DISPOSAL OF LABORATORY WASTES TO SANITARY SEWER

Policy for Drain Disposal of Laboratory Chemicals at Alfred University

INTRODUCTION

Staff at the Village of Alfred Waste Water Treatment Plant, the Treatment Plant’s engineering firm, and the Village of Alfred Sewer Ordinance were consulted in developing these guidelines to assure that local government regulations are followed.

RESPONSIBILITIES

Within individual laboratories, authorization for specific operations, delineation of appropriate safety procedures and instruction about these procedures is a responsibility of the principal investigator.

It is the responsibility of Alfred University laboratory workers to be sure that chemical waste generated from their activities is disposed of properly. Some materials can be safely let into the sanitary sewer and others can cause damage to health, the environment or the functioning of the wastewater plant.

Laboratory workers should consult this guide before undertaking drain disposal of any lab chemicals.

GENERAL GUIDELINES

What

Send down the drain only those materials found on the safe list. Compounds not listed are not suitable for drain disposal.

Where

Drain disposal must only be used when the drain flows to the sanitary sewer* system, which eventually goes to the wastewater treatment plant. Storm drain systems flow directly into surface water and should NEVER be used for chemical disposal. Floor drains may flow to storm sewers and should never be used for disposal. Laboratory sinks should be used for disposal of chemicals on the safe list as discussed below.

How Much

Quantities of chemical waste for drain disposal should be limited generally to a few hundred grams or milliliters or less per day. Larger amounts should have prior approval. Only materials listed as safe for drain disposal in this document are approved for drain disposal in quantities up to 100 grams or 100 milliliter per discharge. Disposal should be followed by flushing with at least 100-fold excess of water at the sink. (That means for 100 ml of chemical run the water for about two minutes at maximum flow.)

Note: Sulfuric, hydrochloric, acetic and phosphoric acids may be discharged in larger quantities after they have been neutralized. They must be neutralized to a pH of between 5.0 and 9.0 before they can be drain disposed to the sanitary sewer.

*Sanitary sewer is the system of sinks, toilets, drains and associated pipes that send wastewater to a treatment plant where it is biologically and chemically treated before discharge into the environment.

Safety

Understand the hazards and toxicity of the materials you work with by consulting material safety data sheets. Work slowly to avoid splashes and wear the proper protective equipment (lab coat, goggles or face shield, gloves) during drain disposal.

NOT SAFE FOR DRAIN DISPOSAL

THE FOLLOWING MATERIALS ARE PROHIBITED FROM DRAIN DISPOSAL:

• Ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, manure, hair and fleshings, entrails, paint residues, solid or viscous substances capable of causing obstruction to the flow of sewers.
• Some chemicals that are **not appropriate** for drain disposal include:

  - Halogenated hydrocarbons
  - Nitro compounds
  - Mercaptans
  - Flammables (immiscible in water)
  - Explosives such as azides and peroxides
  - Water soluble polymers that could form gels in the sewer system
  - Water reactive materials
  - Malodorous chemicals
  - Toxic chemicals such as carcinogens, mutagens, teratogens

• Substances that boil below 50° C.

• Liquids with a temperature greater than 150° C.

• **Mixtures that have a component not found on the safe list.**

• **Any material not found on the safe list.**

*Check with Environmental Health and Safety at x 2190 if you are not certain about drain disposal for a particular material.*

**SAFE FOR DRAIN DISPOSAL**

**Inorganics**

Dilute solutions of inorganic salts where both cation and anion are listed below are suitable for drain disposal. Materials listed are considered to be relatively low in toxicity.

Compounds of any of these ions that are strongly acidic or basic must be neutralized to a pH range of 5.0 to 9.0 before drain disposal. See Appendix A

<table>
<thead>
<tr>
<th>Cations</th>
<th>Anions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al$^{+3}$</td>
<td>BO$_3^{-3}$</td>
</tr>
<tr>
<td>Ca$^{+2}$</td>
<td>B$_4$O$_7^{-2}$</td>
</tr>
<tr>
<td>NH$_4$+</td>
<td>Br$^-$</td>
</tr>
<tr>
<td>H$^+$</td>
<td>CO$_3^{-2}$</td>
</tr>
<tr>
<td>K$^+$</td>
<td>Cl$^-$</td>
</tr>
<tr>
<td>Li$^+$</td>
<td>HSO$_3^{-}$</td>
</tr>
<tr>
<td>Mg$^{+2}$</td>
<td>OCN$^{-}$</td>
</tr>
<tr>
<td>Na$^+$</td>
<td>OH$^-$</td>
</tr>
<tr>
<td>Sn$^{+2}$</td>
<td>I$^-$</td>
</tr>
<tr>
<td>Sr$^{2+}$</td>
<td>NO$_3^{-}$</td>
</tr>
<tr>
<td></td>
<td>PO$_4^{-3}$</td>
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<tr>
<td></td>
<td>SO$_4^{-2}$</td>
</tr>
<tr>
<td></td>
<td>SCN$^{-}$</td>
</tr>
</tbody>
</table>
SAFE FOR DRAIN DISPOSAL

Organics

Materials listed below in quantities up to about 100g or 100 ml at a time are suitable for disposal down the drain while flushing with excess water. These materials are soluble to at least 3 percent, present low toxicity hazards and are readily biodegradable.

Alcohols (at less than 24% concentration)
Alkanols with 4 or fewer carbon atoms:
- methanol
- ethanol
- propanol and isomers
- butanol and isomers

Alkanediols with 7 or fewer carbon atoms
- ethylene glycol
- propylene glycol
- butylene glycol
- butanediol + isomers
- pentylene glycol
- pentanediol + isomers
- hexylene glycol
- hexanediol + isomers
- heptamethylene glycol
- heptanediol + isomers

Alkoxyalkanols with 6 or fewer carbon atoms:
- methoxyethanol
- ethoxyethanol
- butoxyethanol
- 2-methoxyethoxyethanol
- n-C4H9OCH2CH2OCH2CH2OH (2(2-butoxyethoxy)ethanol)

Carboxylic Acids

pH must be between 5.0-9.0
- formic acid
- acetic acid
- oxalic acid (1,2-ethanedioic acid)
- lactic acid (2-hydroxypropanoic acid)

RADIOACTIVE MATERIALS

Radioactive materials may not be drain disposed with the following exceptions:

- Wash and rinse water used for cleaning contaminated glassware that has been double rinsed may be drain disposed. The first two rinses of the glassware must be collected in liquid radioactive waste containers.

- With specific written permission from the Radiation Safety Officer, in accordance with procedures stipulated by Federal, State, and Local regulations, Alfred's license to use radiation, and the University Radiation Safety Committee, certain radioactive materials may be approved for drain disposal. Call x 2190 for specific information.
APPENDIX A

NEUTRALIZATION PROCEDURES

Federal, state and local regulations allow for elementary neutralization (pH adjustment) of hazardous wastes without a permit provided:

1. the waste is a “characteristic corrosive waste” only (40 CFR 261.22, EPA code D002) and
2. the neutralized waste is discharged to the sanitary sewer meeting all applicable discharge standards.

Therefore, the decision for neutralization must be made on a case-by-case basis:

1. the waste chemical must be a “characteristic corrosive” aqueous solution. If the chemical waste carries any additional listed, process or characteristic codes, it must not be neutralized and disposed of to the sanitary sewer, but managed as hazardous waste. An example of this would be a corrosive solution containing a listed or characteristic toxic code (a heavy metal).
2. if a chemical waste does meet the code criteria for neutralization it must be neutralized to a pH range of 5.0 to 9.0, then discharged to the sanitary sewer.

General Instructions:

• Do neutralizations in a fume hood as fumes and heat may be generated. Wear lab coat or apron, gloves and goggles.

• Keep containers cool during process.

• Work slowly.

• When neutralization is complete, flush to sewer followed by copious amounts of water.

• Keep a log stating: chemical being neutralized, neutralizing chemical, pH and quantity discharged, date and your initials (see Environmental Health and Safety web site). Submit this log to Environmental Health and Safety when submitting hazardous waste logs for hazardous waste removal.

• Equipment:
  Elementary Neutralization Unit (large beaker or plastic bucket)
  Stirring wand (large plastic spoon)
  pH paper or pH meter
  Safety goggles, gloves and lab coat

Acid Neutralization
1. While stirring, add acids to large amounts of an ice water solution of base such as sodium carbonate, calcium hydroxide, or sodium hydroxide for concentrated acids.
2. When a pH of 5.0 to 9.0 is achieved, dispose of the solution into the sewer, followed by copious amounts of water.

Base Neutralization
1. Add the base to a large vessel containing water. Slowly add a solution of HCl.
2. When a pH of 9.0 to 5.0 is achieved, dispose of solution into sewer system followed by copious amounts of water.

See Alfred University Elemental Neutralization Waste Log Form for recording neutralized acids and bases; submit forms to EH&S at time of hazardous waste disposals (twice annually).
APPENDIX B

WASTE OIL COLLECTION AND DISPOSAL

1.0 WASTE OIL COLLECTION (INCLUDING VACUUM PUMP OILS)

Oil should be collected and stored temporarily within your department in properly labeled DOT approved containers. The containers must be stored inside the building. The containers must be clearly marked "Waste Oil Only: No Solvents."

2.0 DISPOSAL OF WASTE OILS

When the oil containers are full please contact EH&S x 2190 to obtain information on the disposal of oils.

References:


Safety Manuals from Cornell University and the Universities of Wisconsin and Cincinnati.

Village of Alfred Sewer Ordinance