

IX. Disposal of Low-Level Radioactive Waste

A. Waste Minimization

Authorized Users and radiation workers should be aware of the volume and activity of waste produced. Should any proposed work with RAM generate a waste that cannot be processed by the methods described in this section, contact ORS prior to beginning the project.

In all cases, whether waste is shipped for disposal or held onsite for decay, volume minimization is very important. Please survey materials to be sure that non-radioactive wastes are not unnecessarily placed in the radioactive waste.

B. Separation of Waste Types

ORS uses several methods to process low-level waste at MCW, depending on the chemical and physical form. It is essential that labs segregate waste according to type before it is offered to ORS for disposal.

HAZARDOUS MATERIALS, LEAD SHIELDING AND UNDEFACED RADIATION STICKERS OR LABELS ARE NOT PERMITTED IN RADIOACTIVE WASTE.

C. Scintillation Fluids

High-Flashpoint (HFP or Bio-Safe) Cocktail – As a general policy, MCW allows the use of only non-hazardous liquid scintillation (LS) fluids. In some cases, low-flashpoint (LFP or toluene-xylene based) cocktails may be used, **but only with prior approval by ORS**.

H-3 and C-14 – Liquid scintillation fluids containing only H-3 and C-14 in concentrations less than 0.05 $\mu\text{Ci/ml}$ must be kept separate from other scintillation fluids. The concentration is averaged over each “batch” of vials.

Isotopes with Half-Lives Less than 120 Days – LS fluids of this type can be held for decay, and must be separate from other types.

Other Isotopes or Fluids – The disposal of other long half-life isotopes or low flash-point cocktails must be arranged with ORS. These wastes are often EPA-regulated “mixed” wastes, the cost of disposal for which can be high. The Authorized User may need to bear a portion of the disposal costs.

D. Sewer Disposal

Low-level radioactive liquids may be disposed of directly to the sanitary sewer, if the following conditions are met:

- The material is readily soluble, or is readily dispersible biological material, in water.
- Radioactive liquids must be disposed in designated sinks only.
- A record must be kept of all disposals.
- The activity does not exceed the following limits:

Isotope	Activity
^3H	5,000 μCi
^{14}C	1,000 μCi
All Others Combined	1,000 μCi

Authorized Users may choose to transfer liquids to ORS for disposal. Such liquids must be stored in approved containers.

E. Dry, Solid RAM Waste

Lab waste contaminated with RAM that contains only dry solids, paper, plastic, gloves, glass and some metal shall be prepared for disposal and transfer to ORS.

The following are NOT PERMITTED in RADIOACTIVE WASTE:

- HAZARDOUS MATERIALS;
- LEAD SHIELDING;
- UNDEFACED RADIATION STICKERS OR LABELS.



Make sure all radioactive labels are clearly defaced before disposing into either the regular trash or radioactive waste.

ORS provides semi-transparent yellow bags with the radiation symbol printed on the outside. Put the waste in the bag, fill out a waste pickup request in the online database, print the waste tag and place it in the bag with the text facing out so that it may be read. Securely close the bag using supplied zip ties and place in the designated waste storage area. Radiation Safety will pick up the waste as soon as we are able.



H-3 and C-14 – These are the only two isotopes that may be combined in a single bag.

All Other Isotopes – Waste from any isotopes other than H-3 and C-14 must be placed in separate bags.

Sharps – Contaminated sharps must be stored in approved sharps containers. Contaminated sharps must be segregated according to isotope, the same as for other dry, solid waste.

F. Biological Waste

Animal carcasses or tissue containing RAM must be disposed of through transfer to ORS. Waste must be bagged, tagged, and kept frozen.

- Animal tissue containing H-3 or C-14 in quantities less than 0.05 $\mu\text{Ci}/\text{gram}$, averaged over the weight of the entire tissue or carcass may be combined into the same bag.
- All other isotopes or H-3 and C-14 concentration above 0.05 $\mu\text{Ci}/\text{gram}$ must be bagged separately.

Due to freezer space constraints, the Authorized User should consult with ORS before starting any projects involving biological waste containing RAM. The cost of storing biological waste may be passed on to the Authorized User.

G. Mixed Hazardous and Radioactive Waste

Projects that generate hazardous waste mixed with radioactive contamination must be declared on the Application for Authorization and approved by the RSC. Contact the Safety Office for hazardous waste criteria.

H. Waste Tags

A waste tag must be completed for every item of waste. Waste tags are available from ORS. The waste tag must contain the following information:

- Authorized User name,
- Isotope,
- Activity,
- Physical form (solid, biological, etc.),
- Chemical form, if applicable for hazardous or other constituents,
- Date completed.

Waste items with incomplete information will be sent back to the Authorized User, and will not be picked up by ORS.

I. Shipping Containers, Vials

Shipping Containers – Shipping containers and the secondary containment vial holders that arrive from the vendor with RAM orders are checked for contamination upon arrival at MCW. However, it is the responsibility of the Authorized User to verify boxes, cartons, shielded containers and any packing materials are not contaminated in the laboratory.

In general, shipping materials should be kept contamination-free so that they may be disposed of in the ordinary trash. Before disposal in the ordinary trash, verify that:

- A survey confirms that no radioactive contamination is present,
- All shipping labels or other markings or symbols indicating “Radioactive” or references to activity have been clearly defaced, so that a member of the public would not confuse the package for one containing radioactivity,
- All lead has been removed.

Stock Vials – When stock vials are emptied, deface the label and put the vial in with the dry, solid radioactive waste.