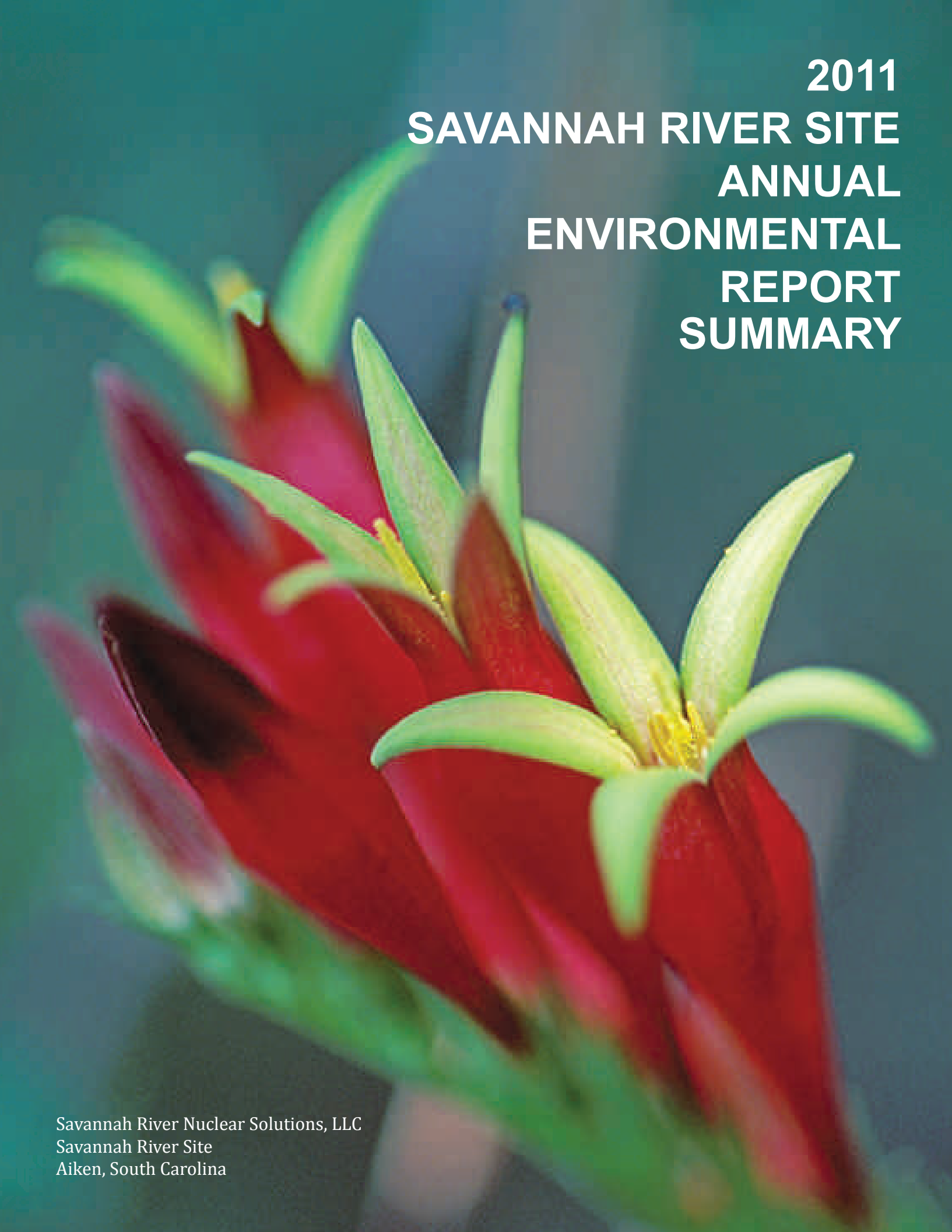


2011 SAVANNAH RIVER SITE ANNUAL ENVIRONMENTAL REPORT SUMMARY

Savannah River Nuclear Solutions, LLC
Savannah River Site
Aiken, South Carolina

HISTORY/DESCRIPTION

The Savannah River Site

The 310-square-mile Savannah River Site (SRS) is located in South Carolina and borders the Savannah River. The U.S. Atomic Energy Commission, a U.S. Department of Energy (DOE) predecessor agency, established SRS in the early 1950s, with its primary mission to produce special nuclear materials (SNM) (such as plutonium-239 and tritium) used in the production of nuclear weapons. Five SNM-production reactors, along with support facilities to separate and purify the reactor products, were constructed and operated until 1988. With the end of the Cold War in 1991, waste management, environmental restoration, plutonium disposition, and decontamination and deactivation activities became primary missions for SRS. As those missions mature, SRS is turning its attention to using its nuclear knowledge to benefit the nation.

1950	President Harry S. Truman asks DuPont to design, construct, and manage the Savannah River Plant
1953	First SRS Reactor goes critical
1954	First delivery of plutonium product
1972	Atomic Energy Commission designates SRS a National Environmental Research Park
1988	All production reactors shut down
1989	SRS placed on the National Priorities List, becomes regulated by the Environmental Protection Agency; Savannah River Plant becomes Savannah River Site, reflecting mission change
1991	End of Cold War
1996	The Defense Waste Processing Facility processes first legacy radioactive waste
1997	First liquid radioactive waste tank closed
2000	SRS selected for new missions: Mixed Oxide Fuel Fabrication Facility, Pit Disassembly and Conversion Facility, Plutonium Immobilization Facility
2004	Savannah River Technology Center receives National Laboratory designation
2009	Accelerated cleanup efforts initiated under American Recovery and Reinvestment Act
2011	Enterprise SRS is launched, to use the assets of the SRS and its nuclear knowledge to benefit the CSRA and the nation

SRS Missions and Programs

National Security

- **Meet the needs of the U. S. nuclear weapons stockpile**
- **Store, treat, and dispose of excess nuclear materials safely and securely**

Environmental Stewardship

- **Treat and dispose of legacy radioactive liquid waste from the Cold War era**
- **Clean up environmental contamination from previous operations**

Clean Energy

- **Develop alternative energy technology**

Upper Right: Workers Using Gloveboxes to Isolate Hazardous Materials at SRS.

Left: Savannah River National Laboratory (SRNL) Building

Today, SRS is a key DOE industrial facility dedicated to national security, environmental stewardship, and clean energy.

SRS activities continued to be diverse in 2011, with the primary goal to ensure that the existing U.S. stockpile of nuclear weapons remains safe and reliable. Other SRS activities include:

- storage, treatment, and disposal of excess nuclear materials safely and securely,
- remediation of legacy contamination sites,
- disposal of waste, and
- decommissioning of excess facilities.

Savannah River Nuclear Solutions, LLC (SRNS) was the Management and Operations contractor in 2011. Savannah River Remediation, LLC (SRR) was the liquid waste operations contractor.

During 2011, SRS continued to successfully execute a number of national security missions. The tritium facilities continued to ensure that the existing U.S. nuclear weapons stockpile continues to be safe and reliable. Construction of the Mixed Oxide Fuel Fabrication (MOX) Facility, and the Waste Solidification Building, key to the nation's nuclear proliferation efforts, continued, as did planning for a pit disassembly and conversion capability at the SRS.

SRS NOW

The environmental stewardship mission includes management and disposition of waste materials, remediation of waste sites, and environmental research.

Center for Hydrogen Research

Treatment and disposal of legacy waste from the Cold War Era continued as part of the environmental stewardship mission in the F and H Area Tank Farms, the Defense Waste Processing Facility (DWPF), the Interim Salt Disposition Processing (ISDP) Facility, and Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit (ARP/MCU) and Saltstone facilities. Waste management activities conducted in the E Area Low Level Waste (LLW) facility, remediation, and deactivation and decommissioning (D&D) activities also contributed to this mission. Environmental research is conducted at the Savannah River National Laboratory (SRNL) and Savannah River Ecology Laboratory (SREL).

The SRS is a DOE Complex leader in biomass renewable energy operations, a significant component of the SRS clean energy mission. 2011 accomplishments also include the startup of a 50L algae photobioreactor to support the industrial production of algae for biofuels by SRNL, and continued of support of the small modular reactor deployment initiative.

Whit Gibbons, an SREL Research Ecologist and Nationally known Herpetologist and Author, with SRS Specimen. Because turtles are long-lived inhabitants of a wide variety of aquatic and terrestrial habitats on the site, they serve as excellent indicators of environmental quality. SREL's research on turtles and other SRS wildlife has been in progress for over 40 years, yielding hundreds of scientific publications on radioecology, wetlands, and habitat quality.

Biomass Facility

SRS NOW

Key organizations that work together on the Savannah River Site to accomplish missions include the following:

The U.S. Department of Energy - Savannah River Operations Office

The Department of Energy's (DOE) Savannah River Operations Office oversees the Environmental Management (EM) mission at SRS and serves as the site landlord, providing support and oversight for EM and NNSA missions in several areas, including environmental compliance, monitoring, and surveillance.

National Nuclear Security Administration

At SRS, the National Nuclear Security Administration (NNSA) is responsible for the oversight of contractor execution of the defense and nuclear nonproliferation programs. For defense programs, tritium operations support the stewardship of the nation's nuclear weapon stockpile. For the nuclear nonproliferation program, plutonium disposition program activities include plutonium material processing and storage, and the construction of the MOX fuel fabrication and Waste Solidification facilities.

Savannah River Nuclear Solutions, LLC

A joint venture of Fluor Corporation, Newport News Nuclear, and Honeywell International, Inc., Savannah River Nuclear Solutions (SRNS) is the Management and Operating contractor at SRS. SRNS operates SRNL, nuclear materials and used nuclear fuel facilities, waste management facilities, tritium programs, site infrastructure, and waste site remediation and closure projects.

Savannah River National Laboratory

The Savannah River Nuclear Laboratory (SRNL) "puts science to work" to create and deploy practical, high-value, cost-effective technology solutions in the areas of environmental management, national and homeland security, and energy security. The facility also provides technical leadership and key support for future SRS missions.

Savannah River Remediation, LLC

Savannah River Remediation (SRR), a subsidiary of URS, which includes partners Bechtel National, CH2M Hill and Babcock & Wilcox, is SRS's liquid waste contractor. SRR works to remove, stabilize, and dispose of liquid radioactive waste currently stored in underground storage tanks at the site.

Parsons Infrastructure & Technology Group, Inc.

Parsons operates under contract with DOE to design, build, start up, and operate the Salt Waste Processing Facility.

Shaw Areva MOX Services, LLC

Shaw Areva MOX Services, is responsible for the design, building and operation of SRS's Mixed Oxide Fuel Fabrication Facility.

Savannah River Ecology Laboratory

Operated by the University of Georgia, the Savannah River Ecology Laboratory (SREL) provides an independent evaluation of the environmental effects of SRS operations through a program of ecological research, education, and outreach. Research emphasis includes environmental characterization, ecological risks and effects, and remediation and restoration. SREL manages the SRS National Environmental Research Park. SREL also helps DOE effectively discuss environmental issues and information with SRS organizations, neighbors, decision-makers, stakeholders, and the general public.

US Department of Agriculture Forest Service - Savannah River

The U. S. Department of Agriculture Forest Service - Savannah River (USFS-SR) contributes to environmental stewardship at SRS by managing the site's natural resources, including timber; by maintaining and improving habitat for threatened, endangered, and sensitive species; and by evaluating the effects of its management practices on the environment.

WSI-SRS

WSI-SRS is contracted by DOE to provide a protective force that fulfills security requirements and executes emergency contingency plans that protect special nuclear materials, government assets, site employees, and surrounding communities from security threats.

Ameresco

Ameresco is contracted by DOE to design, construct, operate and maintain several biomass-fueled steam plants at SRS, including the biomass-fueled steam cogeneration plant.

COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS

Federal and state regulations and statutes provide specific requirements and standards to protect the environment and maintain environmental quality. The Environmental Protection Agency (EPA) and the South Carolina Department of Health and Environmental Control (SCDHEC) are the principal administrative authorities for these laws. SRS is also subject to DOE requirements for the control of radionuclides, as authorized by the Atomic Energy Act.

Regulatory Program Description	2011 Status
Clean Air Act (CAA) regulates the release of air pollutants through permits and air quality limits. Emissions of airborne radionuclides are regulated by EPA via National Emission Standards for Hazardous Air Pollutants (NESHAP) authorizations.	• SRS operated in accordance with permits issued under the CAA
Clean Water Act (CWA) seeks to improve surface water quality by establishing standards and a system of permits. Wastewater discharges are regulated by National Pollutant Discharge Elimination System (NPDES) permits issued by SCDHEC.	• SRS operated in accordance with permits issued under the CWA
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) provides the regulatory framework for remediation of (1) releases of hazardous substances and (2) inactive hazardous waste disposal sites.	• At the end of 2011, 392 waste units were complete and 16 were in remediation out of 515 total waste units
DOE Order 231.1B, *Environment, Safety and Health Reporting*, ensures the timely collection, reporting, and analysis, and dissemination of information on environment, safety, and health issues.	• *The SRS Environmental Report for 2011* was posted to the world wide web on September 29, 2012
DOE Order 435.1, Change 1, *Radioactive Waste Management,* is implemented to ensure that all DOE radioactive waste is managed in a manner that protects workers, public health and safety, and the environment.	• Annual review of Performance Assessment (PA) and Composite Analysis (CA) showed that low-level waste operations were well within the performance envelope analyzed by the PA, Special Analyses (SA), and the CA
DOE Order 436.1, *Departmental Sustainability*, defines requirements and responsibilities to ensure DOE carries out its missions in a sustainable manner.	• Continued construction of the Biomass Cogeneration Facility • Continued operation of several satellite biomass plants • Increased use of alternative fuels and alternative-fuel vehicles • Obtained LEED certification for new buildings • Continued implementation of recycling programs
DOE Order 458.1, *Radiation Protection*, was established to protect the public and the environment against undue risks from radiation. This order establishes standards and requirements for DOE and DOE contractor operations.	• The highest potential dose to the maximally exposed individual (MEI) from all pathways in 2011 was 0.12 mrem, 0.12% of the 100-mrem/year dose standard
Emergency Planning and Community Right-to-Know Act (EPCRA), also referred to as the Superfund Amendment Reauthorization Act (SARA), Title III, requires the reporting of emergency planning information, hazardous chemical inventories, and environmental releases of certain toxic chemicals to federal, state, and local authorities.	• SRS had no EPCRA reportable leaks, spills, or other releases to the environment • Chemical inventory reports (Tier II) were submitted February 2011. The Toxic Release Inventory (Form R) was submitted July 1, 2011

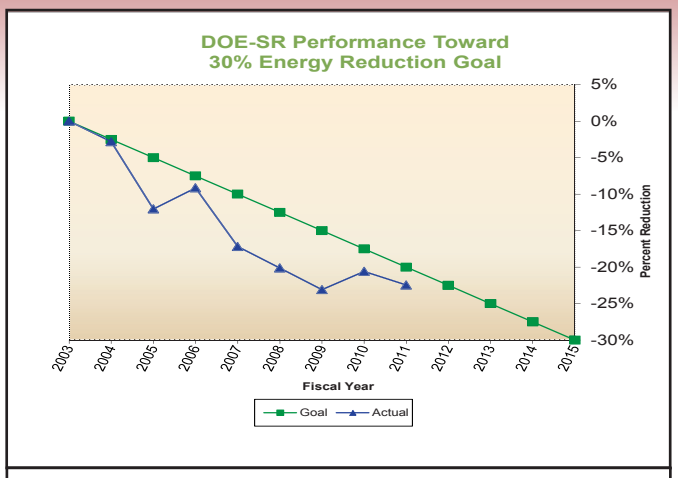
COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS

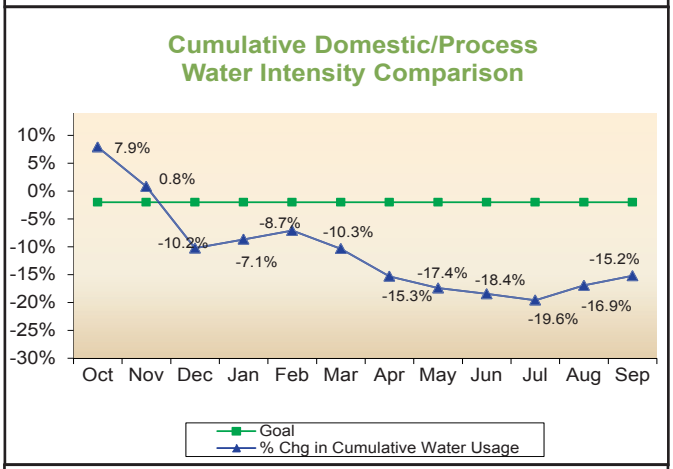
Regulatory Program Description	2011 Status
Endangered Species Act (ESA) and Migratory Bird Treaty Act (MBTA) provide protection of rare species of plants and animals and their habitats.	• Four biological evaluations conducted indicate that site activities have no adverse impacts on threatened or endangered species • Nests covered under MBTA found at SRS were protected until hatchlings fledged or the nests were determined to no longer be viable
F**ederal Facility Compliance Act (FFCA)** requires the development of schedules by DOE for treatment of mixed waste to meet Land Disposal Restrictions under Resource Conservation and Recovery Act (RCRA).	• SRS issued an annual update to the Site Treatment Plan. The next update will be in 2016
Federal Facility Agreement for Savannah River Site, WSRC-OS-94-42 (Required under Section 120 of CERCLA) Section IX. High-Level Radioactive Waste Tank System establishes requirements for remediation of high-level radioactive waste tank systems that are removed from service.	• Of the 22 remaining underground tanks in F Tank Farm, bulk waste removal efforts were completed on 3 tanks, residual sampling and analyses were completed on 2 tanks, isolation work was completed on 4 tanks, and preparations for introducing grout was completed on 2 tanks • In January 2011, the General Closure Plan for the F Area Tank Farm was approved by the State of South Carolina
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) regulates the storage and use of pesticides.	• SRS operated in compliance with FIFRA
National Defense Authorization Act (NDAA), Section 3116 provides an avenue for DOE, in consultation with the Nuclear Regulatory Commission, to dispose certain waste materials as low-level waste.	• Held public teleconferences between DOE and Nuclear Regulatory Commission (NRC) • Prepared a document responding to NRC comments on the draft 3116 Basis Document. The document demonstrates that waste remaining in the F-Tank Farm and ancillary structures after closure meets Section 3116 criteria, and thus are not high-level radioactive waste.
National Environmental Policy Act (NEPA) requires (1) consideration of how federal actions may impact the environment and (2) examination of alternatives to the actions. NEPA also requires that decisions include public input and involvement through the scoping and review of NEPA documents.	• 408 SRS-related NEPA reviews were conducted • 296 categorical exclusion determinations were posted on the SRS external website
National Historic Preservation Act (NHPA) protects the nation's historical resources by establishing a comprehensive national historic preservation policy.	• 985 acres were surveyed, resulting in 13 new archeological sites • 19,026 artifacts were curated in FY11
Resource Conservation and Recovery Act (RCRA) governs the generation, management, and disposal of hazardous waste. RCRA also regulates underground storage tanks containing petroleum and hazardous substances, universal waste, and recyclable used oil.	• SRS operated in accordance with RCRA permits • The site received the annual compliance certificate for 19 underground storage tanks after SCDHEC conducted an annual inspection
Safe Drinking Water Act (SDWA) establishes minimum drinking water standards and monitoring requirements.	• The drinking water systems sampled at SRS met the SDWA standards
Toxic Substances Control Act (TSCA) regulates the manufacture, use, and distribution of many hazardous chemicals, including asbestos and polychlorinated biphenyls (PCBs).	• SRS decommissioned 35 large oil-filled circuit breakers and 19 transformers resulting in the generation of large volumes of non-radioactive PCB waste, which were shipped for disposal at appropriately permitted facilities • SRS made 67 shipments to WIPP that included containers of PCB/TRU waste in 2011

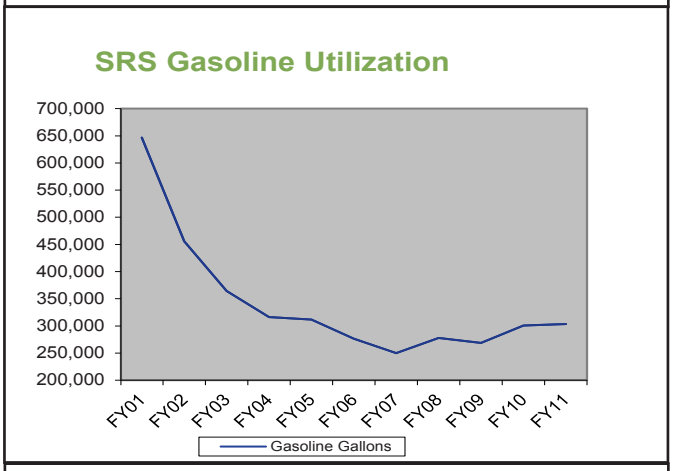
ENVIRONMENTAL MANAGEMENT SYSTEM

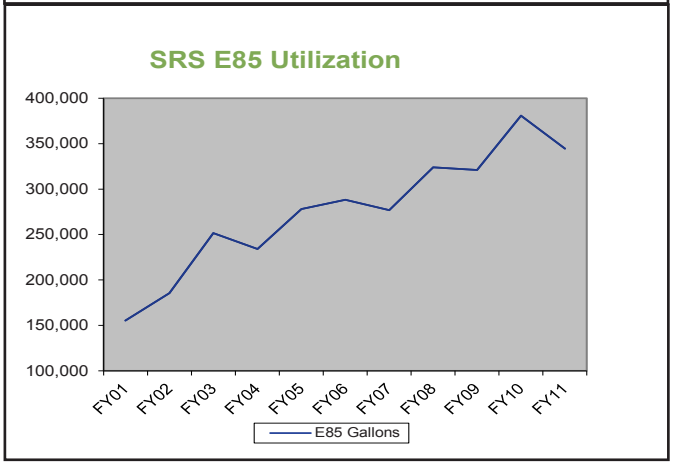
Activities at SRS are performed while ensuring protection of the employees, the public, and the environment by implementing an environmental management system (EMS). The EMS, a globally recognized standard originating with the International Organization for Standardization (ISO) 14001, is a business management practice that incorporates concern for environmental performance throughout an organization, with the ultimate goal being continual reduction of the organization's impact on the environment. SRNS has designed the SRS EMS to meet the 17 requirements of the standard. Operations are identified with a potential environmental aspect and EMS is implemented to minimize or eliminate such impacts. An SRS working group determines the EMS objectives and targets implemented each fiscal year.

FY11 Environmental Targets	
Purchase Energy from Renewable Sources	• Construction of the new Biomass Cogeneration Facility remained on schedule in 2011. The scheduled startup in 2012 puts SRS on target to meet a goal of purchasing 3% of facility electrical energy from renewable sources in FY13 and beyond • SRS is ahead of the goal of 30% reduction in energy usage by FY15
Reduce Energy Usage	• Site energy intensity decreased by approximately 2.5% versus FY10
Reduce Water Usage	• Terminated K Area well pumping and tied into C Area process water, reducing process water use by 19% during FY11. Potable water consumption was reduced by 5% during 2011
Reduce use of Hazardous Materials and Toxic Chemicals	• The generation of 2,009 m^3 radioactive and hazardous waste was avoided, far exceeding the FY11 goal by 357 m^3 • 35.5% of sanitary waste was recycled, exceeding the goal of 35% • More than 35,300 pounds of excess chemicals, was redistributed avoiding $234,000 in waste and acquisition costs
Increase use of Alternative Fuels	• Petroleum consumption decreased by nearly 50,000 gallons over FY10, a 0.5% decrease • SRS has achieved over 10% reduction in petroleum consumption from FY11 vs. FY05, meeting its goal of a 2% annual reduction from 2005 through 2015 • Although E85 fuel use was down in 2011, SRS has increased the use of E85 fuel by 350% over the past 10 years, far surpassing the 10% annual increase goal







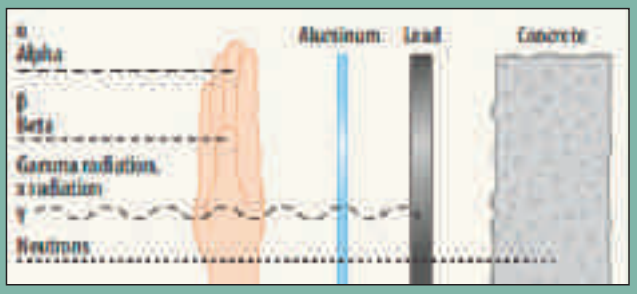


Forms of Radiation

Alpha particles are heavy, positively charged particles given off by some decaying atoms. Alpha particles can be blocked by a sheet of paper or skin. Atoms emitting alpha particles are hazardous only if they are swallowed or inhaled, or enter the body through an open wound.

Beta particles are electrons or positrons (positively charged electrons) ejected from the nucleus of a decaying atom. More penetrating than alpha radiation, beta particles can pass through several millimeters of skin. A sheet of aluminum only a fraction of an inch thick will stop beta radiation. Beta particles can damage skin but are most hazardous if the beta-emitting atoms are swallowed or inhaled.

Gamma rays are waves of pure energy similar to X-rays, light, microwaves, and radio waves. Gamma rays are emitted by certain radionuclides when their nuclei transition from a higher to a lower energy state. They can readily pass into the human body. They can be almost completely blocked by about 40 inches of concrete, 40 feet of water, or a few inches of lead. Gamma rays can be both an external and internal hazard.



Courtesy World Nuclear Association

X-rays are a more familiar form of electromagnetic radiation, usually with a limited penetrating power, typically used in medical or dental examinations. Television sets, especially color, give off soft (low-energy) X-rays; thus, they are shielded to reduce the risk of radiation exposure.

Neutrons are uncharged heavy particles contained in the nucleus of every atom heavier than an ordinary hydrogen atom. They induce ionization only indirectly in atoms that they strike, but they can damage body tissues. Neutrons are released, for example, during the fission (splitting) of uranium atoms in the fuel of nuclear power plants. They also can be very penetrating. In general, efficient shielding against neutrons can be provided by materials containing hydrogen, such as water or concrete. Like gamma rays, neutrons are both an external and internal hazard.

What is a dose?

Dose is the amount of energy absorbed by the human body externally as a result of a radioactive source; it is measured in rem or mrem (millirem), which is one-thousandth of a rem, and is the unit typically used in this report.

Common Doses to the Average American

Source/Activity	Average Dose/Year (or as noted)
Five-hour jet plane ride	3 mrem/5 hours
Building materials	4 mrem
Chest X-ray	8 mrem
Per Mammogram	138 mrem
Per CT scan	2,500 mrem
Smoking 20 cigarettes/day	5,300 mrem to the smoker's lungs

Source: http://hss.energy.gov/HealthSafety/WSHP/radiation/Radiation-final-6-20.pdf as accessed on July 19, 2012

Humans, plants, and animals potentially receive radiation doses from natural and man-made occurrences. The average annual effective "background" dose for Americans is 625 mrem; this includes a ubiquitous background dose of 311 mrem from naturally occurring radionuclides found in our bodies and in the earth, and from cosmic radiation. It also includes 300 mrem from medical procedures, 13 mrem from consumer products, and less than 1 mrem from industrial and occupational exposures. Doses attributed to common activities are identified in the table.

DOE has established dose limits to the public so that DOE operations will not contribute significantly to this average annual exposure.

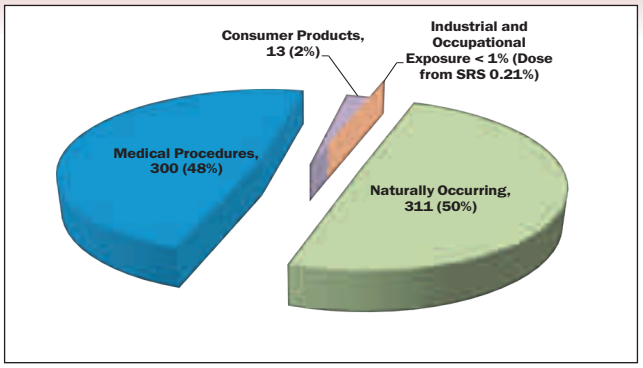
Dose estimates are performed using effluent release data, environmental monitoring and surveillance data, estimated exposure conditions that tend to conservatively estimate the calculated effective doses, and environmental transport and dosimetry codes that calculate the potential doses.

RADIATION AND EXPOSURE

To monitor the dose the public is exposed to, SRS calculates the dose to the Maximally Exposed Individual (MEI).

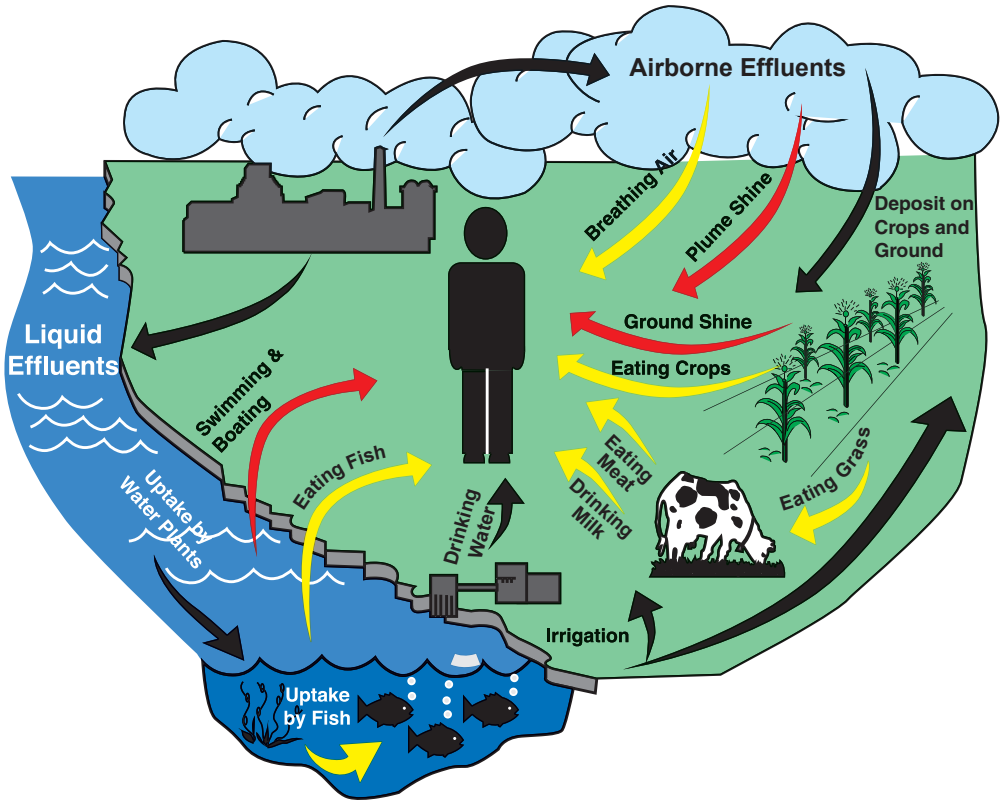
What is a maximally exposed individual?

The MEI is a hypothetical person situated at the site boundary where the person has a potential to receive the largest radiation dose outside of SRS.



SRS Contribution to Annual Background Dose to the Average American, mrem/year

In 2011, the MEI hypothetically lived at the SRS boundary; consumed milk, meat, and vegetables produced at that location; consumed water and fish from the Savannah River; and spent time on or near the river every day. The dose to this individual was 0.21 mrem. It is well below the dose limit of 100 mrem/yr established by DOE Order 5400.5 (and its successor, DOE Order 458.1) for radiation exposure to the public from all pathways combined. This total dose estimate is indistinguishable from natural background radiation experienced by the public residing in communities near SRS, and is even further below the annual average radiation dose for Americans of 625 mrem.



Potential Exposure of Public to Contaminants

Public Dose Limits for SRS Operations

4 mrem/yr – the dose limit to the public from beta and gamma emitters (above natural background) from public drinking water supplies, as specified by Safe Drinking Water Act.

10 mrem/yr – the dose limit to the public (above natural background) from the air transport pathway, as specified by National Emission Standards in Hazardous Air Pollution.

100 mrem/yr – the dose limit to the public (above natural background) from all pathways combined, as specified by DOE Order 5400.5, "Radiation Protection of the Public and the Environment."

MONITORING RELEASES TO THE ENVIRONMENT

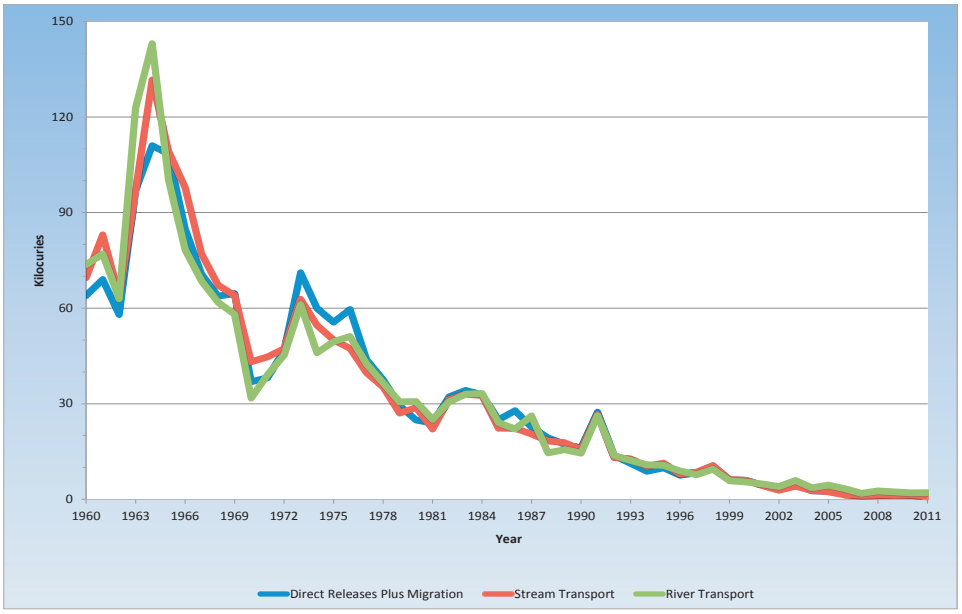
Releases to the environment of radioactive and nonradioactive materials come from past legacy contamination, and potentially from ongoing site operations. For instance, contaminated groundwater—a legacy from Cold War operations—flows slowly toward on-site streams and swamps and into the Savannah River. In addition, small amounts of radioactivity are discharged during the processing of nuclear materials in ongoing operations. These discharges are maintained within authorized limits established in site operating permits and environmental regulations.

SRS collects and analyzes thousands of samples annually to determine the presence of radiological contaminants from site operations. Samples are taken at the points where materials are released from the facilities (air at stacks and water at outfalls), and in the environment (air, rainwater, site streams, the Savannah River, drinking water, meat, fruit, green vegetables, milk, fish, wildlife, soil sediment, grassy vegetation, and groundwater) to determine the level of exposure of the public to SRS contaminants, both at the SRS and beyond its boundary.

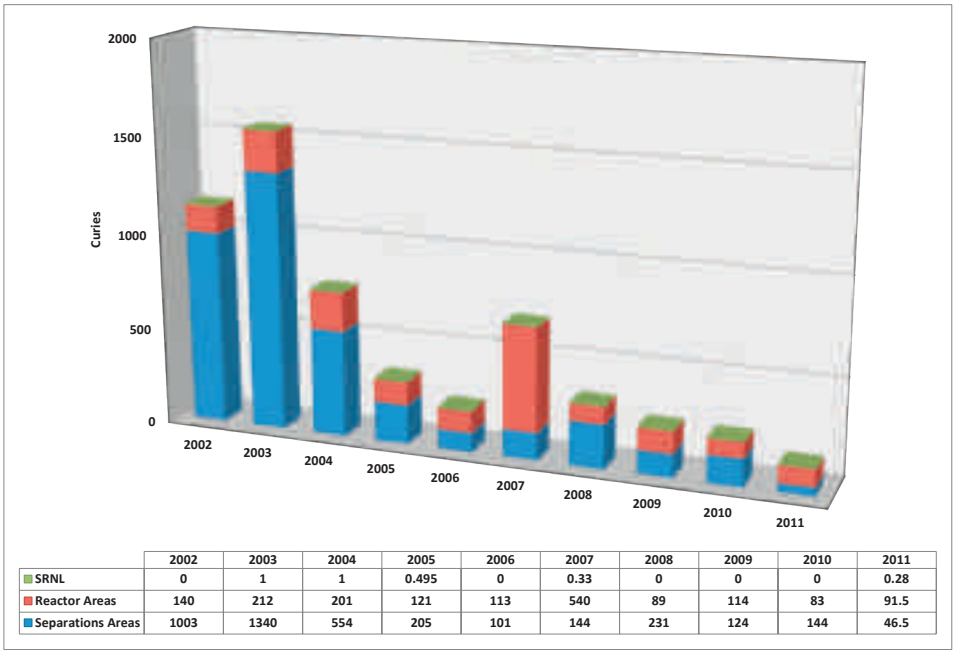
Radioactive Emissions

Tritium (a radioactive form of hydrogen) is the radionuclide of greatest abundance in SRS releases. Overall, the site has reduced tritium releases to the lowest levels since its early operations. The maximum annual tritium release of 2.4 million curies occurred during 1958. In 2011, 28,238 curies of tritium were released to the atmosphere and site streams (28,100 Ci to the atmosphere and 138 Ci to site streams); 803 Ci migrated from seepage basins and disposal facilities.

Curie (Ci) is the traditional measure of radioactivity based on the observed decay rate of 1 gram of radium. One curie of radioactive material will have 37 billion disintegrations in 1 second.



SRS Tritium Transport Summary 1960 - 2011



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
SRNL	0	1	1	0.495	0	0.33	0	0	0	0.28
Reactor Areas	140	212	201	121	113	540	89	114	83	91.5
Separations Areas	1003	1340	554	205	101	144	231	124	144	46.5

Ten-Year History of Direct Releases of Tritium to SRS Streams

MONITORING RELEASES TO THE ENVIRONMENT

Photo: Cyprus Swamp - Savannah River Site

The Savannah River, which receives wastewater containing tritium oxide, is monitored continually to ensure that the amounts of tritium and other contaminants released to the river are within federal limits. SRS operates monitoring stations on the river at points upstream from the site and as far downstream as 100 miles. A program is in place to notify downriver drinking water authorities promptly of significant changes in tritium concentrations in the river. Samples from municipal downstream water treatment plants also are analyzed frequently by the site to ensure that tritium levels are below regulatory limits.

20,000 pCi/L – The EPA-established concentration limit for tritium in drinking water. All drinking water samples from the Savannah River contained less than 1,000 pCi/L, less than 5% of the standard.

A picocurie is one-trillionth of a curie, and is the unit commonly used when describing background levels of radiation.

Non-Radioactive Emissions

Air Emissions

The release of air pollutants is regulated at SRS under two Title V CAA operating permits.

Estimated Quantity of Pollutants Released into the Air from SRS Operations in 2011*	
Criteria Air Pollutants	Tons
Particulate matter (< 10 microns)	637
Carbon monoxide	125
Nitrogen oxides	2,060
Sulfur dioxide	4,560
Volatile organic compounds	4.60
Lead	0.017

*No emission limits were exceeded in 2011.

An estimated 7,387 tons of criteria air pollutants were released from SRS in 2011. The majority of the emissions were sulfur dioxide, nitrogen oxides, and particulates from boilers used for energy production. The total air emissions of lead, also a criteria pollutant, were 0.017 tons. No emission limits for any air pollutants were exceeded in 2011.

As part of a stratospheric ozone protection program, SRS is phasing out its use of halon, and closely monitoring air conditioning/chiller systems to minimize freon releases. Both products are ozone-depleting substances. Incidental discharges from refrigerant sources at SRS during 2011 totaled 3,435 pounds.

Water Releases

Releases of storm water, industrial waste water, utility water, and sanitary waste water to site ponds and streams are regulated at the SRS under a series of discharge permits. Discharge limits established in these permits ensure that water quality is strictly maintained. Routine monitoring is performed to ensure that discharges are within established limits.

Contaminants in the Environment

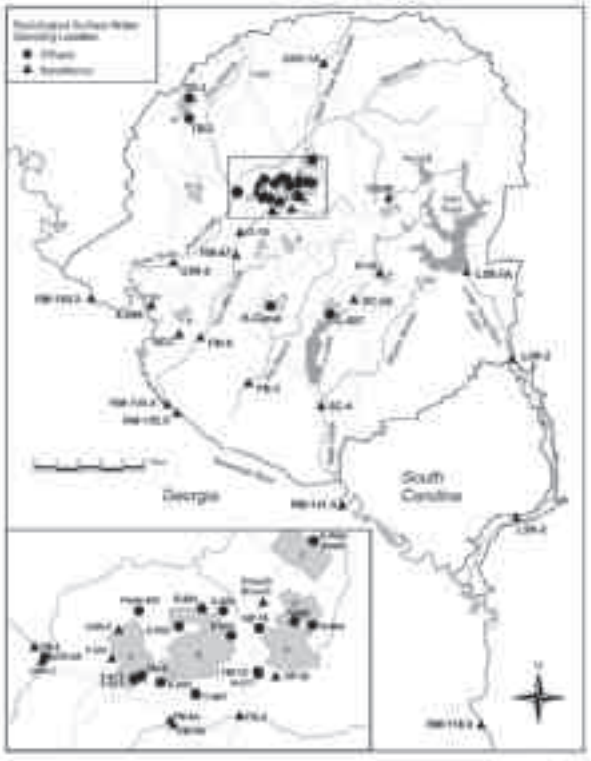
The environment in and around the site is monitored to determine the impact of site operations and the levels of exposure of the public to contaminants. Air, rainwater, site streams, the Savannah River, drinking water, meat, fruit, green vegetables, milk, fish, wildlife, soil sediment, grassy vegetation, and groundwater are monitored on a regular basis.

External Configuration of Air Surveillance Sampling Station

Radiological Surveillance

Radiological surveillance at SRS includes the monitoring of air, water, and food products in and around the site to determine if radionuclides have reached the environment in measurable quantities.

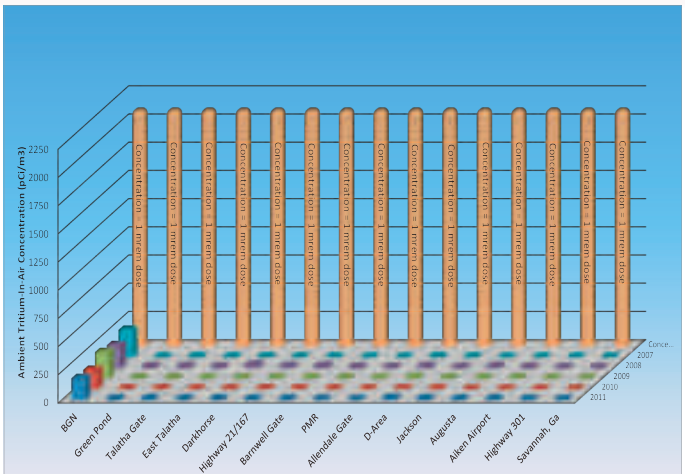
Fifteen air surveillance sampling stations in and around SRS are used to monitor the concentrations of tritium and other radionuclide particulates in the air and rainwater. No specific radionuclides were routinely found at the site perimeter in 2011 except for tritium, which was found at levels similar to those in 2010—well below levels determined to pose a health risk. Tritium is released as part of routine SRS operations and becomes part of the natural environment. Rainwater, stormwater basins, streams, groundwater, and domestic water are monitored for radionuclides.



Tritium in rainwater, collected at various locations off the plant site, was found in 2011 to be thousands of times lower than the EPA concentration limit for tritium in drinking water at the site boundary (average 190 pCi/L vs. 20,000 pCi/L). Other radionuclides were detected in some rainwater samples; these included both naturally occurring and man-made radionuclides at levels below drinking water standards. The concentration of radionuclides in rainwater decreases as distance from the release points increased.

MONITORING RELEASES TO THE ENVIRONMENT

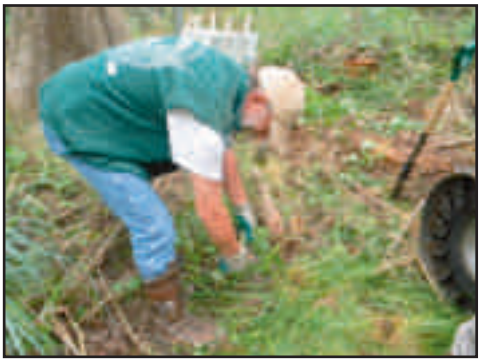
Vegetation and soil samples were taken at all air sampling locations during 2011—and at locations where higher radionuclide concentrations are expected. Results were consistent with historical levels of radionuclide deposition. Continuous monitoring in site streams identified tritium present above background at levels consistent with historical releases in all streams. Other radionuclides were detected in some of the sampling locations; however these were at levels below EPA standards, consistent with previous years' monitoring data. Tritium also was monitored in 2011 to quantify migration from site seepage basins and waste disposal facilities. Migration releases have declined over the past 10 years, from more than 4,000 Ci in 2000 to 803 Ci in 2011.



Atmospheric Tritium-in-Air Concentrations, 2006-2011

The tritium-in-air results are well below the concentration equivalents to 1 mrem from inhalation. The NESHAPS limit for the airborne pathway is 10 mrem.

The Savannah River is continuously monitored at five locations above and below SRS tributaries. Tritium is the predominant radionuclide detected above background levels in the river, although the concentrations remain well below the drinking water standard and continue to decrease. Gross alpha and beta radioactivity was detected at levels consistent with the previous five-year averages (less than 1 pCi/L gross alpha, less than 3 pCi/L gross beta, below drinking water standards). Monitoring of sediment from the river and from site streams feeding the river revealed distribution and concentration results consistent with previous years; there is less sediment in the river than in site streams. Cesium-137 was the only gamma-emitting radionuclide detected in sediment.



SRS Field Technician Collects Vegetation (above) and Soil (below)

Domestic water is monitored at on-site locations and at water treatment facilities that use the Savannah River for water. No domestic water samples collected in 2011 exceeded EPA's activity limits for gross alpha or gross beta, nor did they exceed the tritium limit or the strontium-89,90 minimum detectable concentrations. Several on-site drinking water samples contained detectable levels of other radionuclides, although these were found to be below EPA's National Primary Drinking Water Regulations.

MONITORING RELEASES TO THE ENVIRONMENT

Terrestrial food products in and around SRS, including meat, fruit, vegetables, and milk; aquatic food products, including fish and shellfish; and wildlife, including deer, hogs, turkeys, and beavers, are monitored for radionuclides. Food products are collected from communities surrounding the site; fish and shellfish from nine surveillance points in the Savannah River between Augusta and Savannah, Georgia; and deer, hogs, and turkey from hunts conducted on site.

Radiological results from food products were consistent with those of previous years, and include low levels of tritium attributed primarily to releases from SRS. The only man-made gamma-emitting radionuclide detected in game hunted at SRS was cesium-137, which was found at an average field measurement of 1.46 pCi/g. This contributes minimally to the administrative dose for the consumption of game animals, which SRS has established at 30 mrem/year.

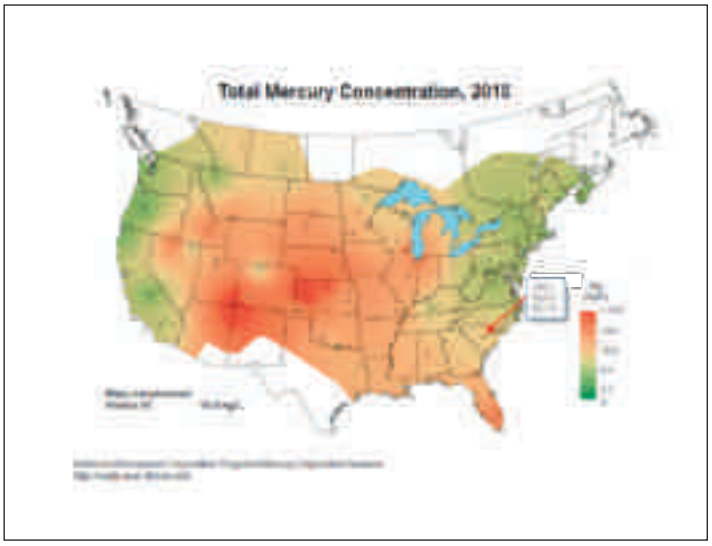
Striped Bass Collected at Steel Creek River Mouth

Non-Radiological Surveillance

Beyond air and water emissions monitoring in accordance with permit requirements, SRS does not conduct additional monitoring of air quality for non-radiological pollutants. Air dispersion modeling for all site sources of criteria pollutants and toxic air pollutants is used to demonstrate compliance with environmental regulations and standards.

SRNL sponsors a monitoring and collection station in support of the National Mercury Deposition Network of the National Atmospheric Deposition Program (NADP). This network provides data on the geographic distributions and trends of mercury in precipitation.

Drinking water at the site is supplied by a number of facilities. All samples collected from these systems in 2011 were in compliance with SCDHEC and EPA water quality standards.



2010 Total Mercury in Rainfall Results from the National Atmospheric Deposition Program (NADP)

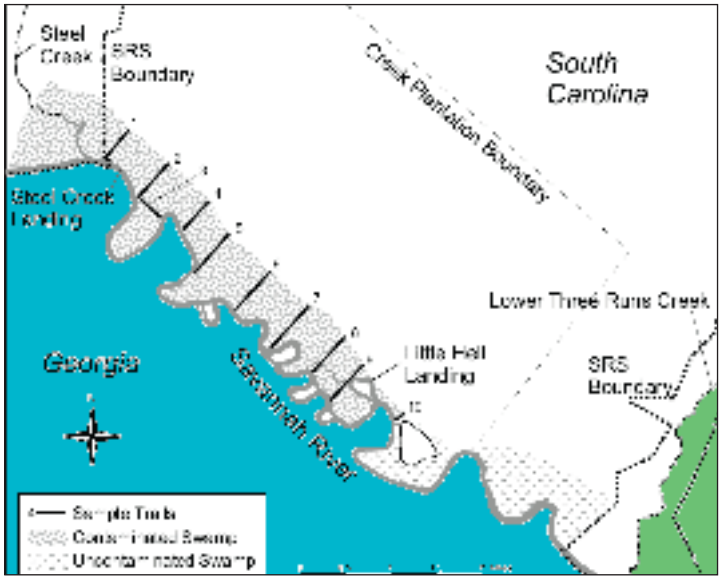
Field Technician Collects River Sediment

Sediment surveillance is conducted to quantify the accumulation of non-radiological contaminants in stream systems. No pesticides or herbicides were found in 2011 sediment samples; this is consistent with results from the previous five years. Similarly, metals analysis results for 2011 were comparable to those of the previous five years.

Extensive groundwater monitoring is conducted to ensure that contamination is not transported from the site by groundwater flow. A network of hundreds of groundwater monitoring wells is used to monitor waste sites, operating facilities, and site boundaries. No off-site wells have been contaminated by SRS groundwater.

Surveys and Special Sampling

Special sampling is performed for pre-operational baseline monitoring prior to start-up of any new activity or facility, and for non-routine radiological and non-radiological surveys conducted on and off site.



Creek Plantation Swamp Trails

Savannah River Swamp Surveys

Annual surveys of Creek Plantation Swamp are performed in order to determine the amount and/or distribution of radioactivity that was deposited during the 1960s during high river levels. A comprehensive survey (requiring extensive media sampling and analysis) is performed every five years and a cursory survey (requiring limited media sampling and analysis) on the years in between the comprehensive survey years. A cursory survey was performed in 2011. Cursory surveys provide assurance than conditions observed during the more detailed comprehensive surveys have not changed significantly. The results for 2011 were comparable to those from previous surveys, and are used to estimate the exposure for a hunter in the Savannah River swamp to ensure no health risks exist to such an individual.

Non-Routine Monitoring

On March 11, 2011 following an earthquake and tsunami, a nuclear disaster resulting in releases of radioactive materials occurred at the Fukushima Daiichi Nuclear Power Plant in Japan. Radiation from Japan's Fukushima nuclear incident and the detection of elevated levels of radioisotopes led to the EPA establishing special monitoring protocols for sampling and testing of food, air, and water across the US. Accordingly, SRS expanded its routine environmental surveillance program to assure the public that no harmful levels had reached the immediate community surrounding SRS. Milk, vegetation, and edible foodstuffs were sampled. Vegetation was sampled at the Burial Ground North location, four perimeter locations, three locations 25-miles from the center of the site, and the Savannah, Georgia location. In addition, vegetation was sampled near a Georgia dairy location.

Detectable levels of radioiodine-131 were observed in all the media, except strawberries at levels comparable to other results published in the United States. The levels fell below the Minimum Detectable Concentration (MDC) level during the third week of April 2011 and remained below the MDC thereafter. The dose impact to the public from the radioiodine levels for the airborne pathway would equate to <0.1 mrem, far below the average natural background radiation dose of 311 mrem.

Field Technician Collects Air Sample

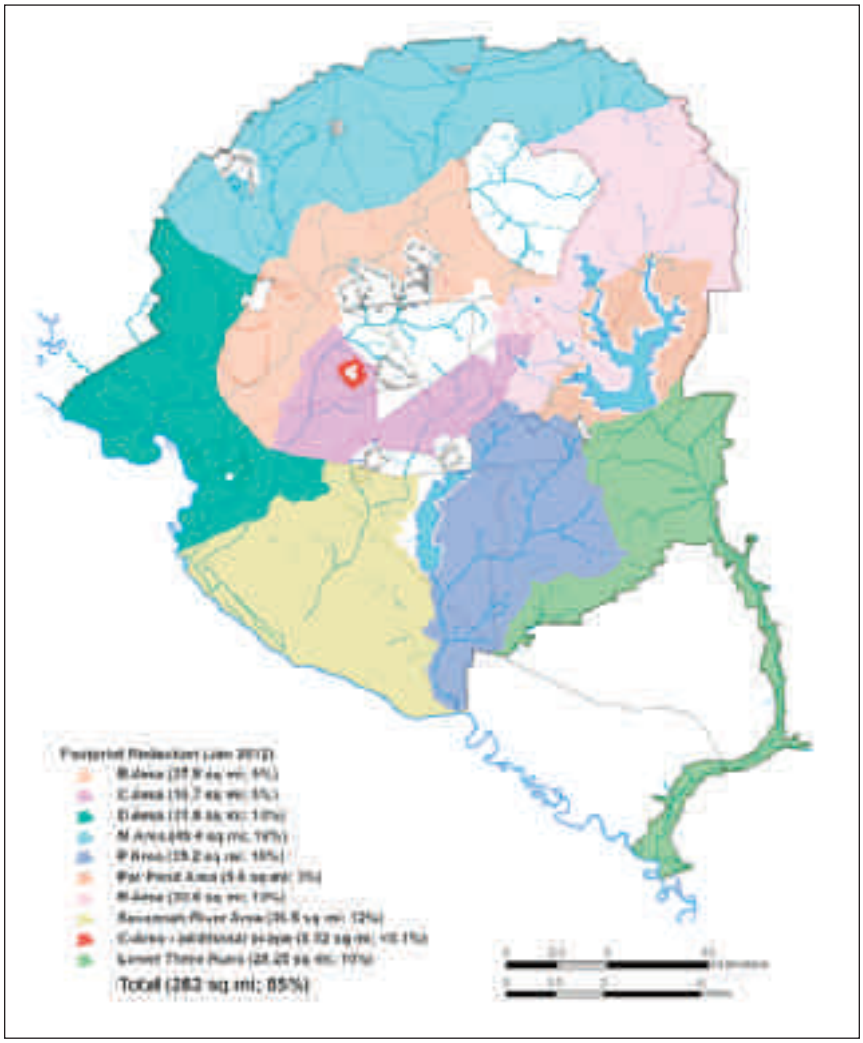
Legacy Contamination

Soil and Groundwater - **The approach for soil and groundwater cleanup is to treat or immobilize the source of the contamination and clean up or slow the movement of contamination that has already migrated from the source. Field work includes closure of inactive seepage basins, rubble pits, rubble piles, and disposal facilities. Major groundwater cleanup systems operate in A/M , C, F, H, and T Areas as well as in the Mixed Waste Management Facility, the Chemical, Metals, and Pesticides Pits, and at the sanitary landfill. At the conclusion of 2011, 392 waste units had been remediated; an additional 16 were in progress.**

Facilities - **The approach for deactivating facilities is to safely remove hazards such as hazardous and radioactive waste, nuclear materials, contaminated equipment and debris and to bring facilities to a cold and dark condition. When all hazardous material has been removed, facilities that are not dismantled can be used for other activities. The deactivation and decommissioning (D&D) of radiologically contaminated facilities present numerous challenges. The D&D process is the safe decontamination, dismantling, removal of contamination and structures, and/or the release for reuse of facilities that are no longer active, and includes industrial, radiological, and nuclear facilities. More than 1,100 SRS structures exist where facilities, equipment, and/or debris have been contaminated by historical nuclear research, development, and production activities. At the conclusion of 2011, 284 facilities have been decontaminated and decommissioned.**

Footprint Reduction

A key objective of the Department of Energy is to significantly reduce the footprint of the Savannah River Site with respect to environmental contamination. By implementing a strategy in which large areas are cleaned up, 263 square miles, or 85% of the Site, will be freed up for potential reuse or redevelopment by the end of September 2012. The footprint reduction map indicates the areas on site that are targeted for clean up by the end of September 2012. In 2011, SRNS accomplished most of this goal (230 square miles).



Footprint reduction is defined as remediation of an area and the surrounding buffer zone, if necessary, such that cleanup has achieved all regulatory requirements (i.e., all soil contamination has been remediated, contaminated facilities dispositioned, and groundwater remediation in place). After footprint reduction is achieved, the previously affected land area may be made available for potential beneficial reuse, transitioned to long-term remedial operations, or made ready for transfer to long-term stewardship.

Footprint reduction efforts focus on cleanup of soil, structures, and potential sources of contamination to groundwater. With sufficient resources invested, cleanup of surface contamination can be accomplished relatively quickly. Remediation of groundwater and subsurface soils that have become contaminated are longer term tasks. Groundwater and vadose zone remediation efforts underway during 2011 include air stripping, soil vapor extraction, funnel- and gate-technology, base injection, edible oil injection, phytoremediation, and monitored natural attentuation. These technologies are being used to implement a variety of remedial actions across the site. It is anticipated that groundwater corrective actions will continue for decades before remedial goals can be met.

Environmental Remediation

Summary of 2011 Remediation Activities		
Date	**Remediation Complete (% of total of 515 units)**	**Active Remediation**
1/1/2011	373 units (73%)	13 units
12/31/2011	392 units (76%)	16 units

Two major federal laws drive environmental cleanup: the Resource Conservation and Recovery Act (RCRA), which establishes a system for tracking and managing hazardous wastes from generation to disposal; and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or Superfund, which addresses the protection and cleanup of the environment from known release of hazardous substances. SRS is meeting the integrated requirements of these two laws through a Federal Facility Agreement (FFA) with DOE, EPA-4, and SCDHEC. The FFA specifies how SRS addresses contamination or potential contamination at waste units in accordance with RCRA commitments in FY11, and more than 3,095 commitments since 1993.

2011 Remediation Project Highlights

Cleanup of P Area Ash Basin

SRNS cleaned up the P Area Ash Basin, which contained coal ash residues from Cold War operations at SRS. This was the second ash basin to be remediated. A similar cleanup was performed in 2010 on an ash basin in R Area. The Recovery Act funded the environmental restoration project, allowing SRS to complete the project at least five years ahead of schedule.

At the P Area Ash Basin, workers removed about 35 acres of vegetation on and around the 14-acre man-made earthen basin to prepare for remediation. Next, they consolidated ash inside the basin that had spread in the area from former P Area Powerhouse operations, which ended in 1991. Workers then prepared a clean soil and sod cover, and planted seedlings. The vegetative layer prevented precipitation from infiltrating the basin's ash residues and entering the groundwater. About 1,500 feet of erosion-control fencing also was installed.

September 2010: P Ash Basin - Before Closure

May 2011: P Ash Basin - Project Complete

DEACTIVATION & DECOMMISSIONING

What is D&D?

When DOE declares a facility "surplus" (no longer needed), it is shut down and prepared for deactivation and decommissioning (D&D). The process involves the safe decontamination, dismantling, and removal of contamination and structures, and/or the release for reuse of facilities that are no longer active. DOE is conducting D&D activities on reactors, processing plants, storage tanks, laboratory facilities, and other structures.

P Reactor Undergoing in situ Decommissioning

P and R Reactors Sealing

Under the Recovery Act, SRNS sealed the access to the historic P and R Reactors as part of footprint reduction and legacy cleanup at the Savannah River Site. Sealing access to P and R Reactors was the most visible milestone reached in the closure of the P and R Area Operable Units, rendering the availability of both areas for future new missions.

Recovery Act funds were used to deactivate and perform in situ, or in place, decommissioning of these two reactors, the first reactors in the DOE Complex to be placed in this state. The underground areas and vessels of both reactors were grouted in place to 0-foot elevation with an estimated 260,000 cubic yards of concrete grout. The two structures are expected to stay in their present state for 1,400 years.

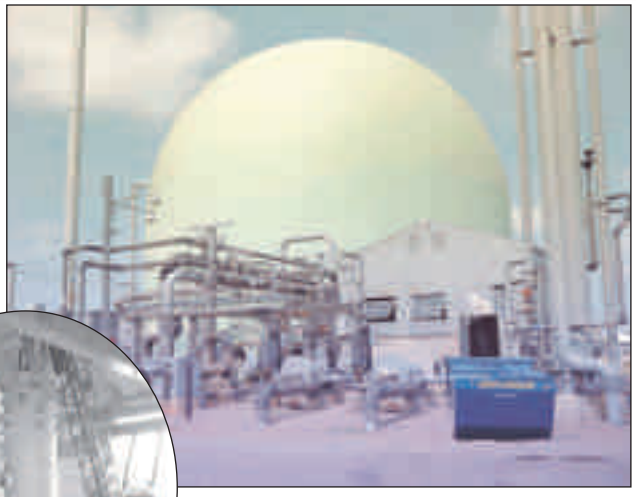
Notable projects that contributed to the closure of the P & R areas include: deactivation and decommissioning (D&D) of P and R Reactors, soil and groundwater remediation, building and operation of the Batch Plant Facility to produce the special concrete used in reactor grouting, and the remediation of P and R Area Ash basins, which received coal-fired power plant ash and waste during the operation of the reactors.

The SRS Workforce Stands in Front of the Decommissioned P Reactor

P Reactor boasted a record of never having a lost-time injury from the time it reached criticality in 1954 until it was shut down in 1988. R Reactor was the first fully functioning reactor at the Site. It became operational in 1953 and was shut down in 1964 when it was no longer needed for the nation's defense.

Heavy Water Components Test Reactor (HWCTR) Decommissioning

SRNS achieved a significant milestone in the decommissioning of a Cold War reactor when the rusty, orange, 75-foot-tall dome was removed. With the help of a 660-ton crane and lifting lugs, workers pulled the 174,000-pound dome off the Heavy Water Components Test Reactor (HWCTR), capping more than 16 months of preparations. The dome was then cut into smaller pieces for disposal. Removal of the dome allowed workers to access the 219,000-pound reactor vessel and two steam generators so the items could be removed and permanently disposed on-site. Remaining equipment was moved to the cavity vacated by the vessel, and below-grade portions of the reactor were sealed with grout. The Recovery Act project was completed on September 7, 2011 after a concrete cover was installed over the reactor's footprint. Built in 1959, the reactor was used to test experimental fuel assemblies for commercial heavy-water reactors until 1964.



Above: HWCTR - 1964
Left: Reactor Vessel

HWCTR before Decommissioning - 2009

Lifting the Reactor Dome

HWCTR Block Removal

Above Left: Concrete Cover Installed over HWCTR Footprint
Above: HWCTR End State

WASTE MANAGEMENT

Waste management at SRS includes the treatment, storage, and/or disposal of radioactive and nonradioactive wastes, in solid or liquid forms.

Solid radioactive wastes are managed in E Area facilities, and either stored or disposed in E Area facilities or shipped to off-site commercial disposal facilities.

Liquid radioactive wastes are held in large storage tanks until they are processed on site through one of several treatment facilities into a safe form for long-term storage and disposal.

Nonradioactive wastes are treated, stored, or disposed either in on-site facilities or off-site commercial facilities.

2011 Waste Management Project Highlights

Hazardous Waste

SRS received into the permitted hazardous waste/mixed waste facilities 27 containers while shipping 55 containers off-site for treatment and disposal.

Low Level Waste

In 2011, SRS safely disposed of 354,000 cubic meters of LLW at its facilities. Interim operational stormwater runoff covers were installed over Slit Trenches 1 - 5 in 2011, minimizing the potential for water infiltration.

Mixed Waste

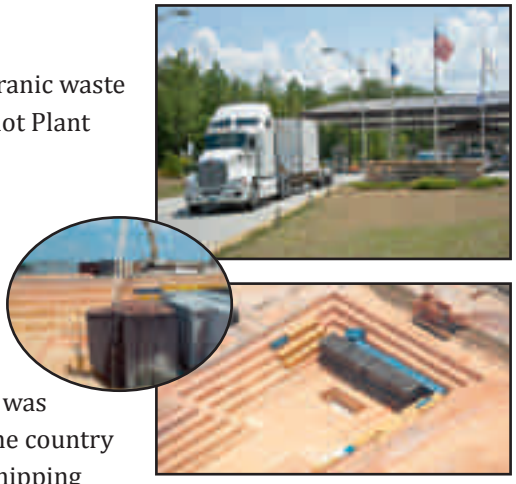
In 2011, SRS shipped 55 containers of mixed waste off-site for treatment and disposal.

Transuranic Waste

In 2011, SRS sent transuranic waste to the Waste Isolation Pilot Plant (WIPP) in New Mexico:

- 1,605 Drums
- 363 Standard Waste Boxes
- 5 Standard Large Boxes

On August 24, 2011, SRS was the first DOE facility in the country to use the TRUPACT-III shipping container. This large container helps minimize worker radiological exposure by decreasing the amount of size reduction necessary to package and ship larger items to WIPP.



Top: TRUPACT Shipment to the Waste Isolation Pilot Plant,
Left: Grouting Tall Box in LLW Trench
Bottom: Drive in Slit Trench

What is E Area?

- **E Area is SRS' primary radioactive waste storage and disposal facility.**
- **Waste is contained in trenches or vaults, or in buildings awaiting off-site shipment**

Low-level waste (LLW) such as paper, building rubble and soil that is contaminated with radionuclides (but is not transuranic or high-level waste) is placed in large steel boxes and disposed in trenches or vaults.

Mixed low-level waste that is contaminated with both radionuclides and hazardous components (as defined by the EPA) is containerized and stored in buildings to protect them from the weather, and shipped off-site to commercial disposal facilities.

Transuranic waste, which contains more than 100 nanocuries per gram of a man-made element whose atomic number is greater than uranium (such as Plutonium or Americium) and has a half-life over 20 years, is containerized, stored in vaults, and shipped off SRS property to the Waste Isolation Pilot Plant in New Mexico if it meets requirements; if not, contents of the container are processed to meet requirements.

Above : Defense Waste Process Facility
Left: Stainless Steel Canister

Radioactive Liquid Waste Management

High activity radioactive liquid waste results primarily from the reprocessing of spent nuclear fuel, and contains radionuclides in concentrations that require permanent isolation from the environment. The waste consists of a sludge (~10% of volume, ~50% of curies) that settles on the bottom of the tank, and a watery supernate (~90% of volume, ~50% of curies) that occupies the area above the sludge.

Final disposition of this material requires removal of waste from tanks, processing of the waste, and closure of the waste tanks.

Bulk waste removal requires specially designed mixing pumps to suspend the waste in liquid until it is removed from the tank. Bulk waste removal in three tanks was completed in 2011, a record for annual bulk waste removal efforts.

Processing of salt and sludge waste streams are performed in the Interim Salt Disposition Process (ISDP), the Saltstone facility and the Defense Waste Processing Facility (DWPF). ISDP removes nearly all the radioactivity from the salt waste prior to its transfer to the site's Saltstone facilities, which safely stabilizes and disposes the waste. In 2011, ISDP performed at record rates, processing in excess of 130,000 gallons of salt waste in a single month. Saltstone processed nearly 1.5 million gallons of the decontaminated salt waste over the course of the year. Sludge waste is converted into a glass matrix and sealed in stainless steel containers for long-term storage and disposal at DWPF. In 2011, a record 267 canisters were poured, bringing the total to approximately 12.6 million pounds of glass and 40 million curies of radioactivity immobilized since operations began in March 1996.

Saltstone Operations

Closure of the waste tanks - carbon steel reinforced concrete containment vaults - is a multi-step process including waste removal, cleaning, sampling, and isolation. In 2011, 15 of the Site's 22 remaining old-style tanks were in various stages of the closure process. In 2011, grouting (part of the final isolation stage of tank closure) was commenced on Tanks 18 and 19, and is scheduled to be completed in 2012.

PUBLIC INVOLVEMENT

Education Outreach

The US DOE SRS Operations Office and SRS' Educational Outreach Programs (EOP) provide science and literacy outreach programs focused on enhancing interest in science, mathematics, engineering and technology. In FY11, EOP reached out to Central Savannah River (CSRA) students through various programs and events mostly aimed at reaching a diverse population of students and teachers, and increasing their knowledge in science, technology, engineering and math. Approximately 28,000 students and teachers benefited from EOP through presentations, contests, and community events.

Future City 1st Place Award Winners

Community Outreach

SRS continues to support community outreach initiatives focused on fostering a climate of trust and partnership on a variety of site-related issues. Community outreach initiatives include business and community development and outreach; contributions to community-based and national organizations (both corporate contributions and volunteer hours); mission-related and public Site tours; and public involvement activities such as the SRS Environmental Bulletin, special public meetings, and hearings or events. In FY11, SRNS was recognized for its efforts in historic preservation and for large corporate giving.

Aiken County Family Y Showing Appreciation

Environmental Justice

Funded by DOE since 1995 and the EPA since 2003, the environmental justice program (coordinated by grant recipient Savannah State University in Savannah, Georgia) includes the following:

- Coordinated meetings in the communities of Augusta and Waynesboro, Georgia; and North Augusta, Edgefield, Aiken, Blackville, Barnwell, and Allendale, South Carolina to address environmental justice concerns, job training initiatives, grant a resource availability, environmental monitoring and emergency response
- Organizing the Teaching Radiation, Energy, and Technology (TREAT) Workshop to provide opportunities for local school teachers and members of the public to learn about environmental radiation
- Continuing to upgrade cutting edge environmental analytical laboratory equipment for the Savannah State University Environmental Science Students, and mentoring the Environmental Scholars Program

Students from the Science and Technology Enrichment Program (STEP) Gaining Hands On Experience

For more information about the SRS EJ program contact:

de'Lisa Carrico
Department of Energy - Savannah River Operations Office
P. O. Box A
Aiken, South Carolina 29802
(803) 952-8607

The CAB

The SRS Citizens Advisory Board (CAB), is one of eight Environmental Management Site-Specific Advisory Boards (EMSSABs) funded by DOE. These boards provide advice and recommendations to DOE, at its request, on environmental remediation, waste management, and related issues. Agency liaisons from DOE, EPA, and SCDHEC were represented at CAB meetings in 2011.

The SRS CAB, nationally recognized as one of the most productive site-specific advisory boards in the DOE complex, provided ten recommendations to DOE in 2011.

An element of the SRS CAB mission is to improve communication with communities potentially impacted by the site, and to ensure that stakeholders have opportunities to become involved in decisions made at the site. A speaker's bureau is available to provide information about the SRS CAB and its activities at civic organizations and club meetings.

More information about the CAB and its recommendations may be obtained by calling the CAB administrator at 1-800-249-8155, e-mailing the board at srscitizensadvisoryboard@srs.gov, or visiting the CAB website at http://cab.srs.gov. A schedule of the SRS CAB meetings, including online meetings, is available on the website. Membership applications, also available on the website, are accepted year-round from stakeholders in Georgia and South Carolina. Candidates are selected annually.

Report Available on Web

Readers can find the SRS 2011 Environmental Report Summary on the World Wide Web at the following address: http://www.srs.gov/general/pubs/ERsum/index.html.

For more information about this report,
or to obtain additional copies, contact

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Telephone: (803) 952–6937
E-mail address: benjamin.terry@srs.gov

Can We Make This Report More Useful to You?

We want to make the *Savannah River Site Environmental Report* more useful to its readers. Please take a few minutes to let us know if the report meets your needs. Then fold and tape this page so the postage-paid notation and the mailing address are visible, and place it in the mail.

1. How do you use the *Savannah River Site Environmental Report*?
   - ☐ to learn general information about the Savannah River Site
   - ☐ to learn about doses received for the current year
   - ☐ to learn about site compliance information
   - ☐ to gather effluent data
   - ☐ to gather environmental surveillance data
   - ☐ other _____

2. What part(s) of this report do you use?
   - ☐ main report ☐ data tables ☐ summary

3. Does the *Savannah River Site Environmental Report* contain
   - ☐ enough detail?
   - ☐ too much detail? For example, _____
   - ☐ too little detail? For example, _____

4. Is this report
   - ☐ too technical?
   - ☐ about right technically?
   - ☐ not technical enough?

5. If you could change this report to make it more readable and useful to you, what would you change?

   _____

   _____

   _____

6. What is your affiliation?
   - ☐ DOE Headquarters
   - ☐ other DOE facility
   - ☐ regulator
   - ☐ other government office/agency
   - ☐ environmental group
   - ☐ elected official
   - ☐ university/academy
   - ☐ library/public reading room
   - ☐ media
   - ☐ industry
   - ☐ other group
   - ☐ other individual

7. To help us identify our audience, please indicate your educational background.
   - ☐ graduate degree in scientific field
   - ☐ graduate degree in nonscientific field
   - ☐ undergraduate degree in scientific field
   - ☐ undergraduate degree in nonscientific field
   - ☐ experience with science outside college setting
   - ☐ little or no scientific background

If you are interested in attending a workshop to critique the 2011 report, please provide your name, address, and telephone number.

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For more information, please call Benjamin Terry, at (803) 952–6937, or send an e-mail message to Benjamin.terry@srs.gov.

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Front Cover — Indian Pink's (Spigelia marilandica) summer flowers are brilliant red and tubular with canary yellow throats and can be found in rich, moist woods and streambeds in the greater southeastern United States. It was used by the Cherokee and other American Indian tribes as a ritual and ceremonial herb to induce visions and foretell the future. This year's photograph was taken by Robert Kemmerlin of Savannah River Nuclear Solutions' Environmental Compliance and Area Completion Projects Department.

enterprise·srs