

Waste Management – Division of Science

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Categorisation and segregation of hazardous wastes

If you are producing hazardous waste then a **risk assessment** of the work activity generating such waste must have been completed within your department. The University (its staff and students) must make every effort to categorise, segregate and contain wastes according to the standards imposed by current legislation and best practice.

If there is any uncertainty about the proper categorisation or method for dealing with a particular waste Health & Safety or the department of Energy and Environment (which includes Waste Management) should be contacted. Since 1992 the duty of care for pollution control and the revision of the associated Regulations has imposed stricter management and documentation procedures. These requirements can only be met by following a scheme of management based on the strict segregation of hazardous wastes from the greater bulk of less harmful material which arises in the University. Such a scheme will also help to minimise the increasingly high costs of waste disposal.

Contaminated and Hazardous Waste Streams

If you are producing hazardous waste then a risk assessment of the work activity generating such waste must have been completed within your Department or Centre.

For specific wastes go to table 1 to find the appropriate disposal route.

Laboratory waste

1. **Low-hazard aqueous waste** can be poured down the sink. Dilution to the sewer can be the most appropriate method for disposal of a wide range of materials, particularly organic. Advice can be sought from the Dept. of Energy and Environment as to whether disposal to drain is appropriate. **Some chemicals are prohibited from entering the drainage system (see Discharges to Drain)**. (Some items will be excluded by our trade effluent consent). Very-low-level radioactive aqueous waste must only be poured down designated sinks (as long as permits are in place!). The controls stipulated by the Environment Agency mean that radioisotope users are required to log details of such aqueous radioactive waste disposals on the individual radioisotope's track record.

Problems of disposal to drain experienced in the past, by other institutions, include those associated with the poor state of repair of the drains. This was exacerbated with the cavalier use of water vacuum (Venturi) pumps to generate vacuums for filtration and rotary evaporation apparatus where materials which are highly volatile or have a strong stench are being used.

Acetone (used for a final rinse for clean lab glassware) should not be disposed of to drain. In 2003 there was an explosion in the drainage system at Bath University, probably caused by acetone vapour.

2. **Organic solvent waste** should be segregated into 'halogenated' (chlorinated) and 'non-halogenated' (non-chlorinated) labelled 2.5 litre glass Winchester bottles. Users should be aware that there is a potential problem when mixing incompatible solvent wastes (such as chloroform and acetone, ethers and ketones, isopropyl alcohol and ketones, nitro compounds and amines). NOTE the labelled bottles should have special (vented) caps to release any gradual build-up of pressure. Waste contractors usually bulk the contents of these bottles into 205 litre metal drums, maintaining the segregation between halogenated and non-halogenated waste. The bottles are re-used for waste solvents. The contaminated solvents can be sent for use as support fuels in cement kilns.

3. **Spent photographic chemicals** (developer and fixer) should be segregated in containers and sent for silver reclamation and proper disposal. If a silver trap is used, the waste material can be discarded down the sink and the silver trap disposed of appropriately.

4. **Waste oil** from laboratories can be collected in suitable (e.g. 5 litre plastic) containers. This can then be taken for recycling.

5. **General solid laboratory waste** is essentially low hazard industrial waste and should be placed in black bins. This stream must not contain glass, 'sharps' or 'hazardous waste' materials. The porters collect this waste and transfer it to the large industrial waste bins. These are emptied and the contents sent for local landfill. Problems have been experienced in the past with the improper segregation of hazardous waste from this stream (such as hypodermic needles and loose powders) so black bag use in labs should be closely monitored.

6. **Contaminated or hazardous laboratory waste** (including all gloves) should be placed in yellow bins. 'Special wastes' consist of any of the controlled wastes which contain substances or have characteristic properties specified in the Hazardous Waste Regulations 2005. The Environment Agency provide an interpretation of the definition and classification of hazardous waste as an aid to the identification of Hazardous Waste. This stream must not contain glass or 'sharps'. These bags are collected, at least once a week, by the local council for incineration.

7. **All waste contaminated with biological material** should be placed in the clear bags for autoclaving. Disposal via this stream includes anything that has come into contact with biological material including used tissue culture plastics and items exposed to microbial organisms. The autoclaved bags will then be placed into yellow bags for incineration by the local council.

- 8. Disposable and broken laboratory glassware** is segregated into glass bins. These are collected by the local council for disposal via incineration. This stream should not include iodine, hypodermic needles, sealed ampoules or vials of fluids, capped bottles, reusable/recyclable containers such as milk bottles, coffee jars and wine bottles or laboratory reagent bottles which should be washed, dried and segregated for recycling.
- 9. Clean glass bottles** should be segregated for recycling. Some laboratory reagent suppliers (such as Merck and Fisher) will take back empty 2.5 litre Winchester bottles. Most chemical bottles are made from soda glass (low melting temperature) and providing they are clean, have their caps removed and any hazard warning labels have been defaced or removed they can be sent for recycling. Borosilicate laboratory glassware (high melting temperature, e.g. 'Pyrex' and 'Rasotherm') must not be sent for recycling as it can cause very expensive damage to the glass kilns and should be disposed of as described in 8 above. Containers for recycling such bottles are situated in lab prep rooms and/or wash-up areas where these bottles are routinely encountered.
- 10. Fluorescent light tubes, ordinary light bulbs and large incandescent lamp bulbs** can be collected for recycling. (Fluorescent tubes contain mercury and they are now classified as 'special waste' to be disposed of by the council.)
- 11. 'Sharps' must be discarded into approved Sharps bins.** Sharps comprise items such as hypodermic needles (and attached disposable syringes if removal is inadvisable), small shards of broken glass, mercury-free glass from broken thermometers, scalpel blades and other small sharp items. As long as biological and/or chemical contamination can be rendered harmless, disposable glass Pasteur pipettes can be disposed of as waste glassware (see 8 above). Sharps bins are treated as clinical waste no matter from where they originate. Prior to collection, Sharps bins must have their closures secured, should be autoclaved if a biological hazard is present and the tops secured with adhesive packaging tape. They are disposed of via incineration with residues going to landfill.
- 12. Solid radioactive waste** should be managed by the University's Radiological Protection Officer. The controls stipulated by the Environment Agency mean that users are required to log details of radioactive waste. At present, we have no permit to undertake work with radioactivity.
- 13. Radioactive solvent waste** (used scintillation vials) should be segregated in 60-litre disposable plastic sealable containers which are sent for incineration. (Set an upper limit of radioactivity of 4MBq per container). At present, we have no permit to undertake work with radioactivity.
- 14. Bottles of chemicals**, which are surplus to requirements. Disposal of these may be via incineration, landfill or neutralisation. You should consult Waste Management about the best disposal route for a particular chemical.
- 15. Refrigerators and freezers** disposal. These are sent for destruction in approved premises usually through local Council waste disposal contractors.
- 16. Asbestos-containing waste** should be managed by the Waste Management Dept.
- 17. Computers, monitors and associated hardware.** Contact Computing and Waste Management who will decide if the equipment can be recycled.

Discharges to drain

Does UoB have a [Trade Effluent Discharge Consent](#) and who is it issued by? Trade effluent rules usually state that when the University's effluent reaches the public sewer it must have;

pH not less than 6 or greater than 10
temperature not to exceed 43.3°C (110°F)
there must be no flammable solvents, petroleum or any volatile petroleum products.
Suspended solids not to exceed 500 mg/l of effluent
all suspended material to pass through a screen having perforations of 6.5 mm in diameter
grease and oil or fats not to exceed 200 mg/l of effluent
maximum quantity not to exceed 500 cubic metres in a 24 hour period
rate of discharge not to exceed 6 litres per second

Substances prohibited from entry into the sewerage system;

petroleum spirit (flammable)
calcium carbide (produces highly flammable acetylene gas on contact with water)
carbon disulphide (highly toxic and flammable)
organo-halogen compounds, incl. pesticide residues and degreasing agents (toxic)

Problems of disposal to drain are experienced with a poor state of repair of the drains. This is exacerbated with the cavalier use of water vacuum (Venturi) pumps to generate vacuums for filtration and rotary evaporation apparatus where materials, which are highly volatile or have a strong stench are used.

Prohibited Substances, which must not be disposed of in the general waste bins or down the sink;

Aldrin	Hexachlorobutadiene
Antimony (**10mg/l)	Lead (**10mg/l)
Arsenic (**10mg/l)	Malathion
Atrazine	Mercury and compounds
Azinphos-ethyl	Nickel (**10mg/l)
Azinphos-methyl	Organo-halogen compounds
Beryllium (**10mg/l)	Parathion
Cadmium and compounds	Parathion-methyl
Calcium carbide	PCBs (polychlorinated biphenyls)
Carbon disulphide	Pentachlorophenol and compounds
Carbon tetrachloride	Petrol
Chloroform	Selenium (**10mg/l)
Chromium (**10mg/l)	Silver (**10mg/l)
Copper (**10mg/l)	Simazine
DDT	Tetrachloroethylene
1,2-Dichloroethane	Tin (**10mg/l)
Dichlorvos	Tributyl-tin compounds
Dioxins	Trichlorobenzene
Drins (aldrin, dieldrin, endrin)	Trichloroethane
Endosulfan	Trichloroethylene
Fenitrothion	Trifluralin
Fenthion	Triphenyl-tin compounds
HCH (gamma hexachlorocyclo-hexane)	Vanadium (**10mg/l)
Hexachlorobenzene	Zinc (**10mg/l)

** At point of discharge to the public sewer