

Recommendation 326

Double-Stacking of Defense Waste Processing Facility Canisters

Background

As the nation's only radioactive glassification waste plant, the Defense Waste Processing Facility (DWPF) converts the liquid nuclear waste stored at the Savannah River Site (SRS) into a stabilized solid glass form suitable for long-term storage and disposal. Scientists have long considered this glassification process, also known as "vitrification," as the preferred option for treating liquid nuclear waste. By immobilizing the radioactivity in glass, the DWPF reduces risks associated with continued storage of liquid nuclear waste at SRS, while holding the waste until for final disposal in a federal repository. About 37 million gallons of liquid nuclear wastes are stored in 45 underground carbon-steel tanks at SRS, with about 281 million curies of radioactivity.

The waste in the underground tanks is in two forms, a sludge waste and a salt waste. The salt waste, which contains low radioactivity, is processed and ends up as saltstone in the Saltstone Disposal Facility. The sludge waste contains the higher radioactivity and is the waste sent to DWPF for vitrification that is vitrified. To complete the waste vitrification mission, DWPF is estimated to produce 7,800 canisters.. To process the sludge, a sand-like borosilicate glass ("frit") is mixed with sludge waste and sent to a 65-ton steel and ceramic melter. The melter uses electricity to heat the waste/frit mixture to nearly 2,100 degrees Fahrenheit until a molten form is made; and then poured, in a pencil-thin stream into stainless steel canisters to cool and harden. Each canister is 10 feet tall and 2 feet in diameter, and weighs about 5,000 pounds. A stainless steel plug is fitted into the neck of each filled canister, and the canister is welded shut.

A specially designed vehicle (Shielded Canister Transporter) moves each sealed canister from DWPF to one of two Glass Waste Storage Buildings adjacent to the facility. At the storage buildings, canisters are lowered by the transporter into an underground reinforced concrete vault. The two storage buildings have the capacity to store about 4,590 canisters.

As outlined in Revision 19 of the Liquid Waste System Plan (May 2014), SRS is closing and cleaning tanks to the extent practical in order to reduce operational and leak risks to the environment. Of the 14 tanks with leakage history, four tanks are closed and grouted (tanks 5, 6, 19 and 30), two are cleaned (tanks 12 and 16), four are dry with virtually no liquid residue (tanks 1, 9, 14 and 15), and four contain liquid waste that is at a level in the tank that is known to be below the leak site (tanks 4, 10, 11, and 13).

While SRS has made progress in closing these tanks, projected funding in Revision 19 is insufficient to perform all activities to fully engage the liquid waste program. Given the limited funding, DOE examined two options for prioritization. Both options hailed safe storage as the overarching goal. Option A opted to clean and grout the tanks with hazard elimination and risk reduction being secondary Option B focused primarily on hazard elimination and risk reduction

with tank cleaning and grouting. Essentially, Option A is geared towards maximizing compliance with regulatory requirements over activities that continue waste processing rates.

While removing waste from tanks with a leakage history and working to meet the January 15, 1993 Federal Facility Agreement (FFA), storage space at SRS is at a premium. The FFA requires SRS to operationally close Tank Styles I, II and IV no later than 2022. Canister production will exceed existing storage space in fiscal year 2019. Currently, 3,877 of the estimated 8,582 canisters are complete. Currently, there are no plans to build a third Glass Waste Storage Building (GWSB), as the cost is estimated at roughly \$130 million dollars. While plans are underway for a storage pad, DOE believes interim canister storage is required. By “double-stacking” canisters in GWSB1, DOE will increase canister capacity from 2,254 to 4,508.

The South Carolina Department of Health and Environmental Control (SCDHEC) calls the 37 million gallons of highly radioactive “the single largest environmental threat to South Carolina,” and threatens to fine the federal government \$10,000 a day for failure to close the tanks per their agreement. South Carolina could also fine the federal government \$193 million through fiscal year 2016 for missing deadlines to clean and close nuclear waste storage tanks at SRS.

Recommendations

The SRS Citizens Advisory Board recommends that the Department of Energy:

1. Work with Savannah River Remediation and its contractors to request and justify necessary funding to ensure safe treatment and storage of waste while moving forward with maximum effort to close the aging tanks no later than the agreed upon schedule in the Federal Facility Agreement and other legally binding documents.
2. Continue to research double-stacking to ensure that double-stacked-canisters are as safe to the community and environment as traditionally stored canisters, and protect workers from radiation exposure per applicable DOE regulations.
3. If research results indicate that double-stacked containers do not pose a threat to the public and environment utilize this temporary storage method while a federal repository is sought.