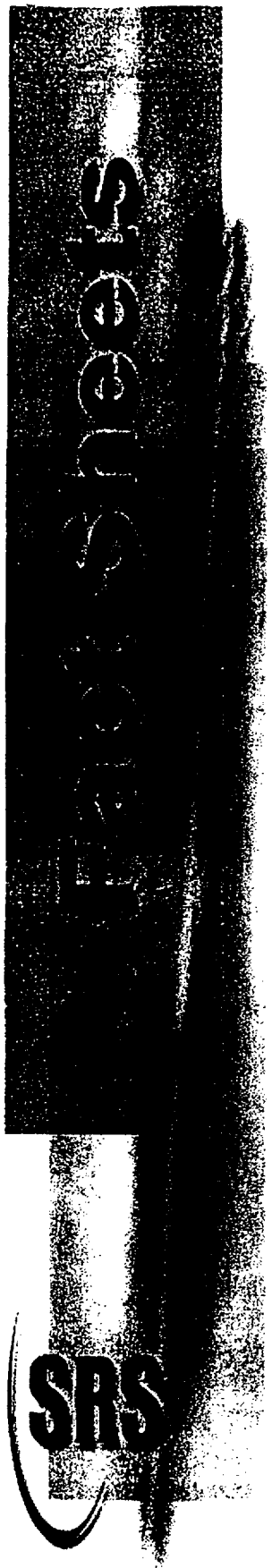

Savannah River Site

The Savannah River Site (SRS) is a key Department of Energy industrial complex dedicated to the stewardship of the environment, the enduring nuclear weapons stockpile and nuclear materials. More specifically, the SRS processes and stores nuclear materials in support of the national defense and U.S. nuclear non-proliferation efforts. The site also develops and deploys technologies to improve the environment and treat nuclear and hazardous wastes left from the Cold War.

The SRS complex covers 198,344 acres, or 310 square miles encompassing parts of Aiken, Barnwell and Allendale counties in South Carolina, bordering the Savannah River.

The site is owned by DOE and operated by an integrated team led by Westinghouse Savannah River Company (WSRC). Under the contract that went into effect Oct. 1, 1996, and was recently extended with modifications until 2006, WSRC is responsible for the site's nuclear facility operations; Savannah River Technology Center; environment, safety, health and quality assurance; and all of the site's administrative functions. The team also includes Bechtel Savannah River Inc. (parent company: Bechtel National Inc.), which is responsible for environmental restoration, project management, engineering and construction activities; BWXT Savannah River Company (parent company: BWX Technologies), which is responsible for facility decontamination and decommissioning; and British Nuclear Fuels, Limited (BNFL) Savannah River Corporation (parent company: BNFL Inc.), which is responsible for the site's solid waste program.

Savannah River Site Focus

The Savannah River Site is committed to our people, missions and the future. SRS has a long track record of being the safest site in the DOE complex and one of the safest major industrial sites in the world. Protecting workers, the public, the environment, and national security interests is our highest goal. SRS will continue to maintain needed facilities and infrastructure while training and retaining a skilled and motivated workforce to insure our technical capability and performance. The SRS team has made commitments to its regulatory organizations, to the two states of the Central Savannah River Area, and to the community. Recognizing the imperative of open communication and trust, SRS will strive to accomplish regulatory milestones and community-driven obligations among the site's various neighbors and stakeholders. We also focus on cost effectiveness in contract and project management and a cross-cutting corporate perspective that will best serve SRS, other Department of Energy sites and national labs, and the U.S. Government.

SRS Business Approach

SRS is positioned for continued success by our commitment to a business approach focused on four cornerstones of success: safety and technical excellence, a DOE mission-supportive infrastructure, cost effectiveness and community support.

While the changing world has caused a downsizing of the site's original defense mission, the future of SRS lies in several areas: reducing the nuclear danger, transferring applied environmental technology to government and non-government entities, cleaning up the site and managing the waste SRS has produced, and forming economic and industrial alliances.

History

During the early 1950s SRS began to produce materials used in nuclear weapons, primarily tritium and plutonium-239. Five reactors were built to produce nuclear materials. Also built were support facilities including two chemical separations plants, a heavy water extraction plant, a nuclear fuel and target fabrication facility, a tritium extraction facility and waste management facilities.

Irradiated materials were moved from the reactors to one of the two chemical separations plants. In these facilities, known as "canyons," the irradiated fuel and target assemblies were chemically processed to separate useful products from waste. After refinement, nuclear materials were shipped to other DOE sites for final application. SRS produced about 36 metric tons of plutonium from 1953 to 1988.

New Missions

SRS is one of the primary DOE sites with missions to address issues of national security and non-proliferation, including legacy material disposition.

SRS has been designated to continue as DOE's center for the supply of tritium to the enduring nuclear weapons stockpile. DOE has announced that its primary new source of tritium will be an existing commercial reactor in the Tennessee Valley Authority system. Tritium extraction from targets and loading into containers for shipment to the Defense Department will continue to be a site mission.

SRS has been selected to "blend down" highly enriched uranium irradiated and unirradiated fuel to low-enriched uranium that can be converted to commercial reactor fuel in a privatized venture.

Plutonium stabilization now being conducted at SRS will be expanded to include materials from dismantled weapons and surpluses from other DOE sites. In early January 2000, the Secretary of Energy announced that SRS was to be the location for the Department's plutonium pit disassembly and conversion, mixed oxide fuel fabrication and plutonium immobilization facilities. These missions establish SRS's vital role in plutonium management for DOE. The actual state of any of these projects will depend on subsequent administration and congressional decisions.

On-Going Missions

Tritium

Tritium, with a half-life of 12.5 years, must be replenished, and SRS is the nation's only facility for recycling and reloading tritium from nuclear weapons reservoirs returned from service. Recycling tritium allows the United States to stretch its tritium supplies.

All tritium unloading, mixing and loading is performed in a facility that went into operation in 1994. It replaces older facilities that processed the nation's tritium for 35 years. A new tritium extraction facility is being built to extract tritium created in the Tennessee Valley Authority's light-water reactors.

Spent Fuel

Spent nuclear fuel currently stored at SRS is from the site's production reactors, and from domestic and foreign research reactor programs. All of this fuel is stored in water-filled concrete storage basins, which were intended originally for interim storage while spent fuel awaited processing in a chemical separations facility.

Until 1988, it was routine for foreign researchers to return U.S.-origin spent fuel to this country. At the urging of the U.S. Department of State and the International Atomic Energy Agency, DOE renewed that policy in 1996. The first shipment of foreign-research-reactor, spent nuclear fuel under the renewed policy arrived at SRS that September.

For three decades, the SRS Receiving Basin for Offsite Fuels (RBOF) has provided safe receipt and interim storage of this fuel. Plans are under way to deinventory RBOF, transferring spent fuel to SRS's L Area Disassembly Basin, a much larger, water-filled, reinforced-concrete facility. The basin was modified and received its first shipment of foreign spent fuel in January 1997. Spent fuel from SRS operations is also stored in the similar K Area Disassembly Basin. In addition, studies are underway to find alternative technologies, such as dry cask storage, for the spent fuel.

Canyon Operations

SRS has its two primary separations facilities — called canyons — located in F and H areas. F Canyon and H Canyon — together with the FB Line and HB Line, which are located atop the canyons — are where nuclear materials historically have been chemically recovered and purified.

HB Line has produced plutonium-238 for NASA. In 1995, SRS completed a five-year campaign to supply plutonium-238 for NASA's Cassini mission, an unmanned expedition to the planet Saturn, which was launched October 13, 1997.

Currently, both canyons continue to stabilize and manage most of the remaining inventory of plutonium-bearing materials at SRS. F Canyon is scheduled to operate until about 2002 to stabilize SRS materials. In addition, in July 1996, DOE determined that H Canyon, scheduled to operate until 2006, should be used to convert a large quantity of weapons-usable HEU to low-enriched material. No longer weapons-usable, the material will be suitable as fuel in commercial power reactors.

Waste Management

Weapons material production produced unusable byproducts, such as radioactive waste. About 38 million gallons of high-level radioactive liquid waste are stored in tanks. (Savannah River High-Level Waste Systems Plan, Rev. 12.)

The Defense Waste Processing Facility (DWPF) is processing the highly radioactive waste, bonding radioactive elements in borosilicate glass, a stable storage form. DWPF began operations in March 1996.

Much of the volume in the tanks ultimately will be separated as relatively low-level radioactive salt solution, which is mixed with cement, ash, and furnace slag and poured into permanent concrete monoliths for disposal at a facility called Saltstone.

In addition to high-level waste, other radioactive wastes at the site are: low-level solid and liquid waste; and transuranic waste, which contains alpha-emitting heavy isotopes that have decay rates and concentrations exceeding specified levels. Other wastes include hazardous waste, which is any toxic, corrosive, reactive or ignitable material that could affect human health or the environment; mixed waste, which contains both hazardous and radioactive components; and sanitary waste, which, like ordinary municipal waste, is neither radioactive nor hazardous.

The site's solid, low-level radioactive waste includes items such as protective clothing, tools and equipment that have become contaminated with small amounts of radioactive material. In October 1994, SRS opened engineered concrete vaults for permanent disposal of solid low-level waste. The nation's first state-of-the-art waste vaults, they provide significantly better isolation from the environment than previous in-ground disposal methods for all but the lowest-activity wastes.

Waste that contains transuranic (TRU) nuclides (radioactive elements with an atomic number greater than uranium-92) is stored temporarily at SRS. The site has developed characterization and treatment capabilities to support shipment of TRU waste to the Waste Isolation Pilot Plant in New Mexico. Those shipments began in 2001. Hazardous wastes and mixed wastes are being stored on site in Resource Conservation and Recovery Act-permitted facilities until the appropriate treatment facilities are operational.

Environmental Restoration

In 1981, SRS began inventorying waste units. There are now 515 inactive waste and groundwater units included in the environmental restoration program. Waste sites range in size from a few feet to tens of acres and include basins, pits, piles, burial grounds, landfills, tanks and associated groundwater contamination. Remediation of the waste sites is regulated under the Resource Conservation and Recovery Act and the Comprehensive Environmental Response, Compensation, and Liability Act.

So far, 340 of 500 contaminated acres have been remediated. Also, more than four billion gallons of groundwater have been treated, with about one million pounds of solvents removed. Even though the site has had success, this cleanup process is expected to take decades.

SRS seeks public participation in prioritizing the Environmental Management program. One way this is accomplished is through the SRS Citizens Advisory Board (CAB), formed in February 1994. This group of 25 individuals with diverse viewpoints provides advice to DOE, the U.S. Environmental Protection Agency and the South Carolina Department of Health and Environmental Control.

Research and Development

The Savannah River Technology Center – the site's applied research and development laboratory – creates, tests and deploys solutions to the site's technological challenges. SRTC researchers have made significant advances in glass technology, hydrogen technology, nonproliferation technology, environmental characterization and cleanup, sensors and probes, and other fields.

The laboratory's 750-person staff includes several internationally recognized experts; one-fourth of the research staff holds Ph.D's. SRTC's unique facilities include biotechnology laboratories, laboratories for the safe study and handling of radioactive materials, a field demonstration site for testing and evaluating environmental cleanup technologies and laboratories for ultra-sensitive measurement and analysis of radioactive materials.

Today, while the laboratory continues to solve the site's technological challenges, half of its work now comes from non-SRS customers, including DOE-Headquarters, other DOE sites and other federal agencies. The laboratory's largest work-for-others contract to date is a $31 million, multi-year contract to demonstrate and evaluate the processes that will be used at the Hanford Site to treat and dispose of the waste in Hanford's waste tanks.

Economic Development

Because of the increased emphasis on sharing the site's expertise with the nation that, for more than four decades, has invested in its work, SRTC now forms strategic partnerships with private industry, academia and other government agencies to apply the laboratory's unique expertise to challenges of mutual interest. For example, SRTC, working with a broad-based consortium, applied its extensive hydrogen expertise to the development of a hydrogen-fueled bus that became part of the City of Augusta's public transit fleet before being shipped to another DOE site for further development.

The laboratory also shares its expertise by licensing private companies to manufacture and/or market technologies created at SRTC, a move that helps American businesses sharpen their competitive edge and provides taxpayers a second return on their investment.

Environment

Originally farmland, SRS now encompasses a timber and forestry research center managed by the U.S. Forest Service. The site also houses the Savannah River Ecology Laboratory, an environmental research center operated for DOE by the University of Georgia.

In 1972, DOE's predecessor agency, the Atomic Energy Commission, designated SRS as the first National Environmental Research Park. The site is home to the bald eagle and the red-cockaded woodpecker, an endangered species. Other endangered species, including the shortnose sturgeon, peregrine falcon and wood stork, visit the site from time to time. Other wildlife commonly found on the site includes alligators, whitetailed deer, wild turkeys and otters.

Employment

Today, about 13,800 people are employed at SRS, making it one of the largest employers in South Carolina. About 89 percent are employees of WSRC and its major subcontractors. DOE employees represent about 3.5 percent of the SRS population. The rest are other Westinghouse subcontractors and DOE contractors; the site's security contractor, Wackenhut Services Inc.; Savannah River Ecology Laboratory; and U.S. Forest Service.

Economic Impact

The site's economic impact ripples across a two-state area. Currently, the site's overall budget is about $1.3 billion. Of that, nearly $1 billion is payroll and employee benefits. In Fiscal Year 2001, which ended Sept. 30, 2001, the site purchased about $254.6 million in goods and services in South Carolina and Georgia combined. Of that, about $162.5 million was spent in the local area.