Savannah River Site

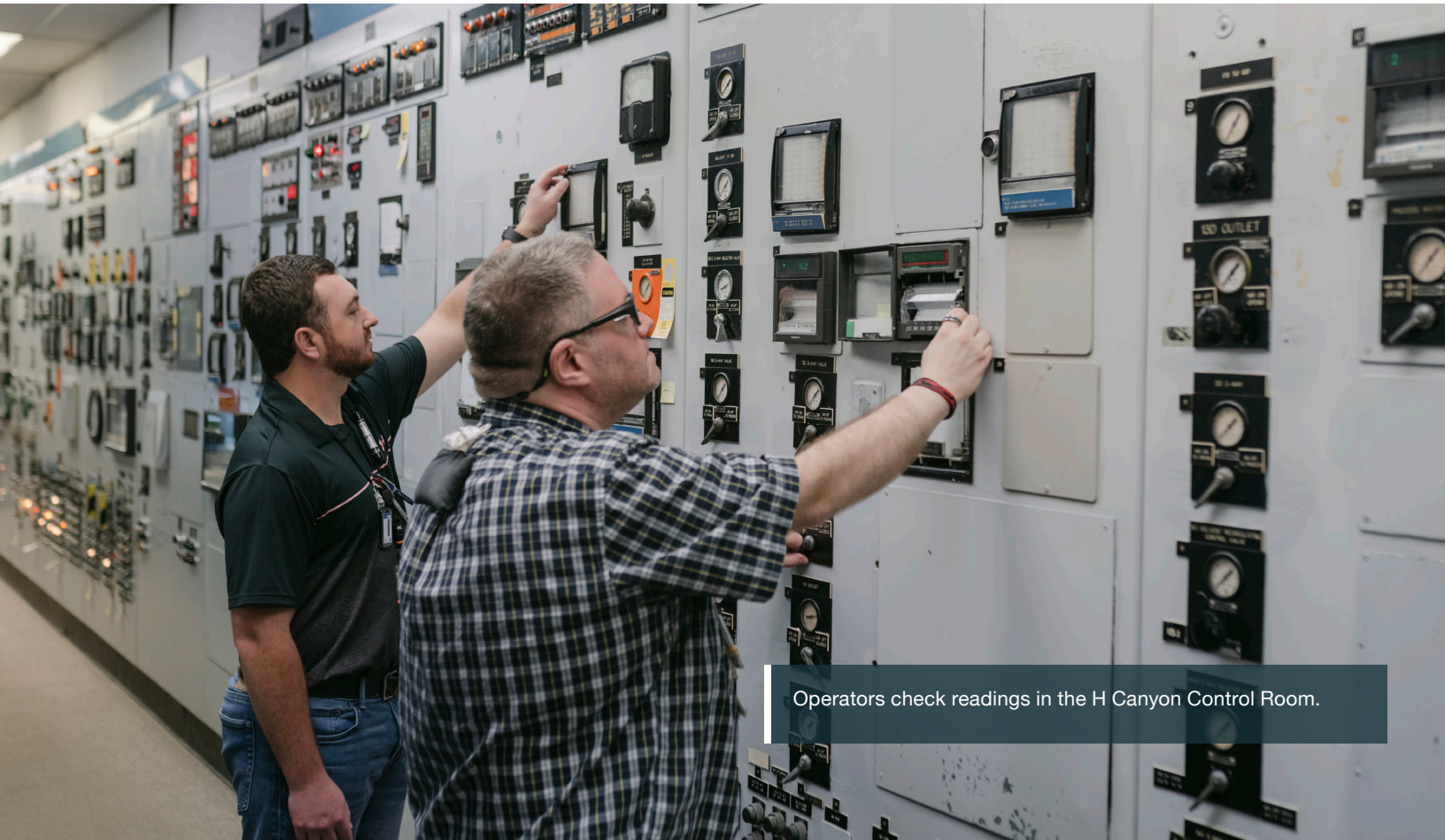
Overview

The Savannah River Site (SRS), a 310-square-mile site in Aiken, South Carolina, focused on the production of plutonium and tritium for use in the manufacture of nuclear weapons from its inception in the early 1950s until the end of the Cold War. In 1992, the focus at SRS turned to environmental cleanup, nuclear materials management, and research and development (R&D) activities.

Today, SRS is run by EM and host to National Nuclear Security Administration (NNSA) and the U.S. Forest Service. The DOE Savannah River Operations Office (DOE-SR) works in partnership with multiple contractors in technically sophisticated nuclear and non-nuclear facilities. Cleanup activities at SRS include addressing 33.2 million gallons of radioactive liquid waste stored in 43 underground tanks; surplus plutonium downblending with eventual disposition as transuranic waste at the Waste Isolation Pilot Plant (WIPP); disposition of highly enriched uranium and receipt/storage/processing of foreign and domestic research reactor spent nuclear fuel; facility deactivation and decommissioning (D&D); and soil and groundwater remediation.

To date, 317 of 1,126 facilities have undergone D&D; 412 of 515 waste units across multiple industrial areas have been remediated; and 40 remediation systems are in operation addressing 14 groundwater contamination areas. Notably, collaboration among SRS stakeholders and state and federal regulators resulted in the in-situ decommissioning of P- and R-Area Reactors in 2011 — the first in the DOE complex. Finally, the operational footprint of SRS has been reduced by 85 percent.

SRS processes and stores nuclear materials in support of national defense and U.S. nuclear nonproliferation efforts. SRS is also responsible for operational oversight of the Savannah River National Laboratory (SRNL), EM's only national laboratory. SRNL assists EM in achieving the nation's legacy nuclear waste cleanup objectives and plays an equally important role supporting NNSA through its work in tritium R&D, operations support,



Operators check readings in the H Canyon Control Room.

Saltstone Disposal Unit 8 project team members stand in front of the mega size disposal unit completed at the Savannah River Site.

stockpile stewardship, nuclear nonproliferation, and other critical national security programs.

SRS leadership is dedicated to meaningful engagement with stakeholders and the citizens of the Central Savannah River Area. DOE-SR and contractor managers meet regularly with federal and state regulators, business and community leaders, and citizen groups to provide updates on SRS operations and to solicit input regarding the missions and budget priorities. SRS enjoys a positive working relationship with stakeholders who support the vision for the coming decade. SRS stakeholders include the Environmental Protection Agency (EPA), South Carolina Department of Health and Environmental Control (SCDHEC), the Savannah River Site Community Reuse Organization, the SRS Citizens Advisory Board, and a host of state and local elected officials.

Calendar Year 2023 Accomplishments

- **Reached a milestone of more than 2,000 canisters double stacked at Glass Waste Storage Building 1**
- **Achieved record production of treating nearly 2.6 million gallons of waste at the Salt Waste Processing Facility (SWPF)**
- **Completed construction of Saltstone Disposal Unit 8 — an EM 2023 priority**
- **Received 114 electric vehicles as part of the EM-wide fleet goals — an EM 2023 priority**
- **Began preparations for High Assay Low Enriched Uranium production in H Canyon**
- **Completed implementation of the accelerated remedial strategy for the Lower Three Runs watershed, the first watershed closed on SRS**
- **Received Secretary of Energy Achievement Award for the Lower Three Runs Remediation Project**
- **Gained CD-0/1 approval for 235-F Facility Demolition**
- **Placed the last piece of structural steel for the Advanced Manufacturing Collaborative (AMC) — an EM 2023 priority**

Planned Cleanup Scope 2024–2034

Over the coming decade, DOE expects to significantly enhance its ability to tackle the largest remaining environmental risk at SRS — radioactive tank waste — with continued operational improvements within waste treatment facilities. DOE will also make continued progress in addressing nuclear materials stored at SRS and complete disposition of the remaining TRU waste.

The liquid waste program will achieve significant risk reduction through continued stabilization and immobilization of the high-activity fraction of the waste in a glass form and immobilization of the low-level fraction of the waste as a saltstone form. The SWPF has processed more than 7.6 million gallons of tank waste since radioactive operations began in January 2021. EM expects to process up to 9 million gallons of waste per year following several planned process and facility optimizations over the next year. In total, the Savannah River liquid waste program has processed more than 15 million gallons of radioactive salt waste since 2008.

In 2023, DOE-SR and its liquid waste contractor released Revision 23 of the SRS Liquid Waste System Plan. This plan integrates and outlines the activities required for the disposition of existing and future high-level radioactive waste and the removal from service of radioactive liquid waste tanks and facilities belonging to EM. It records a planning basis for waste processing in the liquid waste system through the end of the program mission.

With the startup and operation of SWPF and its integration with the liquid waste system, there has been substantial progress toward tank closure. While 8 of 51 underground waste tanks have been operationally closed, work continues with 11 of the remaining 43 tanks set to be operationally closed in the next decade. By 2034, the Defense Waste Processing Facility (DWPF) is forecast to have produced more than 7,400 canisters of vitrified radioactive waste. More than 4,400 canisters have been poured so far. The liquid waste program will continue to support receipt of waste from H-Canyon operations.

The nuclear material disposition program's near-term strategic objectives are to continue disposition of legacy material stored in L- and K-Areas, as well as continued surveillance and maintenance of excess, non-operating nuclear facilities awaiting decommissioning. Over the next 10 years, the K-Area facilities will continue to downblend and disposition both EM and NNSA surplus plutonium to produce TRU waste for disposal at WIPP. In 2023, Savannah River began shipping downblended plutonium to WIPP from K-Area. The NNSA capital

An aerial photograph of Building 235 F at the Savannah River Site.

project for Surplus Plutonium Disposition is underway and will expand the existing downblending capability by installing three new gloveboxes and support systems.

The K-Area facilities will continue to provide long-term storage of special nuclear material owned by both EM and NNSA.

The L-Area facilities will continue to provide wet storage of spent nuclear fuel received as part of the domestic and foreign research reactor fuel receipt programs. The Receiving Basin for Off-Site Fuels and F/H Analytical Laboratories will complete deactivation activities, enabling transfer to the decommissioning program.

The SRS environmental remediation program employs an approach to address remediation of waste units and facility D&D per the various site areas. The program will continue to clean up contaminated soils, groundwater, streams and associated wetlands, and legacy waste units, which include ash basins and coal yards. EM is committed to reducing risk and protecting groundwater aquifers and surface waters from the spread of contamination by addressing sources of contamination and employing innovative technologies such as the in-ground reactive barrier wall in P-Area to treat solvent-contaminated groundwater. In addition, an integral part of the cleanup mission is the D&D of legacy facilities constructed in support of industrial operations, common infrastructure systems, and past nuclear materials production, such as the 235-F Plutonium Processing Facility, C/K/L Reactors, and F-Area Tank Farm. SRS will continue to operate and maintain soil and groundwater remedial systems, and conduct post-closure and post Record of Decision care, surveillance, and maintenance of 73 closed areas (approximately 1,000 acres).

EM TO NNSA TRANSFER

EM will transfer site responsibilities to NNSA in fiscal year 2024. This transfer is in recognition of the increasing role Savannah River will play in NNSA's ongoing nuclear security missions. EM will remain focused on completing the remaining legacy cleanup activities at the site. A transition plan defines the responsibilities and management of functions and capabilities for each organization.

SAVANNAH RIVER NATIONAL LABORATORY

In 2024, SRNL begins its third year under an independent management-and-operating contract, to grow and modernize to assure it meets DOE's mission needs. SRNL's core missions are to provide innovative and practical solutions to address complex environmental cleanup, long-term stewardship, and nuclear security problems in EM, the DOE Office of Legacy Management, and NNSA missions.

To support the SRNL mission, EM is building the AMC facility on the campus of University of South Carolina, Aiken. Once constructed, the AMC will provide SRNL with an accessible, modern facility for R&D that brings government, industry, and academia together to develop and share advanced manufacturing technology. It will also support STEM education to train the next generation of advanced manufacturing workers to support both DOE missions and U.S. industry that will increase manufacturing competitiveness across the state, region and nation. Construction of the AMC facility is expected to be completed in 2025.

Following the completion of the transfer of overall site responsibility from EM to NNSA, EM will retain management of SRNL.

Key Regulatory Milestones 2024–2034

Cleanup work at Savannah River is governed by a Federal Facility Agreement among the DOE, SCDHEC, and the EPA. In addition, the Dispute Resolution Agreement with SCDHEC governs salt waste processing quantities for the liquid waste program.

- **Continue accelerated D-Area closure activities**
- **Remedial Action start for Ash Program Beneficial Reuse for 6 units — 2028**
- **Remedial action for C-Area groundwater — 2031**
- **Remedial action for L-Area rubble pits — 2032**
- **Remedial action for P-Area groundwater — 2032**
- **Remedial action for D-Area groundwater — 2033**

The Advanced Manufacturing Collaborative continues to take shape in Aiken, SC. The last piece of structural steel was placed in November 2023 and crews are on track to have the facility completed in summer 2025.

Post-2034 Cleanup Scope

The liquid waste program will start shutting down its operations after DWPF completes treatment operations for the remaining sludge and salt waste and operational closure of the tank farms is completed. Once the liquid waste program cleanup mission is completed, the surveillance and maintenance of the vitrification canisters in storage will be transferred to the solid waste program before eventual disposition at a federal repository yet to be determined. The remaining non operational nuclear material facilities (e.g., F Canyon/FB Line, H Canyon/HB Line) will complete deactivation and be turned over for decommissioning. Operations in K Area will continue to support the disposition of surplus plutonium with a significant downblending mission, with the facility deactivated after the special nuclear material is dispositioned.

Newly generated wastes resulting from the EM cleanup program will continue to be disposed of in accordance with the EM mission as the waste is generated. As the nuclear materials and liquid waste programs complete their missions, the environmental remediation and D&D programs will ramp up to provide for remediation of approximately 100 legacy waste units and D&D of over 800 industrial, nuclear, and radioactive facilities. DOE currently expects to complete legacy cleanup activities at Savannah River by 2065.