures and their cost of disposal is 2-3 times higher.

IMPORTANT NOTE: Segregation of halogenated and non-halogenated solvents is very important. Solvent mixtures are considered contaminated even at concentrations of halogenated solvents as low as 1000 ppm.

1. **Segregate** and collect only non-halogenated solvents in UBC non-halogenated waste solvent containers.
2. Do not mix halogenated and non-halogenated solvents together.
3. Do not mix oil with the waste solvents.
4. Do not pour acid, sludge, grit, glass, plastic, paper, or inorganic chemicals, into the waste solvents.
5. Complete the required information and affix the generator bar code to the **Flammable Liquid Disposal Tag (Blue)** (as shown below). Identify/classify all materials in the containers **including water content (%)**.
6. Affix the tags to the appropriate containers.
7. Tighten all caps before shipping.
8. Place the containers in room B2.211 for pick-up by ESF.

Organic Solvents for Recovery Tag



The form is titled "SOLVENT-RECOVERY" and includes a header with "The University of British Columbia Environmental Services Centre". It features a "Generator to Complete This Section Only" section with a green background. This section contains a "WASTE CONTENT (Please specify components 100%)" table with rows for Acetone, Isopropyl Alcohol, Hexane, Ethanol, and Other, each with a percentage field. Below this is a "Waste Details" section with fields for "Date Received", "Volume", "Weight", "Date Rec'd", "Date Rec'd", "Date Rec'd", and "Date Rec'd".

Organic Solvents for Disposal Tag



The form is titled "FLAMMABLE LIQUID DISPOSAL TAG" and includes a header with "The University of British Columbia Environmental Services Centre". It features a "Generator to Complete This Section Only" section with a blue background. This section contains a "WASTE CONTENT (Please specify components 100%)" table with rows for Acetone, Isopropyl Alcohol, Hexane, Ethanol, and Other, each with a percentage field. Below this is a "Waste Details" section with fields for "Date Received", "Volume", "Weight", "Date Rec'd", "Date Rec'd", "Date Rec'd", and "Date Rec'd".

Disposal of Photographic Waste

Scope

This disposal procedure applies to waste solutions of photochemical fixer, stabilizer, and developer.

Purpose

This procedure ensures that photochemical wastes are segregated and stored properly so that silver can be recovered from the fixer.

Background

Disposal of photochemical waste without treatment in the sewer or landfill is prohibited by the Metro Vancouver Sewer Use Bylaw No. 299, 2007 Consolidated and the BC Hazardous Waste Regulation 2009.

Photochemical waste solutions are classed as “corrosive” and may contain levels of silver in excess of BC Hazardous Waste Regulations, 2009. In order to reduce photographic waste, generators are **highly encouraged to use digital photography** as much as possible.

Procedure

1. Collect photochemical wastes in a dedicated 5 or 20 liter **red** container which has only contained photochemicals, as provided by the Environmental Services Facility (ESF). To obtain these containers, call 604-822-1285 or 604-822-1281. Photochemicals contaminated with trace amounts of solvents will damage the photochemical recovery columns.
2. Separate containers must be used for **fixer, developer, stop** and **stabilizer**.
3. Do not mix solvents with photochemical waste.
4. When containers are full, complete the **Photographic Waste Tag (Purple)**, as shown below, affix the generator bar code label, check the appropriate box on the tag and attach to the red containers.
5. Place containers in room B2.211 for pick-up by ESF.

Photographic Waste Disposal Tag



The image shows a purple and white form for photographic waste disposal. At the top, it reads 'PHOTOGRAPHIC WASTE—TREATMENT' and 'The Ministry of British Columbia Environmental Services Facility'. Below this, there are two identical sections for 'PHOTOGRAPHIC WASTE—TREATMENT'. The main section is purple and contains the text 'GENERATOR TO COMPLETE THIS SECTION ONLY' and 'WASTE CONTENT (Please /)'. There are three checkboxes: 'Developer', 'Silver Fixer', and 'Stop/Stabilizer'. At the bottom, there are fields for 'Date Received' and 'Date Filled', and a 'Waste ID' field.

Disposal of Ethidium Bromide Liquid Waste (NEW)

Scope

The following procedure describes the waste disposal and treatment of ethidium bromide solutions.

Purpose

Ethidium bromide is considered a mutagen and must be neutralized and/or disposed of properly.

Background

Ethidium bromide (EtBr), (3,8 diamino-5-ethyl-6-phenylphenanthridinium bromide, CAS #1239-45-8), is commonly used as a nucleic acid stain. Ethidium bromide is considered a mutagen because it intercalates double stranded DNA. This could affect DNA biological processes, like DNA replication and transcription. Although ethidium bromide is strongly mutagenic, causing living cell mutations, there is no evidence at this time of human carcinogenicity or teratogenicity. However, EtBr can be toxic at high concentrations. Testing in humans and longer studies in any mammalian system would be required to fully understand the potential risk ethidium bromide poses to lab workers.

Consider substituting EtBr with less hazardous materials such as GelRed™ from Biotium (UV excitation at 300nm, emission at 595nm – so conventional UV transilluminators are sufficient) or SYBR® Safe DNA gel stain from Life Technologies/Invitrogen (requires filter for UV transilluminator, but has the advantage of using non-UV light for visualisation).

Ethidium bromide is typically purchased in powder (an irritant to the upper respiratory tract, eyes and skin) or solution form and is soluble in water. Solid ethidium bromide waste (e.g., gels) typically contains 3 –5 ug/mL of ethidium bromide. At higher concentrations of EtBr the colour of the gel is dark pink or red. Items such as gloves, tubes and paper towels only contain traces of EtBr. Stock solutions of ethidium bromide contain higher concentrations of ethidium bromide than gels (approximately 10 mg/mL). Liquid ethidium bromide waste (e.g., buffers) typically contains less than 0.5 ug/mL of ethidium bromide.

The disposal of laboratory ethidium bromide remains a controversial subject. Ethidium bromide can be degraded chemically, or collected and incinerated. While it is not specifically regulated as a hazardous waste, the mutagenic properties may present health hazards and disposal concerns if it is not managed properly in the laboratory.

NOTE: Ethidium bromide is a chemical and should **NOT** be treated or labeled as a biohazard.

Procedure

A. Solid Waste Contaminated with Ethidium Bromide

For any solid waste contaminated with ethidium bromide (i.e., electrophoresis gels, gloves, test tubes, paper towels) follow the “Disposal of Non-Regulated Contaminated Solid Waste” (UBC.RMS.ENV.013.PRO).

B. Contaminated Liquid Waste

Aqueous solutions containing ethidium bromide can be removed from solutions with activated

charcoal or amberlite ion exchange resin or chemically deactivated. Some commonly used methods are described below. **IMPORTANT NOTE:** Liquid waste contaminated with ethidium bromide **must not** be sent to the Environmental Services Facility (ESF). However, solutions containing heavy metals, organics, cyanides or sulfides should be disposed as hazardous waste.

1) Charcoal Filtration

Filtering the aqueous ethidium bromide waste solution, free of other contaminants, through a bed of activated charcoal is a relatively simple and effective method for removal of ethidium bromide. The filtrate may be poured down the sink drain. These methods should be used for ALL solutions of EtBr in organic solvents. There are a few simple options available for charcoal filtration:

a) Destaining "Tea" Bags

This method is convenient as it allows rapid concentration of ethidium bromide from large volumes of solutions into a small "tea" bag which can then be disposed of as "non-regulated contaminated solid waste".

One simple charcoal filtration method is the GreenBag™ which has the capacity to remove 10 mg EtBr/bag. The GreenBag™ kit [cat. # 2350-200] is available from MP Biologicals/Q-Biogene. There are other "tea" bags similar to the GreenBag™ kits which remove ethidium bromide and other biological stains, including Coomassie Blue. Typically each bag will remove 99% of the dye from a 0.5 ug/mL EtBr solution. These bags are available from MO BIO [cat# 15007-25] or Amresco [cat# E732-25].

- Drop a destaining "tea" bag into the ethidium bromide solution.
- Allow to stand for the allotted time, usually overnight (stirring speeds the process).
- Pour filtrate down the drain.
- Follow the "Disposal of Non-Regulated Contaminated Solid Waste"

(UBC.RMS.ENV.013.PRO).

Place charcoal filter in a thick plastic bag and ensure no leaks. Place in a cardboard box and affix a **Non-Regulated Contaminated Solid Waste tag (Yellow)** and indicate waste type on tag. Store box in the building's designated chemical waste area for pick-up by ESF.

b) Funnel Kits

The funnel kit uses a packaged charcoal disk that is graduated for easily tracking the amount of aqueous solution calculated for a fixed quantity of ethidium bromide residue. This is particularly useful for labs that generate large amounts of ethidium bromide solutions at a time. Commercial filter funnel kits (e.g. Whatman Extractor EtBr Systems) are available from Fisher Scientific [cat# 09301101] or VWR [cat# 28165-500].

- Filter the ethidium bromide solution through the charcoal filter.
- Pour filtrate down the drain.
- Follow the "Disposal of Non-Regulated Contaminated Solid Waste"

(UBC.RMS.ENV.013.PRO).

- Place charcoal filter in a thick plastic bag and ensure no leaks.
- Place in a cardboard box and affix a **Non-Regulated Contaminated Solid Waste tag (Yellow)** and indicate waste type on tag.

- Store box in the building's designated chemical waste area for pick-up by ESF.

c) Powdered Activated Charcoal

Powdered activated charcoal can be used for buffers containing less than or equal to 0.5 ug/mL of ethidium bromide or for cleaning up accidental spills.

- Add 100 mg of powdered activated charcoal for each 100 mL of waste buffer solution.
- Store the solution for one hour at room temperature, shaking it intermittently. Filter the solution through a Whatman No. 1 filter and dispose of the filtrate down the drain.
- Follow the "Disposal of Non-Regulated Contaminated Solid Waste" (UBC.RMS.ENV.013.PRO).
- Place filter and activated charcoal in a thick plastic bag and ensure no leaks.
- Place in a cardboard box and affix a **Non-Regulated Contaminated Solid Waste tag (Yellow)** and indicate waste type on tag.
- Store box in room B2.211 for pick-up by ESF.

NOTE: Used tea bags, cartridges and activated charcoal are still **highly contaminated** and will need to be further treated as contaminated solid waste. Refer to the "Disposal of Non-Regulated Contaminated Solid Waste" (UBC.RMS.ENV.013.PRO) for steps on how to properly dispose of this type of waste.

2) Chemical Neutralization

Solutions containing ethidium bromide can be chemically deactivated, neutralized and poured down the drain. Chemical deactivation **MUST NOT** be used for organic solvent (flammable) solutions of EtBr. Deactivation **MUST** be confirmed using UV light to detect fluorescence.

Most ethidium bromide users are familiar with using household bleach as a simple and inexpensive method of deactivation (i.e. Armour method below). However, in 1987, Lunn and Sansone studied eight methods for destroying ethidium bromide. By using mutagenic assay techniques (e.g. the Ames test) they showed that as much as 5% of the activity of ethidium bromide (or a subsequent mutagen formed by the oxidation) survived treatment with sodium hypochlorite.

Studies showed the following protocol to be the best method for destroying mutagenic activity in ethidium bromide solutions (Lunn G. and Sansone E., Analytical Biochemistry, 162: 453-458, 1987).

a) Lunn and Sansone Method

Add sufficient water to reduce the concentration of ethidium bromide to 0.5mg/mL or less. For each 100 mL of ethidium bromide aqueous solution (0.5 mg/mL):

- Add 20 mL of freshly prepared 5% hypophosphorus acid (H_3PO_2) solution (dilute 10 mL of hypophosphorous acid commercially available as a 50% solution, into 90 mL of water).
- Add 12 mL of freshly prepared 0.5 M sodium nitrite ($NaNO_2$) solution (dissolve 3.45g of sodium nitrite in water to a final volume of 100 mL).
- Stir the mixture briefly and let stand for minimum 20 hours at room temperature.
- Using a UV light, check to ensure that all the EtBr has been removed (absence of reddish-orange fluorescence)
- Adjust pH to 5.5-10.5 using sodium bicarbonate ($NaHCO_3$) and pour down the drain with copious amounts of water.

b) Armour Method

Add sufficient water to reduce the concentration of ethidium bromide to 0.5mg/mL or less. For each 100 mL of ethidium bromide aqueous solution (0.5 mg/mL):

- Add 100mL of bleach (sodium hypochlorite, NaOCl).
- Stir the mixture for 4 hours at room temperature and let it sit for 2-3 days. (Alternatively, stir continuously for 20 hours using a magnetic stirring plate).
- Using a UV light, check to ensure that all the EtBr has been removed (absence of reddish-orange fluorescence)
- Adjust pH to 5.5-10.5 using sodium bicarbonate and pour down the drain with copious amounts of water. Alternatively, for large volumes of solution use 3% hydrogen peroxide (H₂O₂) or sodium thiosulphate (Na₂S₂O₃) to neutralize the bleach. **Remember** that bleach is corrosive with a pH = 11-13. **Do not** pour bleach solutions down the drain without neutralizing first!

IMPORTANT NOTES: In this updated version of the procedure, there is a change in the quantity of bleach and the time required to deactivate the ethidium bromide solution (Armour method). The previous amount of bleach was 440 mL to 100mL of EtBr and the time was 2 hours. This change was deemed necessary in order to minimize the amount of bleach used.

All the chemicals used for the chemical deactivation are toxic and/or corrosive and the methods described above are rather complicated and time consuming. Most universities in Canada and elsewhere are not endorsing the bleaching technique and in general are moving away from the chemical deactivation methods. The bleaching technique is currently being evaluated by RMS due to its possible residual mutagenicity, and will likely be banned **in the near future**. Therefore, **OXIDATION WITH BLEACH IS DISCOURAGED. Waste generators are STRONGLY encouraged to use the safer and less controversial charcoal filtration techniques described above.**

For further information, please contact the Advisor, Environmental Services at 604-822-9840.

Non-Regulated Contaminated Solid Waste tag

NON-REGULATED CONTAMINATED SOLID WASTE
The Ministry of Environment, Conservation and Forestry

Generator ID: [REDACTED]

NON-REGULATED CONTAMINATED SOLID WASTE
The Ministry of Environment, Conservation and Forestry

Generator ID: [REDACTED]

GENERATOR TO COMPLETE THIS SECTION ONLY

WASTE CONTENT

Solid waste contaminated with Ethidium Bromide

Silica Gel

Date: _____

Other use only
Date Received: _____
Weight: _____ kg

Disposal of Non-Regulated Contaminated Solid Waste

Scope

This disposal procedure applies to non-regulated solid wastes such as silica gel and solid waste contaminated with ethidium bromide.

Purpose

This procedure ensures that non-regulated solid wastes are diverted from landfill and disposed of properly.

Background

Certain wastes, although not regulated as hazardous, are not permitted at the landfill. These wastes classified as non-regulated (NR) waste must be diverted from the solid waste stream and disposed of properly in a secured land fill.

Procedure

1. Collect solid waste contaminated with ethidium bromide or silica gel in a thick plastic bag. Ensure there are no leaks. Double-bag waste in a thick clear garbage bag.
2. Each bag must not weigh more than 10 kg. Ensure that there is no liquid in the bag.
3. Package the bag in a heavy duty cardboard box. Tape box to seal.
4. Affix a **Non-Regulated Contaminated Solid Waste tag (Yellow)**.
5. Indicate waste type on tag.
6. Attach generator barcode sticker on tag.
7. Store box in room B2.211 or pick-up by ESF.

Non-Regulated Contaminated Solid Waste Tag

NON-REGULATED CONTAMINATED SOLID WASTE
The University of Western Ontario, Environmental Services Facility

Recycling Identification No. [REDACTED]

NON-REGULATED CONTAMINATED SOLID WASTE
Recycling Identification No. [REDACTED]

GENERATOR ID:
COMPLETE THIS SECTION ONLY

WASTE CONTENT

Solid waste contaminated with Ethidium Bromide

Silica Gel

Other: _____

Generator ID: _____

Weight: _____ kg

Disposal of Mercury Waste

Scope

This procedure applies to the disposal of mercury waste, such as: thermometers, barometers, manometers (broken or unbroken), or other.

Purpose

This procedure specifies the proper disposal of mercury waste in order to ensure the safety of workers and staff, and in compliance with the BC Environmental Management Act, 2003 and the BC Hazardous Waste Regulation, 2009.

Background

Waste mercury is regulated as Class 8 (Corrosive) and Class 6.1 (Toxic Substance), as defined by the current Transportation of Dangerous Goods Regulation.

The Metro Vancouver Sewer Use Bylaw No. 299, 2007 Consolidated and the BC Hazardous Waste Regulation, 2009 prohibit the discharge of waste mercury into sewers or landfills.

Procedure

A. Mercury Thermometers (Unbroken or Waste)

If no mercury has spilled and the thermometers are intact, put into a glass or plastic bottle/container. Label the bottle "**Mercury Thermometers for Disposal**". Request approval for disposal from the Environmental Services Facility (ESF) via the online Chemical Waste Inventory System.

B. Broken Mercury Thermometers

1. Refer to the Spill Clean Up Procedures for details on how to clean up a mercury spill. Report the spill to a supervisor and to RMS using the Spill Reporting Form. If necessary, contact HAZMAT (911) for immediate assistance and Risk Management Services 604-822-9840 for further assistance.
2. Place all waste mercury in a sealed vial or jar and all the clean-up materials in a leak-proof container. Label the jar as "**Mercury Waste**" and list as "Mercury" under chemical name when entering the information in the Chemical Waste Inventory System, for ESF approval.
3. Contact ESF at 604-822-6306 for more directions concerning disposal.

NOTE: For any other mercury waste, place mercury in a sealed container, label as "**Mercury Waste**" and dispose using the online Chemical Waste Inventory System.

Disposal of Unknown Laboratory Chemicals

Scope

This disposal procedure applies to hazardous laboratory chemicals in the solid or liquid form that cannot be identified and does not include gases or lecture bottles.

Purpose

This procedure specifies the method for the proper disposal of unidentified laboratory chemicals such that hazards are addressed and UBC is in compliance with all legislation.

Background

The Environmental Services Facility (ESF) Operation Plan authorized by the BC Ministry of the Environment (MOE) does not allow ESF to handle unknown chemicals.

The disposal of unidentified chemicals is the responsibility of the generator. The expense of identifying the unknowns is borne by the generator. ESF will arrange for the disposal of unknowns on the generator's behalf by external contractor.

Disposal of unidentified hazardous chemicals in the sewer or landfill is prohibited by the Metro Vancouver Sewer Use Bylaw No. 299, 2007 Consolidated and by the BC Hazardous Waste Regulations, 2009.

Procedure

1. Put the containers of unknowns (any type of unidentified waste) in a cardboard box.
2. Write "**Unidentified chemicals - Do Not Touch**" on the box in clear lettering.
3. Store securely.
4. Contact ESF at 604-822-6306 to arrange for an approved external contractor to pick-up the waste.
5. ESF will contact the external contractor on the generator's behalf.
6. The **generator pays the contractor directly** for the cost of identification and disposal.

Disposal of Explosive Chemicals

Scope

This procedure applies to the disposal of chemicals that are considered explosive or potentially explosive.

Purpose

This procedure specifies the requirements for the disposal of Dangerous Goods (DG) Class 1 (Explosives), chemicals identified as explosive, or potentially explosive substances.

Background

Explosive chemicals are classified according to the BC Environmental Management Act, 2003 and Hazardous Waste Regulation, 2009, as well as the current Transportation of Dangerous Goods (TDG) Regulations.

Disposal of explosive waste in the sewer or landfill is prohibited by the Metro Vancouver Sewer Use Bylaw No. 299, 2007 Consolidated.

Procedure

The Environmental Services Facility (ESF) **DOES NOT** accept explosives.

The procedure for the disposal of all types of explosives is as follows:

1. Put the containers of explosives in a cardboard box.
2. Write "**Explosives - Do Not Touch**" on the box in clear lettering.
3. Store securely.
4. Contact ESF at 604-822-6306 to arrange for an approved external contractor to pick-up the waste.
5. ESF will contact the external contractor on the generator's behalf and will let them know what the approximate cost of disposal is.
6. The **generator pays the contractor directly** for the cost of disposal.

Disposal of Propane and Butane Gas Cylinders

Scope

This procedure applies only to the disposal of non-rechargeable and non-returnable propane and butane cylinders. This procedure does not apply to other gas cylinders and lecture bottles.

Purpose

This procedure specifies the safe and proper disposal of non-rechargeable and non-returnable propane and butane gas cylinders.

Background

Compressed gas cylinders are not accepted at local landfills. As a result many of the university's compressed gas cylinders designated for disposal (empty or full) remain in the buildings thereby creating fire or explosion hazards.

Gas cylinders should be disposed of or recycled in a safe manner. When purchasing propane or butane gas cylinders, generators must ensure that the cylinders are refillable or can be returned to the supplier.

Procedure

Propane/Butane cylinders

1. All propane and butane cylinders must first be approved for disposal by the Environmental Services Facility (ESF) via the online Chemical Waste Inventory System.
2. Ensure that the generator information is filled in completely.
3. Approved processed requests are sent to the generator via e-mail.
4. Package cylinders in strong cardboard boxes.
5. The weight of each box must not exceed 10 kg.
6. Once the box is full, tape the box closed.
7. Tape an envelope with the approved form on the box. Write the generator's name, department, and telephone number on the envelope. On top of each box write the gas cylinder hazard class code number.
8. Place the boxes in room B2.211 for pick-up by ESF.
9. Do not vent propane or butane cylinders through the fume hood.

Disposal of Waste Oil

Scope

Waste oil is defined as a hazardous waste if it is a “refined petroleum product that has become unsuitable for its original purpose owing to the presence of impurities, or a loss of its original properties”, according to the BC Hazardous Waste Regulations, 2009. This disposal procedure applies to the disposal of waste oil, or a non-hazardous material containing more than 3% by weight of oil. The types of waste oil include the following:

- Automotive lubricating oil
- Cutting oil
- Fuel oil
- Gear oil
- Hydraulic oil
- Refined petroleum based oil
- Synthetic oil
- Emulsion
- Crude oil
- Vacuum-pump oil

IMPORTANT NOTE: Waste oils must not be contaminated with **water, solvents, toxic materials** or **polychlorinated biphenyls (PCB's)**.

Purpose

This procedure specifies the requirements for the packaging and disposal of oil or material contaminated with oil, such that UBC is in compliance with all local and provincial legislation.

Background

Oil reuse and recycle operations must strictly adhere to the BC Hazardous Waste Regulations, 2009. Waste oil is not permitted in landfills and in sanitary or storm sewers in compliance with both the BC Hazardous Waste Regulations, 2009 and the Metro Vancouver Tipping Fee and Solid Waste Disposal Regulation Bylaw No. 263, 2012.

Procedure

The procedure for the collection and disposal of waste oil is as follows:

1. The oil can be collected in three ways:
 - a) Supplier's original disposable plastic container if it is in good condition (i.e. not leaking);
 - b) Designated 5 liter or 20 liter red plastic oil cans; or,
 - c) 205 liter metal drums.
2. **Do not use red solvent cans for disposal of waste oil.** If you require empty oil containers, contact an Environmental Services Facility (ESF) Technician at 604-822-1281.
3. Complete the required information on the **Flammable Liquid Disposal Tag (Blue)** below and affix the generator barcode sticker. Under “Other” write the type of oil in the container (as listed in the Scope of this procedure).
4. Make sure that all waste oil containers are properly tagged and identified, with lids tightly closed.
5. Place the containers in room B2.213 for pick-up by ESF.

IMPORTANT NOTE: For waste oil contaminated with a high amount of water that cannot be segregated contact ESF at 604-827-5389 for a special “Contaminated Waste Water” tag.

Disposal of Waste Paint

Scope

This procedure applies to the disposal and recycling of waste paint at UBC Point Grey Campus.

Purpose

This procedure specifies the methods for proper disposal of oil paint waste, latex based paint, and waste water generated from paint brush cleaning.

Background

Paint waste is a mixture of pigment and solvent. The solvent can be water or a variety of organic solvents, paint waste can be toxic. Users should be aware that Metro Vancouver Sewer Use Bylaw No. 299, 2007 Consolidated prohibits paint waste from being disposed of into the sewer. Paint waste is also considered a hazardous waste and is prohibited in Metro Vancouver landfills.

Procedure

A. Waste Solvent Contaminated with Paint

1. Follow the disposal of “Organic Solvent Waste Procedure” (UBC.RMS.ENV.010.PRO)
2. Use the **Flammable Liquid Disposal tag (blue)** and check the “Non-Halogenated” box.
3. Contact the Environmental Services Facility (ESF) at 604-822-1281 for disposal.

B. Waste Water Contaminated With Paint

1. Collect waste water in 20 L plastic container (jerry-can) or 205 L drum.
2. Contact ESF (604-822-1281) to obtain a special **Contaminated Waste Water tag (aqua blue)**. Add the generator barcode sticker and check the waste component “Paint” on the tag.
3. Contact ESF at 604-822-1281 for disposal.

C. Surplus Paint for Recycling

1. ESF will recycle surplus non-industrial paint containers and aerosol paint through Product Care.
2. Contact the ESF technician at 604-822-1281 to make arrangements for drop-off at the Environmental Services Facility.

Green Tips

- Buy only as much paint as you will need to use in a month.
- Water based paints are the safest option available.
- Latex paints are less toxic than oil based, and also do not need to be thinned and cleaned-off with solvents.

Disposal of Waste Batteries

Scope

This disposal procedure applies to waste batteries in class 8 (corrosive) or class 6 (containing toxic heavy metals) as defined by the current Canada Transportation of Dangerous Goods (TDG) Regulations. Disposal of these items at UBC is facilitated by the Environmental Services Facility (ESF).

Waste batteries include the following:

a) Standard/Non-rechargeable Batteries:

- All sizes of regular consumer alkaline batteries (eg. AA and AAA)
- Watch batteries

b) Rechargeable Batteries:

- Nickel-Cadmium batteries (Ni-Cd)
- Lithium-Ion batteries (Li-ion)
- Nickel Metal Hydride (Ni-MH)
- Lead acid (automotive/power supply) batteries (Pb)

If you have any questions, contact the ESF Technicians at 604-827-5389.

Purpose

This procedure specifies the procedure for the proper disposal of waste batteries such that UBC is in compliance with all legislations. Another objective is to promote waste minimization and embed sustainability into the culture and operations of our campus.

Background

Waste batteries shall be disposed in accordance with the BC Environmental Management Act, 2003.

All batteries will be shipped for recycling by a designated contractor. Shipping and packing of all rechargeable batteries are required to comply with TDG shipping regulations in order to prevent short circuits and fires.

Procedure

A. Automotive Batter or UPS Batteries (Over 5 Pounds)

1. All battery disposal requests must clearly identify:
 - a. Name
 - b. Battery Type
 - c. Quantity
 - d. Location and Address Information
2. Ensure that ALL information is filled out completely.
3. E-mail the completed requests to ESF for approval:
battery_recycling@riskmanagement.ubc.ca . Contact the ESF technician at 604-827-5389 if you

have any questions.

4. **UPS batteries:** package inside a strong cardboard box and secure the box with tape prior to pick-up. Ensure each box weighs less than 10 kg.
5. Place batteries in room B2.211 for pick-up by ESF.
6. **IMPORTANT NOTE:** Ensure that all batteries are contained in plastic bags if they are wet or leaking.

B. Regular & Rechargeable Batteries (Below 5 Pounds)

The procedure for the disposal of all types of waste batteries except car and UPS batteries over 5 pounds is as follows:

1. Find a Call2Recycling Collection Box location (call LSC Safety Advisor at 604-827-4127)
2. Before placing your batteries in the collection box, segregate them into the following two categories:

Non-Rechargeable Batteries (eg. alkaline batteries, AA, AAA, D, 9V, lantern batteries)

- No extra packaging is required. Put these batteries directly into the battery recycling box.

Rechargeable Batteries (cell phone batteries, laptop batteries, electronic batteries, cordless hand-tool batteries) and Lithium Primary Batteries (button batteries, camera batteries)

- Place each battery in its own plastic bag

5. Place inside the collection box
6. **Note:** If there is no Call2Recycle collection service in your area request a special Battery Collection Box from ESF. To arrange for the delivery and pick-up of a white collection box contact the ESF Technician at battery_recycling@riskmanagement.ubc.ca or 604-827-5389.

Disposal of Laboratory Glass Waste

Scope

This procedure applies to disposal of glass that is uncontaminated or contaminated by biohazardous or biomedical agents, or hazardous chemicals.

Glass waste includes the following:

1. Glass bottles
2. Pipettes
3. Other glassware

Purpose

This procedure specifies the method for proper disposal of glass waste to ensure the safety of disposal workers.

Background

Disposal of contaminated glassware waste to landfills is prohibited by Metro Vancouver, and under the BC Hazardous Waste Regulation, 2009.

Procedure

Only APPROVED containers may be used for these wastes. These containers must not to be used for any other purpose.

Approved glass waste containers: five gallon grey metal cans or white plastic pails. All containers must be clearly labeled as “**Glass Waste Only**”. Each container must be lined with a clear 6 mil plastic bag that encloses all the glass. Pails and bags are available through Building Operations Stores (604-822-5272).

- If **uncontaminated**, treat as regular glass waste.
- If the glass container was previously **contaminated** with the following hazardous materials:
 - o Hazardous chemicals: safely empty container, decontaminate or neutralize as necessary, triple rinse, dry and dispose of as regular glass waste.
 - o Risk Group 1 or Risk Group 2 biohazardous materials: decontaminate empty containers with bleach, by autoclaving, or by using other approved methods. For details refer to “Disposal of Biohazardous Waste” (UBC.RMS.ENV.001.PRO). Then treat as regular glass waste.

In general, for the disposal of contaminated glass waste, follow these steps:

1. Decontaminate safely as required.
2. Clean completely of residues, including organic vapours and chemicals
 - leave bottles of organic solvents in a fume hood for at least one day
 - rinse other reagent bottles well with cold water
3. Remove all bottle caps.
4. Remove or deface all labels and hazard warnings.
5. Place in Glass Waste containers.

6. Once glass waste container is **3/4 full**, tie bag closed, ensuring that no glass objects protrude past the top of the container.
7. Attach a label to the bag indicating your building, room, and telephone number.
8. Take container to room B2.211.

NOTE: NO sharps (e.g. needles, blades, syringes) and glass vials/jars containing chemicals or other hazardous materials can be disposed of in the glass waste containers.

Disposal of Polychlorinated Biphenyls

Scope

This procedure is only applicable to Polychlorinated Biphenyls (PCB) material handled by the UBC Electrical Shop. Other users of PCBs have to contact the Environmental Services Facility (ESF) for disposal procedures. Solid or liquid PCBs to be disposed of include in this procedure include:

- Ballasts
- Transformers with contaminated oil
- Contaminated oil in barrels
- Capacitors
- Electrical cables
- Spill clean-up material

UBC Building Operations will be charged by ESF for the disposal of PCB waste.

Purpose

This procedure specifies the requirements for the disposal of PCB-contaminated materials, to ensure that UBC is in compliance with all relevant legislation.

Background

Disposal of PCB contaminated material in the sewer or landfill is prohibited by Metro Vancouver Tipping Fee and Solid Waste Disposal Regulation Bylaw No. 263, 2012.

PCB waste is considered a special waste under the BC Environmental Management Act, 2003.

Procedure


A. Ballasts Disposal

1. After ballasts have been removed by UBC Electricians, they must be brought to the electrical shop and sorted into PCB-containing and non-PCB-containing ballasts using the protocol set in the Technical Guidelines (Section 16502).
2. Non-PCB containing ballasts should be placed in a container marked "Non-PCB Ballasts" and disposed of through UBC Waste Management. Ballasts containing PCB's must be packaged in 20-litre (5-gallon) metal cans designated and labeled as containing PCB waste.
3. Place full cans into the metal cage at the dock area of UBC Electrical Shop. Keep cage locked at all times.
4. When the cage is nearly full, contact ESF at 604-822-6306 or 604-822-1285.
5. Environmental Services Facility will make arrangements for a contractor to pick-up PCB-containing ballasts.

B. Other PCB contaminated waste

Contact 604-822-6306 or 604-822-1285 to arrange for disposal of this waste.

Appendix A - UBC Hazardous Waste Disposal Procedures Poster



a place of mind

UBC Hazardous Waste Management Procedures Environmental Services Facility (ESF), Risk Management Services

ESF Weekly Pick-up Schedule
Please have wastes ready before 9:30 a.m.

Monday	Tuesday	Wednesday	Thursday	Friday
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- Please ensure wastes are **properly packaged and tagged** and do not exceed **10 kg**
- To ensure worker safety, ESF will **NOT** pick up waste that is not properly packaged, tagged or weighed

Chemical Waste Disposal
Vanessa Kuznetsov
604-827-8306 or 178-879-2862
vanessa.kuznetsov@ubc.ca

Biological Waste Disposal
Wengand Sit
604-827-5388 or 178-879-2866
wengand.sit@ubc.ca

Pickup and Delivery
Suhail Mahani
604-827-1781 or 604-245-4772
suhail.mahani@ubc.ca

Solvent, Photographic Waste Disposal & General Inquiry
Biang Dang
604-822-1202 or 604-323-4422
biang.dang@ubc.ca

Also visit:
www.ubcenvironmental.ca/ubc-environmental

Produced by the Management Services
Facility November 2011

Biological Waste Disposal

Autoclaved Risk Group 1

- Autoclave in **clear**, unlabelled autoclave bags
- Double bag with clear bags and ensure no leaks
- Affix biological waste disposal tag (red)
- Indicate Risk Group 1 on tag
- Attach generator barcode sticker on tag

Autoclaved Risk Group 2

- Autoclave and package in **orange** biohazard bags
- Double bag with clear bags and ensure no leaks
- Affix biological waste disposal tag (red)
- Indicate Risk Group 2 on tag
- Attach generator barcode sticker on tag

Sharps Waste

- Collect in **red** or **yellow**, autoclavable sharps containers and ensure lid is securely closed/locked. Do not overfill.
- Autoclave
- Affix biological waste disposal tag (red) with generator barcode

Human Anatomical/ Human Blood & Fluids

- Double bag in **red** bags, ensure no leaks
- Affix biological waste disposal tag (red) with generator barcode
- Store in freezer for pickup

Pathological Waste

- Package in a **black** 6 mil polypropylene bags
- Double bag to ensure no leaks; do not exceed **10 kg**
- Affix biological waste disposal tag (red)
- Attach generator barcode **sticker** on tag
- Store in freezer for pickup

Biological Waste Disposal

Chemical Waste Disposal

Surplus Chemicals and Experimental Byproducts

- Check if chemical is included on the "non-hazardous" list.
<http://www.ubcenvironmental.ca/ubc-environmental/non-hazardous>
- vanessa.kuznetsov@ubc.ca
- Access Chemical Inventory System online
<http://www.ubcenvironmental.ca/ubc-environmental/chemical-inventory>
- vanessa.kuznetsov@ubc.ca
- Input generator and chemical information
- Wait to obtain approval for disposal from ESF
- **Acquire** chemicals by hazard class
- Package chemicals with absorbent material in a **leak-proof cardboard box** (ensure package is less than 10kg)
- Tape the box closed
- Affix the approval form to the box (in an envelope)
- Print generator contact info, on the envelope
- Print **hazard class** and authorization number on box

Solvent/Oil Waste

- Collect in red jerry cans, **acquire** halogenated & non-halogenated
- Ensure cap is tight and there are no leaks
- Affix flammable liquid tag (blue)
- Include **halogenated, non-halogenated** or **oil waste**
- Attach generator barcode sticker on tag

Non-Regulated Contaminated Solid Waste

- Double bag waste in thick clear garbage bags
- Ensure no liquid, do not exceed **10 kg**
- Package in a **leak-proof cardboard box**
- Affix non-regulated contaminated solid waste tag (yellow)
- Indicate waste type on tag
- Attach generator barcode sticker on tag

Photographic Waste

- Separate film and developer
- Collect in **20L** red jerry cans
- Affix photochemical tag (purple)
- Indicate waste type on tag
- Attach generator barcode sticker on tag

Note: ESF will not pick-up the following types of materials: 1) radioactive 2) potentially explosive 3) compressed gases 4) unknowns 5) controlled substances

Appendix B - ESF Price List

Item	Description	Price
Absorbing Material, Per Kg		\$2.58
Acids, Class 8, Per Kg		\$5.00
Aerosols, Per 205L Drum	Aerosol cans - 1x205L drum	\$280.00
Anatomical Animal, Per Kg		\$2.40
Autoclaved Plastics, Per Kg		\$2.72
Batteries - Alkaline, Per Kg		\$5.00
Batteries - Sealed Lead Acid, Per Kg		\$1.00
Bio Oil, Per Kg		\$0.85
Biomedical, Per Kg		\$12.00
Chemist and Truck		\$75.00
Corrosive Solids, Class 8, Per 5L Pail		\$64.00
Corrosive Substances, Per 205L Drum	Corrosive Substances	\$360.00
Corrosive, Class 8, Per Kg		\$6.50
Corrosives Solids, Class 8, Per 20L pail	Class 8, 20L Pail	\$75.00
Crude Oil, Per Kg		\$0.85
Cyanide Solution, Per Kg		\$6.50
Cyanide Compound, Per Kg		\$8.80
Cytotoxic, Per Kg		\$1.47
Drum and Truck Operator	Drum and Truck Operator	\$75.00
Drum with Sludge, Per Kg		\$3.00
Empty 205L New Plastic Drum	Empty 205L New Plastic Drum	\$50.00
Environmental Hazardous Substance, Per 205L Drum	Miscellaneous Dangerous Goods, Class 9, Silicon Dioxide, 205L Labpack Drum	\$210.00
Environmental Hazardous Substance, Per 20L Pail		\$75.00
Environmental Hazardous Substance, Per Kg	Class 9	\$3.75
Flammable Liquid, Class 3, Per 205L Drum	Flammable Liquid, 205 L drum	\$420.00
Flammable Liquid, Class 3, Per Litre		\$2.36
Flammable Solid, Class 4.1, Per Kg		\$6.50
Inorganic Toxins, Class 6.1, Per 205L Drum		\$420.00
Inorganic Toxins, Class 6.1, Per Kg		\$6.75
Manifest Charge		\$20.00
Mercury Debris, Class 8, Per Kg		\$5.50
Mercury Metal, Class 8, Per Kg		\$20.00
Mixed Batteries, Per Kg		\$3.00
Oil Contaminated Material Per 205L Drum		\$185.00
Oil Contaminated Material, Per Skid Bin		\$400.00
Oil, Per Litre		\$2.36
Oxidizers, Per Kg		\$6.50
PCB-Light Ballasts, Per Kg	PCB - Light Ballasts	\$3.60

Pharmaceutical Pail		\$10.50
Pharmaceuticals, Per Kg		\$2.70
Photochemical Waste, Per Litre		\$1.00
Poisonous Substance, Class 6.1, Per 205L Drum	Class 6.1, 205L Drum	\$420.00
Poisonous Substance, Class 6.1, Per 20L Pail	Class 6.1, 20L Pail	\$85.00
Poisonous Substance, Class 6.1, Per Kg	Poisonous Substance, Class 6.1 Per Kg	\$15.00
Poisonous Substance, Leachable, Class 6.1, Per Kg	Poisonous Substance, Leachable, Class 6.1, Per Kg	\$5.50
Propane Bottles, Per Bottle		\$29.00
Reactive, Class 4, Per Kg		\$8.80
Sharps, Per Kg		\$2.70
Silica Gel, Per Kg		\$1.47
Special Pick up	Animal Carcasses Special Pick Up	\$100.00
Toxic Liquid, Organics, Per Kg		\$6.50
Toxic Liquid, Organic, Per 205L Drum		\$420.00
Toxic Solid, Organic, Per 205L Drum		\$420.00
Transportation/Hour		\$40.00
Waste Coolant, Per 205L Drum		\$120.00
Waste Oil - Per 205L Drum		\$120.00
Waste Oil - Per 20L Pail		\$12.00
Waste Oil, Per Liter		\$2.36
Waste Oily Solid, Per 205L Drum		\$130.00
Waste Oily Water, Per 205L Drum		\$120.00
Waste Paint Related Material, Per 205L Drum		\$350.00
Waste Pump Oil, Per 205L Drum		\$120.00
Waste Pump Oil, Per Litre		\$2.36

APPENDIX C - Laboratory Exit Protocol for UBC Principal Investigators

Scope

This protocol is applicable to all departments with laboratories or operations where hazardous materials or equipment that has come in contact with hazardous materials are used.

Purpose

To provide a framework for Administrative Heads of Units to develop a site-specific exit protocol for research faculty and staff under their supervision that is leaving the University of British Columbia.

To allow for proper lab decommissioning process, prior to renovation or transfer of lab ownership.

Background

Heightening the need to ensure a smooth transition comes with the advent of the Workplace Hazardous Materials Information System (WHMIS), provincial and federal health, safety and environmental regulations, the Canadian Nuclear Safety and Control Act (2000) requirements, and the Health Canada and Canadian Food Inspection Agency Guidelines for working with bio hazardous materials. These requirements have made it mandatory that principal investigators decommission laboratories to ensure that the legal and ethical expectations associated with such work are met. (Also to comply with the responsibilities of owner's user and handlers of hazardous materials under UBC Policy 9)

When properly applied, an exit protocol ensures that:

- Unsafe conditions are eliminated;
- A proper clean-up is performed;
- Lab equipment is properly decontaminated and disposed of or recycled;
- Hazardous materials are properly disposed of or recycled/reused;
- Work surfaces are free of contamination;
- The health and safety of researchers is protected;
- University policies and Departmental procedures are followed; and
- Regulatory requirements are met.

Notification

When a faculty or staff member informs his or her Administrative Head of Unit of his or her intentions to leave UBC (suggested minimum three months' notice), the Administrative Head of Unit shall provide a copy of the Departmental Exit Protocol and inform the Department of Risk Management Services of the researchers intent to leave the University. It is suggested for purposes of due diligence that the date of this information transfer be documented. It is then the responsibility of the Administrative Head of Unit to monitor that the faculty or staff member follows all the steps in the protocol to completion, including all requirements for documentation.

Checklist

A checklist will provide a simple method for the Administrative Head of Unit to confirm the

protocol has been completed. The faculty or staff member shall submit a completed exit protocol checklist to the Administrative Head of Unit prior to departure. The Administrative Head of Unit shall keep a copy and a copy shall also be provided to the faculty member.

Procedure

When the primary researcher or supervisor of a laboratory leaves or decommissions a laboratory, the following procedures shall be followed:

General

1. A current inventory of all hazardous materials must be completed.
2. All unknowns must be identified and appropriately labeled.
3. All chemicals should be removed from the laboratory by transfer to another primary researcher/laboratory supervisor, or by disposal through the Environmental Services Facility.
4. All solid waste and, glass waste containers, should be emptied, all equipment removed or accepted by the future owner of the space.
5. Fume-hoods, biosafety cabinets, glove boxes and lab benches need to be decontaminated and cleaned.
6. Special arrangements need to be made for the disposal of potentially explosive materials and lecture bottles of hazardous gases (contact ESF at 26306 for assistance)
7. The Local Health and Safety Committee should inspect the laboratory to ensure removal of all material and approve the removal by signing the inventory form.
8. An approved inventory form should be sent to the Administrative Head of Unit or Director. It is the responsibility of the Administrative Head of Unit or Director to ensure that adequate procedures are followed for the decommissioning of laboratories.
9. In the case of building decommissioning, or when the area is to be renovated, or in swing spaces, the building manager should participate in the lab inspection and approved lab decommissioning.

Transfer of chemicals to another primary researcher or laboratory supervisor

All materials transferred must be labeled according to WHMIS requirements and the receiving party must obtain appropriate Material Safety Data Sheets. For further information please contact the Chemical Safety and Occupational Hygiene Associate at 604-822-2273.

Some of the materials may be forwarded to the University Chemical Exchange Program for future use. Contact the Environmental Services Facility (2-6306)

Disposal of Chemicals

The identity of all materials must be established before disposal. If there are unidentified materials, contact the Environmental Services Facility to arrange for materials to be classified for waste disposal purposes; there will be a cost associated with this process (□\$100.00 - \$150.00/hour).

Make special arrangements for the disposal of potentially explosive materials or lecture bottles of hazardous gases by ESF approved contractor (contact ESF at 2-6306), disposal costs to be paid by generator

A chemical disposal inventory form must be completed for all chemicals ready for disposal and forwarded to the Department of Risk Management Services. Following approval by ESF staff,

the materials must be packaged according to the instructions provided and then arrangements are to be made with ESF at 822-6306 for pick-up of the material.

Return compressed gas cylinders to suppliers.

Radioisotope Permit & Laboratory Decommissioning

Required from the Licensee:

1. Memo to Radiation Safety Office (RSO) stating intent to discontinue the radioisotope permit.
2. A complete set of wipe tests for each laboratory/room licensed for isotope use, regardless of radiation use, within the space. Please refer to your permit and associated amendments for the list of permitted rooms.
3. Record of proper disposal of all isotopes on hand (this can include a transfer of remaining isotope to another researcher that is licensed for that nuclide or the Radiation Safety Office).
4. Completion of a yearly isotope inventory (obtained from the RSO).
5. All isotope purchase, use, disposal and contamination control records must be transferred to the Radiation Safety Office.

Following the completion of the above steps, a Radiation Safety Office member will remove all signs and all records will be transferred to the RSO. Thereafter, a letter will be issued to the researcher, and the department head if requested, stating that the license is no longer active. Decommissioning of laboratory space is not complete until all steps have been verified by the Radiation Safety Office.

Biohazard Laboratory Decommissioning

1. Notify the Biosafety Office (604-822-9527) and the Office of Research Services that the biohazard protocols are to be concluded and by what date.
2. Record transfer of bio hazardous materials to the inventory of another researcher.
3. Terminate all biohazards not transferred to the inventory of another researcher.
4. Decontaminate all working surfaces.
5. Conclude liquid nitrogen delivery contract.

LABORATORY EXIT PROTOCOL CHECKLIST

Lab / Principle Investigator: _____ **Date:** _____

Have you:	Yes	No	N/A
1. Created a complete inventory of all hazardous materials in the laboratory?			
2. Has Administrative Head of Unit received a copy of the inventory?			
3. Have all unknowns (chemicals, etc.) been identified and properly labeled?			
4. Arrangements were made for the disposal of lecture bottles of hazardous gases and potentially explosive chemicals			
5. Are MSDS sheets available for all known chemicals?			
6. Have the chemicals been transferred to a another researcher's inventory or to the Environmental Services Facility?			
7. Have compressed gas cylinders been returned to the suppliers?			
8. Has the Radiation Safety Office (RSO) been notified of your intent to decommission the radioisotope permit?			
9. Has a complete set of wipe tests been performed in all licensed areas and submitted to the RSO?			
10. Have the radioisotopes been disposed of or transferred to another licensee?			
11. Has an annual inventory record been submitted to the RSO?			
12. Have all radiation inventory and contamination control records been submitted to the RSO?			
13. Has the Biosafety Office been notified of your intent to terminate work with Biohazards?			
14. Has bio hazardous material been disposed of and transferred to another researcher?			
15. Are all working surfaces decontaminated?			
16. Has the liquid nitrogen contract been terminated?			
17. Has specialized lab equipment been safely decontaminate, de-energized, recycled and/or disposed?			
18. Has the Safety Committee inspected the laboratory? [attach Exit Safety Inspection Report]			
19. If you will be transferring to a new laboratory or work area, has RMS been provided with updated information for the hazard information door signs, specifically hazard information and emergency contact information.			

When a PI retires, closes an entire lab or moves to another building, the form must be signed below and forwarded to Risk Management Services for approval.

Principal Investigator: Administrative Head of Unit:

Name: _____ Name: _____

Signature: _____ Signature: _____

Date: _____ Date: _____

LSC Safety Advisor:

Name: _____ Name: _____

Signature: _____ Signature: _____

Date: _____ Date: _____

When a PI leaves a lab, but the space will still be occupied by the same department, the incoming PI accepts the lab and the inventory in its current condition.

Outgoing Laboratory Supervisor Incoming Laboratory Supervisor

Name: _____ Name: _____

Signature: _____ Signature: _____

Date: _____ Date: _____