2014 SRS Environmental Report Overview

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SRS Citizens Advisory Board Meeting
November 16, 2015

SRNS-MS-2015-00213
Purpose

• 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

- 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
- µg/g = microgram per gram
• **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.
• **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.
• 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

- 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

• 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
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 μg/g in bass
    
    — Review of mercury data shows a decreasing trend by location
    
    — SCDHEC Fish Consumption Advisory
      
      [http://www.scdhec.gov/FoodSafety/FishConsumptionAdvisories/AdvisoryMap/](http://www.scdhec.gov/FoodSafety/FishConsumptionAdvisories/AdvisoryMap/)
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.)

— **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?

• 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

- Per CT scan: 2,000 mrem
- Annual average radiation dose for Americans: 625 mrem
- Radon in average home: 228 mrem
- Average mammogram: 42 mrem
- Cosmic radiation: 33 mrem
- Chest X-Ray: 10 mrem
- Five-hour plane ride: 3 mrem
- Annual dose from SRS operations: Less than 1 mrem per year
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

Driving Toward the Goal Line

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

- **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

• The report is available on the web at:

• To inquire about the report, contact:
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