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Subject:	Savannah River Site Tops 15 Million Gallons of Salt Waste Processed
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The following news release is from the Department of Energy and Savannah River Mission Completion. Please follow the Savannah River Site on Facebook and Twitter!

For Immediate Release

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Savannah River Site Tops 15 Million Gallons of Salt Waste Processed

AIKEN, S.C. (February 22, 2024) – The Savannah River Site's (SRS) liquid waste program has processed more than 15 million gallons of radioactive salt waste since 2008 through the work of three major facilities.

To reach this milestone of 15 million gallons processed, SRS has relied on the Salt Waste Processing Facility (SWPF) for the past three years, along with the past performance of the Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit (ARP/MCU) and Tank Closure Cesium Removal (TCCR).

Radioactive liquid waste is generated at SRS as byproducts from processing nuclear materials for national defense, research, medical programs, and for NASA missions. The waste — totaling 33 million gallons — is stored at SRS in two groupings of underground waste tanks known as tank farms.

Jim Folk, DOE-Savannah River assistant manager for Waste Disposition, said waste is being safely removed from the aging tanks and the site's treatment of liquid waste is moving forward.

"We are now processing more waste faster, further reducing the risk to people and the environment," he said.

In the fiscal year ending September 30 last year, SWPF set a single-year record by processing nearly 3.2 million gallons of radioactive salt waste. This facility was the final piece needed to finish treating and disposing of the liquid waste.

SWPF separates and concentrates the highly radioactive waste — mostly cesium, 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, known as the alpha strike, removes actinides, such as uranium and plutonium, from the waste. The second step, known as caustic side solvent extraction, is designed for the removal of radioactive cesium.

After the separation process is completed, the concentrated high-activity waste is sent to the nearby Defense Waste Processing Facility (DWPF). There, the waste is combined with sludge waste, immobilized in glass and stored in stainless steel canisters in reinforced, underground vaults called Glass Waste Storage Buildings (GWSB). The canisters will be safely stored in the GWBSs until a federal repository is established.

The decontaminated salt solution from SWPF is mixed with dry materials to create a grout at the nearby Saltstone Production Facility (SPF) for disposal onsite. The grout is pumped from SPF into Saltstone Disposal Units (SDUs). There, the grout solidifies into a monolithic, non-hazardous low-level waste form called saltstone.

Dave Olson, president and program manager of Savannah River Mission Completion, the Department of Energy Office of Environmental Management's liquid waste contractor at SRS, said that SWPF is now the facility in the SRS liquid waste program that will treat most of the volume of the waste in the tanks.

"SWPF operates at a much larger scale than earlier salt waste processing facilities," Olson said. "We continue to engineer improvements at SWPF that we expect to help us achieve even greater production goals."

SWPF's radioactive commissioning began October 2020. In its first three years of operation, SWPF has safely processed nearly 7.5 million gallons of tank waste.

To reach these levels, optimizations were made to enhance the facility's existing design capabilities.

Optimizations include changes to the amount of monosodium titanate (MST) used and the addition of an on-line flushing capability for the facility's strip effluent coalescer (SEC). During the solvent recovery function, the SEC gathers small droplets of solvent and grows them into larger droplets so they can be easily removed from the system. However, other unwanted particles in the waste – such as mercury and titanium – are also collected on the surface of the SEC. Previously, to clean the SEC, operations were required to temporarily shut down.

These improvements are already demonstrating that SWPF requires less downtime for maintenance, which means more time for production. SRMC's planned modifications will help boost the system to process even greater quantities, moving toward the processing goal of 9 million gallons each year.

ARP/MCU Processes First Salt Batches

The forerunner to SWPF was ARP/MCU, which began operations in 2008. ARP/MCU were designed as a demonstration project to show that salt waste in the high-level waste tanks could be separated from the more radioactive constituents.

Although ARP/MCU were expected to operate temporarily, the facilities performed well for 11 years before suspending operations in 2019 to prepare for startup of SWPF.

The two facilities worked as an integrated system to decontaminate the salt waste.

ARP decontaminated the salt solution through adsorption of actinides and entrained sludge solids onto MST, followed by filtration or settling. The actinides and MST-laden sludge waste stream was transferred to DWPF, while the remaining clarified salt solution was transferred to MCU.

Using principles involving centrifugal force and a special engineered solvent, MCU separated the high-activity salt solution into two waste streams. The process removed cesium from the clarified salt solution using solvent extraction chemistry. The removed cesium was sent to DWPF to be vitrified, poured into stainless steel canisters, and moved to the GWSBs. The remaining decontaminated salt solution was transferred to SPF to be mixed with dry materials to form a cement-like grout for safe, permanent on-site disposal in the SDUs.

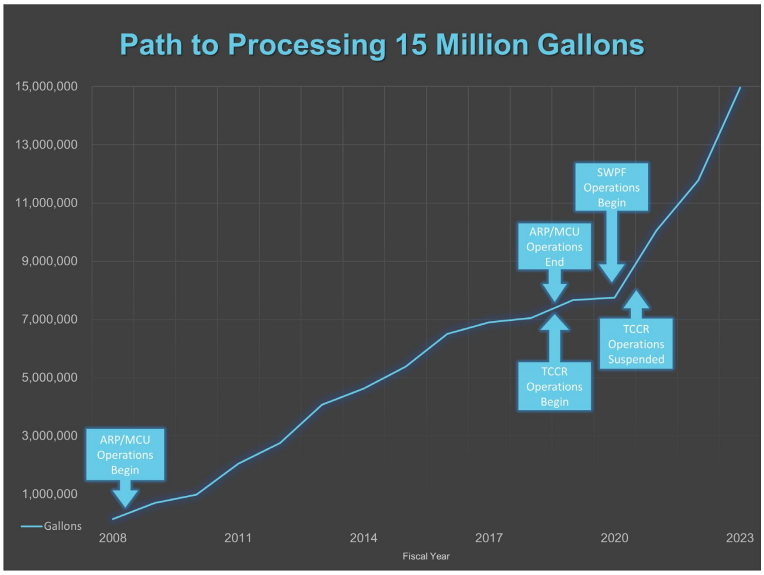
During their lifetime, ARP/MCU processed 7.4 million gallons of radioactive salt waste.

TCCR Supports Processing

The TCCR project, which operated from fiscal year 2019 until the project was suspended in 2022, consisted of a self-contained ion exchange process for the removal of cesium from the liquid salt waste to provide a supplemental treatment capability. TCCR removed cesium from more than 371,000 gallons of tank waste.

The high-level waste constituents, such as cesium, must be removed from the tanks before the tanks can be operationally closed and removed from service. Cesium's characteristics make it a top priority for removal.

The TCCR unit was situated beside a feed tank, allowing the cesium-removal to take place outside of the tank. The waste passed through the module, including a pre-filter and multiple ion exchange columns. The waste stream was treated with an engineered resin inside the ion exchange columns to remove the cesium, then the decontaminated waste was transferred to SPF.



Cutline: *In its first three years of operation, the Salt Waste Processing Facility processed approximately 7.5 million gallons of tank waste, significantly contributing to the liquid waste program's output of 15 million gallons of radioactive salt waste since 2008.*