#### 1620 Revision 4 02/09/79

### THREE MILE ISLAND NUCLEAR STATION CONTROLLED COPY. STATION HEALTH PHYSICS PROCEDURE 1620 RADIOLOGICAL CONTROLS FOR PROCESSING RADIOACTIVE SOLID WASTE

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THREE MILE ISLAND NUCLEAR STATION

STATION HEALTH PHYSICS PROCEDURE 1620

Radiological Controls for Processing Radioactive Solid Waste
1.0 <u>PURPOSE</u>

This procedure outlines the responsibilities of the radiation protection group in the processing of solid radioactive waste.

- 2.0 DISCUSSION
- 2.1 In the operation of any nuclear facility, waste products will be generated. The elimination of these radioactive materials is complicated by the necessary concern over the exposure of personnel working with the waste. A waste disposal system has been installed at TMI to solidify evaporator bottoms and package spent resin. Whenever personnel are required to work with radioactive wastes, individuals knowledgeable in the safe handling of such materials should be present at all times.
- 2.2 It is also the responsibility of the radiation protection personnel to insure that solid waste material shipped from the station comply with transportation regulations set forth by the Nuclear Regulatory Commission and the Department of Transportation.
- 2.3 When considered necessary by the Radiation Protection Supervisor, the waste packaging operation shall be performed with the use of shielded shipping containers. This will reduce the possibility of excessive radiation levels in the packaging area and in the corridors leading to storage or shipping locations.
- 2.4 Piping and values to and from the exterior of the auxiliary building are located to allow for low activity solid wastes in slurry form to be pumped into a tank truck and dewatered for shipment off-site.

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#### 3.0 REFERENCES

- 3.1 Solid Waste Disposal System Description.
- 3.2 DOT Regulations, Part 100-199 10 CFR 49.
- 3.3 HPP-1618, Shipment of Radioactive Materials.
- 4.0 EQUIPMENT
- 4.1 Radiation Monitoring Equipment
- 4.2 Radiation Signs
- 5.0 OPERATICN INSTRUCTIONS
- 5.1 Responsibilities of the Radiation Protection Personnel at the Solid Waste Disposal System Location.
- 5.1.1 The radiation protection personnel must determine the level of radioactivity in the waste to be processed so that appropriate precautions can be followed. Depending upon the level of radioactivity in the waste, and the number of hours required for the operation, the radiation protection personnel may require either 1½" or 3" of equivalent lead shields to be placed around the 50 cu. ft. shipping contained to be loaded. If the estimated dose to personnel working in the areas is low, then no shielding may be required.
- 5.1.2 The radiation protection personnel will be responsible for posting of the area, in accordance with 10 CFR 20.
- 5.1.3 The operator or the rad waste foreman shall check the radiation levels in the vicinity of any filled containers in the solidification area after filling each container.
- 5.1.4 Before shipping the containers offsite a radiation survey of the shipping container shall be taken. (Use Form 1620-1 for the survey).

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- 5.2 Responsibilities of the Radiation Protection Personnel in Direct Loading of Radioactive Slurries into truck mounted shipping containers.
- 5.2.1 Radioactive wastes may be pumped directly as a slurry into truck mounted shipping containers. The radiation protection personnel will be responsible for placing appropriate radiation signs in the area around the tank truck (or rail car).
- 5.2.2 If radiation levels warrant it a controlled area may be established.
- 5.2.3 After filling the shipping container, areas likely to have become contaminated will be surveyed and decontamination, as required. Record results on appropriate forms.

5.3 Drumming Radioactive Waste.

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- 5.3.1 Radioactive waste may be placed in 55 gallon drums. The 55 gallon drums are connected to the solidification module (as are the 50 cu. ft. shipping containers) or place in the trash compactor.
- 5.3.2 A radiation survey of the drum will be taken after disconnecting it from the solidification module or removing it from the compactor, prior to loading it on a carrier for transportation to a designated burial site. (Results of the survey should be recorded on Form 1620-1).

5.4 Identification of Shipping Containers

- 5.4.1 Both 55 gallon drums and 50 cu. ft. shipping containers will be labeled in compliance with applicable NRC and DOT Regulations.
- 5.4.2 Containers will also be identified by a numbering system. An example of such a number is as follows: 73-1-D or 73-2-SC

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The first number (73) represents the year the container was surveyed. The second number (1 or 2) represents the container number. The third item is a letter or letters designation of the type of container (D=Drum, SC=Shipping Container).

- <u>NOTE</u>: When a new calendar year begins, the container number reverts back to "1". (e.g. 74-1-D or 74-2-SC).
- 5.5 Estimate of Activity (mCi) Content of Radioactive Waste Shipping Containers.
- 5.5.1 Solidified Material in 55 Gallon Drum.

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The activity may be determined by the following methods:

 If an isotopic analysis is available, the activity is determined by:

Activity (mCi) = Volume (Gal) x  $\Sigma$  S.A. (µCi/ml) x 2.49

 If an isotopic analysis is not available the activity may be determined by:

Activity (mCi) = 0.17 x Highest contact Gamma Dose Rate (mR/HR)

- NOTE 1: Results of the second method should be reviewed by the Supervisor of Radiation Protection prior to shipping the waste offsite.
- NOTE 2: The dose rate should be measured with the detector probe at contact with the longitudinal midpoint of the drum. Exercise caution to minimize contribution from other rad-waste containers or other sources of radiation in the area.

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- 5.5.2 Compacted Waste in 55 Gallon Drum
  The activity is determined by:
  For Full Drum:
  Activity (mCi) = 0.08 x Gamma Dose Rate (mR/HR)
  (See Notes in 5.5.1)
- 5.5.3 Solidified Waste in a 50 cubic foot (or larger) container.
- 5.5.3.1 If an isotopic analysis of the waste material is available, the activity is determined by:

Activity (mCi) = Volume (cu. ft.) x  $\Sigma$  S.A. (µCi/ml) x 18.9

- NOTE: Σ S.A. is the total of the specific activities of isotopes listed on the Geli Analysis printout whose specific activities show greater than 1 x 10<sup>-6</sup> µCi/ml. 18.9 is the conversion 2.832 x 10<sup>4</sup> ml/cu.ft. times .001 mCi/µCi times 2/3 (2/3 of total volume is radwaste, 1/3 is solidifying material).
- 5.5.3.2 If an isotopic analysis is not available, the activity is determined by:

Activity (mCi) = (0.82) x Gamma Dose Rate (mR/HR)

NOTE: The gamma dose rate is determined by averaging the dose rate from 4 contact readings taken around the container at its midpoint with an appropriate survey instrument.

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## SURVEY OF SHIPPING CONTAINERS

1.2.5° • • •

Bkg\_\_\_\_c/m eff.\_\_\_\_

IDENTIFICATION NUMBER	DOSE RATES CONTACT 3 FT.	CONTAMINATION GROSS COUNTS	DATE SHIPPED	COMMENTS			
		1					
TIME		PERFORMED BY					
DATE							
	RADIATION LEVE	L LIMITATIONS					
200 mrem/hr at su 10 mrem/hr at 6 f 2 mrem/hr in driv	urface of vehicle ft. from outside of ver's compartment or	surface of vehicle normally occupied	position	194 290			

THI DOCUMENTS

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DOCUMENT NO: TM-085

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Wilda R. Mullinix, NRC

# 7906140282

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