SOUTH CAROLINA

Savannah River Site

Background

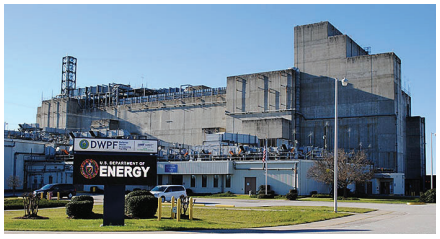

FIGURE 15: The Savannah River Site defense waste processing facility. Photo courtesy of U.S. Department of Energy.

The Savannah River Site (SRS) complex covers 310 square miles in South Carolina's Aiken, Allendale and Barnwell counties (Figure 15). It was constructed during the early 1950s to produce special radioactive isotopes (plutonium-239 and tritium) to produce nuclear weapons. After the Cold War, greater emphasis at SRS was placed on cleanup, but the site remains a major defense installation, with a continuing mission to process and purify tritium, uranium and plutonium. Savannah River is home to H Canyon, the only facility of its kind in the nation for processing nuclear materials. Because of past operations, more than 500 potentially contaminated sites and 14 groundwater contamination plumes exist at SRS.[115] Currently, the site's annual cleanup budget is about $1.4 billion. A consent order between the U.S. Department of energy (DOE) and the state addresses legacy mixed waste storage and treatment under the Federal Facilities Compliance Act. A Federal Facilities Agreement (FFA) among South Carolina, the U.S. Environmental Protection Agency and DOE addresses investigation and cleanup of contaminated sites at Savannah River.[116] In addition, relevant state statutes and regulations are applied to DOE EM cleanup activities, including treatment of high-level waste (HLW) and wastewater.

Accomplishments

DOE EM has worked with South Carolina to achieve the following outcomes:[117]

- DOE EM has made progress in the treatment of approximately 35 million gallons of mixed hazardous and radioactive HLW and closure of the aging storage tanks. As of 2018, eight tanks have been operationally closed—a third of the total old-style tanks scheduled for closure. The Defense Waste Processing Facility has produced more than 4,000 canisters, which is the equivalent of 156 million pounds of glass.
- SRS successfully added the interim salt disposition process in 2008 to augment treatment of the HLW. By the end of fiscal 2017, SRS had processed approximately 7 percent of the entire projected salt waste volume. Salt waste processing is an essential step in the closure of the HLW tanks because 90 percent of this waste is composed of salt waste. Savannah River has completed construction of the large-scale salt waste processing facility, which is slated to begin radioactive operations in 2019.
- Most of the legacy mixed transuranic (TRU) waste volume and mid-low-level waste (LLW) streams have been disposed of.
- At least 81 percent of 500 potentially contaminated sites at Savannah River have a cleanup decision in place in accordance with the FFA.

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[115] U.S. Department of Energy, Savannah River Nuclear Solutions. (2012, January). *Savannah River site* [Fact sheet]. Retrieved from https://www.srs.gov/general/news/factsheets/srs_esrs.pdf.
[116] U.S. Department of Energy, Savannah River Site. (1993, August 16). *Federal facility agreement for the Savannah River Site* (Document No. 89-05-FF). Retrieved from https://www.srs.gov/general/programs/soil/ffa/ffa.pdf.
[117] UU.S. Department of Energy, Savannah River Site. (n.d.). SRS news releases. Retrieved from https://www.srs.gov/general/news/releases.htm.

- To save time and money, DOE EM and regulators adopted an area closure approach rather than individual closures within the area. One example of area closure success is T Area in 2006, which included demolition of 28 buildings, off-site disposal of 91 cubic yards of soil and construction of a 10-acre geosynthetic cap. The project was completed in 36 months—48 months ahead of the original schedule.

Site-Specific Issues

Several site missions are ongoing at Savannah River, and their continuation and expansion are important to South Carolina. State officials are concerned about achieving cleanup and reducing legacy waste for the site to support future missions. The focus of the cleanup is on treatment and closure of the HLW tanks. The 35 million gallons of liquid radioactive and toxic HLW in aging and degrading tanks represent the single largest environmental threat in South Carolina.[118] Other concerns for the site include soil and groundwater cleanup, because SRS is in a uniquely humid area in which groundwater contamination can discharge relatively quickly into surface waters and subsequently the Savannah River.

In 1998, DOE designated SRS as the immobilization or conversion facility for much of the nation's surplus plutonium and began constructing the mixed-oxide fuel fabrication facility at SRS in August 2007. The facility is part of a nuclear nonproliferation agreement with Russia to dispose of 34 metric tons of weapons-grade plutonium by converting it into mixed-oxide fuel for use in commercial nuclear power plants. Although the mixed-oxide facility has been partially constructed, DOE has attempted to terminate funding for construction completion, prompting a lawsuit by South Carolina. DOE has considered other options for plutonium disposition, but questions remain about the feasibility, validity and timing of the considered options. DOE is required under federal law to remove from the state or process certain amounts of plutonium by certain dates.[119]

Relationship to Other Sites in the Complex

SRS will play a significant role in processing nuclear materials into the future. While it moves ahead with those missions, significant volumes of waste will continue to require treatment or disposal at other sites in the complex, including transporting TRU waste to the Waste Isolation Pilot Plant and spent nuclear fuel and vitrified HLW to an HLW repository. The vast majority of LLW (more than 55,000 cubic meters) at SRS will be disposed of on-site between 2015 and 2050, with the remainder destined for the Nevada National Security Site.[120]

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[118] AECOM. (2019). Savannah River remediation. Retrieved from https://www.aecom.com/ie/projects/savannah-river-site/.
[119] U.S. Nuclear Regulatory Commission. (2017, May 23). Backgrounder on mixed oxide fuel. Retrieved from https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/mox-bg.html.
[120] U.S. Department of Energy, Savannah River Site. (2015). *An overview of the Savannah River Site*. Retrieved from https://www.srs.gov/general/outreach/srs_info_pods/documents/srs_overview_2015_web.pdf.