

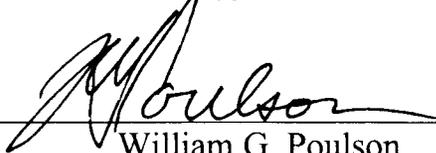
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Savannah River Site Liquid Waste Disposition Processing Strategy

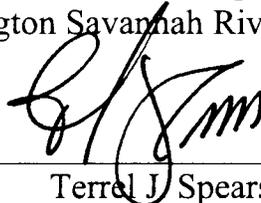
Steven A. Thomas

Approval:



William G. Poulson

Executive Vice President for Liquid Waste Operations
Washington Savannah River Company



Terrel J. Spears

Assistant Manager for Waste Disposition Project
Department of Energy—Savannah River Operations Office

Washington Savannah River Company
Liquid Waste Operations
Planning, Integration & Technology Department
Aiken, SC 29808

The Savannah River Site (SRS) Liquid Waste Disposition Processing Strategy provides a high-level overview of the strategy for liquid waste disposition and tank closure initiatives. The strategy is consistent with performance objectives of the Department of Energy (DOE) and the Common Goals and Values – jointly developed by the DOE, the South Carolina Department of Health and Environmental Control (SCDHEC), and the South Carolina Governor’s Nuclear Advisory Council (GNAC). The activities described herein support the following processing objectives;

- Continue storing liquid radioactive wastes in a safe and environmentally sound manner
- Meet tank closure regulatory milestones in the Federal Facility Agreement (FFA)
- Provide tank space to support staging of salt solution adequate to feed the Salt Waste Processing Facility (SWPF) at system capacity
- Sustain sludge vitrification in the Defense Waste Processing Facility (DWPF)
- Remove the tetraphenylborate (TPB) laden waste from Tank 48 so the tank is available to support DWPF feed batch preparation, tank closures, and SWPF feed batch preparation; treat and destroy the TPB waste unless SCDHEC concurs with an alternative disposition
- Minimize the quantity of radionuclides (curies) dispositioned in the Saltstone Disposal Facility to be as low as practical

The Salt Waste Processing Facility (SWPF) is the cornerstone of the salt processing strategy. This facility will be capable of processing approximately six million gallons of salt solution per year after the first year of operation. The decontaminated salt solution produced by the SWPF is expected to be below Class A limits for both Cs-137 and actinides, and will add less than 0.2 million curies (MCi) to the Saltstone Disposal Facility (SDF) vault inventory throughout its lifecycle.

There is currently a critical shortage of processing and storage space in the SRS radioactive liquid waste tanks. To enable continuation of risk reduction activities, an adequate amount of space in the newer-style tanks must be maintained through the disposition of a limited volume of lower activity salt solution to the SDF prior to the availability of the SWPF. Failure to preserve adequate tank space significantly extends the use of the aging tanks for waste storage, increasing the risk of releases to the environment and delaying risk reduction activities.

In order to maintain sufficient tank space, limited near-term retrieval, treatment, and disposal of salt waste is required. During the period prior to startup of the SWPF, interstitial liquid in the saltcake is extracted to the maximum extent practical, thus removing a large fraction of the radioactive material. Treated water is then added to dissolve the salt with the resultant salt solution transferred to a processing tank where it is adjusted to a sodium molarity that can be processed in downstream facilities. This treatment process is collectively referred to as Deliquification, Dissolution and Adjustment (DDA). DDA processing is required prior to startup of the Actinide Removal Processing (ARP) and Modular Caustic-Side, Solvent Extraction Unit (MCU) facilities to

enable continued tank closure activities, to sustain sludge disposition activities in DWPF, and to minimize continued limited use of older-style tanks. During the DDA phase, approximately 1.0 MCi will be dispositioned in the SDF vaults from the processing of the dissolved salt solution from Tank 41 and associated adjustment streams.

Once the ARP and MCU facilities are operational, the majority of waste will be further processed through these facilities¹. The combination of these facilities and their associated treatment processes significantly reduces the curies in the decontaminated salt solution dispositioned in the engineered SDF vaults. Approximately 0.2 MCi will be dispositioned in the SDF vaults from the processing of salt solutions through the ARP and MCU facilities.

Disposal in the engineered SDF vaults shall be limited to a volume of waste that contains 1.4 MCi from the combination of DDA (1.0 MCi), ARP/MCU (0.2 MCi) and SWPF (0.2 MCi) processes through the end of the salt processing program. The disposal of this volume of waste in the SDF is covered by SCDHEC through the Industrial Solid Waste Permit for the Z-Area Saltstone Disposal Facility (SCDHEC Permit # 025500-1603). Should these volumes or constituents vary due to the uncertainty associated with the current characterization of salt waste, DOE will explain the variation in the quarterly reports submitted to SCDHEC. The extent of variation due to characterization uncertainty in the actual curie content of this material may be as high as 2.3 MCi (1.7 MCi from DDA, 0.3 MCi from ARP/MCU and 0.3 MCi from SWPF). Greater than 99% of the curies are associated with Cs-137, which has a half-life of approximately 30 years, and its daughter product, Ba-137m, with a half-life of approximately 2.5 minutes.

One key activity necessary to support this strategy is the construction of a new low-level waste lag storage system. The construction of this new lag storage system will support placing Tank 50 in higher-activity waste service in H-Tank Farm. Tank 50 is a 1.3-million gallon, newer-style waste tank that has served as the Saltstone Processing Facility feed tank since it was placed into service. Both the location and design of this tank make the conversion of this tank to general Tank Farm services a very important element of this strategy. Industrial Wastewater permitting actions will be required by SCDHEC to allow the new lag storage system to be placed into service. Tank 50 is required to be placed into general Tank Farm service by January 2010.

Another key waste tank in this strategy is Tank 48. Tank 48 currently contains approximately 240,000 gallons of salt solution. This tank also contains approximately 19,000 kilograms of potassium tetraphenylborate and cesium tetraphenylborate. This organic material cannot be introduced back into the other Tank Farm tanks due to chemical incompatibility concerns. DOE and its prime contractor at SRS, Washington Savannah River Company (WSRC), continue to pursue a treatment technology for the

¹ Staging the DDA waste in an older-style tank and co-processing this waste stream along with the decontaminated salt solution from ARP/MCU may be necessary to optimize tank closure activities and the processing of material through DWPF due to the delays in the initiation of salt processing.

Tank 48 waste that would eliminate the organic component of waste, allowing this waste to be processed in the future through the SWPF and returning this critical waste tank to general Tank Farm service. Should no viable treatment technology be identified, DOE is reserving aggregation of the waste with other low level waste as an alternative contingency approach to returning Tank 48 to general service.

In support of the processing described above, additional infrastructure projects will be necessary to complete the treatment and disposition of tank waste and the ultimate closure of the older-style waste tanks. These projects will include the conversion of Tank 25 to service as the 2F Evaporator System concentrate receipt tank, upgrading the mixing capability in Tank 42 to permit the staging of sludge slurry mixtures, modifications to jumper configurations in waste transfer diversion boxes and upgrades to the transfer systems, construction of additional vaults at SDF to support waste disposition, and targeted technology development efforts in the areas of residual heel removal, annuli closure, tank cooling coil closure, and transfer line closure. In addition to these processing activities, DOE must implement the 2005 National Defense Authorization Act Section 3116 consultation process with the Nuclear Regulatory Commission in a manner that supports compliance with the FFA.

DOE will coordinate revisions of this Savannah River Site Liquid Waste Disposition Processing Strategy with SCDHEC in the following manner:

- A. DOE will formally notify SCDHEC of any planned changes as well as the anticipated impacts of those changes in advance to seek comments from SCDHEC as applicable.
- B. DOE will schedule a meeting for discussion of the planned changes with appropriate SCDHEC, DOE and Contractor representatives. SCDHEC may involve representation from the South Carolina Governor's Nuclear Advisory Council if deemed appropriate. This meeting may be waived by SCDHEC if no discussion is deemed necessary and may provide comments independent of this meeting.
- C. SCDHEC may elect not to comment based upon the magnitude of the planned changes.
- D. DOE will address comments provided by SCDHEC in the proposed revision of the Savannah River Site Liquid Waste Processing Disposition Strategy. DOE will ascertain whether SCDHEC believes the proposed revision will necessitate a modification to the Industrial Solid Waste Permit and, if so, will seek such modification.

In summary, the strategy described above supports completion of major salt processing and treatment activities associated with the liquid waste disposition. These activities

enable the closure of older-style tanks as required by the FFA, the sustained operation of the DWPF facility to stabilize and disposition legacy waste, and the staging of salt waste to allow the SWPF to begin operation.