Radioactive Waste Guidelines

Purpose: To outline the guidelines for generating and packaging radioactive waste.

General: Radioactive waste is generated by various laboratory operations at UTHSC. This waste is collected in accumulation areas in each radioactive use laboratory. This document provides guidance for generators of radioactive waste with regards to proper packaging and waste minimization. Waste that has not been properly sorted and prepared will not be accepted for pickup. It is the responsibility of the Authorized User and associated lab staff to correct any issues with the radioactive waste stream as it exists in the laboratory.

Materials:
Survey meter with appropriate probes (if applicable for isotope)
PPE (gloves, lab coat, safety glasses, etc.)
Waste packaging materials (General Stores Number in Parenthesis)
- Large clear plastic bags (GS# 161-436)
- Small clear plastic bags (GS# 131-420)
- Tape

Yellow Cards
Waste Tags
Pen, calculator

Frequency: Varies, however waste should be removed from laboratories in a timely fashion. Most laboratories are not authorized to store radioactive waste for decay.

Guidelines:

A. Waste Generation

1. Determine if the waste is radioactive: Only radioactive materials should be placed into the radioactive waste stream.

2. Characterize the waste: Waste must be sorted by type and isotope into waste streams. Determine which category the waste falls into:

    a. Solid / Dry waste – contaminated paper, plastic, tubes, stock vials, etc… with no more than trace amounts of an associated liquid.

b. Liquid Waste: Aqueous solutions containing radioactive materials. The liquid waste can not contain hazardous materials. If it does then see Mixed Waste below.

c. Liquid Scintillation Vials (LSV): Liquid scintillation vials used for counting wipe tests or samples. Flammable solvents such as Xylene and Toluene based scintillation fluids should not be used.(see mixed waste below).

i. Regulated Vials: LSV's that contain more than 0.05 uCi/ml of H-3 or C-14, or any other isotope.
ii. Deregulated Vials: LSV's that contain no radioactive material, or less than 0.05 uCi/ml of H-3 or C-14

d. Mixed Waste: Radioactive waste that is also chemically hazardous. Examples include solutions which contain flammable solvents such as xylene, toluene or other hazardous chemicals combined with radioactive materials. Contact the Safety Officer for more details regarding hazardous waste management.

e. Biohazardous Radioactive Waste: Radioactive waste that is also a biohazard. Examples include radioactive waste containing human materials. This waste must be treated and the biohazard inactivated before it can be transferred to Radiation Safety. Contact the Biosafety Officer for details regarding biohazardous waste.

f. Radioactive Animals: Radioactive animal carcasses.

i. If the carcass does not contain greater than 0.05 uCi/g of H-3 or C-14 then it may be treated as non-radioactive as long the animal is not destined for human consumption. Records of transfer and disposal must still be maintained on the appropriate yellow cards, though this waste stream does not require a waste tag.

g. Sharps: Sharps contaminated with radioactive material. Examples include needles, scalpels, razor blades, pasteur pipettes and broken glassware.

h. Lead: Lead shielding or pigs may not be placed into radioactive waste containers. Clean lead should be put aside for pick-up and recycling. If you have contaminated lead, contact Radiation Safety for instructions.

3. Waste Accumulation: Radioactive waste must be accumulated according to the following guidelines:

a. Waste containers must be labeled (radiation symbol, isotope contained).

b. A record of waste disposal (waste tag) must be located at or on each container.
    i. The use log on the back of the waste tag must be updated each day that waste is disposed in the container.
    ii. *The front of the waste tag must be filled out completely in order for the waste to be collected.*
c. Containers must be lined with a thick clear plastic bag (see above).
d. Containers must be covered when not in use.
e. Containers should be made of impervious material (plastic, etc...) and have a cover. (*cardboard is not appropriate in most cases*)
f. Waste must be accumulated in a second clear plastic bag (see above).
g. "*Radioactive*" labels, stickers or tape must be defaced before they are placed in the waste container.
h. Stock vials should be completely defaced and placed into the dry radioactive waste stream.
i. Lead may not be disposed in the radioactive waste.
j. All waste must be segregated by type and isotope with the following exceptions:
    i. 3H and 14C scintillation vials may be accumulated together.
    ii. Non-radioactive scintillation vials may be accumulated with exempt concentration scintillation vials.
k. Waste containers for ^{32}P, ^{125}I or similar isotopes must be shielded appropriately.
l. Wastes with potential volatile radioactive components should be accumulated in a fume hood.
m. Liquid scintillation waste containing volatile organic solvents must be stored in a fume hood.
n. Sharps MUST be accumulated in a Radioactive Material labeled sharps container.
o. Aqueous liquid waste:
    i. Is preferred to be released to the sanitary sewer by sink disposal (see Sink Disposal).
    ii. May be absorbed in plastic jugs (thereby turning it into dry/solid waste). If necessary, ask Radiation Safety.
p. Animal carcasses or tissues should be double-bagged and frozen until picked up.
    i. These carcasses and tissues need not be stored in an impervious container as long as they are double bagged.
    ii. Include the weight of the animal (grams) in addition to the activity contained.

4. <u>Sink Disposal:</u> Aqueous radioactive waste may be disposed to the sanitary sewer by sink disposal as long as the following requirements are met.
    a. The sink is posted and approved for disposal.
    b. The daily disposal limit is not exceeded.

c. The waste is not hazardous (as determined by US EPA guidelines).
d. Any biohazards are inactivated prior to disposal.
e. The water should be run for several minutes before and after the disposal.
f. The sink and surrounding area must be surveyed by an appropriate method when disposal is completed.

B. Packaging

Waste must be packaged in the specified clear plastic bags. The open top should be adequately sealed. A completed radioactive waste tag must then be affixed to the bag. Scintillation vial waste and animal carcasses must be double bagged.

C. **Requesting a Waste Pick-Up**

Requests for radioactive waste pick-ups should be sent to radsafety@uthsc.edu as this creates an electronic record of the request. Users should include the following information:

1. Authorized User
2. Waste Location
3. Waste Description
   - **i.** Isotope(s)
   - **ii.** Classification (dry/solid, LSV, etc…)
   - **iii.** Volume (3 large bags, 55 gallon drum, etc…)

D. **Collection and Transport**

Radioactive waste is collected from the labs who have requested a pickup. Waste is then transported back to the central accumulation facility where it is segregated and packaged into drums pending disposal or on-site processing. Waste will not be collected if it does not meet the acceptance criteria. Any such deficiencies must be corrected by the laboratory.

In the event that radioactive waste must be transported by laboratory staff, the following guidelines must be adhered to:

1. Waste must be placed into appropriate secondary containment.
2. Waste may not be transported by vehicle.
3. All accumulation and packaging requirements specified above must be met.
4. The waste may only be transported to:
   a. A laboratory at UTHSC permitted for the use of radioactive materials and under the control of the same Authorized User who generated it. Prior authorization by Radiation Safety is required.
   b. Radiation Safety

Appendix A – Waste Tags

Appendix B – Sink Disposal Limits

Isotope	Disposal Limit (uCi/day)	Allowable Concentration (uCi/ml)
^{3}H	500	1 E -2
^{14}C	500	6 E -2
^{32}P	10	9 E -5
^{33}P	40	8 E -4
^{35}S	50	1 E -3
^{125}I	1	2 E -5
^{99m}Tc	500	1 E -2
^{65}Zn	5	5 E -5
^{18}F	300	7 E -3