SRNS-RP-2024-00004

2023

SAVANNAH RIVER SITE

Environmental Report

SUMMARY

SAVANNAH RIVER SITE

2023 Environmental Report Summary

This report highlights the Savannah River Site's environmental performance and engagement with local communities. Many articles in this Summary are based on the information presented in the *2023 Environmental Report* and touch on the following:

- Significant environmental accomplishments that support Site missions
- Compliance with environmental laws and regulations
- Dose to the public from onsite activities
- Community involvement

When applicable, text at the bottom of the page identifies the related chapters and sections in the *2023 Environmental Report* where readers may find more detailed information, along with supporting data, maps, and figures.

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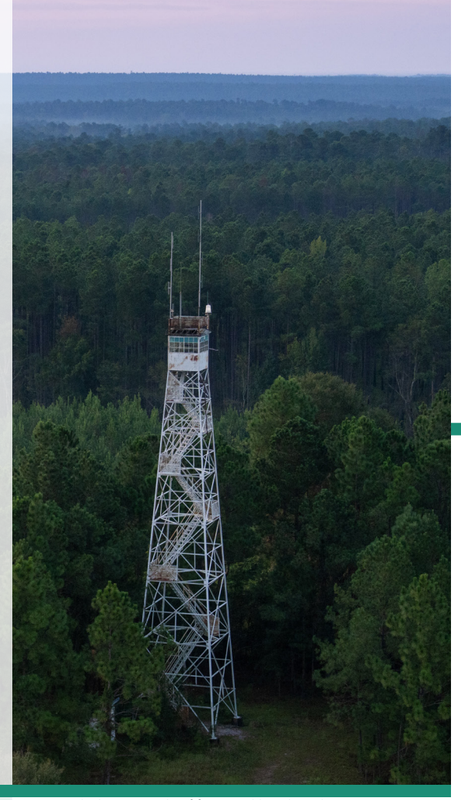


An aerial photograph of forested land and Cassels Fire Tower at the Site

One of the elliptical-shaped Carolina bays onsite

Coneflower in a field/Ken Cheeks, SRNS retiree

OVERVIEW

SRNS-RP-2024-00004

Left, L Lake at sunset. Above, alligators at home at the Savannah River Site

The Savannah River Site (SRS) is a 310-square-mile key Department of Energy (DOE) industrial complex located along the Savannah River in the sandhills of three western South Carolina counties. It is 12 miles to the south of Aiken, South Carolina, and southeast of Augusta, Georgia. The population within a 50-mile radius of the Site center in South Carolina and Georgia is 838,883. The largest population concentration is in the Augusta, Georgia, metropolitan area.

The Atomic Energy Commission, the precursor to the Department of Energy, selected this area in 1950 for E. I. du Pont de Nemours Company to create materials for nuclear weapons for the nation's defense.

In 1972, the Atomic Energy Commission designated the Site as the first National Environmental Research Park, providing it with opportunities to study environmental impacts of energy and defense-related technologies that had taken place. The Savannah River Site supports diverse natural habitats, including pine and hardwood forests, riverine environments, 48,973 acres of wetlands, along with thousands of species of plants and animals.

Today, the Site's mission is to protect public health and the environment, while also supporting the nation's defense and nonproliferation programs. The Savannah River Site is committed to environmental cleanup, nuclear weapons stockpile stewardship, and disposing of nuclear materials to support the nation's nonproliferation policy. Together, these actions are transforming the Site for future use.

The Department of Energy Office of Environmental Management and the National Nuclear Security Administration oversee the Site and its resources. The National Nuclear Security Administration took over primary authority of the Savannah River Site on October 1, 2024.

An aerial photograph of F Area

Wake on a river boat ride

CONSERVE and RESTORE

Managing Habitats

The increased commitment to the plant and animal species that call the Savannah River Site home is part of a larger effort launched by President Joe Biden in 2021 and carried out by the Department of Energy as its Conservation Action Plan. President Biden's Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad," and "Conserving and Restoring America the Beautiful," issued by federal resource agencies and the White House Council on Environmental Quality, promises to conserve, connect, and replenish lands, waters, and wildlife throughout the nation. These mandates will restore 30% of the nation's lands and waters by 2030.

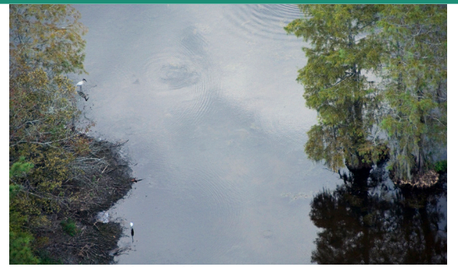
The Conservation Action Plan covers seven focus areas; three of them are actively carried out at the Savannah River Site.

Forest Management at Savannah River Site

Ninety percent of the Site's 198,400 acres is natural forest, inhabited by 250 species of birds, 1,500 species of plants, 100 species of reptiles and amphibians, 50 species of mammals, 100 species of fish, and 600 species of aquatic insects. The forest management program ensures these species can flourish and that their ecological systems are sustained.

Savannah River Site Research Set-aside Areas

In 1972, the Savannah River Site was the first Department of Energy site to be named a National Environmental Research Park.



Top, growth is a focus of forest management. Above, an aerial photograph of the Crackerneck Wildlife Management Area and Ecological Reserve

It has 30 set-aside research reserves, which represent 7% of the Site's property. The areas are kept in a natural state to capture the major vegetative characteristics of the Site. The University of Georgia's Savannah River Ecology Laboratory administers the set-aside program at the Site.

Crackerneck Wildlife Management Area and Ecological Reserve

The Crackerneck Wildlife Management Area and Ecological Reserve is adjacent to the Site in nearby Jackson, South Carolina, and is managed by the South Carolina Department of Natural Resources. It plays a critical role in conserving fish, wildlife, and other natural recourses on its 10,600 acres. The area also offers recreational opportunities for hunting, fishing, biking, hiking, canoeing, equestrian activities, and environmental education and interpretation.

Growing Habitats

Caring for a habitat's sometimes fragile inhabitants relies on the helping hands of the United States Forest Service and other collaborative groups at the Savannah River Site to ensure federal protection mandates are upheld and that lands and ecosystems are managed and cultivated so that the Site's native species will not just grow but will also flourish.

During its more than 70 years at the Savannah River Site, the U.S. Forest Service (USFS) has prioritized keeping a healthy forest, maintaining ecosystems defined in early days of Site operations, and using best management practices to protect clean water for the benefit of all species. This approach ensures ecosystems on Site thrive and meet the needs of their valuable and diverse inhabitants.

The USFS manages more than 170,000 acres of nonindustrialized acreage onsite, including wildlife populations and native flora. A key program of its work onsite is the recovery and sustainability of threatened and endangered species onsite.

Together, the USFS-Savannah River, the Southern Research Station (a 100-year-old research arm of the USFS), the University of Georgia's Savannah River Ecology Laboratory, and numerous colleges and universities across the nation ensure forest management research, technology, and innovative practices are in place to maintain healthy, sustainable forests not just on the Site, but also across the nation.

The key to growing populations of threatened, endangered, and sensitive species is to manage their habitats, making them welcome and accommodating their individual needs. The U.S. Forest Service is responsible for setting yearly targets and certain accomplishments to ensure forest management is being conducted in a manner that will promote a healthy habitat for protected species and other flora and fauna onsite.

The species' profiles in the following sections highlight the mammals, birds, insects, and plants that have benefited from planning and executing practices that protect their ecosystems.

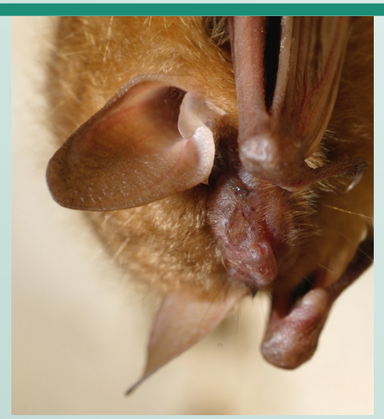
Note:
Under the Endangered Species Act, plant and animal species may be listed as either endangered or threatened. **"Endangered"** means a species is in danger of extinction throughout all or a significant portion of its range. **"Threatened"** means a species is likely to become endangered within the foreseeable future.

States have their own Endangered Species Act-type laws, so species can have different threatened and endangered statuses at the federal and state levels. **"Sensitive"** species are plant and animal species that are given special management considerations or legal protections due to their vulnerability to

Gopher frog, Amanda Hurst/SREL

Gopher Frog

Although not federally listed as threatened or endangered, the gopher frog (*Lithobates capito*) is endangered in South Carolina. Populations are declining throughout most of its range. Some factors leading to the decline of the gopher frog include urban development, forestry practices, and agriculture. The USFS, the South Carolina Department of Natural Resources, and the Savannah River Ecology Laboratory are partnering to restore wetland and upland habitats within the Crackerneck Wildlife Management Area and Ecological Reserve as well as the Gopher Frog Management Area onsite and in South Carolina.



Tricolored bat, Pete Pattavina/USFWS

Tricolored Bat

While not federally listed as a threatened or endangered species, the USFS closely monitors the tricolored bat population (*Perimyotis subflavus*) on the Savannah River Site in accordance with its Regional Bat Conservation Strategy. It has carefully placed acoustic monitors to record bat echolocation, which involves ultrasound calls above frequencies humans can hear. Bats use these calls to navigate and find arthropod prey. Biologists can use these recordings to document habitat ranges for this specific bat. The recordings also help USFS know where it is best to perform forest thinning or other habitat improvements that help ensure species survival.

Red-cockaded Woodpecker

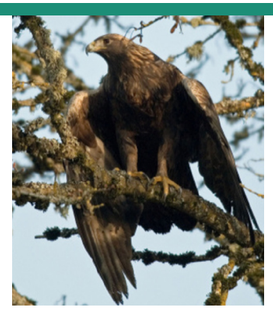
The most recognizable resident of Savannah River Site forests, which fittingly has the biggest habitat success story, is the red-cockaded woodpecker (*Dryobates borealis*), a species recently downlisted from being endangered to threatened under the Endangered Species Act. When first surveyed in the late 1980s, the red-cockaded woodpecker was found to be living onsite in just one cluster of three individual birds. Now, there are 160 clusters surveyed, representing nearly 600 birds onsite.

This success story is the result of different levels of forest management.

Red-cockaded woodpeckers prefer an open pine habitat for hunting and visibility. The USFS maintains areas around the clusters through forest management activities, the most common of which is prescribed fire. Fire is an essential ingredient in a healthy longleaf pine ecosystem. This accomplishes a couple of goals: It keeps the brush to a minimum, preventing overgrowth, and it consumes the younger hardwoods growing near the tree clusters, ensuring the dominant species is the longleaf pine, the bird's preferred habitat. When longleaf pines are healthy, other species can flourish along with them.

Additionally, collaborative research onsite led to the development of artificial cavity boxes that are also present across the Southeast. The artificial cavities provide supplemental nesting shelter for the red-cockaded woodpecker, whose preferred habitat is natural cavities in mature longleaf pine. Because Savannah River Site longleaf pines are too immature to accommodate naturally made cavity nests, the USFS created nesting inserts that are fitted into the trees. Over time, they become integrated with the tree's natural bark.

Top left, a red-cockaded woodpecker hatchling; center left, preparing to install an artificial cavity box for the red-cockaded woodpecker; bottom, left, prescribed burn; and top right, U.S. Department of Energy-Savannah River Manager Michael Budney on the right participating in fieldwork (Josef Orosz/USFS-SR).



Left, bald eagle (Dave Menke/USFWS) and right, golden eagle (George Gentry/USFWS)

Bald Eagle, Golden Eagle

The USFS surveyed for bald eagles and golden eagles in 2023 on Par Pond and L Lake. Nests were observed behind the Par Pond dam, and 12 bald eagles were noted at the Site. The population trends for eagle nests at the Audubon Silver Bluff Sanctuary, located offsite but still adjacent to the Savannah River Site, appeared stable. The USFS shared information with Appalachian eagle groups to gain better understanding of the golden eagle's wintering habitat as it is a migratory bird and observed onsite during the winter. The bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*) are protected under the Bald and Golden Eagle Protection Act.

Plants and Pollinators

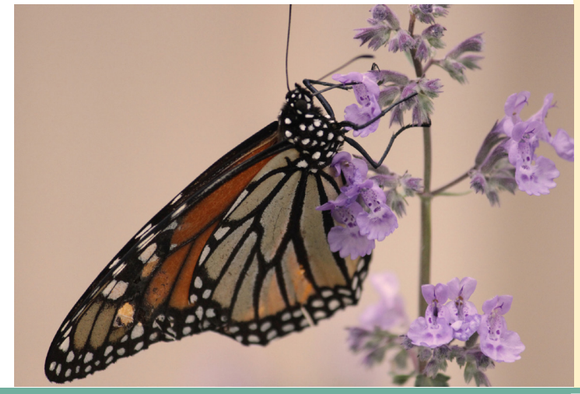
Native plants such as the smooth coneflower (*Echinacea laevigata*), a federally threatened species; the pondberry (*Lindera melissfolia*), a federally endangered species; and important pollinators, such as the monarch butterfly (*Danaus plexippus*), a candidate for federal threatened and endangered listing are important beneficiaries of nurturing a healthy and thriving habitat at the Savannah River Site.

Throughout the year, USFS employees conduct surveys in suitable habitat areas to locate plant clusters of native plants that are on the threatened, endangered, and sensitive species lists.

As these plants are found, the locations are georeferenced in multiple databases, and appropriate steps are taken to preserve the plants and their preferred habitat, as well as help encourage their potential spread and growth.

Top photograph is of the smooth coneflower (Amanda Hurst/SREL); above, pondberry (Hannah Davis/USFS-SR); bottom right, monarch butterfly (Krista Lundgren/USFWS)

Pollinator plots and sections of power line rights-of-way across the Site have been planted with mixed flowering plant species that are known to benefit bee and butterfly species observed on the Site. Mowing and herbicide applications are restricted in these areas in order to maintain natural mixtures of beneficial flowering plants. Additional plans to establish managed areas exclusively for pollinators are slated to be developed following timber removal operations and other various projects throughout the Site.



SUSTAINABILITY

Making the Change from Gallons to Volts

Driving across the Savannah River Site is becoming a lot more economical and environmentally friendly as the vehicle fleet shifts from gas- to electric-powered alternatives.

The Site purchased 115 of these vehicles in 2023: 113 light duty vehicles and 2 medium duty. Electric vehicles emit zero emissions, making them cleaner than the average new model year vehicle.

At the end of fiscal year 2023, the Site managed an inventory of 964 vehicles. In this fleet, 813 (84.3%) were either E-85, hybrid, or electric, which accounted for the reduction in petroleum consumption.

Executive Order 14057, "Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability," is driving the transition from gas to electric vehicles. The Executive Order is the federal government's response to the mounting risks and costs associated with the climate crisis by achieving a carbon pollution-free electricity sector by 2035 and net-zero emissions economy-wide by no later than 2050. In doing this, American technologies, industries, and jobs are projected to increase.

The Savannah River Site has three charging stations, each able to charge eight electric vehicles.

The Site's first phase in meeting the directives of the Executive Order is underway with the conversion of a light-duty vehicle fleet to electric vehicles. During additional phases of the project, the Site will convert mid- and heavy-duty vehicles to zero-emission engines, as well. The Executive Order also specifies that gasoline powered, light-duty vehicles may not be purchased for use at federal facilities after 2027 if an electric version is available.

To power the vehicles, the Site has built multiple charging stations in three locations—each with the capability to charge eight vehicles—to ensure there is the proper infrastructure available to support the conversion to electric vehicles as they are delivered.

Team Repurposes $11 Million in Site Assets

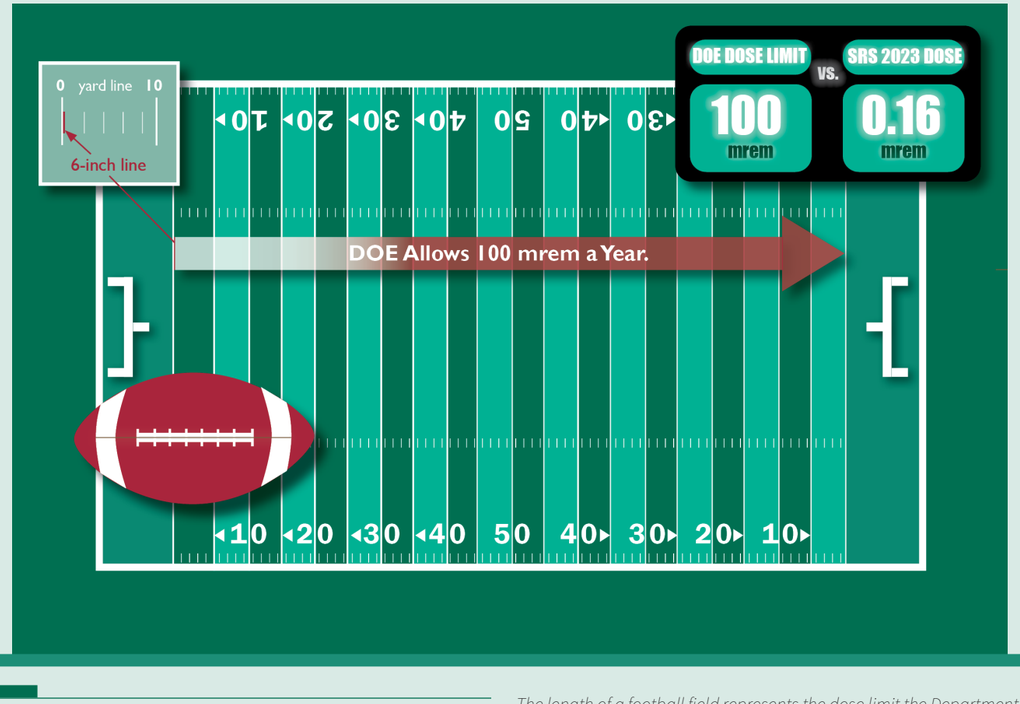
The all-inclusive excess and salvage program at the Savannah River Site, known as "Excess Express," redistributed nearly $11 million in government assets during fiscal year 2023, a 45% increase from the previous year.

Established in 2016, the salvage program ensures all Site customers either safely and securely dispose of or reuse government property. Items their previous users identify as surplus are sent on the "fast track" for disposal or to be repurposed by organizations both onsite and offsite. Excess Express handles the paperwork and salvaging procedures, freeing time for customers to devote to their specialized responsibilities. The program is widely known throughout the Department of Energy complex as a benefit to the government and local communities.

Excessing involves inspecting, separating, demarking, inventorying, preparing, and staging all items. Excess equipment can be reused by Site workers, offsite state and federal government agencies, and nearby community organizations and programs, such as the Laboratory Equipment Donation Program, which provides surplus laboratory equipment to colleges and universities, and the Savannah River Site Community Reuse Organization, which helps technology startups, business expansion, and new ventures across the Central Savannah River Area.

Above and right, the Excess Express program involves inspecting and staging all items that become part of the salvage program at the Site.

RADIOLOGICAL DOSE and MONITORING



The background photograph is of L Lake.

How Are We Exposed to Radiation?

Radiation is the transfer of energy in the form of rays, waves, or particles through space. Humans, plants, and animals receive radiation dose from both natural and man-made sources. It is everywhere and has been here since the earth was formed. It has many uses that are helpful and are important parts of our lives, from regulating the earth's temperature to powering houses.

Radiation is a Part of Everyday Life

Radiation can come from as far away as outer space and from as near as the ground beneath you. Because it is naturally all around us, we cannot eliminate radiation from our environment. We can, however, reduce our exposure to it.

Radiation Exposure Pathways

We are exposed to radiation in a multitude of ways. Simply breathing particles that are in the air will cause some exposure. Every time we eat food or drink water, we receive radiation. We can be directly exposed to radiation from the sun or the ground. Contaminants in the air can deposit on grass, which can then be eaten by animals and in turn be transferred to humans through consumption and through animal produce. Natural radiation can also be found in foods such as bananas, carrots, white potatoes, and Brazil nuts. Exposure to radiation potentially occurs by the following:

- Inhaling through the air
- Ingesting through food and water
- Absorbing through the skin
- Experiencing direct (external) exposure to radionuclides in soil, air, and water.

Radiation dose to a person is the amount of energy the human body absorbs from a radioactive source located either inside or outside of the body. It is typically reported as a unit of measure called a "millirem." The average annual dose of radiation a U.S. resident receives from both natural and man-made sources is 625 millirem. Of this, about 311 millirem a year comes from what is considered natural or background radiation.

Medical procedures account for nearly half of the exposure of radiation to the living person in the United States. Other exposure routes include industrial uses of radiation for various activities, travel by airplane, and even some household items that contain small amounts of radioactive materials. Radiation is truly all around us.

Understanding the 2023 Potential Radiation Dose

The Department of Energy has established dose limits to the public so that Site operations will not contribute significantly to the average annual background exposure. Department of Energy Order 458.1, Radiation Protection of the Public and the Environment, establishes 100 millirem a year as the annual dose limit to a member of the public that can come from Site operations.

In 2023, the Site did not increase potential radiation exposure to the public. The potential doses from Site radioactive discharges to air and water were well below regulatory standards for the public and the environment. The combined dose from air and water pathways—called the "all pathway" dose—was 0.16 millirem in 2023, which is substantially less than the Department of Energy public dose limit. The all-pathway total dose is less than the 2022 total dose of 0.18 millirem, which is attributed to the decrease in radioactive liquid releases. The Department of Energy established the dose limit to protect the public and environment from the potential effects of radiation released during Site operations. The Savannah River Site continues to remain far below the 100 millirem a year public dose limit.

The length of a football field represents the dose limit the Department of Energy allows. Dose at the Savannah River Site is at the 6-inch line.

Assigning Dose to the Representative Person

The representative person is not someone you've met or even have much in common with, but this individual has a great influence on protecting your health, your quality of life, and safeguarding the environment you live in. This person represents **YOU**, but in a very unlikely scenario.

The representative person theoretically lives at the Site boundary. This unnamed, unfaced person exists only in calculations and dose models as a hypothetical human who is between you and the radiation originating from Savannah River Site projects and missions. The premise is, if the dose the representative person receives is at or below the Department of Energy's dose limit prescribed as safe for the public, then you, a resident who does not seek out exposure pathways, would be at an even safer level. The representative person's exposure is at the 95th percentile of national and regional data, meaning that this hypothetical person is participating in the exposure scenarios to an extent greater than 95% of the population.

ENVIRONMENTAL ACCOMPLISHMENTS

Lower Three Runs Physical Remediation Complete

Contaminated sediment from the excavation area was placed into sacks for disposal during the Lower Three Runs cleanup of R-Area Discharge Canal.

The physical work involved in the environmental remediation of the Lower Three Runs Stream System has been completed with the cleanup of the R-Area Discharge Canal.

The stream system consists of several ponds and canal systems that have received thermal discharges from cooling water systems associated with the P and R Reactors. The discharges included radionuclides that may pose a threat to human health as well as mercury pumped from the Savannah River that poses a risk to the environment.

To safely isolate the identified area for cleanup, large water barriers were placed, blocking off the area with higher concentrations. The barriers were inflated, and the water from the contaminated area was pumped out, exposing the sediment underneath. The sediment was treated with a drying agent and excavated to approximately 1-foot-deep. The excavated sediment was then safety discarded and transferred to a lined roll-off pan to be disposed of as low-level waste onsite. Approximately 21 cubic yards of sediment were removed from the 500-square-foot excavation area. This approach can be applied to other stream systems at the Savannah River Site to help achieve legacy cleanup and environmental stewardship.

CTI & Associates, which is part of the Site mentor-protégé program, performed the project fieldwork. The Environmental Protection Agency and the South Carolina Department of Health and Environmental Control approved the work, which was performed by a multidiscipline team of personnel from radiological controls, generator certification officials, planning, engineering, and project management.

The efforts of the Lower Three Runs Final Remediation Decision Team have led to substantial cost savings and the protection of approximately 30 miles of canals and streams and more than 3,000 acres of aquatic habitat. The project was completed within a year and without incident.

Site Devises New Way to Ensure Safe Storage of Radioactive Material Storage Containers

Innovation and teamwork led the Savannah River Site to a storage method that protects the integrity of radioactive material for the next century in a long-term Dry Fuel Storage Area at the Site's L Disassembly Basin.

Two 30-gallon drums, which the Idaho Chemical Processing Plant shipped to the Site in 2007 and 2008, were facing a time limit for safe storage. Originally, the Site planned to send the material through the Site's HB Line facility; however, changes in mission prevented it from being processed before HB Line went into safe shutdown status in 2020. The drums are now awaiting a final onsite disposition path.

The radioactive material is contained in plastic bags and bottles and sealed inside drums. Over time, the decomposition of the plastic generates hydrogen gases, which are flammable. The drums have a limit on how long they can be stored before disposition. One of the drums reaches this limit in 2025, which prompted a plan to ensure the drums would remain safe for a longer period of time.

A site-wide team, consisting of Engineering, Criticality Engineering, Operations, Radiological Control, and the Savannah River National Laboratory, evaluated the conditions. It concluded that venting the cans by piercing the top would relieve the pressure caused by the buildup of gases. The team designed and fabricated a can piercer and a safe process to perform the task, which included using a containment hut and protective plastic suits for operators. This process was a result of extensive planning, dry runs, and mockups conducted by the team. To ensure the safety of the operations, the team practiced on dummy containers until proficiency was achieved to safely execute the work.

Operators, part of a site-wide team, prepare for drum venting operations so the drums can be safely stored in the Dry Fuel Storage Area.

The drums can now continue to be safely stored in the Dry Fuel Storage Area.

Savannah River Site Reaches New Landmark in Cost-saving Double-stack Project

Minor alterations to a storage mechanism at the Savannah River Site has yielded major changes to inventory capability along with sizable savings of taxpayer dollars.

With the goal of expanding the interim storage of canisters of high-level waste that has been turned into glass through vitrification, the Site began double-stacking 2,000 canisters in one of the Site's two Glass Waste Storage Buildings. The original design of the two buildings would accommodate 4,602 canisters. Two canisters can now be stored in an area previously used to store only one, freeing the remaining space for future use.

The storage building consists of below-grade seismically qualified concrete storage locations containing support frames for 2,262 10-foot-tall canisters. Modifying the metal support frame to accommodate canister stacking required workers to develop and test a cutting tool that could be operated from a distance to minimize the potential of workers' exposure to radiation. The Site's liquid waste contractor removed a steel crossbar at the bottom of each canister support and reduced the thickness of the plug that is used to safely seal each canister position.

Enough positions are planned to be converted to allow storage of all canisters produced at the Site. By doubling the original space in the two storage buildings, the Savannah River Site is deferring, and potentially eliminating, the need to construct another Glass Waste Storage Building, saving approximately $100 million. The double-stack program is expected to provide enough storage until a federal repository is established, allowing the Site's liquid waste program to move forward.

APPRENTICESHIPS

Savannah River Site Offers Varied Apprentice Programs

Nuclear Operator Apprentices walk in for their recent graduation ceremony to receive their Aiken Technical College Certificate for Nuclear Fundamentals and their Department of Labor Certificate.

The Savannah River Site's first apprenticeship program began in 2020 as a cohort of 10. In just the few years since, apprenticeships have been established for 22 occupations with more than 100 participants per cohort. Successful partnerships with Aiken Technical College, Denmark Technical College, and Orangeburg Calhoun Technical College have allowed apprentices to gain paid on-the-job training and networking opportunities.

Unlike internships, apprenticeships promote and document knowledge transfer and provide participants with proof of skill mastery as portable U.S. Department of Labor credentials, signifying that the apprentice is fully qualified to successfully perform an occupation.

The Operator Apprentice Program

Early in 2023, management and operations contractor Savannah River Nuclear Solutions, liquid waste contractor Savannah River Mission Completion, and the Savannah River National Laboratory collaborated to develop a joint pipeline for talent that fits multi-industry needs. One hundred apprentices divided their time for eight months between the classroom at Aiken Technical College and onsite work to train as production operators.

Operator apprentices learn the basic qualifications of being a production operator, including conduct of operations principles, radiation worker training and qualification, and how to perform shift rounds. At the end of the program, participants will have earned a certificate in nuclear fundamentals. Those who successfully complete the program are hired and put to work in areas across the Site.

The Operator Apprentice Program started as a partnership between Savannah River Nuclear Solutions, Aiken Technical College, Apprenticeship Carolina™, and the Lower Savannah Council of Governments. The program is now part of Apprenticeship Carolina, which is a division of the South Carolina Technical College System and leads South Carolina in registered apprenticeship programs that help businesses and communities thrive economically. With the guidance of Apprenticeship Carolina and the Lower Savannah Council of Governments, the operator apprenticeship program has been registered both with the state and nationally.

Mechanical Engineering Apprenticeships

The Savannah River Site offers mechanical engineering apprenticeships to college students enrolled in an accredited engineering degree program. Students receive paid on-the-job experience while completing approximately 1,000 hours per year—for up to two years—of competency-based and job-related training. Graduates from the apprenticeship program receive

Nuclear Operator Apprenticeship program held a graduation at Denmark Technical College.

a nationally recognized and portable credential from the U.S. Department of Labor and an opportunity to hire on full time with Savannah River Nuclear Solutions.

The University of South Carolina Aiken recently began offering four-year degrees in mechanical engineering, which sparked a greater need for local apprenticeship opportunities. The new mechanical engineering discipline is part of an ongoing commitment to create innovative workforce development at the Savannah River Site and fill vacant positions. Additional engineering apprenticeship disciplines at the Site include environmental engineer, process control technologist, process software engineer, fire protection, chemical engineer, and electrical engineer.

New Apprentice School Draws Students to Site Careers

Students attending technical colleges in communities in the vicinity of the Savannah River Site can now participate in a new apprentice school created by Savannah River Nuclear Solutions. In addition to getting paid, apprentices gain job-related experience, the opportunity to network to obtain job references, and a chance to test drive occupations of their choosing while pursuing their degrees.

A team of employees from Savannah River Nuclear Solutions, the Savannah River National Laboratory, and Savannah River Mission Completion are working together to quickly grow and enhance the school. Apprentices will be recruited twice each year to start school in January or in the fall.

Aiken Technical College and Denmark Technical College are currently participating in the unique program. The program enhances opportunities for students at smaller schools in rural areas to have extended opportunities for careers at the Savannah River Site. The program has also expanded to include maintenance mechanics and laboratory technicians.

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University of South Carolina Aiken Capstone Fire Protection

The Savannah River Site hired three 2023 graduates of the University of South Carolina Aiken after they finished their science, technology, engineering, and math capstone project, sponsored by Savannah River Nuclear Solutions fire protection engineers. Capstone projects are related to students' areas of study and aid in professional development, portfolio growth, and job experience.

The three students—industrial engineer Noah Chancey and mechanical engineers Tucker Rayfield and Andrew Kricke—transitioned from student to full-time employees with Savannah River Nuclear Solutions. The critical skill set of fire protection engineers is in great demand at the Savannah River Site, and this new program will prepare students to use their knowledge of fire protection engineering concepts to positively impact the Site's missions.

The students' program simulated a glovebox environment and tested the ability of three different flame detectors to identify fires through multiple configurations of glass.

The program is a partnership between Savannah River Nuclear Solutions and the University of South Carolina Aiken Capstone.

University of South Carolina Aiken Capstone graduates received a certificate of completion before transitioning into full-service roles at the Savannah River Site.

TECHNOLOGY

Environmental Bioassay Laboratory Offers Excellence to Customers

A lab specialist at the Environmental Bioassay Laboratory performs a radiochemistry column separation process.

The Environmental Bioassay Laboratory at the Savannah River Site has an error-free rate equal to or just shy of perfect as it analyzes a wide range of materials for both onsite and offsite customers. Each year, it processes more than 10,000 samples and 70,000 single analytical results, all with a better-than 99% accuracy rate and a turnaround time that is impressive among customers and throughout the industry.

Established in 2001, the Environmental Bioassay Laboratory is a nonradiological chemical facility that concentrates on environmental, industrial hygiene, and bioassay analyses for the Savannah River Site. Inside the more than 75,000-square-foot facility located in B Area of the Site, 32 laboratories specialize in the analysis of very low (trace) contaminants in water, air, and more complex matrices (such as soil, urine, and plant and animal materials), as required by the Department of Energy, the South Carolina Department of Health and Environmental Control, the Occupational Health and Safety Administration, and the U.S. Environmental Protection Agency. The laboratory provides high-volume sample loads for the Site's Environmental Compliance, Industrial Hygiene, and Health Physics organizations, among other customers onsite, including liquid waste contractor Savannah River Mission Completion and Battelle Savannah River Alliance, which operates the Savannah River National Laboratory. Offsite, the Environmental Bioassay Laboratory has contracts to perform radiobioassay analysis for the Department of Energy's Oak Ridge National Laboratory in Oak Ridge, Tennessee, and Lawrence Berkeley National Laboratory in Berkeley, California.

Laboratory Purpose and Scope

The Environmental Bioassay Laboratory analyzes samples to assess employee exposure to harmful materials and to protect the public and the environment from these same contaminants. The laboratory can be divided into three general categories that address the following purposes:

- Environmental Laboratory—Measures low-activity radionuclides and nonradiological constituents in environmental samples (for example, soil, foodstuffs, animal products, plant materials, water, and air). The South Carolina Department of Health and Environmental Control certifies the Water Quality portion of the laboratory.
- Radiobioassay Laboratory—Measures trace radionuclides in urine and fecal samples submitted by Savannah River Site radiological workers. The laboratory is Department of Energy Laboratory Accreditation Program-certified.
- Industrial Hygiene Laboratory—Detects trace contaminants in nonradiological and low-level radiological air, surface wipe, and bulk material samples, meeting International Organization for Standardization and International Electrotechnical Commission 17025 requirements with accreditation verified and approved by the American Industrial Hygiene Association Laboratory Accreditation Program.

Accreditations and Certifications

The Environmental Bioassay Laboratory holds South Carolina Department of Health and Environmental Control Laboratory Certification, which is approved for the State of South Carolina to meet or exceed the Environmental Protection Agency's laboratory certification requirements. The laboratory also holds accreditations from the Department of Energy Laboratory Accreditation Program and the American Industrial Hygiene Association Laboratory Accreditation Program.

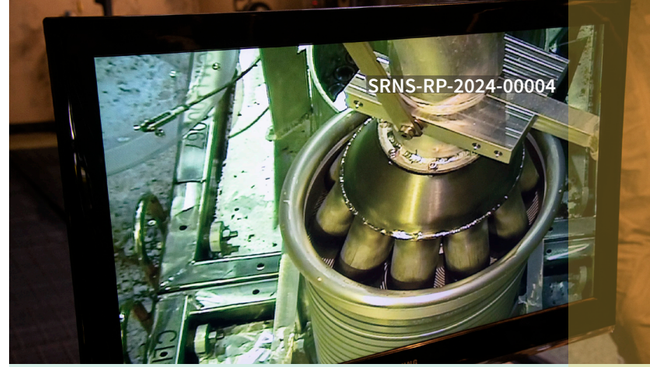
Successful analysis of multiple proficiency testing samples by the Environmental Bioassay Laboratory throughout the year provides a high degree of confidence in the laboratory's ability to achieve correct results.

World-renown Excellence

The Environmental Bioassay Laboratory is often recognized as a top performer on the world stage. The radiobioassay laboratory scored in the top three out of 70 participating laboratories from 26 countries for a Procorad Radiobioassay Laboratory Intercomparison Testing Program.

Additionally, the Environmental Bioassay Laboratory has played a key role in the Department of Energy Consequence Management Home Team's response to assist the government of Japan by analyzing soil and air filter samples for radiological contaminants related to the Fukushima Daiichi reactor incident that occurred in 2011. The laboratory was selected as one of four nationally to perform these sample analyses due to its expertise in rapid analytical methods for radiological contaminants in environmental samples.

The Environmental Bioassay Laboratory understands the value of continuous improvement. It has applied the knowledge gained from these efforts both internally and externally to ensure Savannah River Site and Department of Energy missions are achieved with integrity, high quality, and efficiency.



Site employees designed and installed a High Flux Isotope Reactor core cleaning station and vacuum tooling to ensure continued processing of spent nuclear fuel stored in the Site's L Basin.

Unique Vacuum Designed for Cleanup

A multidiscipline team of Savannah River Site employees turned to the innovative approach of vacuuming spent nuclear fuel to reclaim storage racks in an underwater basin, allowing for uninterrupted fuel processing while the basin is being de-inventoried.

The spent nuclear fuel is safely stored in an underwater basin inside a former production reactor in the Site's L Area, awaiting processing in H Canyon. Once the fuel is dissolved in H Canyon, it is sent through the Site's liquid waste facilities to be made into glass through vitrification. The glass is safely stored onsite until a federal repository is identified.

The reclaimed racks allow the L-Area Disassembly Basin to receive more High Flux Isotope Reactor cores, which contain spent nuclear fuel from foreign and domestic research reactors. The High Flux Isotope Reactor, located at Oak Ridge National Laboratory in Tennessee, is the highest flux reactor-based source of neutrons for research in the United States using highly enriched uranium. The fuel elements, an inner and an outer element, together form a reactor core.

In the 1990s, L-Area Basin operations deposited resin on High Flux Isotope Reactor cores and the racks that held them. The resin, made up of tiny beads, traps radionuclides and helps remove radioactive ions from the basin water. The H-Canyon dissolver is not able to process the resin, and the racks are needed for future spent nuclear fuel receipts.

Site employees developed a plan to remove the resin from the cores and racks. The team designed and installed a High Flux Isotope Reactor cleaning station and vacuum tooling to be used with an existing basin vacuum system. Cores were placed in the cleaning station, vacuumed, and relocated, allowing the racks to be vacuumed.

The Site was able to recover 30 racks and add 60 clean storage positions. This allows the Site to use all storage racks for future receipts. The High Flux Isotope Reactor cores can be scheduled for dissolution, and the basin can receive more cores without causing any interruption to other operations.

ENVIRONMENTAL JUSTICE

Today's Environmental Justice Programs Look to the Future

The Savannah River Site is committed to the principles of Environmental Justice and ensuring that all programs, policies, and activities support these principles, thereby facilitating involvement by affected communities and stakeholders.

Various methods and practices are in place to enhance engagement from the affected communities. The Site provides opportunities for community involvement and decision-making through information sharing and empowering the communities around the Site. The Savannah River Site continues to expand its outreach with educational opportunities and access to information on Site operations and environmental and public health risk-assessments. Environmental Justice programs at the Site include educational opportunities, workforce development, and community advocacy and outreach. These opportunities take the form of community meetings that focus on job training, grants, environmental monitoring, and emergency response. The Site also offers student internships focusing on environmental contaminant analysis research projects.

The Department of Energy Office of Environmental Management's Minority Serving Institutions Partnership Program Achievement Workshop included panel discussions.

Diverse Programs for Varied Needs and Stakeholders

Specific highlights of programs complementing the Site's commitment to Environmental Justice include the following:

- The Savannah River Site Citizens Advisory Board—a stakeholder group of individuals from diverse backgrounds in South Carolina and Georgia counties affected by Site operations. The Citizens Advisory Board provides the Department of Energy with advice, information, and recommendations on issues that affect environmental management at the Site.
- The Savannah River Site Community Reuse Organization—a private, nonprofit organization that develops and implements a comprehensive strategy to diversify the economy around the Site. The Community Reuse Organization ensures that Site excess and operating resources benefit the economic well-being of the surrounding areas.
- The Savannah River Site Tour program—guests learn about current and future Department of Energy-Environmental Management and National Nuclear Security Administration missions at the Site.
- The Teaching Radiation, Energy and Technology Workshop—an event for local educators and community leaders that has been held by the Department of Energy's Savannah River Operations Office since 1995. Designed to educate teachers so they can in turn provide radiation education to their students, the workshop includes experts from the Department of Energy, the Savannah River Site, the Environmental Protection Agency, and the South Carolina Department of Health and Environmental Control.

Community leaders and educators assemble at a Teaching Radiation, Energy and Technology Workshop.

MSIPP Develops Future Source of Scientists for Missions

The Department of Energy's Office of Environmental Management has grown the Minority Serving Institutions Partnership Program over the last few years into a multidiscipline research and development program to produce the next generation of scientists in a segment of the population that has been traditionally underrepresented in science, technology, engineering, and math education and careers.

The program builds on the diversity, inclusion, and equity successes at the national laboratories and is developing a pipeline of future scientists and technologists to complete the safe cleanup of environmental legacy brought about from decades of nuclear weapons development and government-sponsored nuclear energy research.

The program, known as MSIPP, uses internships, competitive research awards, a postdoctoral research program, and an environmental sciences field station. Recent additions have been made to a technology curriculum and professional development program, graduate fellowship program, and a shared interest research partnership between the Office of Environmental Management and minority serving institutions.

All of this is to augment a growing need in the Department of Energy's Office of Environmental Management workforce of nearly 33,000 federal and contractor employees. A significant portion of that workforce is eligible, or will soon be eligible, for retirement.

MSIPP partners with academic, government, and Department of Energy contractor organizations to mentor future minority scientists and engineers in research, development, and deployment of new technologies that address future workforce needs and environmental cleanup challenges of the Office of Environmental Management.

There are more undergraduate science, technology, engineering, and math students enrolled at four-year minority serving institutions and historically black colleges and universities than at four-year nonminority serving institutions. Minority serving institutions produce one-fifth of the nation's bachelor's degrees in these technical disciplines.

The Savannah River National Laboratory has 5 postdoctoral research fellows, 2 graduate fellowship program participants, and 10 research interns participating in the partnership program. In the three discipline tracks at the Savannah River Environmental Sciences Field Station there are 10 environmental sciences students, 8 engineering students, 22 cybersecurity students, and 1 graduate assistant.

In August 2023, for the second year, the program held an achievement workshop. More than 265 minority-serving institutions faculty and students, Department of Energy personnel and Savannah River National Laboratory employees gathered in Augusta, Georgia, for panel discussions, breakout sessions, and student poster sessions.

The Minority Serving Institutions Partnership Program held its second workshop in 2023 in Augusta, Georgia.

OUTREACH to the COMMUNITY

Popular Tour Program Offers Additional Historical Tours

Each year, the Savannah River Site opens its barricades to hundreds of visitors to see firsthand the key facilities that have been the setting for the nation's Cold War effort in the past and the ecology, sustainability, and clean energy initiatives that are central to environmental stewardship today.

General site tours and historic tours accommodate approximately 900 members of the public yearly. Each general tour can serve 34 guests, while historic tours have room for 50 people.

There were 26 general Site tours and 8 historic tours in 2023. Historic tours were split between the former towns of Dunbarton and Ellenton, and both groups visited the Curation Facility, the onsite repository of Savannah River Site artifacts representing employee life, facility construction, and safety culture over the years, and the University of Georgia's Savannah River Ecology Laboratory. Historic tour participants also pass C Reactor on their route. The Site partners with the Savannah River Archaeological Research and the Savannah River Site Cold War Historic Preservation Program to conduct the historic tours.

In addition to driving past key facilities at the Savannah River Site, the general tour includes a visit to the University of Georgia's Savannah River Ecology Laboratory, where participants will hear about the laboratory's history and mission and get an up-close view of some of the animals found onsite.

Participants for both types of tours arrive and depart from the Savannah River Site Badge Office on SRS Road 1, near New Ellenton. Both tours are free, and reservations are on a first-come, first-served basis. Participants must be 18 years of age or older and be U.S. citizens.

All tour participants must register separately as they will be asked to provide their Social Security Number beforehand for enhanced security purposes. The Site tour coordinator will call each participant for that information.

Bob Bonnett (top, right), Savannah River Site Tour Program Coordinator, starts the tours at the Site's Badge office. The historic tour includes stops at the Curation Facility (below) and the former towns of Ellenton (bottom) and Dunbarton.

Inaugural Fishing Challenge Benefits Youth

With an October sunrise and a fishing boat as a backdrop, 25 youth attached their lures, raised their poles, and cast hope into the waterways of the Savannah River Site, vying to catch a winning fish … or better yet, have a dream come true.

The Inaugural Fishing Challenge, a catch-and-release sporting event coordinated by the U.S. Forest Service-Savannah River, partnered with the U.S. Department of Energy-Savannah River and the Outdoor Dream Foundation to offer children and young adults with terminal or life-threatening illnesses connections and quality time with professional bass anglers.

The 2023 event comes after an 18-year history of combined U.S. Forest Service and Department of Energy hunting and fishing outreach events that have allowed more than 450 participants access to Savannah River Site land and water resources. For the past eight years, the U.S. Department of Energy-Savannah River, U.S. Forest Service, and National Wild Turkey Federation have teamed up to host fishing events for injured veterans, mobility challenged or disabled individuals, and most recently, first responders.

Fishing events with new partner Outdoor Dream Foundation are special for all involved. The nonprofit, run entirely by volunteers and based in Anderson, South Carolina, has provided sporting opportunities, including the fishing challenge, to more than 100 deserving youth in the last 20 years.

Events such as Inaugural Fishing Challenge—and the bass challenge and spring turkey hunt that also occurred in 2023—aren't just recreation events, they are also an important tool natural resource and environmental managers and research staff use to gauge the health of forests and waterways and the results of more than 70 years of natural resource management. Records of fish weights and wildlife measurements caught at these events provide information to identify health trends of certain indicator species across such a large forested area. Trending information offers the insight needed to develop future management strategy to improve the health and diversity of the Site's forests and waterways.

Top, Seanan Handwork poses with his catch of the day alongside professional bass angler Brandon Cobb. Below, participants at the Inaugural Fishing Challenge.

Site Encourages Stakeholder Involvement

The Savannah River Site has built long-term support at all tiers of community and government and is committed to keeping the public informed about Site projects. From individuals, schools, and municipalities to a broader reach encompassing state and national officials, the Site has ensured that it has a framework from which communication and information flow purposefully between the Savannah River Site and those with a vested interest in its missions.

The foundation of the stakeholder program is the belief that the public has both the right to know what the Department of Energy is doing in the community and the right to have input in the decision-making process. Stakeholder engagement offers those who will be affected by the outcome of Site work a chance to voice their opinions. This ensures the Department of Energy has a shared vision with the public.

The Site involves stakeholders through a variety of activities that solicit input from the public, including the following:

- Assisting stakeholder groups with analyzing environmental management plans
- Increasing awareness of the impact of contaminant releases or potential releases during cleanup
- Allowing community groups to propose alternative plans that may achieve better results
- Establishing priorities to promote cleanup and safety
- Involving elected officials in Site tours and discussions about technologies, project milestones, and new and ongoing missions

Additionally, the Savannah River Site works closely with the Citizens Advisory Board, the U.S. Environmental Protection Agency Region 4, and the South Carolina Department of Health and Environmental Control to reduce risk and accelerate environmental cleanup at the Site.

Left, recent members of the Savannah River Site Citizens Advisory Board assemble at a meeting venue and below, to hear a presentation at a meeting.

Citizens Advisory Board Represents Public

Since it was established in 1994, the Savannah River Site Citizens Advisory Board, known as the CAB, provides advice and recommendations from a community perspective on Department of Energy programs, policies, and projects. The board also offers the opportunity for members of the community to share their thoughts and opinions with the Site and its regulators.

The advisory board is one of eight that the Department of Energy has in place across the complex to facilitate advice and recommendations on Site-specific issues and concerns. Since its inception, it has issued 380 recommendations to the Department of Energy; five of those were made in 2023. Generally, the Citizens Advisory Board issues advice on environmental restoration, waste management, and other topics of interest to stakeholders.

The board's current 16 members reflect diverse viewpoints in the community and region surrounding the Savannah River Site. Members are recruited from Aiken, Allendale, Barnwell, Beaufort, Charleston, Lexington, and Richland counties in South Carolina and from Burke, Chatham, Columbia, Effingham, Richmond, and Screven counties in Georgia. They are all residents of communities that Savannah River Site operations and cleanup activities directly affect. A chair and vice chair represent the CAB at the Department of Energy's Environmental Management Site-Specific Advisory Board meetings and at public events. The remaining board members belong to the following five issues-based subcommittees:

- Facilities Disposition and Site Remediation
- Nuclear Materials
- Waste Management
- Long-term Missions and Budget
- Administrative and Outreach

The various subcommittees within the board meet bimonthly to discuss topics such as environmental clean-up on the Site, budget management, materials handling, historic preservation, and plans for future uses of the Site.

The Citizens Advisory Board schedules public meetings at rotating locations throughout the region, extending from east central Georgia to the South Carolina Lowcountry, to enable a wide range of attendees and viewpoints. In keeping with the commitment to provide meaningful involvement in the decision-making process, the board held six meetings in 2023 in Aiken, Hilton Head Island, and North Charleston in South Carolina; and Augusta and Waynesboro in Georgia. Agency liaisons from the Department of Energy, the U.S. Environmental Protection Agency Region 4, and the South Carolina Department of Health and Environmental Control also participate in the meetings.

The board streams meetings for those who can't attend, and an archive of past meetings and newsletters exists on its website.

The advisory board provides outreach to the community through Site tours; an online CAB University, which offers background information on general Site missions and quizzes to test knowledge takeaway; and a line-up of speakers that civic groups can engage for events and meetings.

Citizens interested in applying for membership do not need to have any special skills or extensive knowledge about the Savannah River Site. The general requirement is to have a willingness to attend meetings and learn about the plans and activities at the Site and provide advice and recommendations from a public perspective.

SAVANNAH RIVER SITE

Department of Energy-Office of Environmental Management

To Learn More About the Focus on Environmental Safety:
Visit the SRS website: www.srs.gov/general/srs-home.html
View or download the Savannah River Site 2023 Environmental Report:
www.srs.gov/general/pubs/ERsum/index.html

For More Information about the Department of Energy-Savannah River Operations Office or this report, please contact:

Office of External Affairs
Savannah River Operations Office
U.S. Department of Energy
P.O. Box A
Aiken, SC 29802

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Office of External Affairs
Savannah River Operations Office
U.S. Department of Energy
P.O. Box A
Aiken, SC 29802

Email address: DOE-SROEA@srs.gov

Above, the upper left portion of this aerial view shows the a portion of the Savannah River National Laboratory that is onsite. Additional buildings include the Cold War-era administrative building and other facilities that make up the Site's A Area.

Note: Unless a photograph in this document is identified with the name of an outside organization or photographer, it was taken by photographers from Savannah River Site Communications and Media Services or a Savannah River Site representative.

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