

LIQUID WASTE OPERATIONS

A supplement to the
SRS Environmental Report for 2010



Savannah River Remediation (SRR), the liquid waste operations contractor at the Savannah River Site (SRS), continued the SRS tradition of posting another exemplary environmental compliance record in 2010, as liquid waste operations continued to minimize impact to the off-site public and the surrounding environment.

Liquid Waste Operations

High-activity waste is highly radioactive liquid waste that results primarily from the reprocessing of spent nuclear fuel. The waste contains both transuranic waste and fission products in concentrations requiring permanent isolation from the environment.



Many of the SRS waste tanks were built in the 1950s.

SRR continues to manage and disposition approximately 37 million gallons of high-activity liquid radioactive waste (about 400 million curies), which is stored in 49 large, shielded, and underground tanks grouped into two tank farms. Twenty-nine tanks are located in the H Area Tank Farm and 20 in the F Area Tank Farm. All SRS tanks are built of carbon-steel inside reinforced concrete containment vaults.

During the year, the major waste streams coming into the tank farms included transfers from H Canyon and a low-activity waste stream from the Defense Waste Processing Facility (DWPF). Fresh waste received from the processing of the spent nuclear fuel separates into two parts:

A sludge (which contains most of the radioactivity) that settles on the bottom of the tank.

A watery “supernate” that occupies the area above the sludge.

The supernate is transferred to an evaporator system, where it is processed further. The evaporator system reduces the volume of

this supernate. As the concentrated supernate cools, salts, a waste material, precipitate to the bottom of the receipt tank. This solid, commonly known as salt cake, generally forms in the evaporator concentrate receipt tanks. The sludge layer remains in its original tank until a sludge processing campaign is executed. This campaign consists of seven steps over three to six years culminating in the operationally closing of waste tanks.

Liquid Waste Operations Accomplishments in 2010

SRR has committed to operationally closing 22 old-style waste tanks. In 2010, considerable progress was made in preparing many of the old-style waste tanks ready for closure. Fifteen of the 22 old-style tanks are in various stages of the seven-step process leading up to eventual operational closure. There are now more waste tanks in the closure process than at any time in the history of SRS.

The seven-step process includes bulk waste removal, mechanical heel removal, chemical cleaning, cooling coil flushing, annulus cleaning, final sampling and isolation, and ends with the tank being filled with grout. Tanks 18 and 19 are scheduled to be grouted and closed in 2012, followed closely by Tanks 5 and 6.

During 2010, SRR met a major milestone in tank closure. SRR completed bulk waste removal activities on two of the old-style tanks (Tanks 8 and 12) prior to September 30, 2010. In doing so, SRR complied with a U.S. Department of Energy, U.S. Environmental Protection Agency, and South Carolina Department of Health and Environmental Control authored Federal Facility Agreement, which serves SRR as a scheduling reference for tank closure.

Another major accomplishment was achieved in 2010 when the Defense Waste Processing Facility (DWPF), the largest radioac-



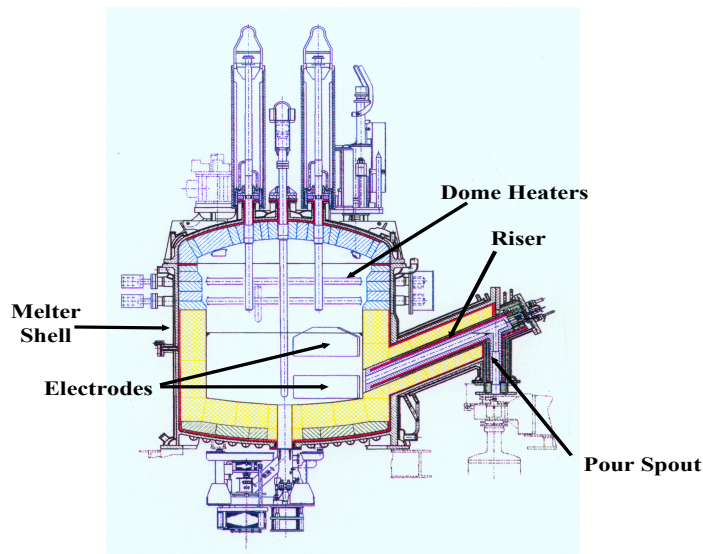
The Defense Waste Processing Facility (DWPF)

tive waste glassification plant in the nation, incorporated new technology and began accelerating canister production.

SRS Environmental Report for 2010

New equipment was added to blow bubbles into the DWPF melter, which evens out the melt pool temperature, allowing for faster pouring of glassified waste into stainless steel canisters. The new bubblers will increase the annual average production rate of waste canisters from 215 canisters a year to 325 annually. When all facility enhancements are complete, the annual canister production rate is projected to reach 400 canisters a year. The canisters will be temporarily stored at SRS awaiting transfer to a national waste storage facility.

Inclusion of the bubbler technology in subsequent replacement melters is expected to provide substantial life-cycle cost savings to DOE. Currently, DWPF is operating the second melter since



operations began in 1996. A third melter with bubbler capability awaits installation when required. The original DWPF melter required replacement after six years of operation.

Since the DWPF began operations in March 1996, some 12 million pounds of glass have been poured and 35 million curies of radioactivity have been safely immobilized. In October 2010, DWPF achieved a milestone of pouring its 3,00th canister of glassified waste.

SRR reached another milestone in 2010, this time by processing more than one million gallons of salt waste material.

Removing and processing salt waste, which constitutes 90 percent of the total waste inventory stored in SRS's two tank farms, is a major step toward operationally closing the Site's waste tanks. The milestone demonstrates safe and continuous operations of a key component in the waste removal process at SRS.

The one million gallons of salt waste was processed from a waste tank as part of the work of the Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit, and has been processed through the Site's Saltstone Production and Disposal Facilities.



The Saltstone Facility and disposal vault

The salt removal process – known as the Interim Salt Disposition Processing (ISDP) – began operations in April 2008 as an interim salt disposition system designed to remove nearly all radioactivity from salt waste solutions prior to its transfer to the Site's Saltstone facilities, which safely stabilizes and disposes the waste. The ISDP is referred to as “interim” because it was designed to operate while the Site's Salt Waste Processing Facility (SWPF) is being constructed. The ISDP is designed to process about one million gallons of waste a year, whereas SWPF will process about six million gallons annually.

SRR became the Liquid Waste Operations contractor on July 1, 2009. The facilities included in the liquid waste contract are the two tank farms and their attendant three evaporators, DWPF, Saltstone facilities, and ARP/MCU. The contract focuses on waste disposition that leads to accelerated tank closure with the expectation of closing all old-style waste tanks by 2022.



The Actinide Removal Process (ARP)

Contributed by Rick Kelley, SRR Public Affairs.

