

# Facts

from the  
**Savannah River Site**

ENVIRONMENTAL STEWARDSHIP • NATIONAL SECURITY • SCIENCE AND ENERGY

## Salt Waste Processing Facility

### Mission

- Reduce radioactive waste volume requiring vitrification
- Separate low volume/high activity waste from the high volume/low activity waste
- Transfer high activity waste to the Defense Waste Processing Facility
- Transfer low activity waste to the Saltstone Production Facility

Nuclear material production operations in the 1950s at Savannah River Site (SRS) resulted in the generation of liquid radioactive waste currently stored, on an interim basis, in the remaining 43 underground waste tanks in the F- and H-Area Tank Farms. The Salt Waste Processing Facility (SWPF) is the key facility at SRS to process about 90% of this waste.



An aerial view of the Salt Waste Processing Facility at the Savannah River Site.

The salt waste contains soluble metal ions, including most of the soluble radioactive cesium and some trace quantities of entrained sludge. The salt waste in the tanks includes a solid saltcake that has crystallized out of solution and a concentrated salt supernate. The supernate contains most of the soluble cesium and limited amounts of entrained sludge and will require treatment at the SWPF. The saltcake in the tanks will be dissolved by adding inhibited water. The resultant salt solution will be treated at the SWPF.

Waste stored in the tanks can be characterized as either “salt” or “sludge” both containing highly radioactive residues. The sludge waste, which is insoluble and settles to the bottom of a waste tank, generally contains insoluble radioactive elements in the form of hydrated metal oxides.

Since 1996, SRS has been removing the sludge waste from tanks, pre-treating and delivering it to the Defense Waste Processing Facility (DWPF) for final treatment. The DWPF was built to vitrify concentrated high-activity tank waste into a stable form and store it for eventual permanent disposal. The Saltstone Production Facility (SPF) was constructed to immobilize and dispose of low activity decontaminated salt waste. To effectively utilize these existing facilities for liquid radioactive waste disposition, a processing capability was needed for separating and concentrating the high-activity constituents from the salt waste solutions resulting from tank closure operations. Construction of the SWPF was completed in June 2016.



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The SWPF separates and concentrates the highly radioactive waste—mostly cesium, strontium, actinides, and waste slurry—from the less radioactive salt solution. The process begins by transferring the waste from H Tank Farm to SWPF where it undergoes a two-step cleanup process. The first step removes strontium and actinides (uranium, plutonium, etc.) from the waste. The second step, known as Caustic Side Solvent Extraction (CSSX), is designed for the removal of radioactive cesium.

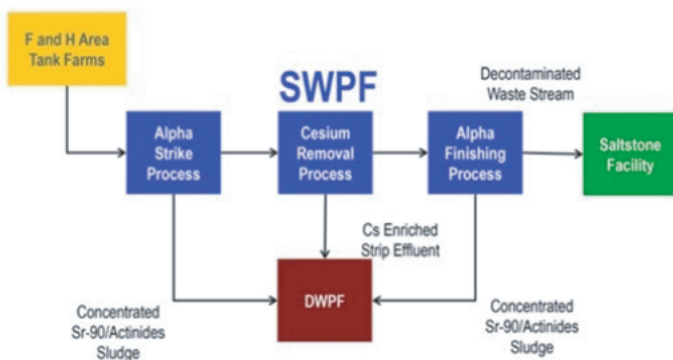
After the separation process is completed, the concentrated high-activity waste is sent to the nearby DWPF. At DWPF, the waste is combined with sludge waste and immobilized in glass and stored in stainless steel canisters on site until a federal repository is established. The decontaminated salt solution is mixed with cement-like grout at the nearby SPF for disposal on site. The grout is pumped from the SPF into Saltstone Disposal Units (SDU). There, the saltstone grout solidifies into a monolithic, non-hazardous, solid low-level waste form.

The first batch of radioactive waste, approximately 4,000 gallons, was transferred to SWPF Oct. 5, 2020 beginning “hot” commissioning of the facility. In its first month of operation, the SWPF received eight transfers totaling nearly 86,000 gallons of waste. SWPF successfully completed the hot commissioning testing phase of operations in January 2021, having validated radiation shielding, environmental emissions, and product waste acceptance requirements while processing over 320,000 gallons of radioactive liquid waste. Completion of hot commissioning signaled the facility’s entrance into fully integrated operations with the other SRS liquid waste facilities.

Parsons Corporation, who designed and built the first-of-a-kind facility, will operate it for one year beginning in January 2021. It is anticipated the facility will process between 4 to 6 million gallons of waste.

The SWPF will significantly increase processing rates for the SRS radioactive liquid waste system in an effort to empty the site’s waste tanks. Now that SWPF is operational, it is expected that nearly all of the salt waste inventory at SRS will be processed by 2030.

SWPF Process Overview



A diagram of the Salt Waste Processing Facility process.