# Aqueous Waste Disposal

It is the responsibility of **Principal Investigators (PI)** to ensure waste has been correctly classified and lab personnel follow the proper procedure.

## Purpose

This procedure aims to prevent the pollution of UBC's sanitary sewer system and the environment, by routine and planned aqueous waste discharges from academic/research activities. Disposal of any hazardous waste down the drain is ***prohibited***. Following this procedure ensures compliance with all applicable legislation.

## Scope

### Waste Application & Regulations

This procedure applies to routine diluted aqueous waste from research and teaching laboratories at the UBC Point Grey campus.

Research laboratories located at hospital sites (on-and off-campus) must follow specific hospital pollution prevention plans in addition to these guidelines.

Acceptable for drain disposal – only non-hazardous aqueous solutions, usually highly diluted, in small quantities and/or infrequently generated in labs. These chemical waste solutions are not regulated because they do not exhibit any of the hazardous characteristics (toxicity, corrosivity, flammability, or reactivity) as defined by BC Hazardous Waste Regulation, 2009, not classified under the Transportation of Dangerous Goods (TDG) Regulations, or not controlled by WHMIS/GHS. Aqueous waste must also not be prohibited or restricted by the Metro Vancouver Sewer Use Bylaw 299, 2007 and/or the Hospital Pollution Prevention Bylaw 319, 2018.

Liquid/aqueous waste generated by laboratories is considered hazardous until approved by SRS that it meets criteria for drain disposal, on a case-by-case basis. Hazardous wastes MUST be handled and disposed via ESF or other appropriate venue.

### Does Not Apply

This disposal procedure does NOT apply to the following wastes that are either unsuitable/ unacceptable for safe drain disposal, or are wastes covered by different procedures:

- Chemical waste mixtures of hazardous reagents (any TDG class, per SDS)
- Aqueous wastes with very low concentration components classified as toxic or health hazards under the Workplace Hazardous Materials Information System (WHMIS) or the Globally Harmonized System (GHS)
- Aqueous wastes which are environmental hazards, marine pollutants, or toxic to aquatic life, even if not regulated under TDG class 9 or other classes – includes heavy metals solutions
- Aqueous waste with high volume, high frequency, or ongoing discharges
- Unknown/Unidentified, Radioactive, or Biomedical/Biohazardous aqueous solutions
- Planned discharges from operational activities on campus – refer to the "UBC Pollution Prevention Sanitary and Storm Sewers Procedure"

## Background

Metro Vancouver's Sewer Use Bylaw 299, 2007 regulates pollutants that are discharged into sanitary sewers to protect the environment as well as human health and safety. This bylaw specifies prohibited wastes (i.e. radioactive, hazardous and biomedical) and restricted pollutant discharges (numerical guidelines for specific contaminants); it also includes monitoring and permit requirements for non-domestic discharges. Metro Vancouver's Hospital Pollution Prevention Bylaw 319, 2018 regulates the discharge of waste from hospitals.

Discharges of hazardous materials, oil and grease to the sanitary sewer can compromise the health and safety of staff managing the drain system and/or damage the operation of the sewers and sewage facilities.

Metro Vancouver Liquid Waste Services have developed guidelines to assist industry and institutions in managing their wastewater safely and responsibly. The "Guide to Managing Wastewater – Post-Secondary Laboratories" and the "Guide to Managing Wastewater – Post-Secondary Studios" are applicable to research/teaching laboratories and art studios, and help eliminate or reduce pollution at its source.

Refer to the SRS Environment Pollution Prevention – Sanitary Sewer webpage for additional information.

## Procedure


Contact **ESF** and the ***SRS Advisor, Environmental Protection*** for assesments and review of your aqueous waste profiles.

### A. Aqueous Chemical Waste (regardless of hazards)

New aqueous waste streams (including diluted chemical mixtures) must initially be submitted as chemical waste via the HWIS in order to be pre-assessed for drain disposal suitability – lab personnel must be pre-registered, active HWIS users.

- ✓ Review all the chemical components' SDS – check TDG/WHMIS/GHS classification
  - If any chemical components are listed as hazardous in the SDS, the mixture (aqueous solution) is disposed as hazardous waste.
- ✓ Dispose of any aqueous solutions as chemical mixtures via the online **Hazardous Waste Inventory System** (HWIS).
  - Follow the steps described in the Chemical Waste procedure
- ✓ Complete and submit a detailed **Aqueous Waste Profile**, if required – see sample sheet
  - ESF may request for you to submit a detailed waste profile separately, via email
  - Include aqueous waste streams or solutions that are potentially hazardous to the environment, toxic to aquatic life, of high volume/frequency and ongoing
- ✓ ESF will also determine if aqueous solutions need to be tested, if they meet the Hazardous Waste Regulation Schedule 1.2 effluent standards requirements
  - Examples of analytical tests: toxicity test (limit bioassay, 50% survival of Rainbow trout after 96 hours); metals and other inorganic contaminants test; organic contaminants; Biochemical Oxygen Demand (BOD) test, etc.

***Hints for completing aqueous waste profiles for drain disposal:***

- ✓ *Use this tool for chemical waste streams which may NOT be considered or classified as hazardous (under TDG or WHMIS/GHS)*
- ✓ *Only include highly diluted waste (e.g. >95% water) with very low chemical concentrations of components (e.g. usually these concentrations are 1-2 % or less)*
- ✓ *DO NOT use this tool for solutions with highly hazardous components or heavy metals, regardless of concentrations*
- ✓ *If multiple components, check the most hazardous one(s), and submit details*
- ✓ *Non-hazardous chemicals (not regulated by TDG) are not always suitable for drain disposal (some contaminants may be toxic to the aquatic environment).*

## B. Formalin Waste

Formalin solutions are aqueous mixtures of < 4% paraformaldehyde, and phosphate-buffered saline solutions). Formalin is toxic to humans and also very toxic to the aquatic environment – it is also restricted by the Hospital sewer bylaw (max 30 mg/L).

- ✓ Collect formalin waste for disposal at ESF.
- ✓ Use clear/white plastic containers with caps/lids (preferred) or red jerry cans for collection.
- ✓ Attach the **Toxic Waste Disposal Tag (Brown)** shown below.
- ✓ Affix your generator barcode.
- ✓ Check the **Formalin box** waste on the tag.

## C. Corrosive waste

Corrosive chemical solutions are hazardous because of high/low pH and/or may contain other hazardous contaminants. Corrosives can also be very damaging to plumbing if used in excess or if inappropriately disposed of. Diluted corrosive waste with no other hazard classification, is prohibited from drain disposal, unless it meets the sewer bylaw pH restrictions. Acceptable pH range (6-10).

**Bleach** (sodium hypochlorite, NaClO) solutions commonly used in labs have very high pH (11-14).

- ✓ Do not pour bleach down the drain before testing pH and neutralizing.
- ✓ Only use safe, practical bleach neutralizers: sodium metabisulphite ($Na_2S_2O_5$), sodium bisulphite ($NaHSO_3$), sodium sulphite ($Na_2SO_3$), sodium thiosulphate ($Na_2S_2O_3$), 3% hydrogen peroxide ($H_2O_2$).
- ✓ Bleach solutions that either contain other hazardous contaminants or cannot be safely neutralized, must be disposed as chemical waste via HWIS.

**Acids (low pH) & Bases (high pH)** – their aqueous solutions are common examples of corrosive waste.

- ✓ Collect corrosive aqueous waste with in clear/white plastic containers with screw top caps/lids for disposal at ESF.
  - Include liquid waste mixtures containing additional hazardous contaminants (e.g. heavy metals, cyanides, sulphides, etc.).
- ✓ Attach the **Corrosive Waste Disposal Tag (Green)** shown below.
- ✓ Affix your generator barcode.
- ✓ Include pH & check the **Corrosive Acid/Base/Piranha box** waste on the tag.

NOTE: ESF does not require treatment of corrosive waste (neutralization) before HWIS disposal – this is a best practice only. **Caution**! Only neutralize acids and bases if it is safe to do so – strong acid–base reactions (neutralization) are typically exothermic.

## SAMPLE Aqueous Waste Profile

**Drain Disposal Assessment Tool**: Certain laboratory liquid waste streams which are not hazardous (i.e. not toxic/corrosive/flammable/reactive), ***may fit drain disposal under certain conditions***.

Complete the online aqueous waste profile to allow Environmental Protection to determine if the waste stream of concern can be disposed via the sanitary sewer.

*Refer to the SRS webpages (Pollution Prevention - Sanitary Sewer & Hazardous Waste Procedures) for additional guidelines - see summary below for required information.*

| **Contact Information** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Chemical Name(s)** | | | | | | | |
| **Contaminants**<br>*(per HWR/TDG + Sewer Bylaw + WHMIS/GHS)*<br>*Check the SDS & provide a link.* | Yes/No or N/A | Conc % | Volume (mL/L) | Freq | pH | LD50 | Health Hazards or Toxic to Aquatic Species |
| Corrosive | | | | | | | |
| Toxic | | | | | | | |
| Biohazardous/ Infectious | | | | | | | |
| Flammable | | | | | | | |
| Oxidizing | | | | | | | |
| Dangerously Reactive<br>(potentially explosive, flammable solids, spontaneous combustion, water reactive) | | | | | | | |
| Environmental hazard / Marine pollutant | | | | | | | |
| Oil & Grease | | | | | | | |
| Phenols, BETX (benzene, toluene, xylene), PAH's (naphthalene), etc | | | | | | | |
| Metals (As, Cd, Hg, Pb, Ag, Zn, etc.) | | | | | | | |
| Other inorganic contaminants (cyanide, sulphide, etc.) | | | | | | | |
| Suspended Solids | | | | | | | |
| Large particles | | | | | | | |

***NOTE: Dilution of waste for the purpose of meeting concentration limits is NOT ALLOWED.***

## Toxic Waste Disposal Tag

TOXIC WASTE

The University of British Columbia, Environmental Services Facility

Parcel Identification No: T052210001

TOXIC WASTE


Parcel Identification No: T052210001

GENERATOR TO COMPLETE THIS SECTION ONLY

AFFIX IDENTIFICATION BARCODE LABEL HERE

**WASTE CONTENT**

- ☐ Formalin
- ☐ Toxic Liquid
- ☐ Toxic Solid

Other _____

Office use only:

**Quantity** ____ kg ____ 5L ____ 20L ____ 205L

Environmental Services Facility (ESF)
Phone 604.822.1285

## Corrosive Waste Disposal Tag

**CORROSIVE LIQUID WASTE**

The University of British Columbia, Environmental Services Facility

Parcel Identification No: C052210001

**CORROSIVE LIQUID WASTE**

Parcel Identification No: C052210001

GENERATOR TO COMPLETE THIS SECTION ONLY

AFFIX IDENTIFICATION BARCODE LABEL HERE

**WASTE CONTENT**

Please check ☑

Do **NOT** include mercury, glass, pipettes & tips, plastic, sludge, sand, etc.

- ☐ Corrosive Acidic
- ☐ Corrosive Basic
- ☐ Piranha Solution _____ (Date made) yyyy-mm-dd
- ☐ pH _____ (1-14)

Other _____

**NOTE: CONTENTS IN THIS CONTAINER MAY BE TREATED PRIOR TO DISPOSAL**

Office use only:

**Quantity** _____ 5L _____ 20L _____ 205L

Environmental Services Facility (ESF)
Phone 604.822.1285