

8.4 Liquid Waste

There are two main types of liquid radioactive wastes generated by research laboratories. The most common liquid waste is aqueous, in which the waste materials are dissolved in water. Such waste may be disposed of by dispersal into the sewage system if concentration limits are low enough. Designate and label a sink for this purpose. The pH range of any aqueous waste shall be adjusted to between 6.8 and 8.0. Aqueous wastes shall not exceed the following concentrations:

<u>Radionuclide</u>	<u>Concentration ($\mu\text{Ci/ml}$)</u>
H-3	1×10^{-2}
C-14	3×10^{-4}
P-32	9×10^{-5}
P-33	8×10^{-4}
S-35	1×10^{-3}
I-125	2×10^{-5}
I-131	1×10^{-5}

Other radionuclide concentration limits can be found in Title 10, Code of Federal Regulations, Part 20, Appendix B, Table 3.

The other, less common form of liquid radioactive waste is composed of volatile, flammable, toxic or organic material that cannot be disposed of through the sewage system. Water insoluble organic solvents shall not be released into the sewage system under any circumstances. (Toluene and xylene-based liquid scintillation cocktails and some HPLC fluids fall into this category. Users are advised to use water-soluble fluids whenever possible). *Non-aqueous waste shall be free of all filterable solids.* For filtering liquid scintillation waste, a 60-mesh metal screen is recommended. Organic, water-insoluble liquid waste is then collected by DRS personnel for disposal. Non-aqueous waste shall be stored in spill-proof, unbreakable plastic containers of either six or ten liter capacities.

Liquid wastes that do not fit into the above categories must be treated on a case-by-case basis. See also Section 8.7 *Mixed Wastes*

CAUTION:

Problems involving chemical reactions between mixtures of liquid wastes may occur. Disposing of cyanides in acidic liquid waste will produce hydrogen cyanide, a very toxic gas. Special care must be taken when disposing of tissue that has been digested in nitric acid, as oxides of nitrogen may be formed that could cause the waste container to explode. The PI must ensure that chemical reactions will not occur in liquid waste containers.

Improperly prepared or packaged radioactive waste that during movement or handling will pose an unacceptable hazard to workers, other members of the campus community, or the public must be immediately corrected before pick-up by DRS personnel can occur. Improperly packaged radioactive waste must not be left uncorrected.

Prior to pick-up by DRS, each container must have a completed *Radioactive Waste* tag attached to it. These tags are available from DRS. Appendix B gives instructions for completing these tags. When waste has been properly prepared, logon to DRS website at: <http://www.drs.illinois.edu/> and complete the online pickup request.

8.5 Animal Carcasses

Radioactive material used in animals must be handled on a case-by-case basis. PIs planning to administer radioactive material to animals should contact DRS for guidance concerning the disposal of carcasses.

Animal tissues containing 0.05 μCi or less of H-3, C-14, or I-125 per gram of animal tissue averaged over the weight of the entire animal can be disposed of as if it were not radioactive. However, animal tissue in which radioactive materials have been introduced *shall not* be disposed in a manner that would permit its use either as food for humans or as animal feed, such as rendering.

8.6 Unacceptable Methods of Radioactive Waste Disposal

No freestanding liquids, lead, sharps, or animal carcasses/tissue may be disposed of in solid wastes.

Under no circumstances shall personnel bury radioactive waste in the soil.

Under no circumstances shall *non-aqueous* radioactive waste be released into the sewage system.

Aqueous radioactive liquids in excess of the concentrations specified in Section 8.4 shall not be released into the sewage system. The liquid must either be held for decay or turned into dry waste and packaged appropriately.

Carcasses or animal tissues in which radioactive materials have been introduced *shall not* be disposed of by rendering (a manner that would permit its use either as food for humans or as animal feed).