

# MUHC Disposal of Radioactive Medical Waste

**Purpose:**

To ensure proper handling and disposal of radioactively contaminated waste.

**Scope:**

To provide general instructions to Nuclear Medicine staff on handling radioactively contaminated medical waste resulting from the Nuclear Medicine Department's patient care protocols for the diagnostic and therapeutic use of radioactive materials at approved MU Health Care locations.

**Personnel Qualifications:**

Staff who perform these duties are required to be Radiation Workers for Nuclear Medicine per the MU Radiation Safety Program. Furthermore, function specific training on this procedure is required and must be provided by current MUHC Nuclear Medicine Staff knowledgeable in the procedure and processes.

**Procedure:**

Radioactive medical waste consists of radioactively contaminated waste from the Nuclear Medicine facilities or from radiopharmaceutical inpatients. Typically, this waste is bagged, labeled and stored for decay at a central collection location. Waste that is a puncture hazard must be collected in an appropriate sharps container.

1. During collection, waste will be segregated into separate containers as appropriate and labeled accordingly. Segregation will most often occur in the University Hospital Health Science Center (HSC). It is a requirement, per 10 CFR 20.1904, to label each container with the specific isotopes placed inside so that decay in storage may be assessed according to half-life. This may be done by either writing out the isotope and estimated activity on an HML-R or generating and affixing a NMIS report which relays accurate isotopic information.
2. Several types of containers are available for waste disposal including sharps boxes, cardboard boxes with liners, and plastic bags.
  - a. To close any type of waste container, the Radiation Worker will wear appropriate PPE and dosimetry throughout the procedure.
  - b. Waste bags will be twisted and folded over, then sealed with an appropriate closure device such as a zip-tie or duct tape.
  - c. Cardboard boxes must first have their inner bags sealed in the same manner as waste bags. Then the boxes must be sealed shut using duct tape or packaging tape.
  - d. Sharps containers shall be closed securely.

3. The Nuclear Medicine Hot Labs each have their own temporary storage locations or bins for these items while the container is still in use. When a Radiation Worker needs to dispose of the container, it is removed from the hot lab and either taken to a long-term storage location for decay in storage or held in the hot lab until decayed. This decision depends on the isotopes in the waste container and/or exposure rates taken at the surface of the waste container.
  - a. For the Health Science Center (HSC), the long-term storage location is room GL-29 (also called GL-21C).
  - b. Because isotopes with short half-lives, such as Fluorine-18, are often used at Ellis Fischel Cancer Center (EFCC) and Women's and Children's Hospital (WCH), the waste can be stored in the respective hot labs when capacity allows.
4. Radioactively contaminated wastes are held for a minimum of 10 half-lives at all locations and then surveyed by a Radiation Worker in a low background area to determine if the exposure rates on contact are indistinguishable from background. To determine that the container's radioactivity cannot be distinguished from background, surveys will be performed:
  - a. At the container surface,
  - b. With an appropriate meter set on its most sensitive scale, and
  - c. With no interposed shielding
5. It is the Radiation Worker's responsibility to assess the contents of the waste container to determine the longest-lived isotope and calculate the 10 half-life time frame.
6. If the waste has an exposure rate indistinguishable from background after 10 half-lives, then it shall be disposed of as follows:
  - a. All containers will have radiation information removed or defaced prior to disposal.
    - i. If labels are visible and cannot be obliterated, Nuclear Medicine will notify EHS via EHS Assistant (EHSA) that the item must be picked up and transferred to the Radioactive Waste Building (RWB) to be processed for incineration.
  - b. Solid waste will go into dumpsters.
  - c. Sharps containers will be labeled with a "Pathological Waste" tag and moved to the biohazard disposal room.
7. If, after 10 half-lives, the waste container is above background, a notation will be made in the records and the container will be held until such time that the readings are no longer above background. Consult the MU Radiation Safety Staff with any questions.
8. All locations must document the following on the Decay Form RSIP-W-08-F1.01 (**Activities are obtained from NMIS, calculations, or Written Directives**):
  - a. Date when the waste is placed in storage,

- b. Isotope(s) contained in the waste,
  - c. Initial exposure rate, and
  - d. Date and exposure rate when the waste is removed from storage following a final survey of the item after ten half-lives.
9. Some radioactively contaminated items for medical use are not processed as waste. When items typically provided in patient rooms (such as phones and remote controls) cannot be decontaminated after a procedure (typically iodine-131), they must be held for decay. These items are then returned to the room once a meter survey has been completed to verify that there is no activity distinguishable from background. These items will be stored in GL-29 while being held for decay.

**References:**

1. University of Missouri NRC Broad Scope License 24-0513-32
2. University of Missouri Radiation Safety Manual
3. RSIP-W-08-F1.01 Disposal of Radioactive Medical Unwanted Materials (Waste) Decay Form