Facts from the Savannah River Site
ENVIRONMENTAL STEWARDSHIP • NATIONAL SECURITY • SCIENCE AND ENERGY

Tank Closure Cesium Removal

Tank Closure Cesium Removal (TCCR) is a pilot demonstration of innovative technology to assist in the acceleration of tank closure at the Savannah River Site (SRS). TCCR is a supplemental at-tank process that is removing cesium, a highly radioactive element, from Cold War-era salt waste at SRS.

The TCCR initiative utilizes an ion exchange process for the removal of cesium from liquid salt waste to provide a supplemental treatment capability to support the acceleration of waste retrieval and tank operational closure efforts. Building on the experience of commercial nuclear plant decontamination and following the disaster response associated with Fukushima, the modular TCCR technology selectively removes the cesium component of the bulk salt waste effectively and efficiently. A commercial supplier designed, fabricated, tested, and delivered a modular cesium removal system which has been deployed at Tank 10 for the treatment of liquid salt waste. The unit consists of three modular skids: a main process enclosure housing the systems and components to treat the waste; a separate ventilation skid to provide environmental conditioning and contamination control; and a control skid to house the operating and video monitoring systems.

The salt waste from Tank 10 passes through the modules, including a pre-filter and multiple ion exchange columns. The waste stream is treated with an engineered resin inside the ion exchange column to remove the cesium.

Once the ion exchange media in a column becomes loaded with cesium to the extent practical ("spent"), the column (with media) will be removed from the system and replaced with a new ion exchange column loaded with fresh media. The spent column will be transported to an interim safe storage location on site near the tank farm.

The decontaminated discharge is sent to Tank 11 and eventually to the Saltstone Production Facility for on-site disposal.

Key Facts:

- Demonstration operations began in January 2019 with feed from Tank 10.
- TCCR operates in batch processes.
- TCCR processed over 200,000 gallons of salt waste in two batches during 2019 and a third batch in August 2020 totaling 89,000 gallons bringing the cumulative total to nearly 300,000 gallons processed from Tank 10.
- The Demonstration TCCR unit (TCCR Unit 1) will be used to process salt waste from Tank 9 beginning in 2021.
- Application of this technology to treat salt waste in other tanks is under evaluation.
- Savannah River National Laboratory provided research and development on the engineered resin and safety basis aspects of TCCR.

TCCR utilizes ion-exchange columns to remove cesium from liquid waste.

TCCR is a pilot demonstration of innovative technology to assist in the acceleration of tank closure.

U.S. DEPARTMENT OF ENERGY

The Savannah River Site is owned by the U.S. Department of Energy. Savannah River Nuclear Solutions is the management and operations contractor at the Savannah River Site. Savannah River Remediation is the current liquid waste contractor at the Savannah River Site.

SRS SAVANNAH RIVER SITE

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