

2015 SRS Environmental Report Overview

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SRS Citizens Advisory Board Meeting

November 15, 2016

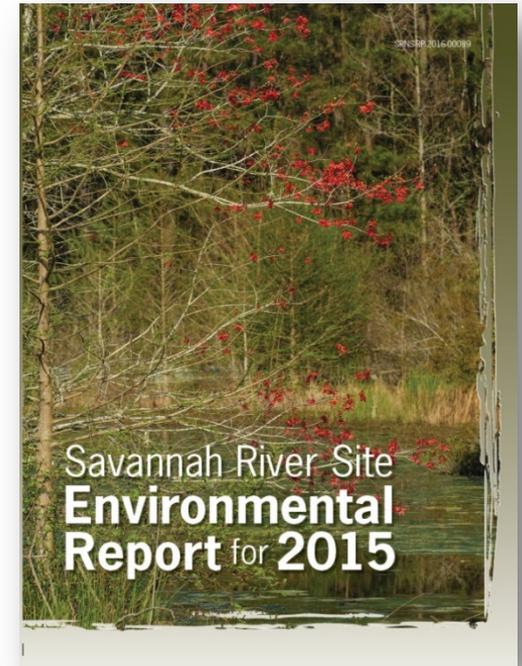
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- Teresa Eddy
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Purpose

- To fulfill a 2016 Facilities Disposition and Site Remediation Committee Work Plan Commitment
- To provide the CAB and public an overview of the SRS Environmental Report and results for 2015



Acronyms and Definitions

- ASER = Annual Site Environmental Report
- BJWSA = Beaufort-Jasper Water and Sewer Authority
- EPA = Environmental Protection Agency
- NPDES = National Pollutant Discharge Elimination System
- PCB – Polychlorinated biphenyl
- pCi/L = picocurie per liter
- SCDHEC = South Carolina Department of Health and Environmental Control
- TREAT - Teaching Radiation, Energy, and Technology
- $\mu\text{g/g}$ = microgram per gram

Acronyms and Definitions (Cont'd.)

- **Ci = Curie** - 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.
- **Radiation Dose** - The amount of energy a person receives internally or externally as a result of a radioactive source.
- **Environmental Monitoring** - Program at SRS that includes effluent monitoring and environmental surveillance with the purpose of showing compliance with federal, state, and local regulations, as well as DOE Orders.
- **Effluent Monitoring** - The collection of samples or data from the point at which a facility discharges liquid or airborne releases to the environment.

Acronyms and Definitions (Cont'd.)

- **Environmental Surveillance** - The collection of samples of air, water, soil, vegetation, milk, food products, fish, biota, and other media—or of data—from the environment.
- **Exposure** - Incidence of radiation on living or inanimate material.
- **rem = roentgen equivalent man** - A unit of radiation dose equivalent; a product of the absorbed dose and a weighting factor which accounts for the effectiveness of radiation to cause biological damage; millirem (mrem) is one thousandth of a rem.
- **Representative Person** - An individual receiving a dose that is representative of the more highly exposed individuals in the population.

Outline

- SRS Environmental Report for 2015 Overview
- SRS Environmental Report for 2015 Improvements
- SRS Environmental Data Results for 2015
- Summary
- Demonstration of Website Improvements

SRS Environmental Report for 2015 Overview

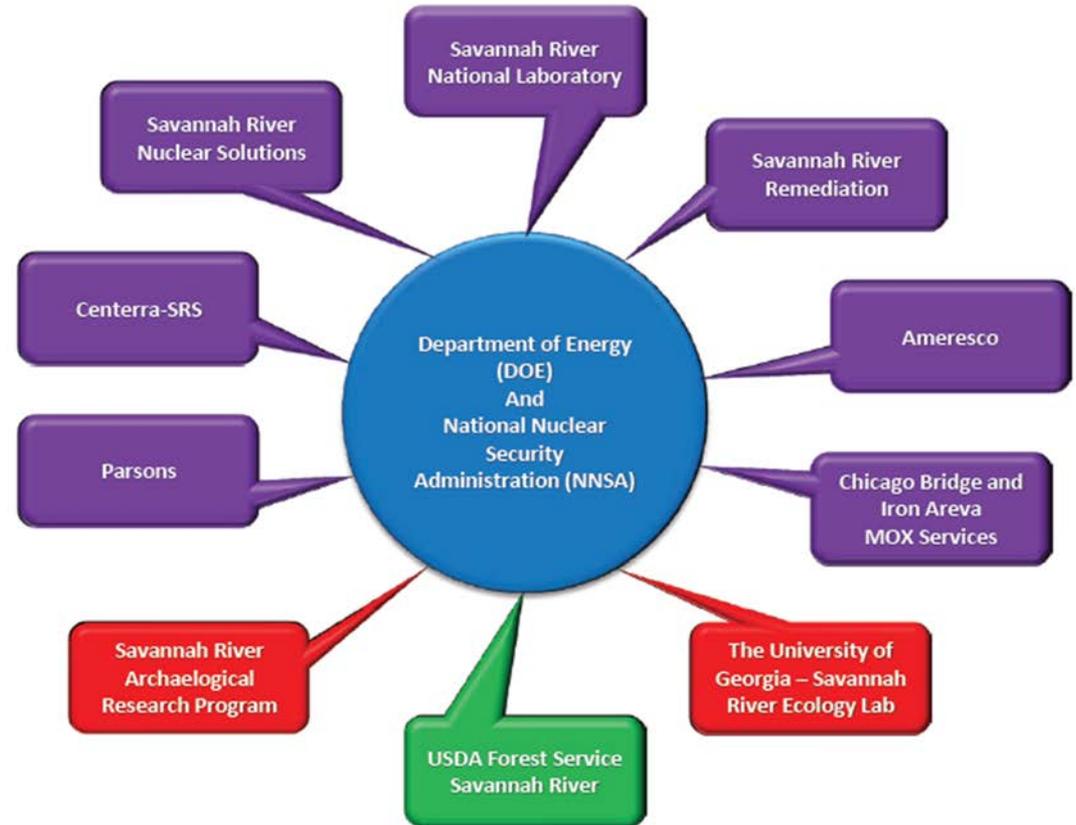
- Annual Site Environmental Reports (ASERs) are required by U.S. Department of Energy (DOE) Order 231.1B (Environment, Safety, and Health Reporting) to provide the public and stakeholders information on:
 - Environmental Program Performance
 - *Site-wide environmental monitoring and surveillance effectiveness*
 - *Confirm compliance with environmental standards and requirements.*
- Savannah River Site (SRS) began publishing the ASER in 1959.

SRS Environmental Report for 2015 Improvements

- Incorporated additional information to Chapter 1
- Reorganized chapters 4 and 5 to better align with chapter 6 and improve understanding of nonradiological versus radiological monitoring programs.
- Incorporated highlights box at beginning of each chapter
- Added summary tables in the appendix
- Chapter 6 was revised with less technical details for improved understanding.
- Improved some graphics
- Updated the 2015 webpage look with scrolling photographs and reconfigured page.

Chapter 1 – Introduction

- SRS History
- SRS Missions
 - *Environmental Stewardship*
 - *National Security*
 - *Clean Energy*



SRS Organizations

Chapter 2 – Environmental Management System

- SRS EMS confirms that Site is compliant with environmental sustainability standards and requirements
- Saved \$3.6 million through initiatives that avoided or diverted hazardous and radioactive wastes from disposal.
- Reduced potable water usage by 37% since 2000.
- 48% of electric energy used in 2015 came from renewable energy sources
- Reduced greenhouse gas emissions by greater than 68% since 2008.
- Over 90% of SRS light duty vehicles are hybrid, electric, or use E85 (ethanol) fuel.
- Shipped \$20.8 million in usable assets (equipment and supplies) for reuse and recovery.



Children monitor natural radiation in rock during Earth Day 2015

Chapter 3 – Compliance Summary

- Confirm compliance with environmental regulations, standards, and requirements
 - Managed more than 500 construction and operating permits
 - Complied with over 20 Laws, Regulations DOE Orders, and Executive Orders
 - Issued the Fifth *“Five-Year Remedy Review Report for SRS Operable Units with Native Soil Covers and/or Land Use Controls”*, which confirmed that the remedies selected were protective of human health and the environment.



Gopher Tortoise



Smooth Purple
Coneflower

Gopher Tortoise and Smooth Purple Coneflower,
Two Protected Species, Found at SRS

Chapter 3 – Compliance Summary

- **SRS did receive one Notice of Violation in 2015.**
 - Issued on January 16, 2015 by SCDHEC
 - Failure to comply with SC R.61-86.1, Standards of Performance for Asbestos Projects
 - Incident occurred December 2, 2014 at the SRS Waste Solidification Building
 - No fines or penalties were assessed by SCDHEC
 - The amount of asbestos released was below the one pound CERCLA Reportable Quantity and did not require reporting to the National Response Center.

Chapter 3 – Compliance Summary

- SRS achieved a 100% compliance rate for:
 - Air Quality and Protection, in FY15, with the five air permits that govern SRS operating facilities.
 - Water Quality and Protection
 - *National Pollutant Discharge Elimination System (NPDES) permit covering 28 industrial outfalls.*
 - *Stormwater Pollution Prevention Plan covering 37 stormwater outfalls.*
- For the 13th consecutive year without a violation, all 19 underground storage tanks that contain usable petroleum fuel were in compliance. (Resource Conservation and Recovery Act)

Chapter 4 – Non-Radiological Environmental Monitoring Program

- Liquid Effluent

- NPDES Permit Compliance Status

- Industrial Wastewater

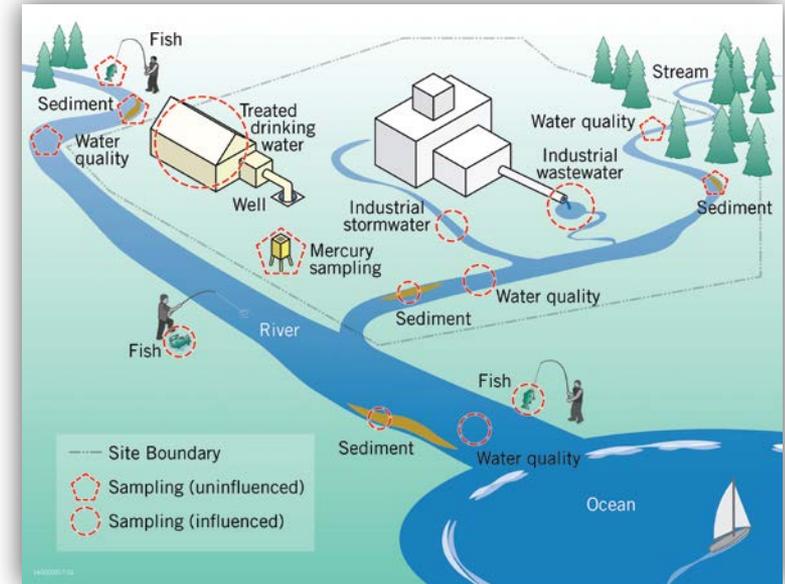
- *Monitored 28 industrial wastewater outfalls*
- *SRS received no Notices of Violation from SCDHEC*

- Stormwater Outfalls

- *Monitored 37 industrial stormwater outfalls*
- *ALL outfalls were monitored and in compliance with stormwater permit requirements*

- Air Effluent

- *ALL permitted emission limits for air pollutants were met in 2015*



Schematic Illustrating types and Typical Locations of Nonradiological Sampling

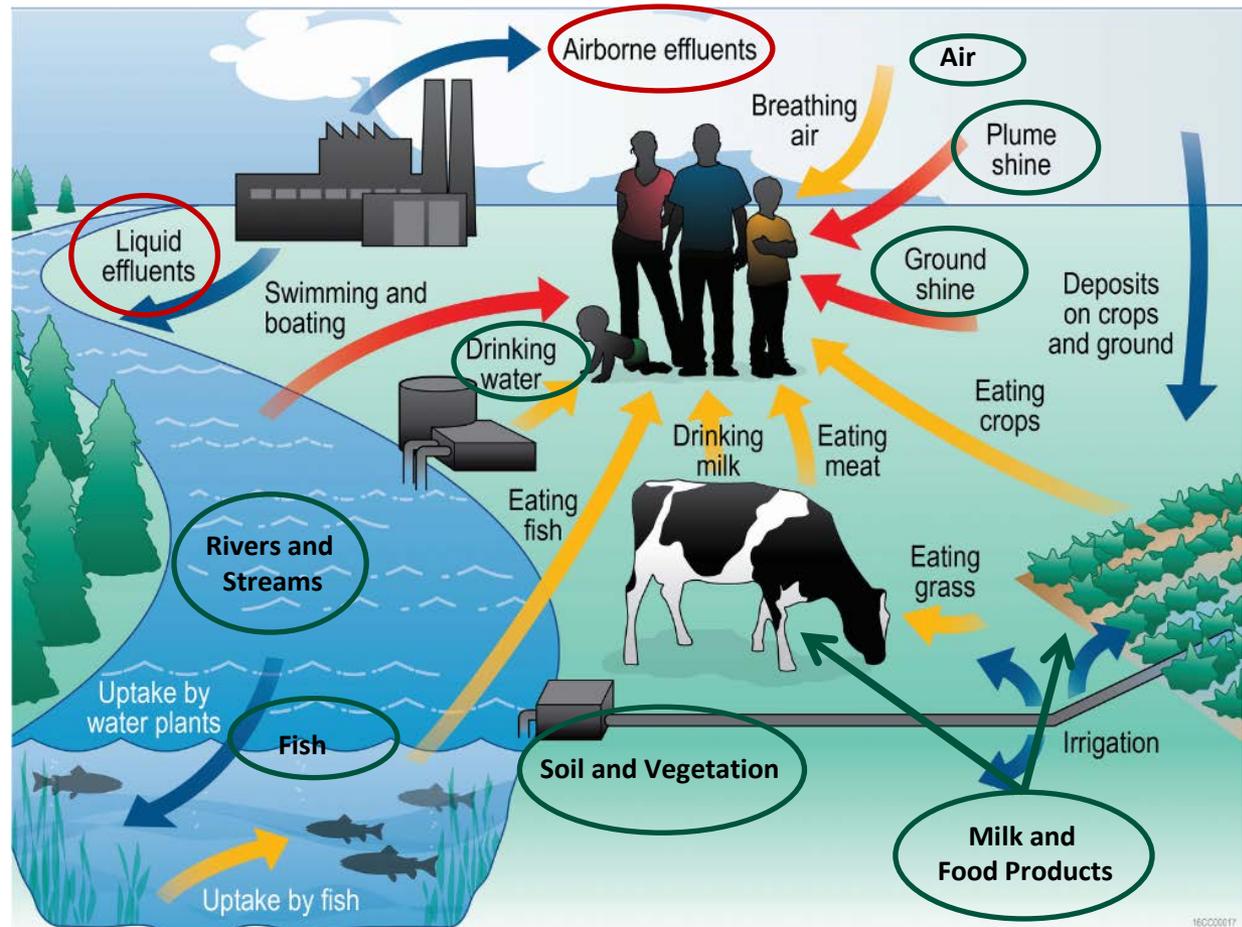
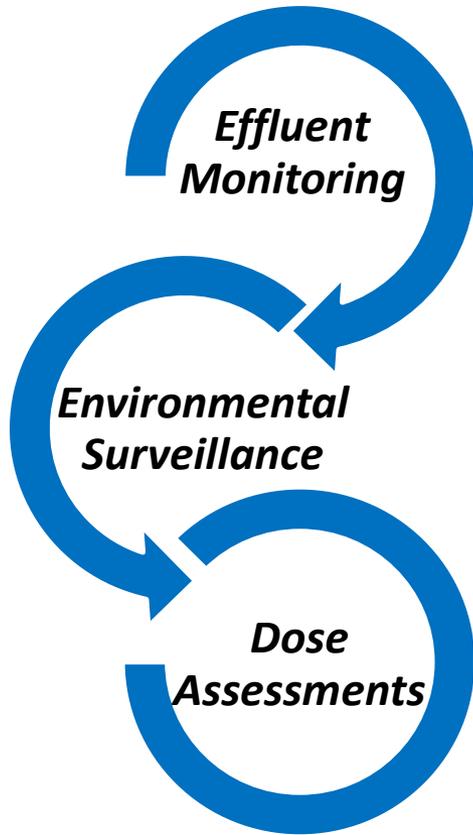
Chapter 4 – Non-Radiological Environmental Monitoring Program

- **Water Quality**
 - *SRS discharges did not impact the water quality in onsite streams or the Savannah River*
 - *Parameters include pH, temperature, dissolved oxygen, metals, organics, total suspended solids, pesticides, herbicides, and PCBs*
- **Fish**
 - *Mercury levels for fish in the Savannah River ranged from below detectable levels to 11.8 $\mu\text{g/g}$ in catfish*
 - *SCDHEC Fish Consumption Advisory*
<http://www.scdhec.gov/FoodSafety/FishConsumptionAdvisories/AdvisoryMap/>



Field Technician Collects Water Quality Sample from SRS Stream

Chapters 5 and 6 – Radiological Monitoring and Dose Assessment



Yellow Circle - Environmental Surveillance
Red Circle - Effluent Monitoring

Chapter 5 - Radiological Environmental Monitoring Program

- Over 20,000 radiological analysis performed annually

– Liquid Effluent

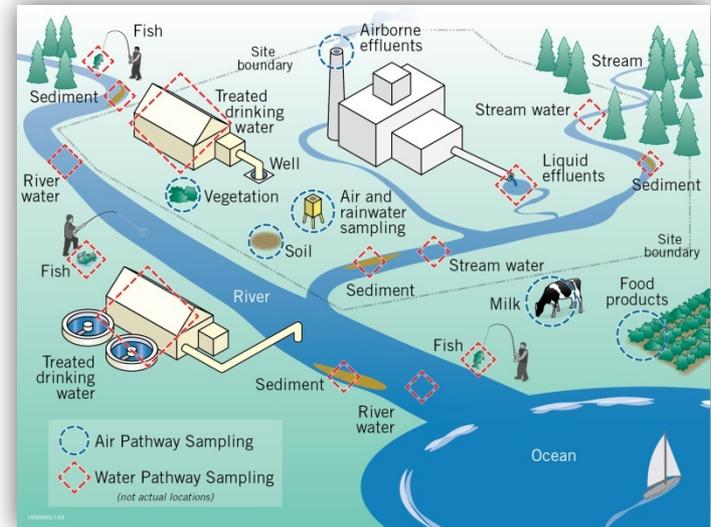
- *In 2015, liquid releases remained well below DOE Derived Concentration Standards.*



Technician Prepares Rain Ion Exchange Columns

– Air Effluent

- *Radiological airborne emissions were all within permit limits.*
- *The offsite dose from all airborne releases remained well below the DOE and EPA annual atmospheric pathway dose standard to 10 mrem.*



Radiological Air and Liquid Pathway Samples

Chapter 5 - Radiological Environmental Monitoring Program(Cont.)

- **Drinking Water**

- Tritium concentrations remain well below the drinking water standard of 20,000 pCi/L at Savannah River Mile 118 and North Augusta and Beaufort-Jasper Water Treatment Plants.

- **Wildlife**

- All animals monitored prior to release from SRS
- Average cesium-137 concentrations in deer indicate an overall decreasing trend for past 50+ years, as well as the last ten years.

- **Fish**

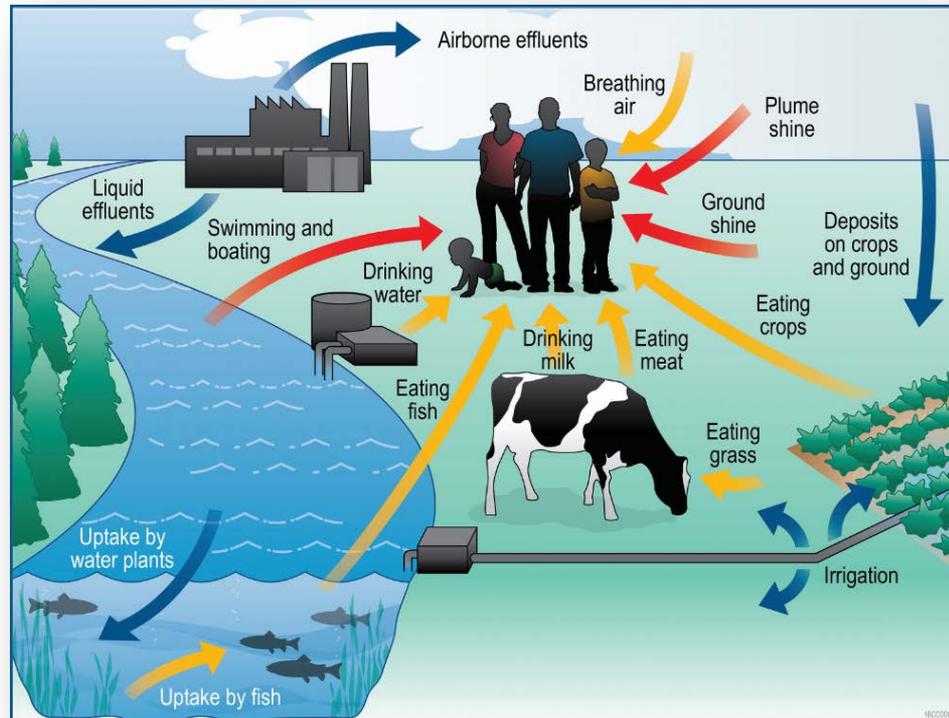
- Cesium-137 levels for fish in the Savannah River ranged from below detectable levels to 0.311 pCi/g in bass
 - *Fish data is used in dose calculations (liquid pathway) as part of the overall dose assessment.*



Fish Collection – Netting Fish

Chapter 6 – Radiological Dose Assessment

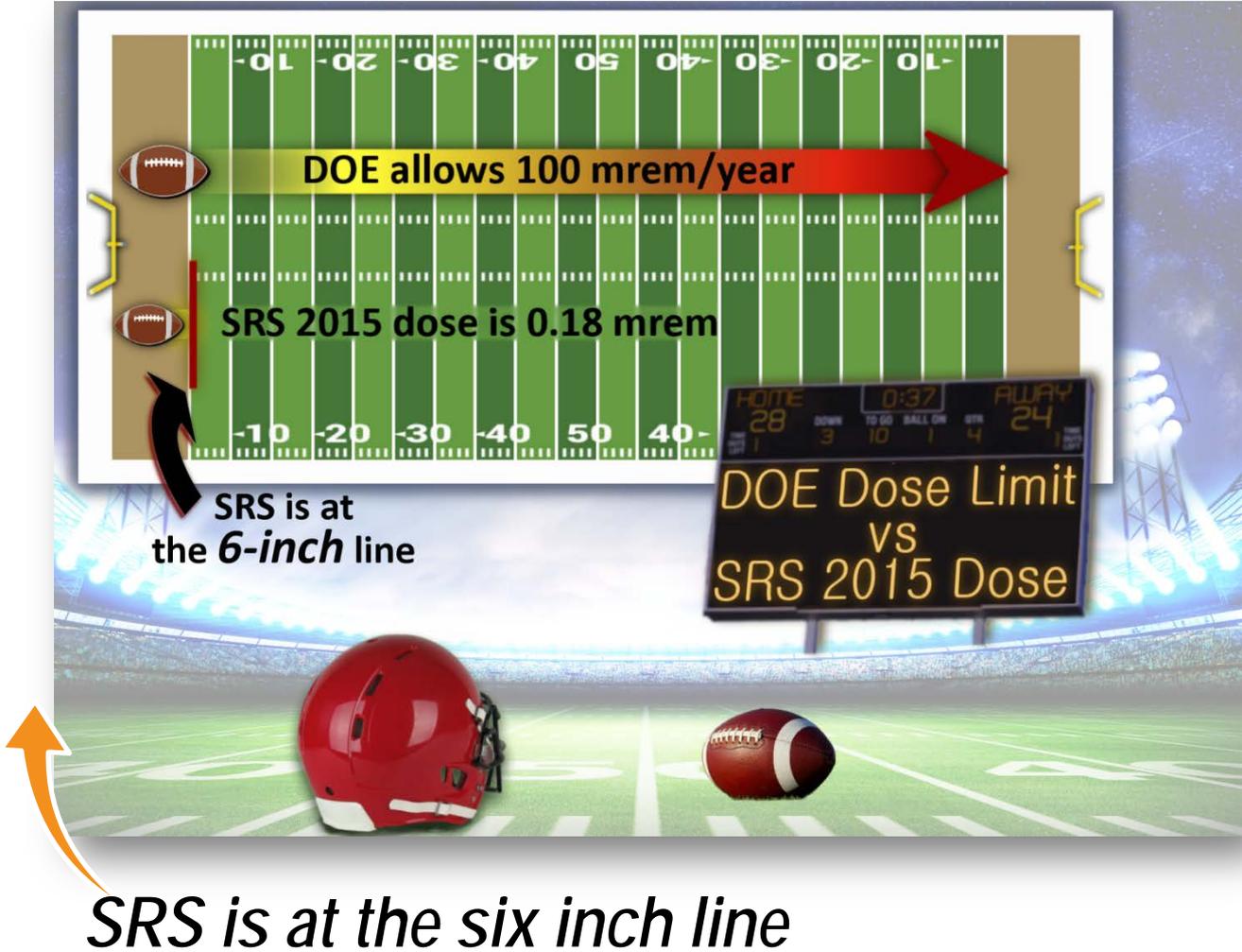
- SRS calculates the potential doses to members of the public from atmospheric and liquid radioactive releases to verify that these releases and exposures do not exceed the DOE public dose standard of 100 mrem/yr from routine DOE operations through all reasonable exposure pathways.



Chapter 6 - Dose Assessment Results

- For 2015, the potential representative person all-pathway dose was 0.18 mrem
 - *0.032 mrem from air pathways*
 - *0.15 mrem from liquid pathways*
 - *Liquid pathway includes irrigation (ingestion of meat, milk and vegetables), fish consumption, and drinking water*
- The all-pathway dose is 0.18% of the 100 mrem/yr DOE dose standard

Chapter 6 – Radiological Dose Assessment Results



Chapter 7 – Groundwater Management Program

- Describes the Site-wide programs in place at the SRS for protecting, monitoring, remediating, and using groundwater
- No exceedances of drinking water standards in the SRS Boundary wells near A/M Area.
- During 2015, SRS removed 8,775 lbs of volatile organic compounds (VOCs) from groundwater and the vadose zone, and prevented 113 curies of tritium from reaching SRS streams.
- SRS collected samples from 40 of the 44 offsite wells in Georgia with all tritium results being non-detects. (3 wells were dry and 1 well was damaged such that it could not be sampled.)

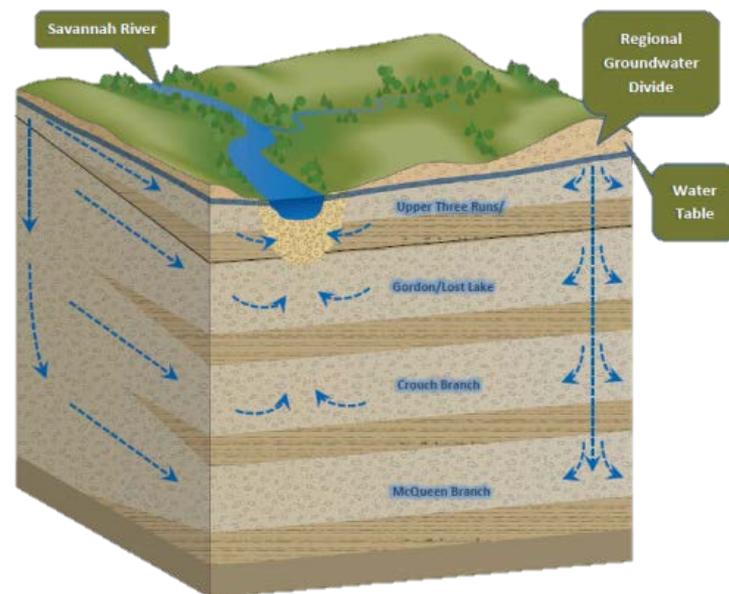


Figure 7-1 Groundwater at SRS

Chapter 8 – Quality Assurance

- SRS laboratories (onsite and contract) maintained certification by SCDHEC and passed audits performed under the DOECAP (U.S. Department of Energy Consolidated Audit Program).
- To support SRS continuous improvement:
 - Implemented the installation of wireless rain and flow “real time modems” at nine NPDES industrial storm water locations, and installation of area velocity sensors at two surface water sampling locations.



NPDES Storm water Outfall E-06

Summary Report - Communication and Outreach

- SRS Citizens Advisory Board
- Environmental Justice Meetings
- Information Pod Sessions
- Public Involvement
- TREAT Workshop
- Education Outreach

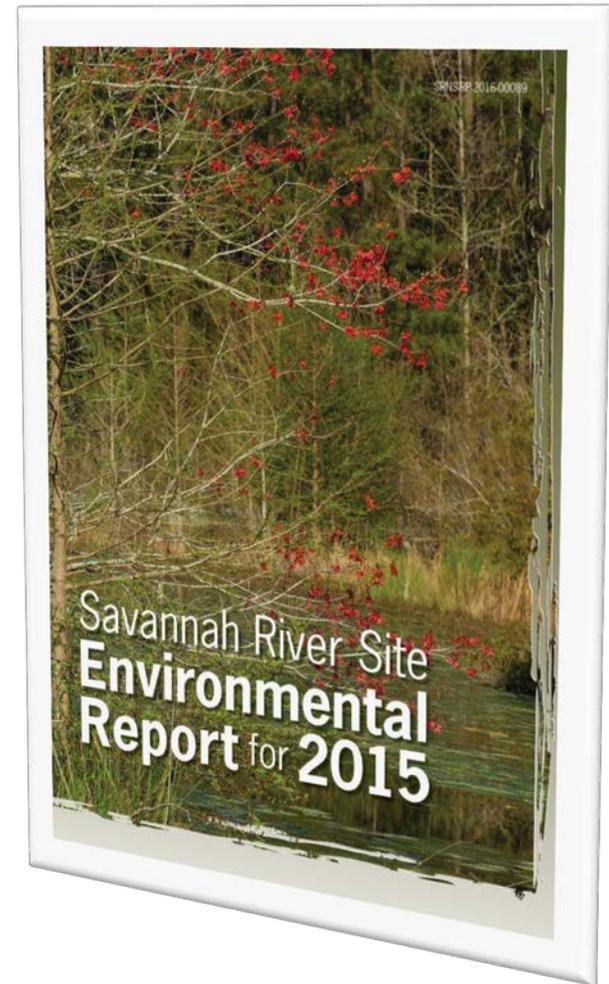


Summary Report - Communication and Outreach

- Website Postings
 - Providing link to report and option to request hard copy
- Social Media, Facebook, Twitter
- News Release - local and regional media
- SRS Environmental Bulletin
- Presentations
 - Full CAB, Environmental Justice and CSRA Radiological Environmental Monitoring Program

Summary

- SRS has a comprehensive environmental monitoring program
 - *Monitors facility discharges (air and liquid)*
 - *Monitors extensively on- and off-site extending to Savannah, Georgia*
 - *Evaluate Radiological and Chemical constituents*
- Results confirm SRS operations are protective of the environment and human health
 - *Annual dose from SRS operations less than 1 mrem*

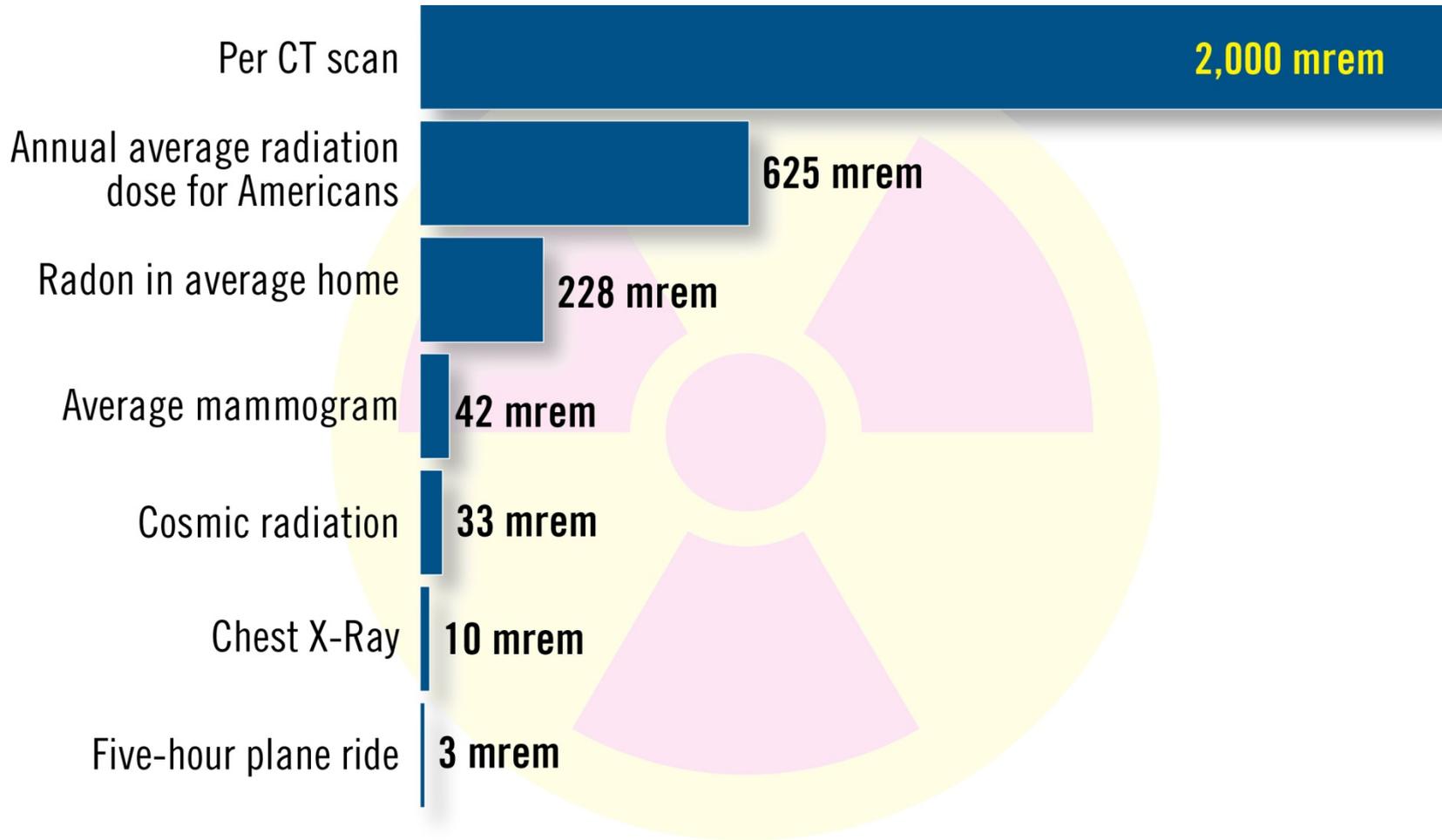


Contact Information

- The report is available on the web at:
 - <http://www.srs.gov/general/pubs/ERsum/index.html>
- To inquire about the report, contact:
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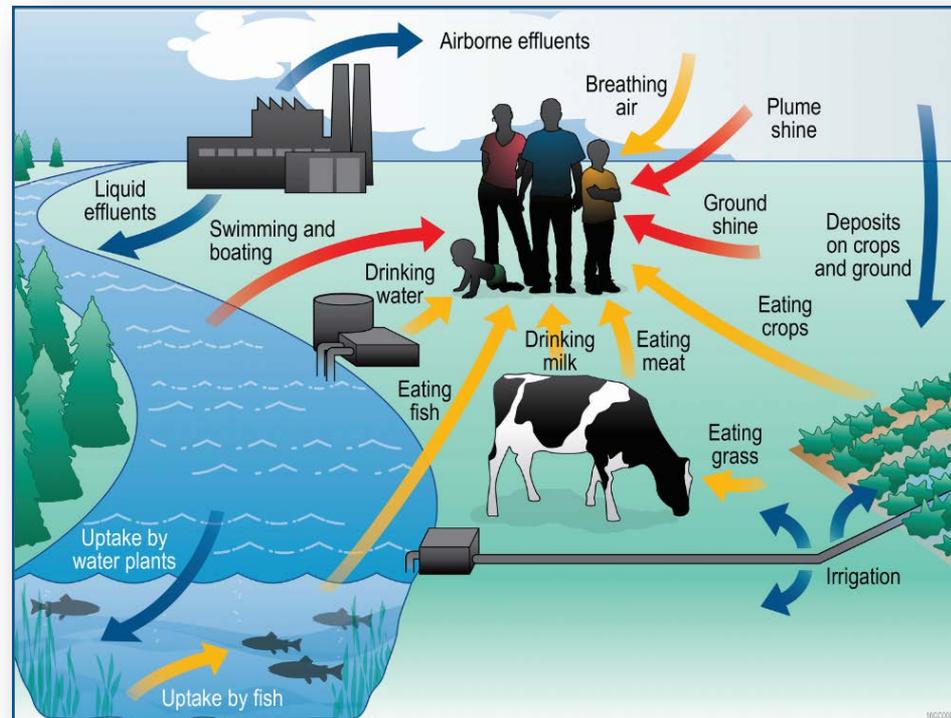
BACK-UP SLIDES

Impact from Radiation Sources

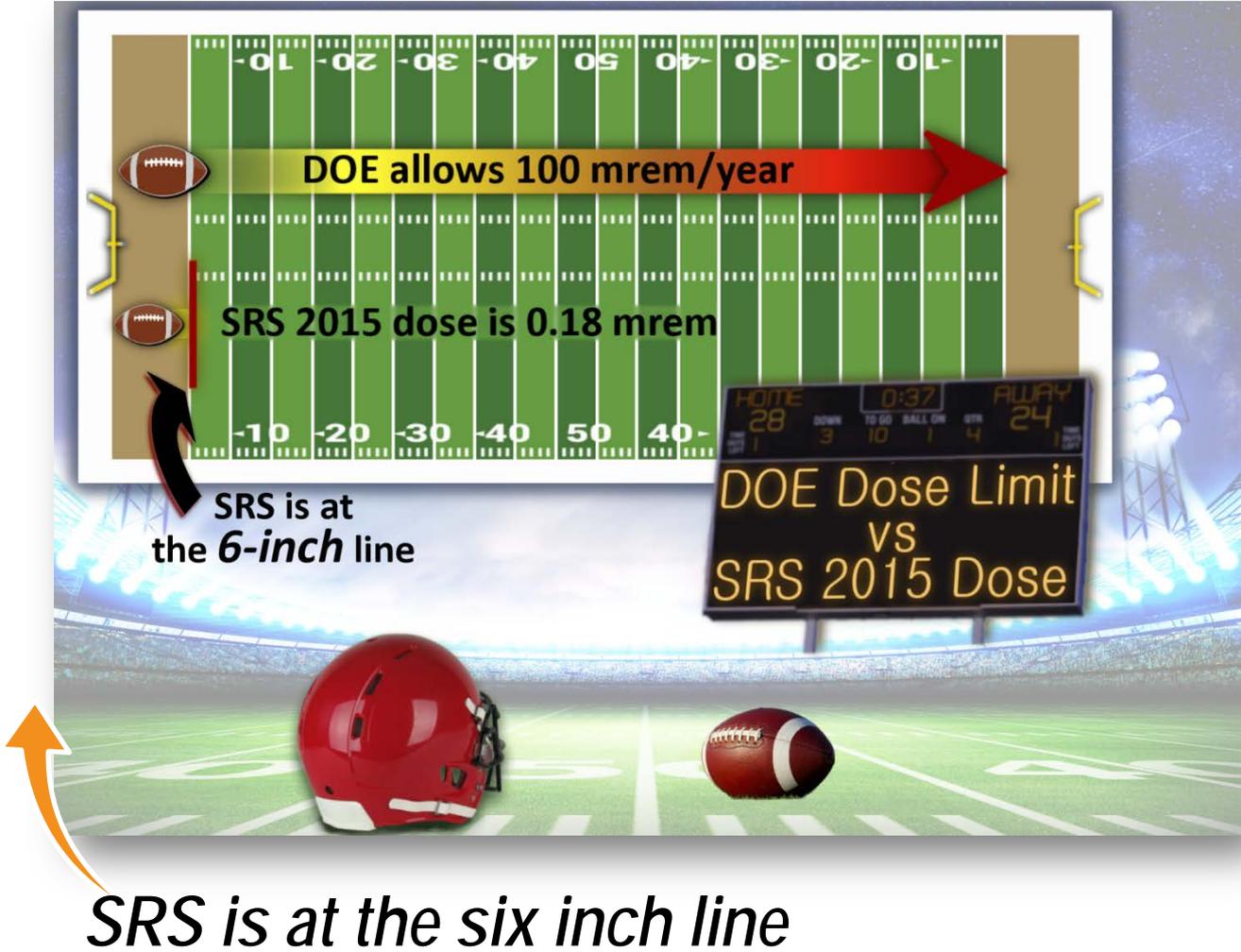


Chapter 6 – Radiological Dose Assessment

- SRS calculates the potential doses to members of the public from atmospheric and liquid radioactive releases to verify that these releases and exposures do not exceed the DOE public dose standard of 100 mrem/yr from routine DOE operations through all reasonable exposure pathways.



Chapter 6 – Radiological Dose Assessment Results



Chapter 6 – Dose Assessments

- What is Dose?
 - Radiation dose to a person is the amount of energy absorbed by the human body as a result of a radioactive source.
- Measured in rem or in millirem (mrem), which is one-thousandth of a rem.
- Millirem is the unit typically used in the report.
- On average, people in the US receive a dose of about 300 mrem from natural background sources and another 325 mrem from medical procedures.
- Effluent monitoring and environmental surveillance data are used to determine dose.

Historical Trend of Cesium-137 Concentration in Deer (pCi/g)

