USTUR 1050: RADIOACTIVE WASTE MANAGMENT

Purpose	Handling of radioactive wastes	**Method Number**	USTUR 1050
Original Date	5/25/11	**Author**	Fred Miller
Revision Number	0	**Approved By**	Sergei Tolmachev
Effective Date	6/15/2011	**Approval Date**	5/25/2011

SAFETY NOTE: Before beginning this procedure, read all of the Material Safety Data Sheets for the chemicals listed in Section 3 of this procedure.

1. Principle of Method

1.1 Identification and collection of waste materials contaminated with radionculides.

1.2 Evaporation and solidification of aqueous wastes to reduce volume, weight, and hazards associated with such materials.

2. Apparatus

2.1 Glass /Teflon Beakers and covers

2.2 Hotplates

2.3 Ringstands

2.4 Light guage polymer twine or monofilament line

2.5 Radioactive waste boxes

2.6 Box liners

2.7 Hazard labels and tapes

2.8 Ziploc bags (various sizes)

2.9 Duct tape and packing tape

2.10 Paper towels

3. Reagents

3.1 Portland cement

3.2 Water

4. Procedure

4.1. Unless surveyed/analyzed and proven to be non-radioactive, all solid and liquid wastes and disposable items which have come into contact with, or which are likely to have been contaminated by radioactive materials shall be deemed radioactive waste, and disposed

and managed in accordance with this procedure. This does not apply to reusable equipment such as beakers, flasks, or other laboratory apparatus, nor to washwater from glassware cleaning. All radioactive waste activities shall occur in authorized radiation use areas only. Evaporation and solidification techniques described in this procedure comport with the guidance set forth at Washington Department of Ecology Publication 96-416, Treatment By Generator, Revised December 2002. These steps are taken to treat the chemical hazards associated with USTUR's waste and preclude the generation of mixed wastes.

4.2 The dry radioactive waste box open and in use is located in Room 106, Radiochemistry Laboratory, under the bench across from the fume hood.

4.3 Closed radioactive waste boxes shall be moved to identified radiation use area in the northwest corner of the building to await pickup by WSU Radiation Safety personnel or their designated contractor/representative.

4.4 Radioactive waste boxes shall be constructed, assembled, marked, and managed in accordance with WAC 246, SPPM , WSU Radiation Protection Program Manual, WSU's Broad Scope Radioactive Materials License WN-C003-1, and USTUR's Radioactive Material Authorization

4.5 Determine the likely volume, chemical composition, and activity of any liquid effluents which may result from each procedure and ensure there is enough capacity in the open radioactive waste box to accept all likely wastes generated by the procedure. If there is insufficient capacity, build a new box and ensure sufficient markings, labels, and liners are on-hand to properly complete the task.

4.6 Obtain a sufficient number and size of appropriate waste collection vessels (typically beakers) and mark them "Waste Acid Solution" along with the type of acid (hydrochloric, nitric, hydrofluoric, etc). Collection vessels must be compatible with the type of acid in use (i.e. Teflon beakers when collecting hydrofluoric acid waste, glass for other acids). Affix a small section of radiation caution tape to each container.

4.7 Place waste collection container(s) sufficient for the procedure in a convenient location within the authorized radiation use area taking care to ensure the containers do not impede work and are not in danger of upset.

4.8 Once waste is first added, collection containers are to be kept covered at all times except when adding waste or during evaporation, emptying, and cleaning.

4.9 Upon completion of the radiochemistry procedure, filling of the waste collection container(s), or end of shift, either close/cover the container(s) and secure them from accidental upset and unauthorized access, or begin the evaporation/solidification process.

4.10 Evaporate liquid wastes to near dryness on a hotplate. Less than 5 ml of liquid should remain at the end of the evaporation step. Do not take to complete dryness. Close observation is required toward the end of this step to ensure residues remain easy to remove.

4.11 For non-oxidizing acid treatment: Set up a drying line with ringstands and line an available fume hood as shown at Figure 1, below.

4.11.1 Allow the container to cool to room temperature and wipe it out thoroughly with paper towels until no visible moisture is present.

4.11.2 Do not saturate towel(s). Use a sufficient number to prevent dripping. Hang the used towels on the drying line and allow to air dry overnight with the fumehood running. When towels are "dry to the touch" discard in the radioactive waste box.

4.11.3 Return glassware to dishwashing.

FIGURE 1

4.12 For oxidizing acid treatment: Prepare a ziploc bag of cement of to receive residual acid. Conduct this procedure in Room 107 Acid Digestion, southwest fumehood, only. Cement weight should be approximately twice acid weight.

4.12.1 Allow the container to cool to room temperaturel.

4.12.2 Decant the contents carefully into the bag of cement.

4.12.3 Leaving the bag unsealed to allow offgassing, gently knead the cement/acid mixture by palpitating the bag to ensure thorough mixing.

4.12.4 Allow the bag to stand in the hood until the cement mixture hardens, seal the bag, place it inside a clean bag, seal that bag, close it with duct tape, and dispose it in the radioactive waste box.

4.13 Deposit dry wastes such as gloves, benchtop papers, weigh boats, etc. in the radioactive waste box, ensuring to reclose the box after adding waste.

4.14 Contaminated broken glassware and other sharp objects shall be placed inside a strong container such as a metal or plastic can or box prior to being disposed in the radioactive waste box.

4.15 Spill cleanup wastes shall contain no free liquids or liquids which can be expressed from absorbent media by application of mechanical compression less than 150 psi.

4.16 Notify the Radiation Safety Office once a radioactive waste box has been filled and closed so they may arrange for pickup and disposal. Follow the procedures found on their web site at http://www.rso.wsu.edu/handling/Pickups.html

5. References

5.1 WSU Radiation Protection Program Manual.
5.2 WSU Broad Scope Radioactive Materials License WN-C003-1.
5.3 USTUR Radioactive Material Authorization.
5.4 WSU Safety Policies and Procedures Manual.
5.5 WSU Radiation Safety web site http://www.rso.wsu.edu