

## **PROCEDURES FOR LABORATORY CHEMICAL WASTE DISPOSAL**

In an effort to create a more effective, cost efficient and environmentally friendly waste management system on campus, we are proposing the following procedures for the disposal of hazardous chemical laboratory waste.

### **Procedures for disposal of hazardous waste**

Segregate materials according to the categories listed on pages 3 and 4. If possible, also segregate within categories. Unless the materials are used together during the course of an experiment, segregate all waste. Do not mix chemicals together in one container for convenience sake. We can not stress strongly enough that different chemicals have different disposal methods. If you are unsure of which category to use or if the materials can be safely mixed into one dump, call the safety office (737-4320). Do not guess and do not assume.

Label all containers with the group name from the chemical waste category and an itemized list of the contents. For example, do not label a container simply 'Corrosive Liquids'. List each chemical in the container, including all solvents used. List by full name only. Abbreviations, initials or chemical formulas are not acceptable labels.

Liquid dumps are intended for liquids only. Do not place glass or plastic items, such as tubes or pipettes, into solution dumps. If these items require disposal, package them separately. (Keep plastic and glass waste separate.)

Any waste containing PCB's must not be placed in waste dumps. Special procedures are in place for disposal of PCB's and it is important to keep the volumes small.

### **Packaging and containers:**

All waste must be appropriately packaged for the waste category. For example: corrosive waste should be stored in non-metallic containers.

All liquid waste must be stored in leakproof containers with a screw-top or other secure lid. Snap caps, mis-sized caps, parafilm and other loose fitting lids are not acceptable.

Solid debris must be placed in plastic bags. Do not place chemical or other non-biohazardous material in a biohazard bag. Biohazard bags are for biohazardous material only. Any waste disposed of in these bags will be treated as such.

For the disposal of vials containing liquid scintillation fluid, place plastic and glass scintillation vials in separate boxes. Plastic vials can be placed loose in a cardboard box lined with a garbage bag. Glass vials should be placed in trays, then placed in a box.. Attach a completed "Waste Scintillation Fluid" label (include all requested information). Please do not "hide" items for disposal in the boxes; the boxes are opened for final disposal and unexpected items can create a safety hazard to personnel.

Sharps (needles) must be well packaged to avoid any possibility of puncturing personnel. Used needles should be disposed of in a commercial sharps container or other suitable heavy plastic container. With the lids secured, place the containers into a cardboard box and seal with tape. Label "Sharps for disposal".

### **Importance of segregating waste**

It is very important that hazardous materials are segregated into the proper categories. Different hazardous waste have different disposal methods. These disposal methods are also reflective in the cost of disposal. For example, waste which has the potential for reuse or recycling, such as non-halogenated organic waste is less expensive to dispose of than waste which is destroyed in a chemical incinerator, such as halogenated organic waste. There is also a tremendous environmental advantage to reusing and recycling chemical waste. When categories are mixed, the disposal method is always for the "more hazardous" chemical. To use the above examples, when a few litres of a

halogenated solvent is mixed with a drum of non-halogenated solvent, the entire volume must be considered halogenated waste. The contents of the drum, including the recyclable waste, will be destroyed in an incinerator.

### **Importance of proper labelling**

Waste that is picked up from a lab is not sent to the final waste disposal facility in the original container. For example, a 4L bottle of waste lead solution is bulked into a 205L drum with lead solution from other labs. This is either done on-site at our campus transfer station or, in the case of larger volumes, at a waste brokers transfer station. Little on site testing is done before bulking. We depend on the labels you place on the containers. If a container is mis-labelled or incompletely labelled, that is, all the contents are not listed, we may inadvertently place the waste in the wrong bulking drum. With the many hazardous combinations of chemical incompatibility possible, this could have serious implications. The result could be the release of noxious fumes, formation of more hazardous compounds, fire or even explosion.

It is also important when shipping hazardous waste to the disposal companies that the exact contents of the containers are known. Transportation of Dangerous Goods (TDG) regulations require that the transport of hazardous materials include detailed shipping documents. Also, although we do not test the container's contents, the waste disposal companies do extensive testing of all waste to determine the proper waste disposal method. Surprises in the containers will result in a surcharge levied onto the cost of disposal. Besides the unnecessary cost expenditure, this can also result in an embarrassing situation when it appears that we are hiding "more hazardous" waste in with other materials.

**Chemical Waste Categories** (see flowchart): AVOID MIXING WITHIN, AS WELL AS, BETWEEN CATEGORIES. SEGREGATE WASTE WHEREVER POSSIBLE.

CONSULT WITH SAFETY AND ENVIRONMENTAL SERVICES (4320) BEFORE MIXING WASTE.

Organic waste - Phenol

Examples: any waste generated which contains phenol or phenol mixtures, including phenol-acid mixtures and phenol-chloroform mixtures.

Organic waste - Halogenated

Examples: any halogenated organic waste or any mixtures containing halogenated organic waste, except those containing phenol. Including chlorinated oils such as cutting oil. Examples: chloroform, 1,1,1-trichloroethane, methylene chloride

Organic waste - Corrosive

Examples: non-halogenated solvent-acid mixtures, non-halogenated organic acids such as acetic acid, trichloroacetate, acetic anhydride.

Organic waste - Non-halogenated plus water

Examples: non-halogenated solvent-water mixtures or non-halogenated solvents with greater than 20% water such as 80% ethanol.

Organic waste - Non-halogenated

Examples: acetone, toluene, acetonitrile, ethyl acetate, heptane, hexane, alcohol with less than 20% water.

Corrosive waste - Acid

Examples: hydrochloric acid, sulphuric acid, nitric acid, chromic acid, hydrofluoric acid.

Corrosive waste - Inorganic/acid mixture

Examples: iron III chloride, aluminium trichloride, mercury compounds dissolved in acid, other inorganic compounds dissolved in acid.

Corrosive waste - Alkali

Examples: hydroxides, phosphates, ammonia.

Corrosive waste - Alkali mixture

Examples: compounds dissolved in hydroxides, phosphates, ammonia.

Waste Oil

Examples: used pump oil, crankcase oil, hydraulic oil. Excluding halogenated oils such as cutting oils.

Reactive waste

Examples: air and water sensitive materials such as Grignard reagent, alkaline metals, reactive halides.

Waste oxidizers

Examples: all nitrates, potassium dichromate, metal peroxides such as chromium dioxide.

Inorganic waste

Examples: heavy metal compounds and solutions such as those of mercury, lead, copper and zinc (except those dissolved in acid), other inorganic compounds not covered by another category.

Hazardous waste - Other

Examples: waste not covered by any other category. All waste in this category must be segregated. No mixtures. Does not include radioactive waste, biohazardous waste, highly hazardous waste, explosive waste or surplus chemicals.

**Materials not covered under these procedures:**

Radioactive waste

Follow procedures in place for the disposal of radioactive waste.

Biohazardous waste

Follow procedures in place for the disposal of biohazardous waste.

PCB waste

Includes any waste containing or suspected of containing PCB's. Follow procedures in place for the disposal of PCB's.

Explosive or other highly hazardous materials

Examples: peroxide formers such as aged ether, di and tri -nitro compounds, old flares, azides. These materials require special disposal. Consult the safety office for arrangements.

Surplus chemicals

Examples: any chemical which is no longer used or needed but which is still in good, usable condition. Consult the safety office for an assessment.

**To request laboratory waste collection:**

Send a completed "Request for Laboratory Waste Collection" form to the *Office of Safety and Environmental Services, Facilities Management*. If you have any questions or are unsure of any part of these procedures please call 737-4320.