

RADIOACTIVE WASTE POLICY FOR DUKE UNIVERSITY/MEDICAL CENTER

The Environmental Programs Division of the Occupational and Environmental Safety Office manages the collection, decay, and disposal of radioactive waste for Duke Medical Center and University. Radioactive wastes are accumulated in laboratories in waste containers provided by Environmental Programs. Waste must be segregated by physical form and if possible, by isotope for collection. This document contains the specific criteria for radioactive waste segregation, packaging and disposal. Questions should be directed to the Environmental Programs Division at 684-2794.

Segregation and Packaging of Radioactive Waste for Pickup

A. Segregation.

Two types of segregation must be completed: a physical segregation of wastes by form and if possible, by isotope. The physical forms include: dry solids, aqueous liquids, animal carcasses, scintillation vials, and liquids with radioisotopes and hazardous chemicals (mixed wastes). For each form you must use a different waste barrel.

B. Radioactive waste packaging.

1. **Dry solids** - Dry solids generally consist of paper, plastic, glass, metal (not lead), and other assorted laboratory wastes without significant liquid content.

All radioactive dry waste must be collected, segregated by isotope if possible, and sealed in plastic disposal bags (tear-resistant) provided by the laboratories. Remove excess air in plastic bags before sealing to minimize volume. Bags must be sealed with tape or twist-tie and then placed in a second bag and sealed to ensure contamination control. The secondary containment bags provide a means for collecting potentially contaminated rubber gloves used to close primary disposal bags. [Sharps in containers are acceptable in dry waste barrels provided that they are placed in some sort of cut/puncture resistant container. Sharps containers are available at the stockrooms and are acceptable for waste disposal in dry waste and carcass barrels. Sharps include, but are not limited to, needles, razor blades, Pasteur pipettes, and broken glass. In addition to packaging, all waste packages must be labeled according to the procedures described under *Disposal, tracking, and pick-up request* (section C).

Laboratories using one isotope or with extra space to accommodate multiple barrels may **consolidate** waste by using a separate barrel for each isotope and directly adding dry waste to the barrel without separately packaging first. However, when the barrel is full, the plastic bag lining the barrel must be sealed and labeled according to the procedures described under *Disposal, tracking, and pick-up request* (section C).

2. Aqueous liquids -Aqueous liquids are solutions involving water as the only solvent.

Radioactive aqueous liquids must be collected in plastic containers approved by Environmental Programs (with size appropriate to the quantity generated) by isotope if possible, and sealed such that the liquids will not leak. Additionally, each collection container must be maintained in a catch basin capable of holding the total volume of liquid, in case any leaking or if spills occur. Small amounts of liquids can be discarded in sealed tubes with dry waste as long as the volume of liquid does not exceed 25 milliliters for the entire barrel. **Note: The use of clay absorbent is prohibited.**

3. Animal carcasses

Radioactive animal carcasses and their associated bedding, excreta, tubes, sharps, etc. must be bagged and sealed in 3 mil plastic bags. Waste packages should be labeled with a radioactive tag and a barcode label.

4. Scintillation vials

Scintillation vials and in-vitro vials should be collected in containers provided by OESO. Before vials are placed in a waste container they must be removed from the carton and have all the caps tightened. Scintillation vials do not have to be segregated by isotope. Biological vials must be handled as carcass waste, due to their tissue content.

5. Mixed Waste

For the purposes of this policy, mixed wastes are those wastes that contain both radioisotopes and hazardous chemicals. Refer to the Chemical Waste Policy for Duke University/Medical Center for the definition of Hazardous Waste. Laboratory personnel must determine if the waste generated by an experiment would be classified as a mixed waste. Examples of mixed waste include: tritiated benzopyrene in ethyl acetate, ^{32}P labeled GTP in chloroform, and ^{14}C labeled acetic acid.

Notify OESO EP prior to generating mixed wastes. NOTE: This policy specifically excludes solvent based scintillation cocktail fluids used for scintillation counting.

6. Lead Containers

- Lead is an EPA regulated hazardous waste and cannot be discarded in the regular trash or with the radioactive waste. However, it can be recycled. Lead containers (pigs) and shielding can be recycled through Environmental Programs. The laboratory must wipe test each pig to ensure that they are not contaminated with radioactivity. They can then be submitted as chemical waste in the on-line Waste Pickup Request System.

7. Other types of radioactive waste

Contact the Environmental Programs Division if you will be creating any radioactive waste that does not fit any of the above categories.

C. Disposal, tracking, and pick-up request.

1. Disposal and tracking.

Each bag of waste placed in the barrel must be packaged according to the specifications listed in *Radioactive Waste Packaging*. In addition, each bag must be labeled with a barcode label. **Note:** For bags with mixed (multiple) isotopes, document all isotopes and their activity on the log sheet disposal form. This documentation of multiple isotopes must also be entered when submitting the waste via the on-line Waste Pickup request System.

For consolidated wastes, with one isotope per barrel, the bag lining the waste barrel is the collection bag. The laboratory must seal this plastic bag with tape and attach one barcode label on the outside of the bag. This barcode label should be readily visible to the technicians upon collection.

Laboratory personnel are responsible for providing a blank log sheet form for all new barrels.

2. Standard Pickup requests

Laboratory personnel in each work area will be responsible for requesting pickups of their radioactive waste. Requests are made on-line through the Waste Pickup Request System. Pick-ups will occur within one business day of a request (excluding weekends and Medical Center holidays); however, waste containers will not be removed if the waste is packaged incorrectly. The technicians will notify laboratory personnel of any problems with the waste when they occur. If the laboratory has questions or needs to solve a waste related problem, they should call Environmental Programs staff at 684-2794.

3. Hot barrel pick-up requests.

Because of differences in shielding and handling requirements, Environmental Programs handles hot barrels differently than standard pickups. Environmental Programs defines a hot barrel as any barrel that gives off greater than **2mR/hr**, one meter from the unshielded barrel.

To have a hot barrel picked up, Environmental Programs must be notified 24 hours in advance. Call 684-2794 and ask for the radioactive waste manager. We will need to know the isotope, activity, waste type, and number of barrels. You will be given a 2 hour time window during which the waste will be picked up the following workday.