

# 2014 SRS Environmental Report Overview

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*SRS Citizens Advisory Board Meeting*  
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*SRNS-MS-2015-00213*

# Purpose

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- To fulfill a 2015 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 2014

# Acronyms and Definitions

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- 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 (Continued)

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- **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 (Continued)

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- **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.

# SRS Environmental Report for 2014 Overview

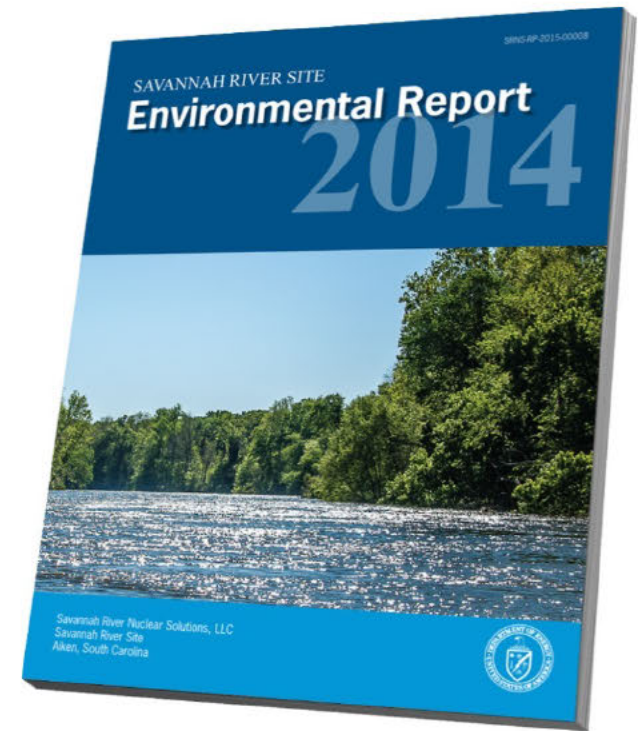
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- Annual Site Environmental Reports (ASERs) are required by U.S. Department of Energy (DOE) Order 231.1B (Environment, Safety, and Health Reporting) to provide the public and stakeholders information on:
  - Environmental program performance
  - Site-wide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



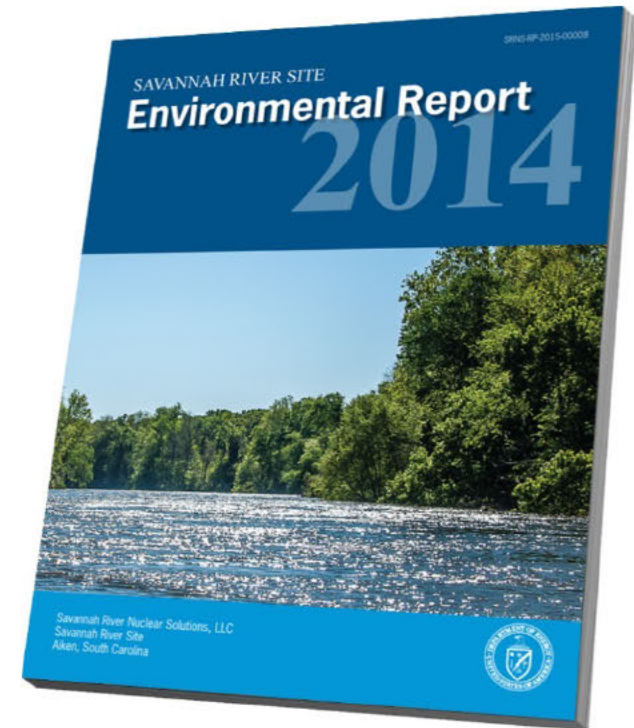
# SRS Environmental Report for 2014 Overview

- **Chapter 1 – Introduction**
  - *Missions and Organization*
- **Chapter 2 – Environmental Management Systems**
  - *Sustainability, pollution prevention and waste minimization*
- **Chapter 3 – Compliance Summary**
  - *Compliance with environmental standards and requirements.*
- **Chapter 4 – Effluent Monitoring**
  - *Provides airborne and liquid emissions results from SRS facilities*
- **Chapter 5 – Environmental Surveillance**
  - *Provides results from the collection and analysis of samples of air, water, soil, foodstuffs, biota, and other media from SRS and its surroundings.*



# SRS Environmental Report for 2014 Overview

- **Chapter 6 – Radiological Dose Assessments**
  - *Provides dose estimates using effluent monitoring and environmental surveillance data*
- **Chapter 7 – Groundwater Management Program**
  - *Describes groundwater monitoring, remediation and conservation*
- **Chapter 8 – Quality Assurance**
  - *Describes programs to ensure that all monitoring and surveillance data accurately represent conditions*
- **Savannah River Site Environmental Report Summary**





# SRS Environmental Program Compliance

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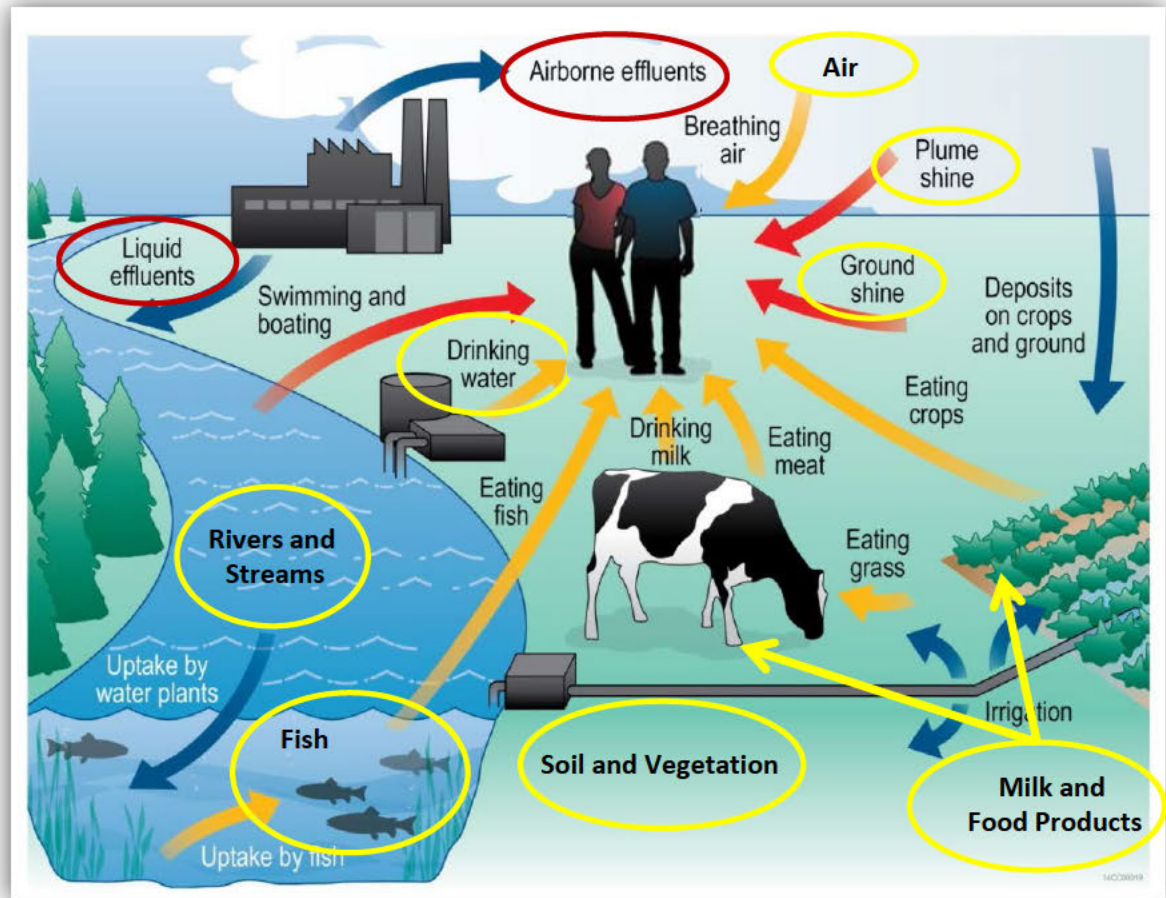
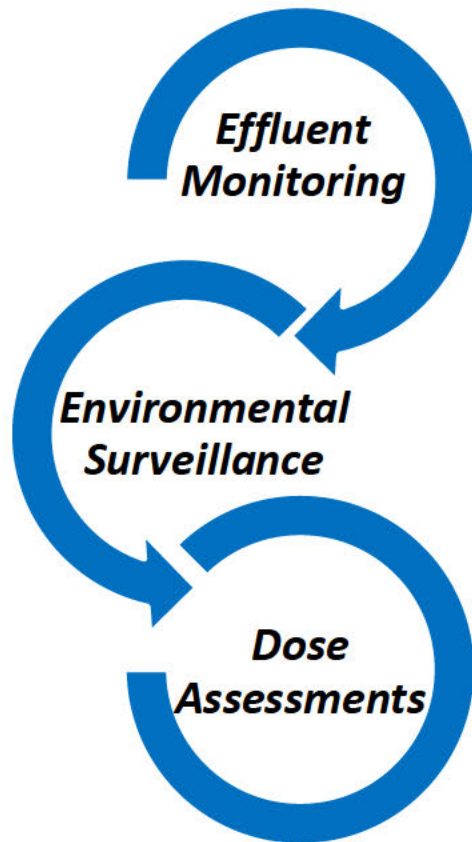
- Environmental program requirements provide specific standards and limits for protection of the public and environment
  - Managed 514 construction and operating permits
  - Laws, regulations and DOE Orders (not all inclusive)
    - *Clean Air Act (National Emissions Standards for Hazardous Air Pollutants)*
    - *Clean Water Act (National Pollutant Discharge Elimination System)*
    - *Safe Drinking Water Act (chemical, radiological, and physical contaminants in drinking water)*
    - *Resource Conservation and Recovery Act (hazardous waste management)*
    - *Comprehensive Environmental Response, Compensation, and Liability Act (cleanup, and emergency response requirements for hazardous substances released to the environment)*
    - *National Environmental Policy Act (requires all branches of government give consideration to the environment prior to undertaking any major federal action that significantly affects the environment)*
- ***SRS did not receive any Notices of Violations in 2014.***

# SRS Environmental Program Compliance

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- DOE Orders
  - *DOE Order 458.1, Radiation Protection of the Public and Environment (radiological monitoring)*
  - *DOE Order 436.1, Departmental Sustainability (implementation of environmental management systems)*
  - *DOE Order 231.1B, Environment, Safety, and Health Reporting*
  - *DOE Order 435.1, Radioactive Waste Management*
- Executive Orders
  - *13423, Strengthening Federal Environmental, Energy, and Transportation Management*
  - *13514, Federal Leadership in Environmental, Energy and Economic Performance*

# Environmental Monitoring



**Yellow Circle - Environmental Surveillance**  
**Red Circle - Effluent Monitoring**



# Non-Radiological Sampling Results

- **Liquid Effluent**

- **NPDES Permit Compliance Status**

- Industrial Wastewater

- *Analyses of 3,200 samples*
      - *SRS received no Notices of Violation from SCDHEC*

- 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 2014*



# Non-Radiological Sampling Results

## — 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 1.46  $\mu\text{g/g}$  in bass*
  - *Review of mercury data shows a decreasing trend by location*
  - *SCDHEC Fish Consumption Advisory*  
<http://www.scdhec.gov/FoodSafety/FishConsumptionAdvisories/AdvisoryMap/>



Field Technician Measures Length of Bass Caught in Savannah River



# Radiological Sampling Results

- Over 21,000 radiological analysis performed annually
  - Liquid Effluent
    - *In 2014, liquid releases remained well below DOE derived concentration standards.*
  - Air Effluent
    - *The offsite dose from all airborne releases remained well below the DOE and EPA annual atmospheric pathway dose standard of 10 mrem.*



# Radiological Sampling Results (Cont.)

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## – 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

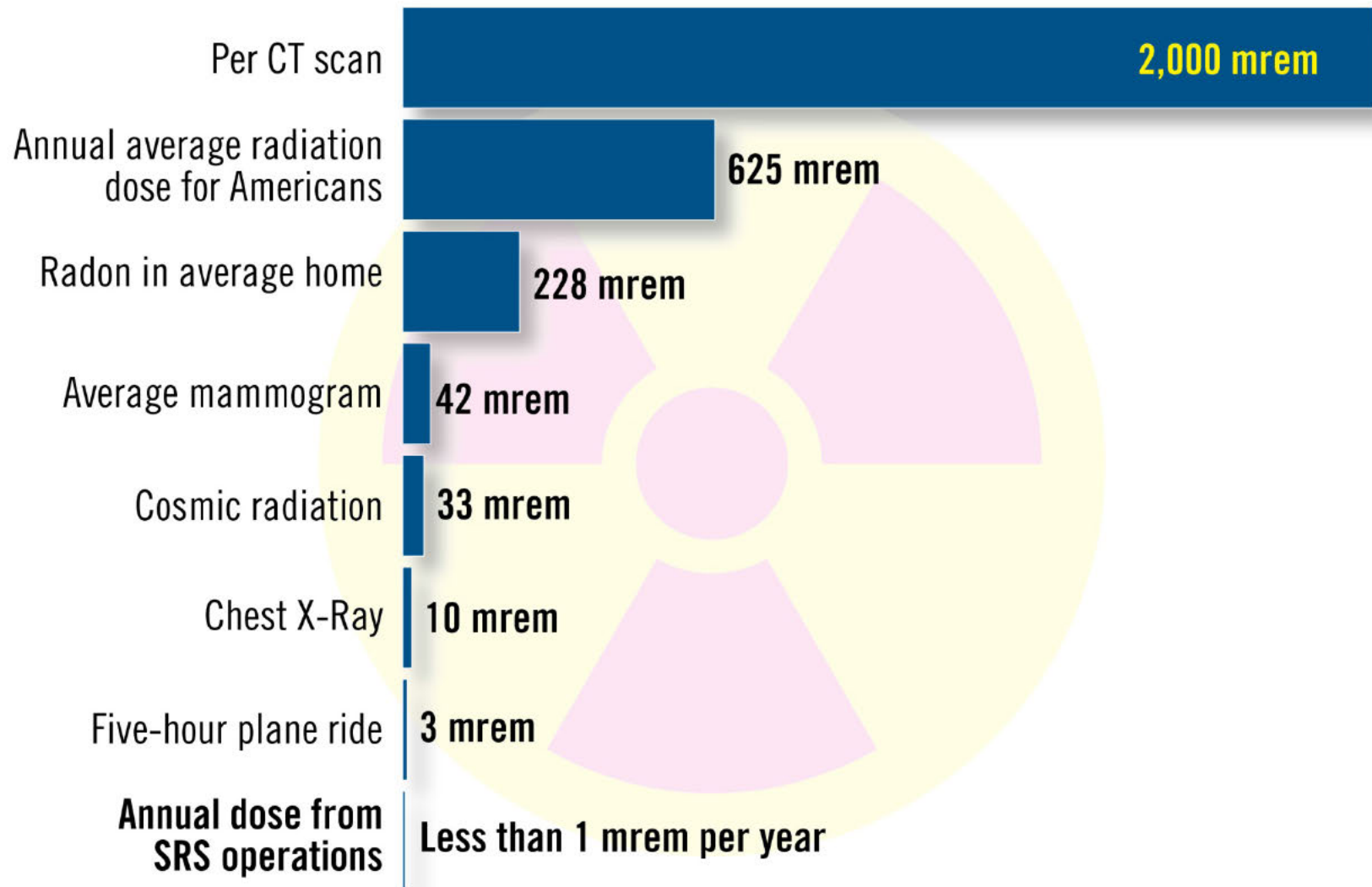
- *Cesium levels for fish in the Savannah River ranged from below detectable levels to 0.159 pCi/g in pan fish*
  - Fish data is used in dose calculations (liquid pathway) as part of the overall dose assessment

# What is a Dose?

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- Effluent monitoring and environmental surveillance data are used to determine 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.

## Impact from Radiation Sources



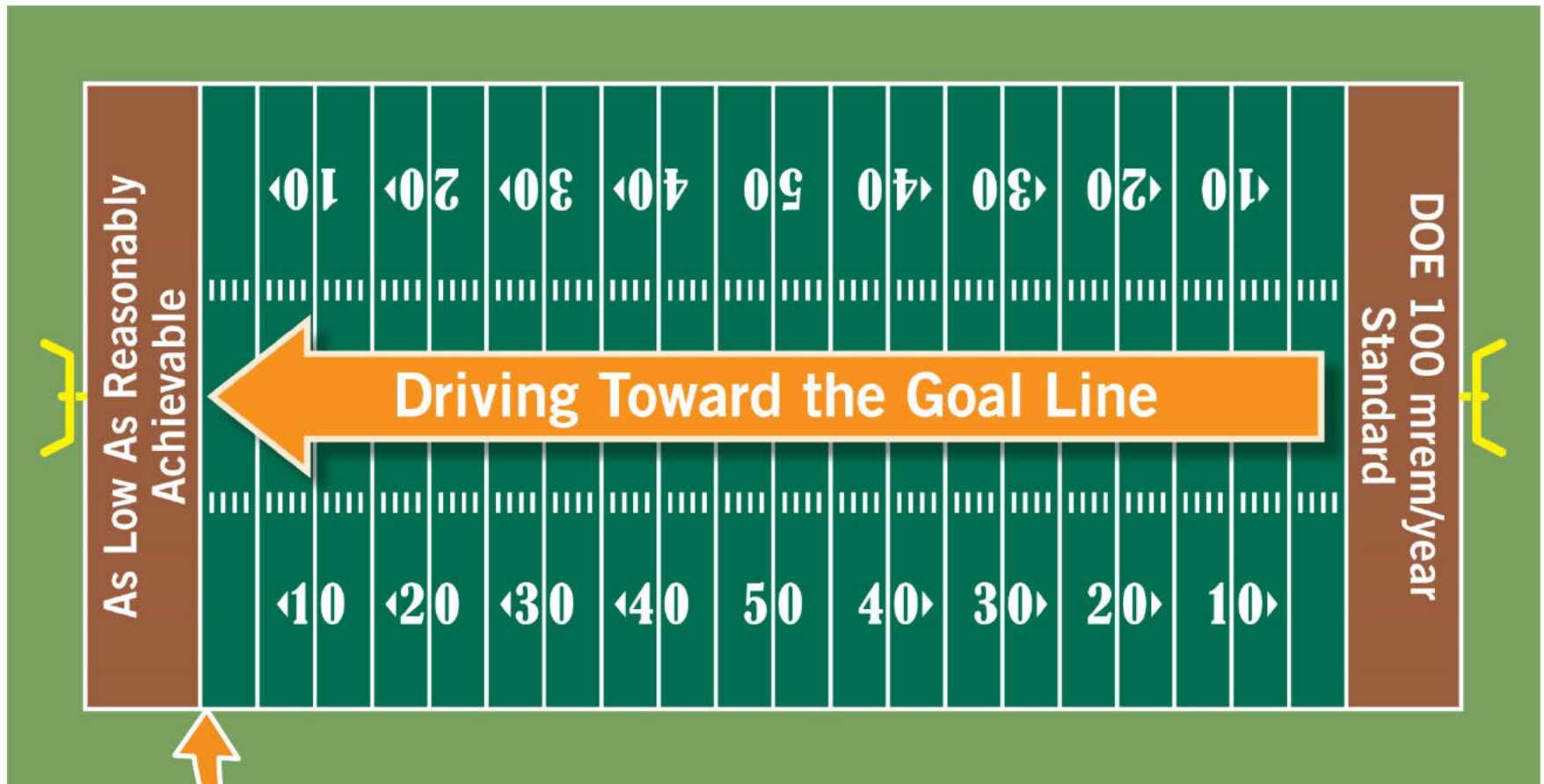
# Dose Assessment Results

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- For 2014, the potential representative person all-pathway dose was 0.16 mrem
  - *0.044 mrem from air pathways*
  - *0.12 from liquid pathways*
    - *Liquid pathway includes irrigation (ingestion of meat, milk and vegetables), fish consumption, and drinking water*
- The all-pathway dose is 0.16% of the 100 mrem/yr DOE dose standard



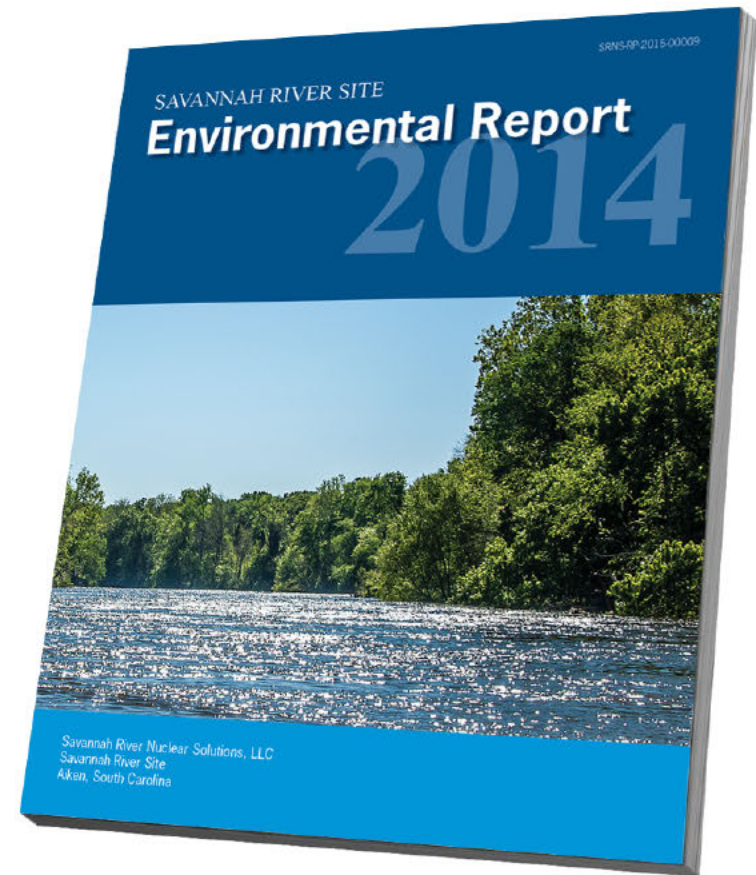
# Dose Assessment Results



***SRS is at the six inch line***

# 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*



# Communication and Outreach

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





# Communication and Outreach

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- **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**
- **Post cards**
  - Environmental Monitoring program participants
  - Area schools and libraries
  - State and Federal elected and regulatory officials
- **Presentations**
  - Full CAB, Environmental Justice and CSRA Radiological Environmental Monitoring Program

# Contact Information

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