



**Savannah River Site
Citizens Advisory Board**

**Recommendation 211
Draft Salt Waste Determination**

Background

The National Defense Authorization Act (NDAA) for fiscal year 2005 was signed into law by the President on October 28, 2004. Section 3116 provides the Secretary of Energy, in consultation with the Nuclear Regulatory Commission (NRC), the authority to determine that certain waste does not require disposal in a geologic repository as high level waste (HLW). Based on Section 3116, Department of Energy (DOE)-Environmental Management (EM) prepared a "Draft Salt Waste Determination" document. Although not required by NDAA, DOE made the document available for public review and comment on April 1, 2005. The draft 3116 Determination only applies to the disposal of solidified low-activity salt waste streams. However, the disposal pursuant to the Determination will enable DOE to continue to remove waste from HLW tanks and stabilize the high-activity fraction of the waste without interruption (Ref. 1).

DOE is treating the salt waste to segregate the low-activity fraction using a two-phase, three-part process. The first phase will involve two parts to treat the lowest activity salt waste: 1) beginning in 2005, processing minimal amounts of the lowest activity salt waste through a process involving deliquification, dissolution, and adjustment (DDA) of the saltcake; and 2) beginning in approximately 2007, processing additional salt waste with slightly higher activity using a, Actinide Removal Process (ARP) and a Modular Caustic Side Solvent Extraction (CSSX) Unit (MCU). The second, and longer term phase, beginning in approximately 2009, would separate and process the remaining (and by far the majority) salt waste using a Salt Waste Processing Facility (SWPF). The SWPF will use the same technologies as MCU (with the capability of using ARP if necessary), but on a larger scale and providing a higher decontamination factor for cesium (Cs) than the MCU. This second phase will begin as soon as SWPF is designed, constructed, tested and permitted by the State of South Carolina.

After processing via DDA, ARP/MCU, or SWPF, as dictated by the activity level of the salt, the resulting low-activity salt solution will be disposed in the Saltstone Disposal Facility (SDF) vaults as a solidified grout matrix. The low-activity salt solution will be mixed with dry chemicals (cement, slag, and flyash) to form a homogeneous grout mixture in the Saltstone Production Facility (SPF) and the slurry will be transferred to SDF where it solidifies. SDF and SPF are commonly collectively referred to as the Saltstone Facility. SDF is operated as a Class 3 Industrial Solid Waste Landfill and permitted as such through South Carolina Department of Health and Environmental Control (SCDHEC) regulations. DOE will not dispose of the solidified salt waste covered by the draft 3116 Determination until SCDHEC issues the appropriate permit modification (Ref. 2).

This draft Salt Waste Disposal section 3116 Determination concludes that the treated salt waste is not HLW because it meets the criteria established in 3116 and therefore may be disposed of as low-level waste at Savannah River Site (SRS). The projected dose from the salt waste disposed in the Saltstone facility will meet both DOE and NRC (10 CFR 61) dose limits for low level waste disposal. The compliance with 10 CFR 61 was based upon the results of the Performance Assessment (PA) and associated special analysis (Ref. 3). This draft 3116 Determination will be finalized after DOE has completed consultation with the NRC.

Comment

As voiced repeatedly in numerous motions (Ref 4, 5, 6, 7, 8, 9), the primary concern consistent with protecting workers, the environment, and the public, of the SRS Citizens Advisory Board (CAB) is to accelerate the HLW Tank closure schedule. A key component in accelerating the HLW closure process is the ability to process the low curie salt. The draft 3116 Determination allows low-curie salt processing to go forward and the SRS CAB supports its findings. Specific comments from individual SRS CAB members may be sent under separate cover.

The SRS CAB has also stated that shutting down the Defense Waste Processing Facility (DWPF)

operations or drastically reducing its production rate is unacceptable (Ref. 10). The proposed interim salt processing strategy is critical to prevent this from happening. The draft 3116 Determination supports this strategy. Interim salt processing will increase the available tank space to allow sufficient feed preparation for DWPF to keep it operating and help relieve concerns about SRS meeting its material stabilization and environmental management missions. Interim facilities are also needed to clear sufficient tank space with sufficient feed to operate SWPF efficiently. It will allow DOE to complete cleanup and closure of the HLW tanks earlier and increase the safety of operations by reducing the number of transfers among tanks. In the past, the SRS CAB questioned the logic of the Actinide Removal Process (ARP) and Modular Caustic Side Solvent Extraction (MCU) treatment due to its cost versus treatment capacity (Ref 11). Given the cost of \$1 million per day to operate the HLW system, operation of the MCU and ARP can avoid a HLW system life-cycle extension of 100 days or more; therefore, producing a breakeven project expenditures and the SRS CAB can now see the importance of proceeding with this treatment option.

The SRS CAB remains concerned about the organic compounds (Benzene) in the Tank 48 waste and the safety impacts it could have on DWPF and the reduction of melter life. Also, the SRS CAB questions what impacts the organics will have on saltstone. The SRS CAB wants more detailed information on the Tank 48 processing strategy.

The SRS CAB is also concerned about the uncertainty associated with the ultimate curie content of the waste going to SDF. The current estimate is 3 MCi but based upon the uncertainties associated with the characterization of the saltcake waste it could be as high as 5 MCi. Of particular concern is that DOE will work with SCDHEC to assure flexibility in operating the SWPF to accommodate disposal of between 3 MCi and 5 MCi. The SRS CAB believes that flexibility is needed to allow for this potential fluctuation.

The CAB would like to have an Independent Scientific Peer Review (ISPR) on both the Vault 4 Saltstone special analysis and the PA revision. An ISPR would result in more confidence in the results and conclusions on both these documents.

The Board concludes that 50 year old tanks, 13 of which have leaked, must be emptied and closed as soon as safely possible.

Recommendation

The SRS CAB recommends the following:

1. DOE-SR proceed with the planned interim technologies to ensure uninterrupted use of DWPF and to enhance risk reduction.
2. DOE SR provide to the SRS CAB by July 26, 2005, more detailed information on the Tank 48 process strategy, including alternatives, and the potential impacts to DWPF and Saltstone.
3. DOE-SR working with SCDHEC, assure flexibility in operating the Saltstone Disposal Facility to accommodate disposal of between 3 million and 5 million curies.
4. DOE-SR provide the results of an independent scientific peer review on both the Vault 4 Saltstone PA special analysis and the PA revision.
5. Give the Citizens Advisory Board the most recent updated tank-leak history and crack history in July 2005, and in April of each year thereafter.

References

1. Notice of Availability of Draft Section 3116 Determination for Salt Waste Disposal at the Savannah River Site, Federal Register, April 1, 2005.
2. Draft Section 3116 Determination for Salt Waste Disposal at the Savannah River Site February 28, 2005.
3. Saltstone Performance Assessment, presentation to the WM Committee by Elmer Wilhite, April 19, 2005.
4. Citizens Advisory Board Recommendation No. 69 (adopted November 17, 1998), "Selection of HLW Salt Disposition Alternatives."
5. Citizens Advisory Board Recommendation No. 81 (adopted March 23, 1999), "High Level Waste Salt Disposition Alternatives to the In-tank Precipitation Process Supplemental Environmental Impact Statement."
6. Citizens Advisory Board Recommendation No. 112 (adopted January 25, 2000), "Selection of

HLW Salt Processing Alternative."

7. Citizens Advisory Board Recommendation No. 137 (adopted April 25, 2001), "Salt Processing Alternatives Draft Supplemental Environmental Impact Statement."
8. Citizens Advisory Board Recommendation No. 147 (adopted January 15, 2002), "Parallel salt Disposition Strategy."
9. Citizens Advisory Board Recommendation No. 159 (adopted March 25, 2003), "Low-Curie Salt to Saltstone."
10. Citizens Advisory Board Recommendation No. 158 (adopted January 14, 2003), "Glass Waste Storage Building #2."
11. Citizens Advisory Board Recommendation No. 205 (adopted January 25, 2005), "3116 Implementation-Salt Waste Processing."

Agency Responses

[Department of Energy-SR](#)