

## SRS Occupants

### Federal

- Department of Energy:  
Savannah River Operations Office
- National Nuclear Security Administration
- U.S. Forest Service–Savannah River
- U.S. Nuclear Regulatory Commission
- U.S. Army Corps of Engineers

### Contractors

- Savannah River Nuclear Solutions, LLC  
– *Management and operations of SRS*
- Battelle Savannah River Alliance, LLC  
– *Management and operations of Savannah River National Laboratory*
- Savannah River Mission Completion, LLC  
– *Liquid waste operations*
- Centerra Group, LLC  
– *SRS Security*
- University of Georgia  
– *Savannah River Ecology Laboratory*

## Savannah River Site

Dedicated to maintaining the highest possible safety and security standards, the Savannah River Site (SRS) is a key Department of Energy (DOE) industrial complex responsible for national security and nonproliferation missions, disposition of nuclear materials, waste management, and environmental cleanup and stewardship.

### Safety

SRS is committed to its people, missions and the future. SRS has a long track record of being one of the safest sites in the DOE complex and one of the safest major industrial sites in the world. Protecting workers, the public, the environment and national security interests are our highest goals.

### Missions

SRS safely produces, secures, stores and processes nuclear materials in support of national defense and U.S. nuclear nonproliferation efforts. The Site also develops and deploys technologies to protect the environment including the treatment of solid and liquid nuclear and hazardous wastes left from the Cold War. While current missions remain the highest priority, SRS leadership places great importance on developing broader missions for SRS that use its unique competencies and capabilities in order to address critical national mission needs.

### The Savannah River Site

SRS is a 310-square-mile site located near Aiken, S.C., on the Savannah River, which borders South Carolina and Georgia. SRS covers 198,046 acres, including parts of Aiken, Barnwell and Allendale counties in South Carolina. The SRS annual budget is approximately \$3.8 billion, with a workforce of about 12,700.



## History

During the 1950s, SRS began to produce materials used in nuclear weapons, primarily tritium and plutonium-239. Five reactors and support facilities were built to produce these nuclear materials. Irradiated materials were moved from the reactors to one of the two chemical separations plants. In these facilities, known as “canyons,” the irradiated fuel and target assemblies were chemically processed to separate useful products from waste. After refinement, nuclear materials were shipped to other DOE sites for final application. SRS produced about 36 metric tons of plutonium (Pu) from 1953 to 1988.

## Environment

Once known for its rural communities and small farms, SRS now supports diverse natural habitats including pine and hardwood forest communities, in- and near-stream environments, and hundreds of individual wetland areas. In 1972, SRS was designated as the first National Environmental Research Park to provide opportunities for studying the environmental impacts of energy and defense-related technologies.

SRS natural resources are managed by the U.S. Forest Service-Savannah River in cooperation with the Savannah River Ecology Laboratory and the South Carolina Department of Natural Resources.

Today, white-tailed deer, turkeys, eagles, alligators, and many species of snakes, amphibians and songbirds thrive on the Site. SRS also manages endangered species populations like the red-cockaded woodpecker, pond berry and smooth purple cone flower.

# Savannah River National Laboratory

The DOE Office of Environmental Management’s Savannah River National Laboratory (SRNL) is a multi-program national laboratory, where accomplished scientists and engineers solve our nation’s challenging environmental, national security and energy problems.

SRNL protects the nation by applying science to discover practical solutions to environmental, national security, nuclear materials management and energy security challenges. The laboratory uses its unique scientific and engineering expertise to develop and deploy solutions with high returns on investment for the nation. SRNL innovations

include advances in energy storage technology, materials science, chemical processing, advanced manufacturing and nuclear nonproliferation, as well as nuclear facility decommissioning, environmental cleanup, and safe transport and storage of nuclear materials.

SRNL conducts research in laboratories specialized for safely studying and handling radioactive materials – laboratories for ultra-sensitive measurement and analysis of radioactive materials, internationally accredited analytical laboratories, and the only radiological crime investigation laboratory in the United States.



*An aerial view of SRNL*



*SRNL employees working with a Mini Arc Melter, which is used for making metallic alloys.*



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 Mission Completion is the current liquid waste contractor at the Savannah River Site.



# National Nuclear Security Administration

Today, National Nuclear Security Administration (NNSA) activities at SRS primarily serve two NNSA missions: managing the nuclear stockpile to support U.S. nuclear deterrence and advancing nonproliferation policy goals.

## MANAGING THE STOCKPILE – Tritium

Savannah River Tritium Enterprise (SRTE), the nation's only resource for managing our country's tritium stockpile, is the collective term for the facilities, people, expertise and activities at SRS related to tritium, which is an isotope of hydrogen and a key element of nuclear weapons.

SRTE prepares the tritium supply for our national defense and transports loaded containers, called reservoirs, to the Department of Defense, where they are installed in nuclear weapons in support of the nuclear deterrent.

Tritium decays radioactively at the rate of 5.5% each year and must be replenished periodically. SRTE accomplishes this by two methods: recycling tritium from the reservoirs of existing warheads and extracting new tritium from fuel rods that have been irradiated in a Tennessee Valley Authority commercial light water reactor.

In the absence of nuclear weapons testing, designers must rely on surveillance data to certify the reliability of U.S. nuclear weapons. To support this certification, a number of reservoirs are removed from weapons in the nuclear stockpile and sent to SRTE for testing.

NNSA has undertaken modernization initiatives to ensure that SRS maintains the ability to continue fulfilling this important mission for the future. These include the new Tritium Finishing Facility (TFF), which is scheduled for completion in 2035. TFF is intended to replace the oldest SRTE process building, the H Area Old Manufacturing Facility, which dates back to the 1950s.

## MANAGING THE STOCKPILE – Plutonium Pit Production

A plutonium pit is a key component of a nuclear weapon. Today, the United States does not have the capability to manufacture new pits at the rate needed to maintain the nuclear deterrent. The national mission is to achieve production of no fewer than 80 plutonium pits per year as close to 2030 as possible to meet

Department of Defense requirements.

NNSA is repurposing the unfinished Mixed Oxide (MOX) Fuel Fabrication Facility at SRS to produce at least 50 pits per year and no fewer than 30 pits

per year at Los Alamos National Laboratory (LANL). This approach is intended to enhance the resiliency and responsiveness of the Nuclear Security Enterprise to adapt to shifting requirements and counter future threats. Repurposing the MOX facility as the Savannah River Plutonium Processing Facility (SRPPF) will allow the use of the existing seismically qualified structure with numerous supporting facilities.

Critical Decision (CD)-1, or conceptual design phase, was achieved in 2021. The NNSA is also establishing the Savannah River Plutonium Modernization Program to develop and train the workforce prior to SRPPF project completion and startup. The Plutonium Modernization Program will operate SRPPF for a minimum of 50 years once facility operations are authorized.

## ADVANCING GLOBAL NUCLEAR SECURITY

SRS plays a critical role in securing, protecting and disposing of vulnerable, weapons-usable nuclear materials from around the world. SRS leads the NNSA programs related to management of U.S. origin irradiated and used high enriched uranium (HEU) and separated plutonium materials.

The NNSA's Surplus Plutonium Disposition mission at SRS is to permanently dispose of 34 MT of weapons-grade plutonium declared excess to national security, with priority on disposition and removal of plutonium previously consolidated at SRS.

NNSA's preferred plutonium disposition approach is the "Dilute and Dispose" method. This method, also referred to as plutonium downblending, uses an adulterant material to dry blend with plutonium oxide. This produces a mixture that is not usable for weapons and can be safely disposed of at the Waste Isolation Pilot Plant (WIPP) in New Mexico.

In addition, the Surplus Plutonium Disposition (SPD) project, which received CD-1 approval in December 2019, will expand downblending capability by installing three new gloveboxes and other capabilities.





## H Canyon Operations

SRS' two primary separations facilities, called "canyons," are located in F and H Areas. F Canyon and H Canyon—together with FB Line and HB Line, which are located atop the canyons—are where nuclear materials historically have been chemically recovered and purified. F Canyon and FB Line have been deactivated and await further disposition decisions.

HB Line located on top of H Canyon, is the only chemical processing facility of its kind in the DOE complex. The facility historically performed plutonium and neptunium oxide production, including Pu-238 for NASA. The facility is in lay-up state and also awaits further disposition decisions.

H Canyon is the only operating production-scale, nuclear chemical separations facility in the U.S. In the past, the facility's operations recovered uranium-235 and neptunium-237 from used nuclear fuel (UNF) rods from Site production reactors and from domestic and foreign research reactor programs.

H Canyon's current mission involves dissolving UNF, currently stored in the L Area Disassembly Basin, and sending it through the Site's liquid waste program to be vitrified and safely stored on-site until a federal repository is identified. H Canyon's mission objective is to disposition up to more than 3,000 UNF bundles in L Basin by 2034.

H Canyon supports the DOE Enriched Uranium and Plutonium

Disposition programs by reducing the quantity of fissile materials in storage throughout the U.S. This supports environmental cleanup and nuclear nonproliferation efforts, and a smaller, safer, more secure and less expensive nuclear weapons complex.



## Nuclear Materials Management

Operations at SRS' K Area Complex (KAC) provide for the handling and interim storage of much of DOE's excess Pu and other special nuclear materials (SNM). The principal operations building formerly housed K Reactor, which produced nuclear materials to support the U.S. during the Cold War for nearly four decades. It was DOE's last operating production reactor, shutting down in 1992. A DOE decision in 2000 allowed K Reactor to go through significant seismic, structural and security upgrades to become DOE's only Category 1 SNM storage facility designated for interim safe storage of Pu and highly enriched uranium at SRS. Since that time, SRS has assisted DOE in saving millions of taxpayer dollars through the safe receipt and storage of nuclear materials from the Rocky Flats Environmental Technology Site, SRS' FB Line, the Hanford Site, Lawrence Livermore National Laboratory and LANL.

In 2017, the KAC initiated plutonium downblend operations, a nonproliferation initiative that mixes the surplus SNM oxide with an adulterant mixture. The material is then packaged, stored and eventually shipped for safe permanent disposal at the WIPP near Carlsbad, New Mexico. The downblend process (also referred to as 'dilute and dispose') continues to be pursued as the disposition strategy for much of the surplus SNM inventory for the complex. As the facility continues to be tasked for additional SNM handling and disposition scope, the K Area mission is evolving from storage to management of nuclear materials.

### Used Nuclear Fuel

UNF is nuclear fuel that has been irradiated in a nuclear reactor. UNF from the Site's former production reactors and from foreign and domestic research reactor programs is currently safely stored in an underwater storage facility in L Area, called a "disassembly basin." L Basin has concrete walls two-and-a-half to seven feet thick and holds approximately 3.4 million gallons of water, with pool depths of 17 to 50 feet. The basin water provides shielding to protect workers from radiation. Since 1964, SRS has received more than 2,509 casks containing over 48,219 UNF assemblies.



*Plutonium downblend activities in the K Area Complex*



*A cask receipt in L Basin*



## Waste Management

### Liquid Waste Operations

Radioactive liquid waste is generated at SRS as by-products from the production and processing of nuclear materials for national defense, research, medical programs, and outer space missions. The waste, totaling about 34 million gallons, is stored in 43 operational underground carbon-steel waste tanks grouped into two tank farms at SRS. There are 51 waste tanks at SRS; eight have been operationally closed.

To reach tank closure goals, new technology and tools have been built, tested and deployed to remove waste from the underground tanks. The waste is categorized into two forms: sludge waste, which includes highly radioactive solids made up primarily of actinides and strontium, and salt waste, which includes soluble radioactive materials, such as cesium.

Sludge waste removed from the tanks is transferred to the Site's Defense Waste Processing Facility (DWPF), where it is immobilized in a glass form and poured into stainless-steel canisters for safe storage and eventual long-term disposal in a federal repository. Since DWPF began operating in 1996, more than 4,300 canisters have been produced, containing more than 16.2 million pounds of glassified waste.

About 90% of the volume of the waste in the tanks is salt waste, which is also removed from the tanks as part of the tank closure process. The Salt Waste Processing Facility (SWPF) is the key facility at SRS to process this salt waste. SWPF separates and concentrates the highly radioactive waste 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 removes strontium and actinides (uranium, plutonium, etc.) from the waste. The second step, known as Caustic Side Solvent Extraction (CSSX), is designed for the removal of radioactive cesium. After the separation process is completed, the concentrated high-activity waste is sent to the nearby DWPF to be combined with the vitrified sludge waste. The remaining salt waste stream is a decontaminated salt solution.

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



*An empty canister at the Defense Waste Processing Facility*



*Salt Waste Processing Facility*



## Waste Management *(continued)*

saltstone for permanent disposal. The newest SDUs on-site hold 33 million gallons of saltstone.

SRS waste tanks have provided more than 60 years of safe storage for radioactive liquid waste. In time, all waste tanks, and all liquid waste facilities, will be operationally closed and decommissioned.

### Solid Waste

Solid Waste Management is responsible for the disposition of SRS solid waste, which includes hazardous, sanitary, construction and demolition waste, plus low-level waste (LLW) and transuranic (TRU) radioactive waste. Sanitary waste is household materials and items that are recycled or disposed of at the Three Rivers Landfill. C&D waste is generated by SRS construction activities and is disposed of in a South Carolina Department of Health and Environmental Control (SCDHEC) permitted landfill. Hazardous waste is collected and disposed of off-site at a permitted facility. Radioactive waste is classified into two categories, the majority of which is LLW, which is contaminated with predominately short-lived isotopes and is disposed of at SRS in engineered facilities. LLW that is also hazardous waste is disposed of off-site at a permitted facility.

The second category of radioactive waste is TRU waste. This waste typically consists of protective clothing, tools, rags, equipment and miscellaneous items contaminated with small amounts of plutonium. TRU waste (including mixed TRU waste) is collected, characterized and packaged for off-site disposal at WIPP in New Mexico.

When the SRS TRU Ship-to-WIPP program began, over 30,000 containers of TRU waste were stored at SRS. The Site has made over 1,700 shipments to WIPP through 2023.



*The Saltstone Disposal Unit (SDU) & project team in front of the newest mega-size SDU completed at the Savannah River Site.*



*Waste container at SRS*



## Environmental Compliance and Area Completion Projects



*Remediation work at the D Area Ash Basin*

SRS Environmental Compliance and Area Completion Projects (EC&ACP) coordinates and provides environmental support and compliance-based oversight of SRS operations. EC&ACP ensures that SRS activities are conducted in accordance with state and federal environmental regulations and are safe and protective of workers, the public and the environment.

EC&ACP also manages extensive environmental and groundwater monitoring programs to determine impacts, if any, from SRS operations to the public, surrounding communities and the environment. More than 10,000 environmental and groundwater samples are collected at SRS and in neighboring areas each year to be analyzed for radionuclides, metals or other chemicals.

EC&ACP investigates and remediates environmental contamination by removing, treating, capping or immobilizing the source of contamination; thereby, preventing or mitigating the spread of contamination. SRS performs these remedial activities in accordance with the Federal Facility Agreement, the Comprehensive

Environmental Response, Compensation, and Liability Act and the Resource Conservation and Recovery Act, with public involvement and the full support of DOE-Savannah River, the U.S. Environmental Protection Agency-Region 4 and the SCDHEC. Fieldwork is a top priority and includes closure and post-closure care/maintenance of inactive SRS waste units, e.g., seepage basins, rubble pits, rubble piles and disposal facilities.

Site remediation continues at SRS with more than 79% of the 515 total number of waste units completed, and over 25% of 1,126 total number of excess facilities safely dispositioned to date.

Cleanup and decommissioning will continue until all areas at SRS are completed. Units at which waste is left, are placed under post-closure care with institutional controls including access and land use restrictions, inspections, maintenance, long-term monitoring and reporting, and groundwater corrective actions and effectiveness monitoring are performed as appropriate.



## Acronyms appearing in this fact sheet

CD	Critical Decision
DOE	Department of Energy
DWPF	Defense Waste Processing Facility
EC&ACP	Environmental Compliance and Area Completion Projects
KAC	K Area Complex
LANL	Los Alamos National Laboratory
LLW	low-level waste
MOX	Mixed Oxide
NNSA	National Nuclear Security Administration
Pu	plutonium
SCDHEC	South Carolina Department of Health and Environmental Control
SDU	Saltstone Disposal Unit
SNM	special nuclear material
SRNL	Savannah River National Laboratory
SPF	Saltstone Production Facility
SRPPF	Savannah River Plutonium Processing Facility
SRS	Savannah River Site
SRTE	Savannah River Tritium Enterprise
SWPF	Salt Waste Processing Facility
TFF	Tritium Finishing Facility
TRU	transuranic
UNF	used nuclear fuel
WIPP	Waste Isolation Pilot Plant

