National Nuclear Security Administration

U.S. DEPARTMENT of ENERGY

2024 Annual Site Environmental Report (ASER)

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SAVANNAH RIVER SITE

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Citizens Advisory Board Full Board Meeting

January 27, 2026

SRNS-MS-2025-00552

What is the ASER?

- **ASER stands for the Annual Site Environmental Report and is the primary document the U.S. Department of Energy uses to inform the public of environmental performance and conditions at SRS.**

- Annual Site Environmental Reports (ASERs) are required by U.S. Department of Energy (DOE) Orders *231.1B, Environment, Safety, and Health Reporting*, and *458.1, Radiation Protection of the Public and the Environment.*

- ASERs provide the public and stakeholders information on:
  - Environmental program performance
  - Site-wide radiological environmental monitoring and surveillance effectiveness
  - Compliance status with environmental standards and requirements

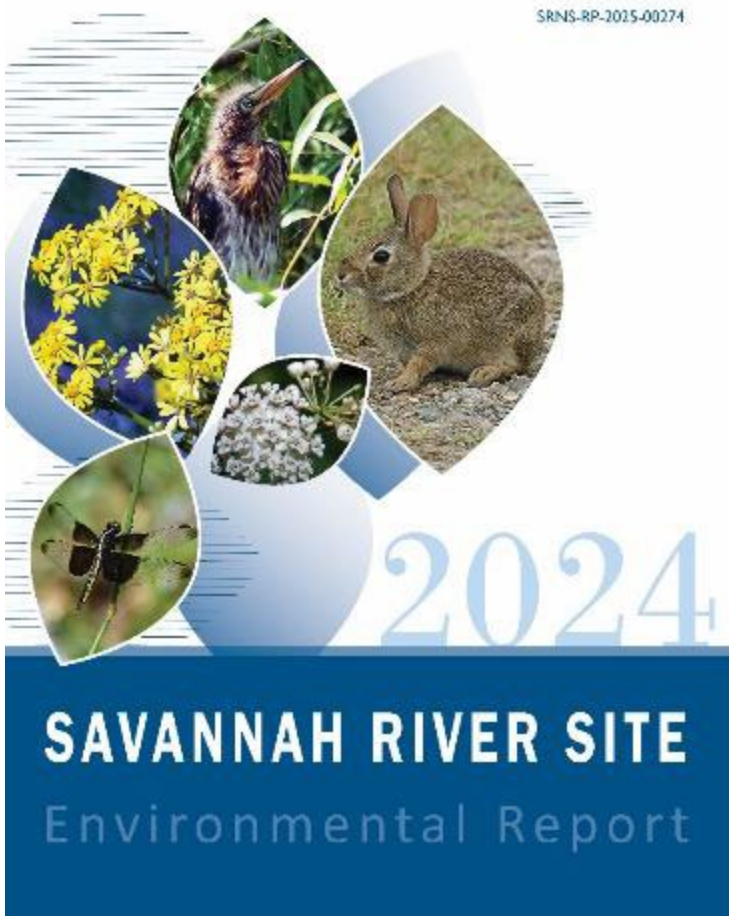
- SRS began publishing the ASER in 1959.

SRS Annual Site Environmental Report

- **The ASER is a public document for anyone interested in the site's impacts to the surrounding areas.**
  - DOE Headquarters
  - Regulators
  - Congress

Citizens Advisory Groups
Activist Groups
Researchers
Professors and Students

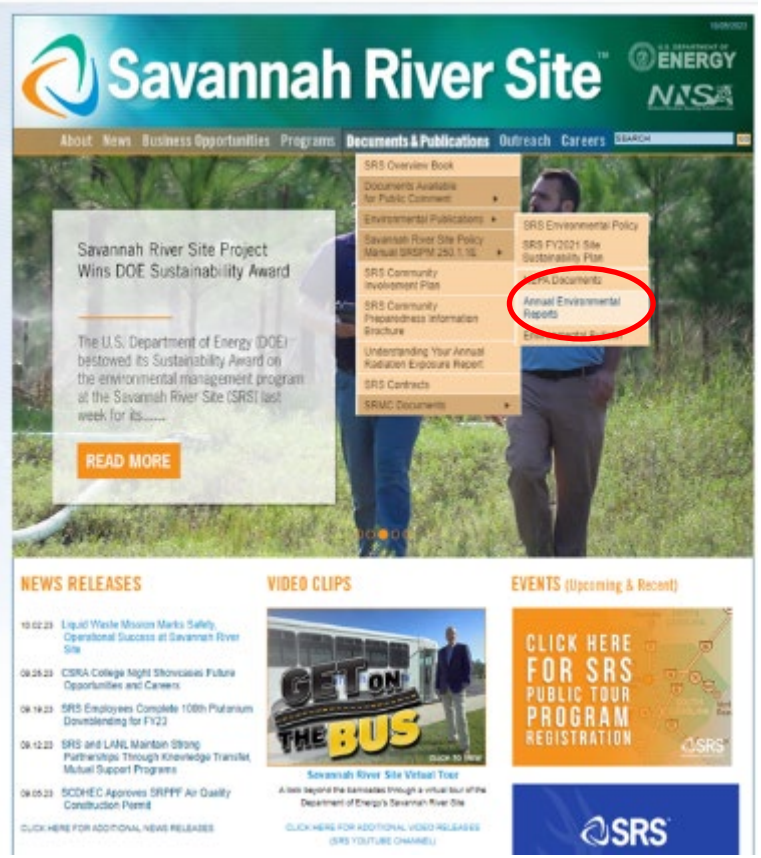
- **The ASER is broken down into 9 chapters and discusses 3 basic themes:**
  - Environmental Compliance
  - Environmental Monitoring
  - Environmental Stewardship



https://www.srs.gov/general/pubs/ERsum/index.html

Where is it available?

- The ASER is available electronically to the public on or before October 1 of each year.
- The data and analysis within the report demonstrate the safety and health of our workers and the surrounding area is the priority of the Savannah River Site.
- The reports can be found by visiting srs.gov and selecting Annual Environmental Reports from the Documents and Publications dropdown.
- Last 24 SRS ASERs are available electronically and posted on the SRS website.



2024 ASER Summary Report

- **Uses magazine-style articles to summarize the results of the ASER and further establish SRS's commitment to environmental stewardship**

- **Links articles to comparable sections of the full report**
  - *Topics include*
    - *Overview of SRS*
    - *Radiological Monitoring and Dose*
    - *Environmental Accomplishments*
    - *Environmental Management*
    - *Education Outreach*
    - *Engaging the Public*

2024 ASER Summary Report

Defense Waste Processing Facility Processes over 17 Million Gallons of Salt Waste

Drone Technology Used for Waste Tank Inspections

Cost-effective Environmental Cleanup and Remediation

Preoperational Surveillance Location for Environmental Sampling

Outreach: STEM Education, Turkey Hunts, Hurricane Relief

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Environmental Monitoring at Savannah River Site

SRS Environmental Monitoring

- **SRS has performed environmental sampling and monitoring for over 60 years to:**
  - Assess impact to the public and environment from Site operations
  - Monitor facility discharges
  - Include extensive on- and off-site locations, extending to Savannah
  - Sample media: air, water, groundwater, soil, food products (including fish) and vegetation
    - *Chemical*
    - *Radiological*

South Carolina and Georgia Counties Where Monitoring has Occurred

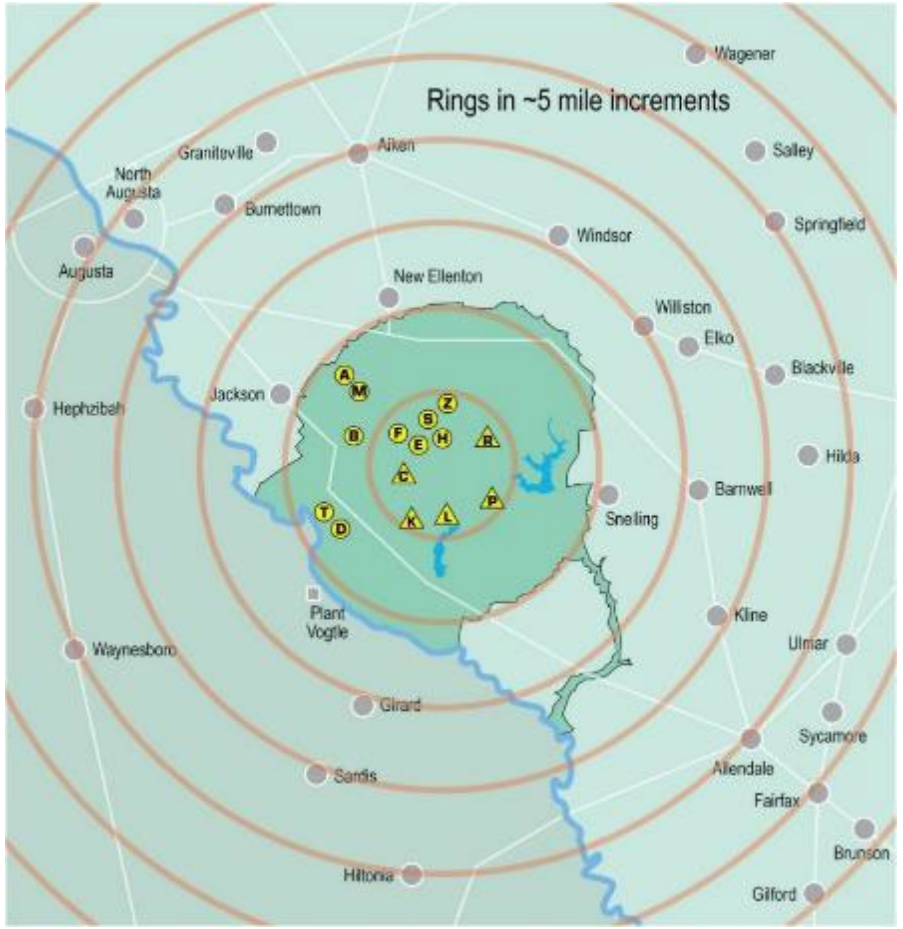
Why SRS Monitors

To ensure protection of the public and the environment

Environmental Monitoring: Site Operations

- **Site operations**
  - Located in the center of site
- **Provides large buffer area**
- **Monitoring focused on Site operational areas**
- **Monitored population centers**

Aiken	Allendale
Williston	Augusta
New Ellenton	North Augusta
Barnwell	Waynesboro



History of Environmental Monitoring

- **Environmental baseline studies during the 1950s were performed by**
  - Scientists from UGA and USC, who ***collected baseline data on plant and animal communities***
  - Academy of Natural Sciences team from Philadelphia, under leadership of Dr. Ruth Patrick, performed a ***biological study of the Savannah River***
  - Du Pont's Site Survey team of Health Physics personnel, which completed a ***landmark study of local natural radioactivity***
- **Environmental monitoring program established in 1953**

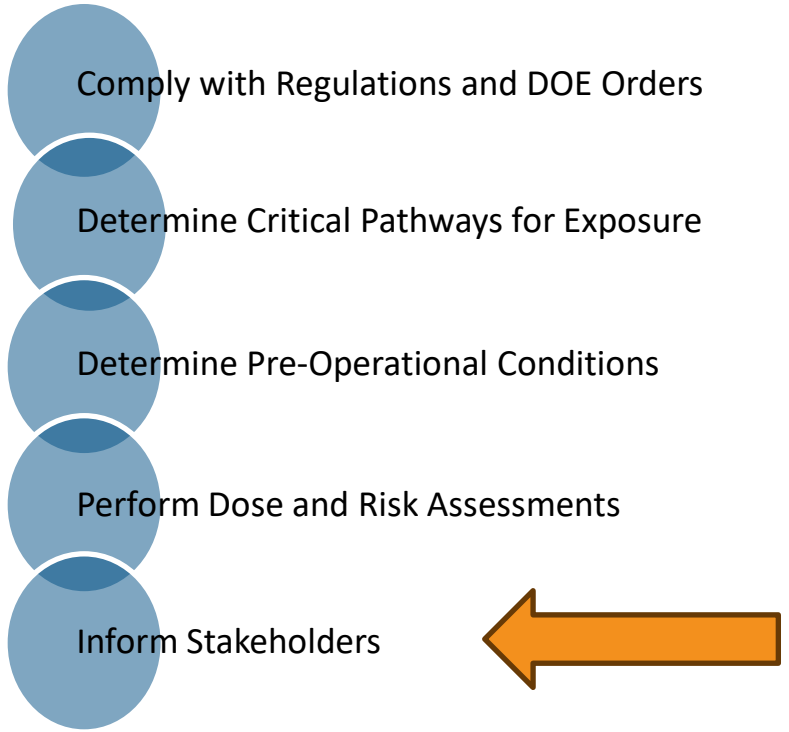
Dr. Ruth Patrick, pioneer in studying the health of freshwater streams and rivers, and member of the Academy of Natural Sciences

Environmental Monitoring Program

Purpose

The SRS Environmental Monitoring Program (EMP) serves the following two main purposes:

- Confirms compliance with applicable federal, state, and local regulations, as well as with U.S. Department of Energy (DOE) Orders
- Monitors any effects of SRS operations on the environment, both on- and off-site

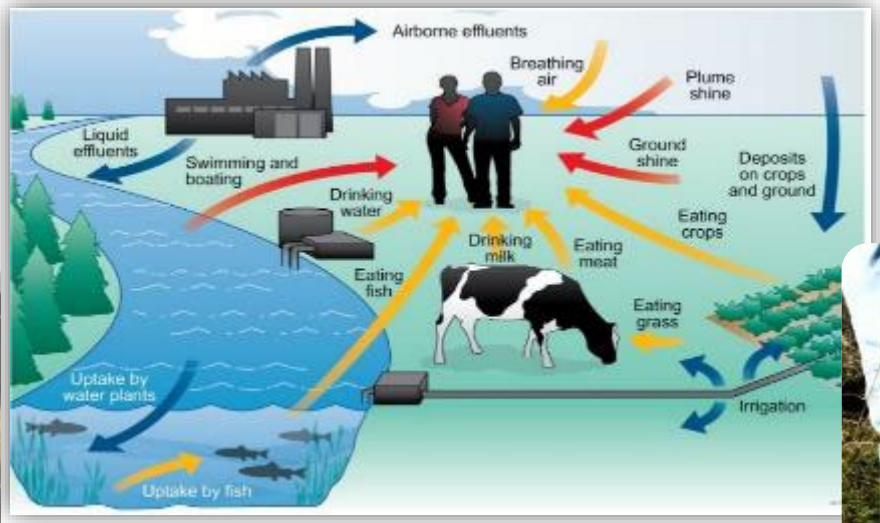


The Site's environmental personnel are responsible for the health of the environment and the impacts a healthy environment has on the on-site personnel and in the surrounding areas.

Environmental Monitoring Compliance

- **Radiological**
  - DOE Order 458.1 All Pathway Exposure Limit
    - All Pathway Total Effective Dose (TED) Limit – 100 mrem/yr
    - *DOE O 458.1 and EPA 40CFR 61, National Emission Standards for Hazardous Air Pollutants*
    - Airborne Total Effective Dose Limit – 10 mrem/yr
    - *EPA Clean Air Act*
      - SCDES Issues Part 70 Operating Permit Program
  - DOE O 458.1 and 40 CFR 141
    - Drinking Water Limit – 4 mrem/yr
- **Nonradiological**
  - EPA Clean Air Act (CAA)
    - CAA Part 70 Operating Permit Program
      - SCDES Title V Operating Permit
  - EPA Clean Water Act
    - *SCDES administers through National Pollutant Discharge Elimination System (NPDES)*
      - NPDES Industrial Stormwater and Industrial Wastewater Permits

Exposure Pathway & Sampling by Media



- Comply with Regulations and DOE Orders
- Determine Critical Pathways for Exposure
- Determine Pre-Operational Conditions
- Perform Dose and Risk Assessments
- Inform Stakeholders

Environmental Monitoring Program

Environmental Monitoring Activities are organized into two program areas:

- Effluent monitoring at the point of release from each facility to the environment
  - *Effluent:* a release to the environment of treated or untreated water or air from a pipe or a stack.
    - *Liquid effluent flows into a body of water, such as a stream or lake.*
    - *Airborne effluent (also called emission) discharges into the air.*

- Environmental surveillance: collection of samples beyond the effluent discharge points and from the surrounding environment (which includes the environment beyond each facility)

Effluent Monitoring

The collection of samples or data directly from where liquid or gas is released onsite

- Radiological Effluent Monitoring
  - Air emissions from facility stacks or liquid discharges from facility outfalls

- Nonradiological Effluent Monitoring
  - Air releases are calculated from a model, and liquid data is acquired from facility outfalls

Environmental Surveillance

- **The collection of samples beyond the facilities and from the surrounding environment**

Air

Liquid
- Streams
- Rivers
- Basins
- Drinking Water
- Rainwater

Foodstuffs
- Crops
- Dairy
- Vegetation

Soil and Sediment

Wildlife
- Fish
- Deer
- Wild Hogs

Environmental Monitoring Program

- **2024 Nonradiological and Radiological monitoring program**
  - Air Pathway
    - All air contaminants released were below applicable permit and regulatory limits.
    - Radiological results for surveillance media were within historical levels.
  - Water Pathway
    - Nonradiological effluent releases for stormwater outfalls and drinking water systems met permit limits and were compliant with applicable standards.
    - Industrial wastewater outfalls had a greater than 99% compliance rate (3 exceptions out of 2,316 analyses)
    - Radiological water contaminants released by SRS were all below applicable standards and within historic levels.
  - Surveillance Media
    - Sediment, SRS streams, stormwater basins, and Savannah River samples were consistent with the background control locations and were comparable with historical levels.
    - Fish flesh sample results were consistent with historical levels.
    - All harvested animals that SRS monitored during the annual onsite hunts were below the applicable standards.
      - SRS monitored the deer, feral hogs, turkeys, and coyotes harvested during the hunts and released 69 animals.

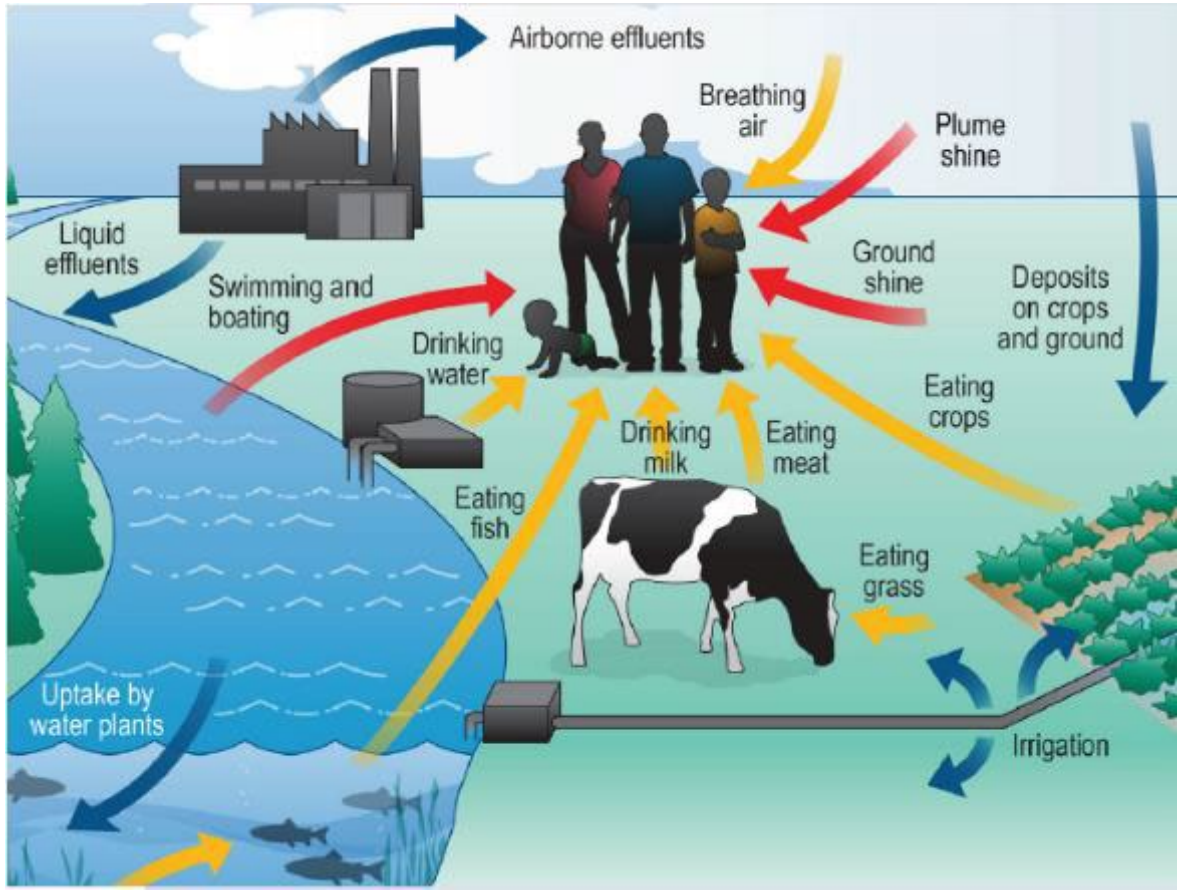
How is this information used?

- **Data from effluent monitoring and environmental surveillance is used in assessing the effects of SRS operations, if any, on the local environment by monitoring potential exposure pathways.**

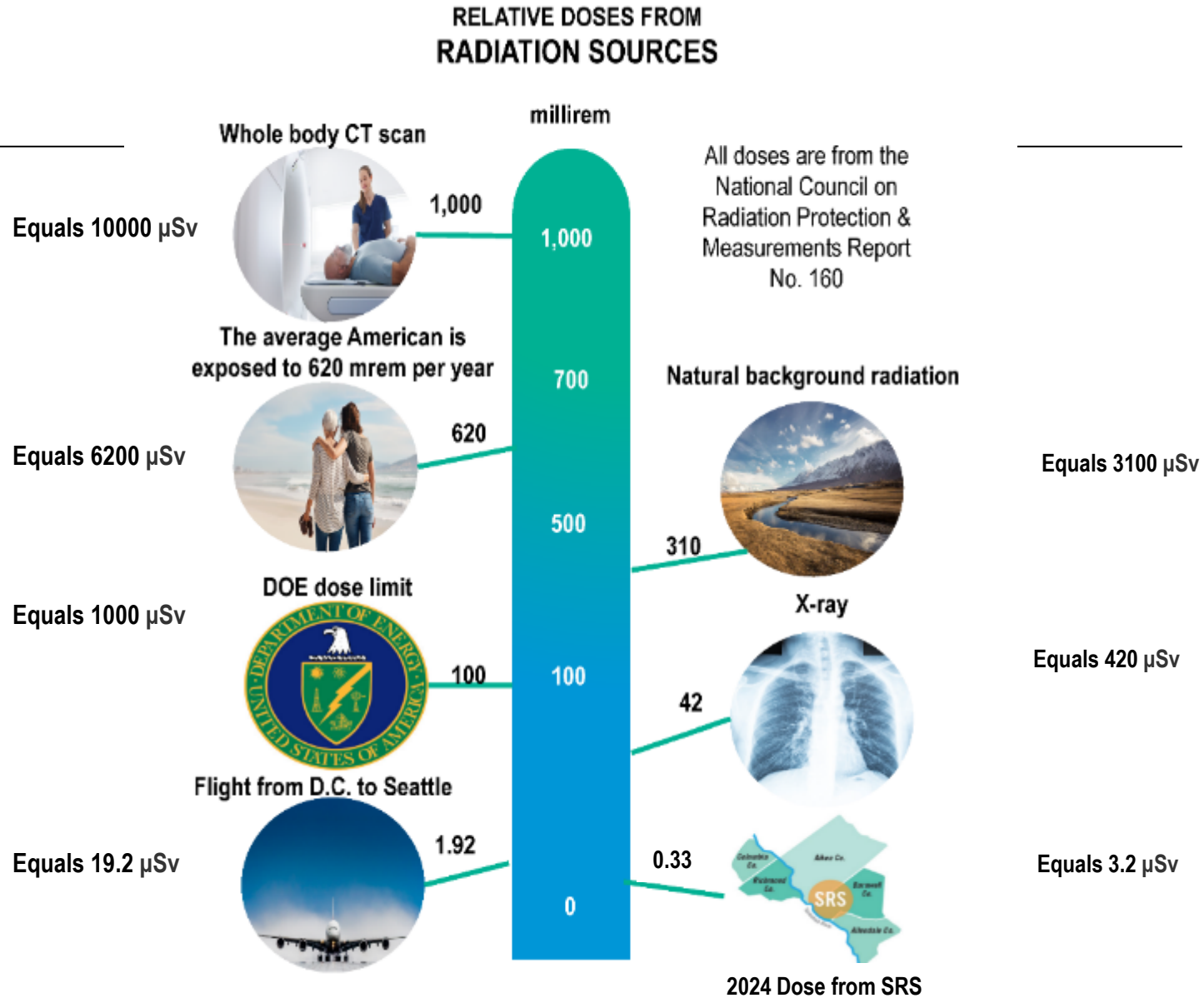
- Comply with Regulations and DOE Orders
- Determine Critical Pathways for Exposure
- Determine Pre-Operational Conditions
- Perform Dose and Risk Assessments
- Inform Stakeholders

Dose

- **Radiation dose to a person is the amount of energy the human body absorbs from a radioactive source**
- **Energy is transferred in the form of rays**
- **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



Impact from Radiation Sources

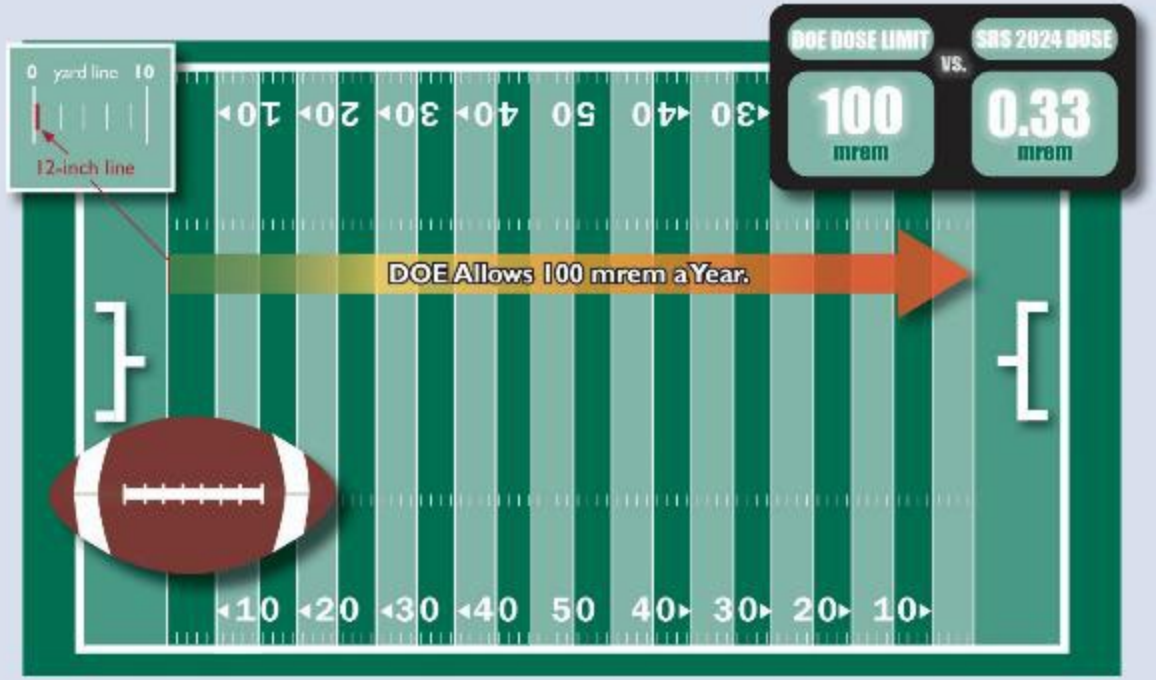


Dose Comparison

- **There were no specific events during 2024 that negatively impacted results of the Radiological Dose Assessment**
- **DOE Dose Limit = 100 mrem/yr**
- **The potential representative person all-pathway dose is very small (<< 1 mrem)**
  - Air pathway: 15-20% of all pathway dose
  - Liquid pathway: 80-85% of the all-pathway dose

- For 2024 the total representative person dose was 0.33 mrem, which is 0.33% of the 100 mrem/yr DOE dose limit.

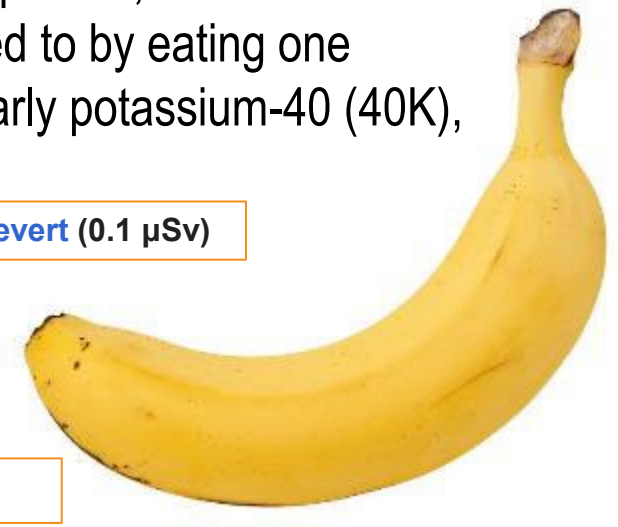
- SRS maintained Environmental Regulatory and DOE Order Compliance throughout 2024.
- All environmental regulatory deliverables were completed on or ahead of schedule.



The SRS 2024 all pathway dose is 0.33 mrem. Based on the length of a football playing field (100 yards or 3,600 inches), SRS's all pathway dose falls at the 12-inch line.

Banana Equivalent Dose

- Banana equivalent dose (BED) is an informal unit of measurement of ionizing radiation exposure, intended as a general educational example to compare a dose of radioactivity to the dose one is exposed to by eating one average-sized banana. Bananas contain naturally occurring radioactive isotopes, particularly potassium-40 (40K), one of several naturally occurring isotopes of potassium.



One BED is often correlated to 10^{-7} sievert (0.1 µSv)

- The Savannah River Site combined dose from air and water pathways—2024 potential radiation dose also known as the "all pathway" dose—was 0.33 millirem

∴ 0.33 Millirem = 3.3 Microsievert

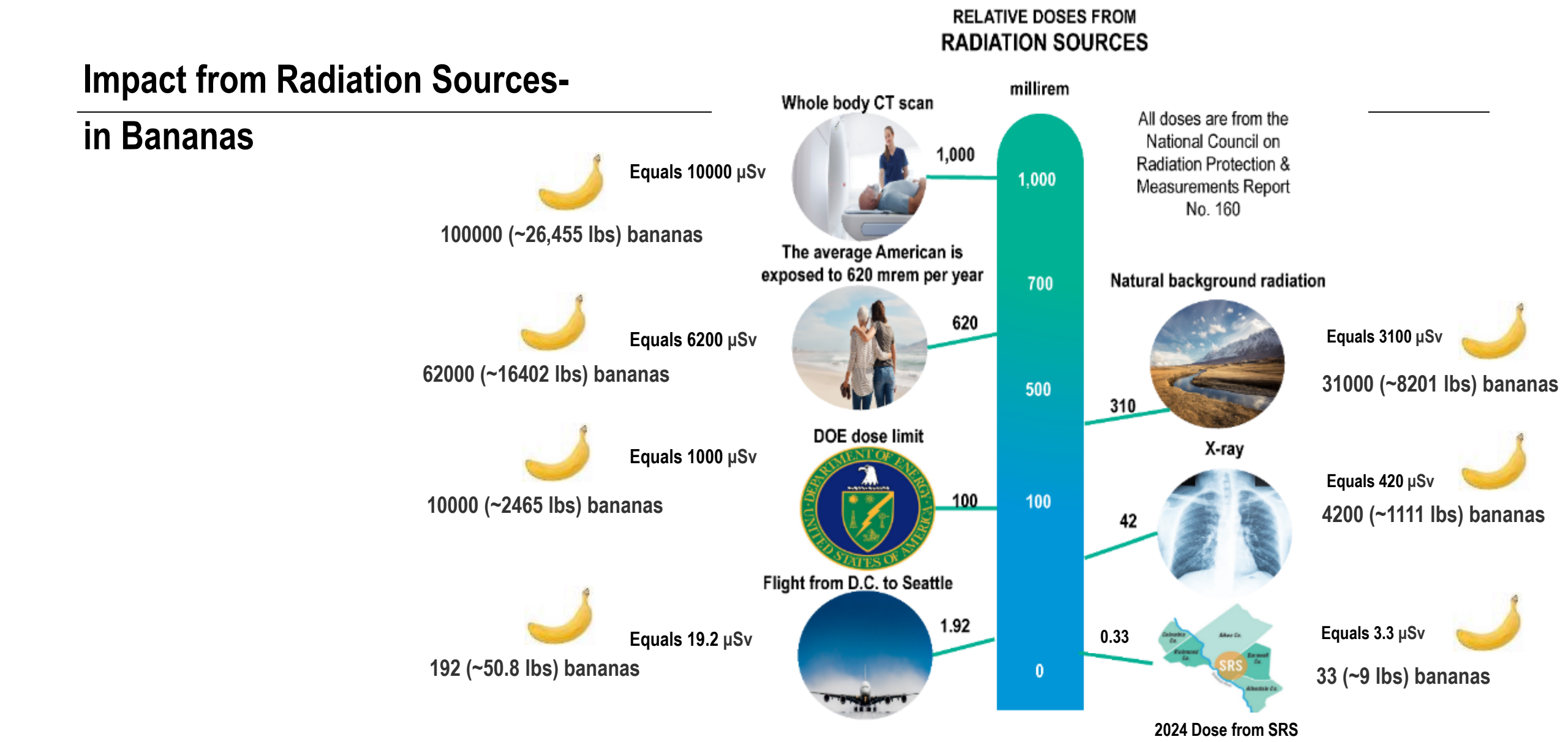
- 3.3 Microsieverts ("all pathway" dose for 2024) divided by 0.1 microsievert (One BED or one averaged-sized banana) equals 33 average-sized bananas.

- In general, most average-sized bananas weigh approximately 120 grams. 33 bananas times 120 grams each equals 3960 grams or 8.73 pounds of bananas.

An average "hand" of bananas weighs between 3 and 7 lbs

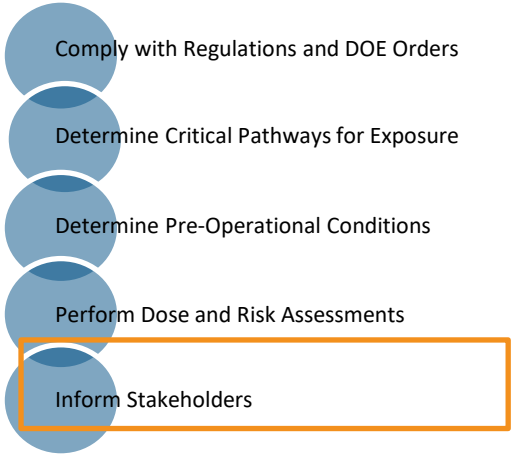
Impact from Radiation Sources-

in Bananas



What do we do with this information?

- **Environmental Monitoring Reporting**
  - Compliance Reports
    - Submit to Federal and State agencies to show compliance with Federal and State regulations
  - Internal Reports
    - To track historical trends, assess programs and protocols, identify areas for improvement
  - External Reports
    - Published to provide information to stakeholders and the public
    - Annual Site Environmental Report and Summary Report



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2024 Annual Site Environmental Report Highlights

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CAB
Savannah River Site Citizens Advisory Board

Environmental Management: Pollution Prevention

- **SRS's Environmental Management System is responsible for safeguarding air, water, land, and natural resources as well as archaeological and cultural resources that SRS potentially affects.**
  - A triennial audit was completed of the EMS in 2024 and determined compliance with the requirements of ISO 14001:2015 with zero non-conformances identified
- **SRS diverted 58.5% of municipal solids waste from landfills.**
- **SRS was recognized for significant contributions towards achieving 100% Zero Emission Vehicle (ZEV) fleet.**
  - DOE received the FY 2024 Green Fleet Award accompanied by a $250,000 grant to support ZEV acquisition and improvements to electric vehicle charging infrastructure.

Trucks filled with wood chips are lifted to unload at the Biomass Cogeneration Facility. These wood chips will be used to generate electricity.

2024 Green Fleet Award Ceremony

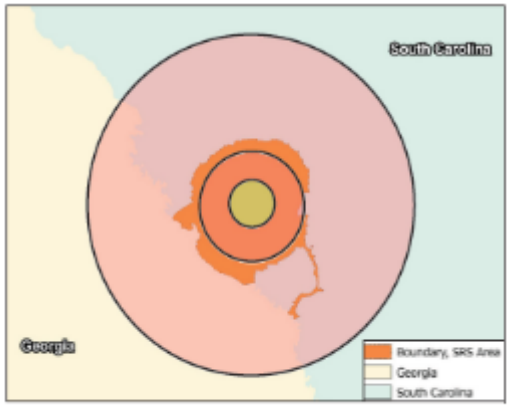
2024 Compliance Summary

- **SRS managed 433 operating and construction permits for the 2024 reporting year.**
- **Permitting**
  - SRS met all Clean Air Act requirements.
  - SRS air and water discharges containing radionuclides were well below the DOE public dose limit of 100 millirem (mrem) per year.
  - All SRS industrial stormwater outfalls were compliant under the National Pollutant Discharge Elimination System (NPDES) industrial stormwater permit.
  - SRS achieved a greater than 99% compliance rate for industrial wastewater outfalls, with only 3 exceptions out of 2,316 analyses at NPDES industrial wastewater outfalls.
- **External Audits and Inspections**
  - EPA and SCDES audited and inspected various SRS environmental programs to ensure regulatory compliance. No Notice of Violations (NOVs) were received in 2024.

Stream Located on the Savannah River Site

Environmental Monitoring

- **Effluent Monitoring**
  - Demonstrate the Site compliance with permits and regulatory requirements
- **Surveillance**
  - Assess any environmental impacts of Site operations on the surrounding area



General overview of the areas the Environmental Monitoring Program covers

Environmental Monitoring
encompasses both effluent monitoring and environmental surveillance.

Effluent Monitoring
collects samples or data from the point (such as a stack or pipe) that a facility discharges liquids or releases gases.

Media Sampled
- Air (stack emissions)
- Surface water (facility effluents)

Stacks are sampled for air emissions

A liquid effluent outfall

Environmental Surveillance
collects samples beyond the effluent discharge points and from the surrounding environment.

Media Sampled
- Air
- Rainwater
- Drinking water
- Surface water
- Stream, river, and basin sediment
- Terrestrial and aquatic food products
- Vegetation
- Soil
- Wildlife

Fish flesh samples

Nonradiological Environmental Monitoring

2024 SRS Nonradiological Environmental Monitoring Summary

Effluent Releases

- SRS reported a greater than **99%** compliance rate for National Pollutant Discharge Elimination System (NPDES) industrial wastewater outfalls.
- **All** SRS industrial stormwater outfalls under the South Carolina general industrial stormwater permit were compliant.

Many alligators call Savannah River Site home.

Surveillance Program

- SRS **began** collecting soil samples around the construction area of the Savannah River Plutonium Processing Facility (SRPPF) to collect background information prior to operation.
- The surface water quality of the Savannah River and onsite streams is **not significantly affected** by NPDES industrial wastewater and industrial stormwater discharges.
- Sediment results from SRS streams, stormwater basins, and the Savannah River were consistent with the background control locations and were **comparable** with historical levels.
- Samples of fish flesh were collected from the Savannah River and results were **consistent** with historical levels.

Onsite Drinking Water

- All SRS drinking water systems **complied** with South Carolina Department of Environmental Services and U.S. Environmental Protection Agency water quality standards.

Radiological Environmental Monitoring

2024 SRS Radiological Environmental Monitoring Summary

Air Pathway

- All air contaminants SRS released **met all** applicable air permit and regulatory limits.
- Radiological results for surveillance media associated with the airborne pathway were **within** historical levels.

Water Pathway

- All water contaminants SRS released **met all** applicable water standards and regulatory limits.
- Radiological results for surveillance media associated with the liquid pathway were **within** historical levels.

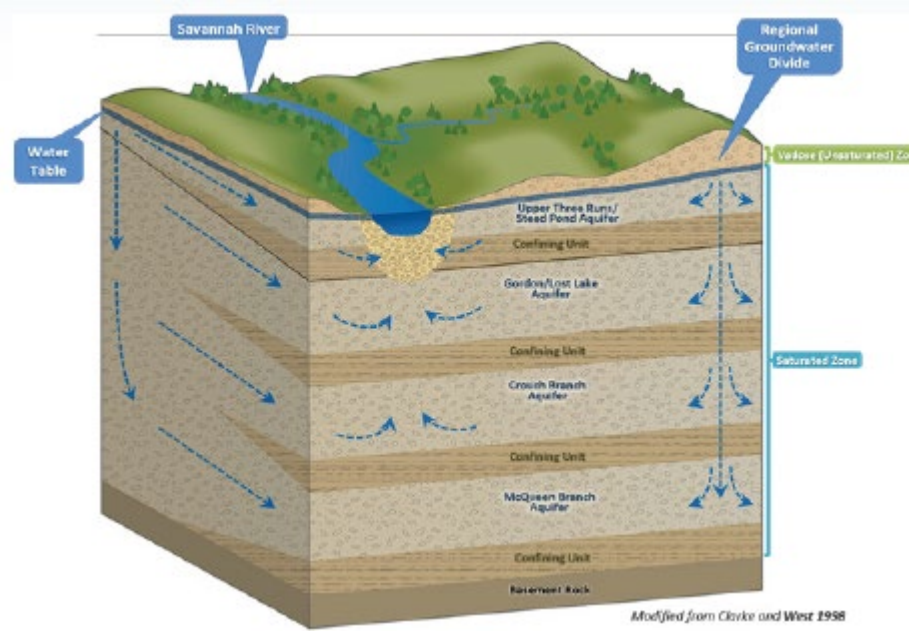
Wildlife Surveillance

- All harvested animals SRS monitored during the annual onsite hunts were **below** the applicable standard. SRS monitored the deer, feral hogs, turkeys, and coyotes harvested during the hunts and **released** all 69 animals.

Hogs/SREL

Environmental Remediation: Groundwater

- **41 remediation systems are currently operating to manage the rate of contaminant movement and reduce the risk of contaminant exposure to human health and ecological receptors**
- **In 2024, SRS removed 11,872 lbs. of volatile organic compounds (VOCs) from groundwater and the vadose zone.**
- **The Site also prevented 15.5 Ci of tritium from reaching SRS streams through the Mixed Waste Management Facility (MWMF) Phytoremediation Project**
  - A total of 6,942.5 Ci of tritium has been prevented from reaching Site streams through this project since it's inception in 2001.



Three-dimensional block diagram of groundwater units at SRS and the generalized groundwater flow movements within them

Quality Assurance

- **Analytical Laboratory Quality Assurance**
  - In 2024, 3 subcontract laboratories were utilized to analyze the environmental samples reported in the Annual Site Environmental Report. Each of those laboratories continues to maintain their DOE Consolidated Audit Program (DOECAP) accreditation.
  - Multiple external audits of treatment, storage, and disposal facilities determined the facilities to be in good standing and eligible to continue to provide services to DOE.
- **Quality Control Activities**
  - Quality Control samples identified no defects affecting the analytical results of the surveillance and monitoring programs.
- **Continuous Improvement**
  - Preoperational sampling was established in F-Area for a number of environmental programs ahead of SRPPF activities coming online.
  - A new electrofishing boat was purchased equipped with current industry standard equipment to improve fishing efficiency and minimize overall environmental impact.

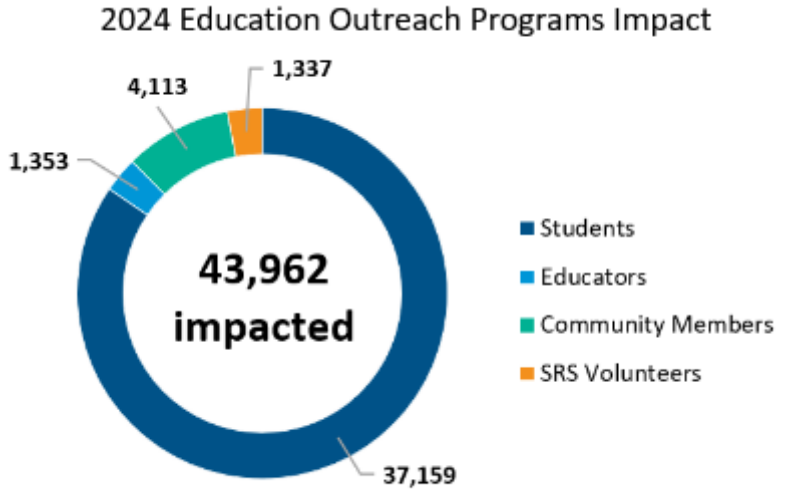
New Smith-Root Electrofishing Boat Enhances Sampling Efforts with Minimal Environmental Impact

Stewardship and Outreach

- **It is the policy of SRS to be a leader in environmental excellence through:**
  - Continuous improvement and research in engineering and scientific disciplines
  - Pollution prevention and waste minimization
  - Safeguarding natural, archaeological, and cultural resources on the site and throughout our communities

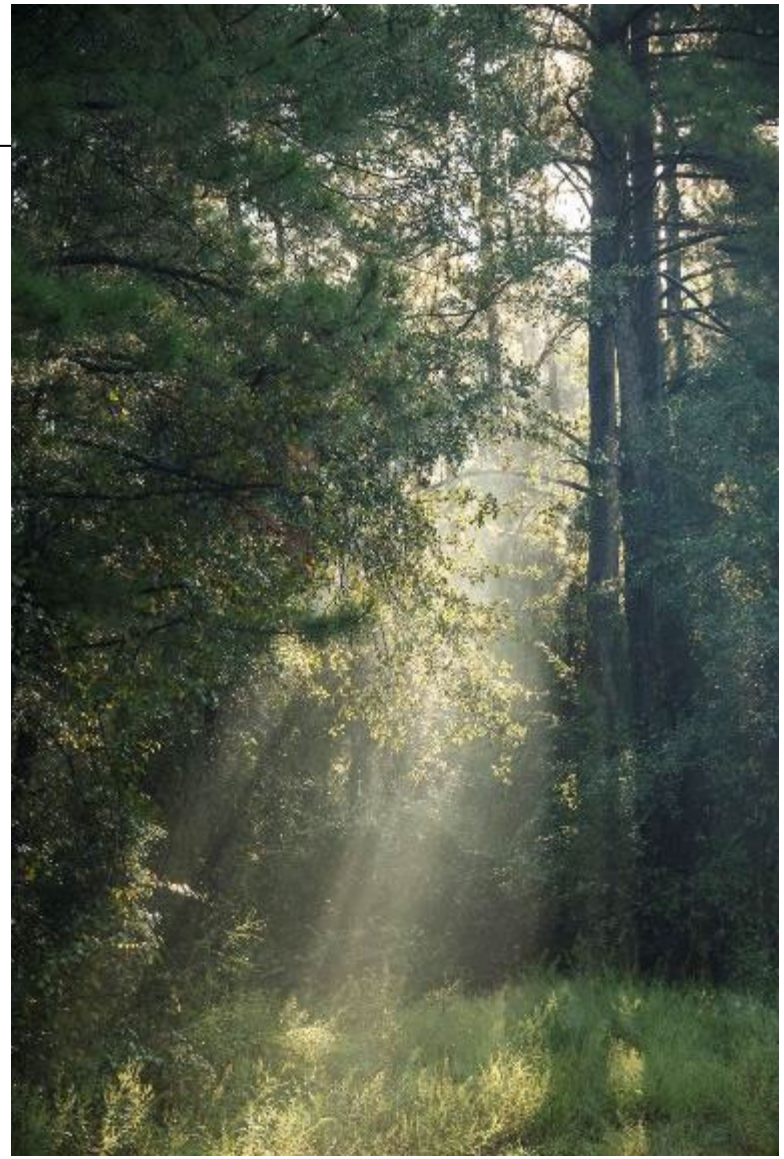
- **SRS is committed to support communities surrounding the site with opportunities for community engagement including:**
  - Advocacy and Outreach
  - Educational opportunities
  - Workforce development

U.S. Forest Service employees examine an affected forested area inhabited by Red-cockaded woodpeckers.



Conclusion and Summary

- SRS maintained Environmental Regulatory and DOE Order Compliance throughout 2024.
- 2024 results (chemical and radiological) confirm SRS operations remained protective of the environment and human health.
- The ASER full report was issued to DOE-HQ on September 16, 2025.



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