

UNIVERSITY OF SOUTH CAROLINA
RADIATION SAFETY POLICY NO. 7

USC NOVEMBER 1985
(Revised May 2011)

Preparation and Disposal of Radioactive Waste

A. Policy and Purpose

This policy is designed to ensure that all radioactive waste is handled safely and is sorted for ease of disposal. Implementation of this policy will ensure compliance with State Regulation RHA 3.55, concerning the general requirements for waste disposal.

B. Definitions

1. aqueous liquid - liquid radioactive waste which has no constituents defined as hazardous by 40 CFR, Part 261. (ex. buffer solutions, nutrient media, lysed cells);
2. mixed waste - waste which meets both the NRC's definition of radioactive waste in 10 CFR Part 61.55 and the EPA's definition of hazardous waste in 40 CFR Part 261;
3. non-hazardous scintillation fluids- scintillation fluids that have no constituents defined as hazardous by 40 CFR, Part 261, and are labeled as biodegradable or environmentally safe. (will not contain toluene, xylene, or have a flash point <140 F);
4. radioactive waste- any material that contains:
 - a. radioactive contaminated general laboratory trash such as glass, paper, lab clothing, gloves, culture dishes, syringes, etc;
 - b. animal carcasses, animal tissues, or bedding containing residual radioactive tracers;
 - c. sealed radioactive sources used for instrument response checks or research;
 - d. aqueous solutions containing radioactive contaminants;
 - e. vials containing scintillation fluids and radioactivity;
 - f. outdated or empty stock vials.

C. Responsibilities

1. The principal investigator is responsible for preparing all waste material for transport from the laboratory. The material must be sorted and labeled as outlined in this policy.
2. The individual user must dispose of radioactive waste in a safe manner and must follow the provisions outlined in this policy.
3. The health physicist is responsible for ensuring that all radioactive trash is properly sorted, labeled and tagged. The health physicist has the authority to reject or return any waste that has not been properly handled by the principal investigator.
4. The radiation safety officer will oversee the packaging, transport and disposal of all radioactive waste generated by the University.

D. Procedures and Practices

1. The Radiation Safety Office must be notified by e-mail at radsafe@mailbox.sc.edu when a radioactive waste pick-up is needed. All waste will be picked up according to the following schedule unless changes are required:
 - a. all requests from the School of Medicine Campus will be handled every Thursday;
 - b. all requests from the Columbia campus (Biology, Chemistry, Physics, Pharmacy, School of Public Health and Psychology) will be handled every Tuesday;
 - c. all requests from all other campuses will be arranged as needed.
2. The Radiation Safety Office must receive a waste pick-up request no later than 3:00 p.m. the day before the scheduled pick-up; otherwise, the waste will be handled the following week.
3. In the event of inclement weather, holidays, etc., the schedule will be changed to the next available day.
4. Radiation safety will reject any material that is not properly packaged, labeled or tagged.

5. The activity (mCi or uCi) for each type of waste must be recorded on form (EHS-F-RAD-027) and the disposal of radioactive waste shall be handled as follows:

a. Solid Waste

- 1). Solid waste must be placed in covered, trash containers that are lined with plastic bags. The containers must be labeled with "radioactive" tape or radiation warning signs.
- 2). No liquid whatsoever shall be put into the solid waste. If any liquid is found in the collected solid waste, the waste will be returned to the principal investigator's laboratory to be separated.
- 3). Pasteur pipettes, needles, razors and other sharp objects must be packaged in a cardboard box.

b. Liquid Waste

- 1). Two and one half gallon plastic carboys are provided, on request, from the Radiation Safety Office for collection of bulk liquids.
- 2). Bulk liquids must be separated as follows:

a) Aqueous liquids

- (1). C-14 and H-3 (tritium) can be combined;
- (2). It is preferred that all other isotopes be separated for ease of analyzing.

b) Mixed liquids

The generation of mixed liquids (radioactive and hazardous) must be avoided due to severe disposal restrictions. If the generation of this type waste is unavoidable, the Radiation Safety Office must be contacted prior to its generation to ensure a disposal option is available. Bulk scintillation media with C-14 and/or H-3 may be classified as "Hazardous Only" providing a radioactive limit is not exceeded.

- 3) All liquid waste must be readily soluble with no trace of mold, bacteria, tissues, or other materials that would prohibit pouring.

- 4) Carboys with blood or blood by-products must be adequately processed by the laboratory to eliminate any bio-hazardous component.
- 5) Liquids can only be accepted with a pH range of 6 to 9.

c. Scintillation Vials

- 1) **Only vials containing non-hazardous scintillation fluid will be accepted for disposal.**
- 2) Vials will be picked up with the scintillation fluids in them if they are packed in scintillation vial trays and separated as follows:
 - a). C-14 and H-3 can be combined;
 - b). All other isotopes must be separated; for example P-32 vials and S-35 vials go into different waste drums, so they must be placed in separate trays.

d. Biological waste

The principal investigator must supply the following information for each animal carcass containing radioactive material: isotope amount injected and animal weight. All carcasses must be double-bagged in plastic and sealed before being frozen. Animal bedding must be double-bagged and sealed with the isotope and approximate activity noted on the tag.

6. No liquid radioactive waste shall be disposed of in the sanitary sewer system. When cleaning contaminated glassware, the first two rinses must be poured into a plastic carboy and treated as liquid waste. Any remaining residue in the glassware can be washed in the sink labeled for radioactive use.
7. Any waste with infectious agents will not be picked up by the radiation safety staff until certified by the biohazards manager that all such agents are deactivated and/or rendered as non-infectious.

E. References

1. 40 CFR, Part 261, Hazardous Waste Identification
2. 10 CFR, Part 61, Licensing Requirements for Land Disposal of Radioactive Waste.