TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

March 29, 1982

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Chief
Licensing Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Ms. Adensam:

In the Matter of the Application of) Docket Nos. 50-390
Tennessee Valley Authority) 50-391

Enclosed are revisions to Watts Bar Nuclear Plant Final Safety Analysis Report section 11.5. These revisions were discussed with the NRC during a telephone conference call on March 8, 1982. Please note that the section concerning the Volume Reduction and Solidification System has been deleted since it is not part of the Watts Bar radioactive waste treatment system.

As specified in this revision, all solidification processes will be conducted with a vendor-supplied Process Control Program (PCP). This PCP will be generic to the system provided by the contractor and will be available for NRC review before use.

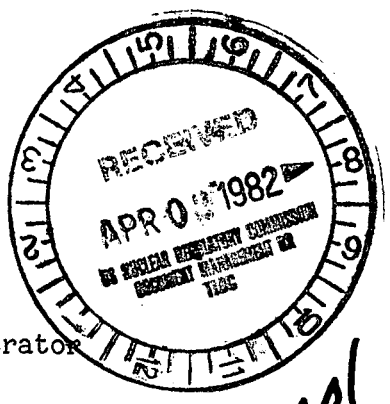
If you have any questions concerning this matter, please get in touch with D. P. Ormsby at FTS 858-2682.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Regulation and Safety

Sworn to and subscribed before me
this 29th day of March 1982
Paulette H. White
Notary Public
My Commission Expires 9-5-84



Enclosure
cc: U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

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11.5 SOLID WASTE SYSTEM

11.5.1 Design Objectives

The Solid Waste System is designed for the packaging of spent resins, evaporator concentrates, and chemical drain tank effluents.

Further, a separate system is available for the compaction of low radiation level, solid compressible wastes such as paper, disposable clothing, rags, towels, floor coverings, shoe covers, plastics, cloth smears, and respirator filters into 55-gallon drums.

It is estimated that 58,150 ft^3 of waste are produced each year from two units.

The packages of radioactive waste which are prepared for shipment are in compliance with 10CFR71 and 49CFR170 through 178.

Shielding is designed to limit the exposure rate in the work areas away from the drums to 2.5 mr/hr.

11.5.2 System Inputs

The input to the Solid Waste System is from the spent resin storage tank, the waste and auxiliary waste evaporator, and the Condensate Demineralizer Waste evaporator concentrate tanks and the chemical drain tank. Solid, compressible wastes are products of the plant operation and maintenance.

Volumes and radioactivity inventories are discussed in Subsection 11.5.5 and indicated in Table 11.5-1.

11.5.3 Process Description

The Solid Waste System is designed to package all solid wastes for removal from the plant.

Spent resins, evaporator concentrates, and chemical drain tank effluents are packaged in disposal liners or drums while solid waste like paper, clothing, rags, towels, etc., are compressed directly into drums. Noncompactible wastes such as metal pipes, lumber, and contaminated components (pumps, valves, and other items) are packaged in metal or wooden boxes.

Bulk Resin Processing

A system exists for packaging and dewatering bulk quantities of spent resin for removal from the plant.

The shipping container consists of an inner disposable steel

liner with an outer returnable shield. Filter elements are mounted inside the liner and are connected to a hose connection outside the shield. The container also has fill and vent connections.

Several types of shipping containers may be used. Most of these are vertical cylinders. TVA currently owns three different kinds of transportation casks. One has a capacity of 186 ft^3 and has a steel shield. The second is designed for waste of higher radioactivity level and has a capacity of 156 ft^3. It has a steel and lead shield. The third type has a capacity of 180 ft^3 and has a steel and lead shield. All containers have been licensed pursuant to the general license provisions of paragraph 71.12(b) of 10 CFR Part 71. Other licensed containers are available to TVA on a rental basis.

Loading of shipping containers is accomplished with the container mounted on a truck or trailer bed. The truck or trailer is located in the waste shipping container loading area (railroad access bay).

The container is filled from the spent resin tank. Resin slurry is sluiced to the container using water from the primary makeup water system. When the container is nearly full, the level-control valve is automatically closed. Water is removed from the container through the internal filters and is collected in the tritiated drain collector tank. A pump is used as required to aid the draining process. Additional slurry is added to the container and the fill-and-drain process is repeated until the level indicator shows that the desired amount of resin has been transferred. The waste is dewatered to meet the freestanding water limitations at licensed disposal facilities. The dewatering procedure utilized will be in the process control program (PCP) used for solidification. This dewatering procedure will be established by testing a liner containing noncontaminated resin. Following successful completion of the test, the procedure will be placed in the PCP. The test will document the procedures' ability to achieve the burial site freestanding water criteria.

Flush connections are provided from the primary makeup water system to flush the lines in the resin loading system.

In the event that the container were to overflow during the filling process, the overflow would take place through the vent line, and the liquid would drain to the tritiated drain collector tank. The strainer in the vent line would prevent overflow of resin.

Spent resin will also be produced from the use of the Mobile Waste Demineralization System. The service vessels which contain the resin during operation of the system will also be used as the

shipping containers. Following the exhaustion of the resin, dewatering or solidification will be conducted depending on what is necessary to meet the burial site criteria. Both the dewatering procedure and the solidification verification procedure will be in the PCP. Solidification will be accomplished by interfacing the demineralizer service vessel with the Mobile Solidification System.

Mobile Solidification System

The Mobile Solidification System (MSS) is designed to receive radioactive wastes such as spent resins, evaporator concentrates, and spent regenerant solutions, etc., combine the radioactive wastes with a solidification agent and additives if required, and package the waste for removal from the plant. Each type of radwaste will be solidified individually and not mixed with other types of waste prior to solidification. The MSS provides storage and feed capabilities for the solidification agent and additives, and will be a mobile self-contained unit. Radioactive waste is fed into a disposal shipping container together with controlled proportions of solidification agent and additives if needed. The shipping container to be filled is positioned within a shielded transportation cask, if required, on a trailer to minimize handling and associated radiation exposure to operating personnel. This filling and solidification process is conducted in the railroad access bay. All hatches and doors will be closed during the process to contain any possible leaks or spills. The MSS will be designed to the applicable parts of Regulatory Guide 1.143.

Resin and filter media such as charcoal resulting from the operation of the Mobile Waste Demineralization System will be solidified by utilizing the MSS.

The MSS will be a vendor-owned system. All solidification processes will be conducted with a vendor-supplied PCP. This PCP will be generic to the system provided by the contractor.

Miscellaneous Solid Wastes Compaction

Dry solid wastes include the following:

Air and gas filter and prefilter elements, liquid filter elements, and clusters of clothing, rags, paper, tools, mop handles, brooms, boards, glassware, and other items.

Air and gas filter and prefilter elements are placed in plastic bags and then into boxes, which are sealed.

Items such as tools, mop handles, brooms, and boards are placed in boxes. Many of these boxes are approxiately 2' x 2' x 6', although various sizes may be used.

Compressible materials such as clothing, mop heads, rags, and paper are compressed in a compactor. The compacting process involves the use of 55-gallon drums. The compactor utilizes a hydraulic ram to compact compressible material into the drums. The compactor is equipped with a dust shroud and enclosed HEPA filter to prevent escape of radioactive particulate matter during the compaction process. This shroud is connected to the building exhaust system. After the drum has been filled with compacted wastes, it is sealed and transferred to the storage area.

Glassware is placed in a box in the laboratory. When full, the box is sealed. The box is then placed in the compactor along with compressible waste.

If radiation levels of drums are high enough to require shielding, they are loaded into and transported in a cask similar to the steel cask used to transport liner containing bulk quantities of dewatered resin. Transportation of high dose rate drums within the plant may be done using mobile carts provided with lead shielding capable of moving throughout the plant.

11.5.4 Operation of Equipment

Mobile Solidification System (MSS)

The MSS takes radioactive wastes and combines solidification agent and additives, if needed, to solidify and package the waste in disposable containers. After filling is completed, the container is placed in a shielded transportation enclosure. The container may then be shipped or stored onsite.

Compactor Operation

The compactor is used to compress low radiation level solid wastes into drums. Solid wastes are inserted in the open drum, following which the drum is placed in the compactor, and the shroud door is closed. The drum is automatically positioned to be co-axial with the compactor ram. An operator initiates the compaction process by positioning an up/down switch in the down position, thus energizing the hydraulic pump motor. The hydraulic pressure forces the ram down into the drum, thereby compressing the wastes. To retract the ram, the operator positions the switch in the up position. The shroud door is opened, the drum is removed, and additional wastes are added to the drum. The cycle is repeated until the drum is full and the lid is installed, clamping ring tightened, and the drum stored pending shipment or storage.

The shroud is ducted to the plant ventilation system in order to remove dust or particulates that may be emitted from the drum during compression of the wastes. In addition, the assembly

incorporates a fail-safe switch that does not permit operation with the compactor door open.

11.5.5 Expected Volumes

The anticipated volume of solid radioactive wastes per year is found in Table 11.5-1. The activity of resins, evaporator bottoms, and chemical sludges is determined by running a gamma scan on a sample of the material. The activity of the trash, both compacted and noncompacted, is determined for each container using a direct calculation with the dose rate on each package.

11.5.6 Packaging

The primary method of waste packaging will be the Mobile Solidification System using 55-gallon drums or large disposable containers. This system will be designed to be capable of immobilizing liquid and slurry radioactive wastes within the limitations specified by Federal Regulations (10 CFR 71 and 49 CFR 170 through 178) applicable to packaging, handling, and transportation of radioactive materials.

Solid compressible wastes of low radiation level will be compressed in standard 55-gallon drums (DOT 17H) or other DOT-approved containers. After compaction, the container is closed and transported to the storage area. The drum is then transferred to a vehicle for disposal at a commercial site or moved to other approved onsite storage areas.

Radioactive plant filters will also be handled in DOT 17H drums. These drums will contain a layer of cement sufficient to absorb potential free water. The filter elements will be remotely and manually removed from the filter housing. Inplant transportation shielding will be provided as required. The filter elements may be drummed and stored in the waste packaging area of the Auxiliary Building awaiting shipment. Further contingency storage is provided in the Auxiliary Building filter decay pit to be used as necessary. Solidification or high integrity containers will be used for liquid filters whose activities are not less than 1 μCi/cc of isotopes with half lives greater than 5 years.

Necessary connections have been provided in the waste loading area shown in Figure 11.5-1 in order to allow for solidification and packaging of radioactive wastes utilizing mobile solidification and packaging equipment. These connections are shown schematically in Figure 11.5-2. When disposal facility requirements can be met without solidification or use of a high integrity container, the bulk packaging system will be used to dewater resin.

11.5.7 Storage Facilities

A drum storage area is located adjacent to the waste packaging area at floor elevation 713 ft. of the auxiliary building as shown. The usable storage area has a storage capacity for approximately 50 55-gallon drums (unstacked).

The entire floor area is serviced by a 6-ton overhead crane. The crane is equipped with an automatic mechanical lifting grab for the remote handling of drums. Shielding windows and television monitoring are provided to permit observation of the operations in the storage area.

11.5.8 Shipment

Radioactive wastes after packaging will be transported by truck, shielded as required, to the disposal site or to other approved onsite storage facility.

Table 11.5-1

Maximum Anticipated Total Solid Waste Generated Per Year

Waste Type	Volume (ft^3)
Spent Resins	1,200a
Evaporator Concentrates	7,000
Spent Regenerates	25,000
Trash	
Compacted (about 3:1 compaction)	12,000
Noncompactible	12,600
Spent Filter Cartridges	350
	58,150

aSolidified Volume is 1/2 this value if resin is dewatered.