Chapter 1

Introduction

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THE Savannah River Site (SRS), one of the facilities in the U.S. Department of Energy (DOE) complex, was constructed during the early 1950s to produce basic materials (such as plutonium-239 and tritium) used in nuclear weapons. The site covers approximately 310 square miles in South Carolina and borders the Savannah River.

Mission

SRS's mission is to fulfill its responsibilities safely and securely in the stewardship of the nation's nuclear weapons stockpile, nuclear materials, and the environment. These stewardship areas reflect current and future missions to

- meet the needs of the enduring U.S. nuclear weapons stockpile
- store, treat, and dispose of excess nuclear materials safely and securely
- treat and dispose of legacy wastes from the Cold War and clean up environmental contamination

SRS will continue to improve environmental quality and clean up its legacy waste sites and manage any waste produced from current and future operations. Managing this waste will include working with DOE and the State of South Carolina to ensure that there is a safe and acceptable way to permanently dispose of high-level waste and nuclear materials off site and to find mutually acceptable solutions for disposition of waste.

Site Location, Demographics, and Environment

SRS covers 198,344 acres in Aiken, Allendale, and Barnwell counties of South Carolina. The site is approximately 12 miles south of Aiken, South Carolina, and 15 miles southeast of Augusta, Georgia.

The average population density in the counties surrounding SRS is about 91 people per square mile, with the largest concentration in the Augusta metropolitan area. Based on 2000 U.S. Census Bureau data, the population within a 50-mile radius of the center of SRS is approximately 712,780.

Various industrial, manufacturing, medical, and farming operations are conducted near the site. Several major industrial and manufacturing facilities are located in the area, and a variety of crops is produced on local farms.

Water Resources

SRS is bounded on its southwestern border by the Savannah River for about 35 river miles and is approximately 160 river miles from the Atlantic Ocean.

The Savannah River is used as a drinking water supply source for some residents downriver of SRS. The river also is used for commercial and sport fishing, boating, and other recreational activities. There is no known use of the river for irrigation by farming operations downriver of the site.

Land and Forest Resources

The SRS region is part of the Southern Bottomland Hardwood Swamp region, which extends south from Virginia to Florida and west along the Gulf of Mexico to the Mississippi River drainage basin.

About 200 Carolina bays exist on SRS. These unique wetlands provide important habitat and refuge for many plants and animals.

Animal and Plant Life

Most of SRS has been virtually undisturbed for decades because of its isolation; this has facilitated a healthy, diverse ecosystem. About 260 species of birds, 60 species of reptiles, 40 species of amphibians, 80 species of freshwater fish, and 50 species of mammals exist on site.

Primary Site Activities

Separations

Originally, site facilities generated materials for nuclear weapons. Since the end of the Cold War in 1991, however, their purpose has shifted to the stabilization of nuclear materials from onsite and offsite sources to ensure safe long-term storage or disposal.

Spent Nuclear Fuel

The site's spent nuclear fuel facilities house used fuel elements from reactors, These elements were generated during site reactor operations and also come from offsite sources.

Tritium

SRS tritium facilities recycle the tritium from nuclear weapons reservoirs that have been returned from service. This allows the United States to use its tritium supplies effectively and efficiently.

Waste Management

The site's waste management facilities manage

- the large volumes of radiological and nonradiological waste created by previous operations of the nuclear reactors and their support facilities
- newly generated waste created by ongoing site operations

Although the primary focus is on safely managing the high-level liquid waste, the site also must handle, store, treat, dispose of, and minimize solid waste resulting from past, ongoing, and future operations. Solid waste includes hazardous, low-level, mixed, sanitary, and transuranic wastes.

Environmental Restoration

About 515 waste units have been identified to be addressed through the site's environmental restoration program.

In its environmental restoration efforts, the site removes, stabilizes, contains, or otherwise treats a contaminant so that it will not harm human health or the environment. At its current rate, environmental restoration work at SRS should be completed within a few decades.

Environmental Monitoring

SRS has always been concerned about the safety of the public. The site is committed to protecting human health and reducing the risks associated with past, current, and future operations. Sampling locations, sample media, sampling frequency, and types of analysis are selected based on environmental regulations, exposure pathways, public concerns, and measurement capabilities.

Releases

Releases to the environment of radioactive and nonradioactive materials come from legacy contamination as well as from ongoing site operations. For instance, shallow contaminated groundwater—a legacy—flows slowly toward onsite streams and swamps and into the Savannah River. In ongoing site operations, releases occur during the processing of nuclear materials.

Meeting certain regulations, such as the Safe Drinking Water Act and the Clean Air Act, requires that releases of radioactive materials from site facilities be limited to very small fractions of the amount handled. The site follows a philosophy that emissions (discharges) be kept far below the regulatory standards.

Pathways

The routes that contaminants can follow to get to the environment and then to people are known as exposure pathways. A person potentially can be exposed when he or she breathes the air, eats locally produced foods and milk, drinks water from the Savannah River, eats fish caught from the Savannah River, or uses the Savannah River for recreational activities such as boating, swimming, etc.

One way to learn if contaminants from the site have reached the environment is through environmental monitoring. The site takes thousands of air, water, soil, sediment, food, vegetation, and animal samples each year. The samples are analyzed for potential contaminants released from site operations, and the potential radiation exposure to the public is assessed. Samples are taken at the points where materials are released from the facilities (effluent monitoring) and out in the environment (environmental surveillance).

Research and Development

The Savannah River Technology Center (SRTC), the site's applied research and development laboratory, creates, tests, and implements solutions to SRS's technological challenges. Other environmental research is conducted at SRS by the following organizations:

- *Savannah River Ecology Laboratory (SREL)* – More information can be obtained by contacting SREL at 803–725–2473 or by viewing the laboratory's website at http://www.uga.edu/srel. Also, SREL's technical progress report for 2002 is included on the CD housed inside the back cover of this document.
- U*.S. Department of Agriculture Forest Service–Savannah River (USFS–SR)* – More information can be obtained by contacting USFS–SR at 803–725–0006 or 803–725–0237 or by viewing the USFS–SR website at http://www.srs.gov/general/enviro/srfs.htm. Also,

USFS–SR's 2002 report is included on the CD housed inside the back cover of this document.

- *Savannah River Archaeological Research Program (SRARP)* – More information can be obtained by contacting SRARP at 803–725–3623.