



Surplus Plutonium Disposition Supplemental Environmental Impact Statement (SPD Supplemental EIS)



Plutonium Disposition at SRS

Savannah River Site

- 198,344 acres, or 310 square miles
- SRS workforce: ~11,000
- Annual budget: ~\$2 billion

The Savannah River Site (SRS) is a key U.S. Department of Energy (DOE) industrial complex responsible for environmental stewardship, environmental cleanup, waste management, and the disposition of nuclear materials. More specifically, SRS processes and stores nuclear materials in support of national defense and U.S. nuclear nonproliferation efforts. The site also develops and deploys technologies to improve the environment and treat nuclear and hazardous wastes resulting from the Cold War.

SRS has a long track record of being one of the safest major industrial sites in the world. Protecting workers,

the public, the environment, and national security interests are its highest priorities.

The site's economic impact ripples across a two-state area at a rate of about \$2.6 billion each year. Currently, SRS's overall budget is about \$2 billion. Of that, roughly 70 percent comprises payroll and employee benefits. The site spends about \$200 million each year in procurements in South Carolina and Georgia.

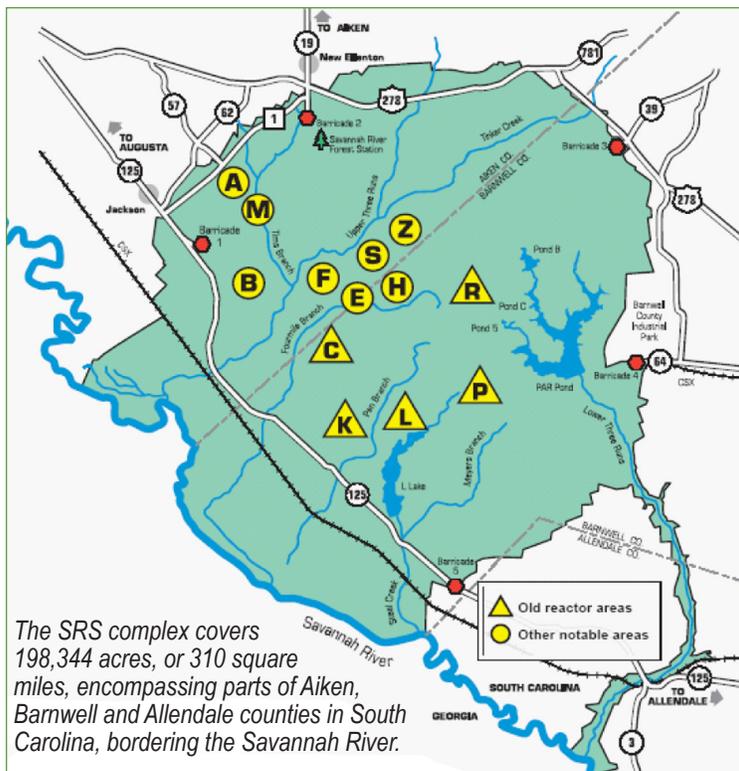
Mixed Oxide Fuel Fabrication Facility

DOE has chosen SRS to be the location for its plutonium pit disassembly and conversion operations and Mixed Oxide Fuel Fabrication Facility (MFFF). These missions, which convert excess weapons-usable plutonium into a form that can be used in commercial power reactors, establish SRS's vital role in plutonium management for DOE.

MFFF will take surplus weapon-grade plutonium, remove impurities, and mix it with uranium oxide to form mixed oxide (MOX) fuel pellets for reactor fuel assemblies. These assemblies will be irradiated in commercial nuclear power reactors.

The design of the facility is based on AREVA's MELOX and La Hague MOX facilities in France. The French have used MOX technology for over two decades and currently supply MOX fuel to over 30 reactors worldwide.

The facility is being built in F Area in the center of SRS. The facility consists of two major sections. Plutonium is cleaned and purified in the five-level aqueous polishing portion of the building. The MOX area consists of three levels. This is where the fabrication of the fuel takes place, from formation of the pellets to assembly of the MOX fuel rods.



Savannah River Site

The U.S. Nuclear Regulatory Commission is overseeing construction of the facility. It will be a hardened facility, similar to a nuclear reactor. A Perimeter Intrusion Detection and Assessment System will encircle the facility for additional protection.



Construction of the Mixed Oxide Fuel Fabrication Facility

When operational, the facility will be capable of turning 3.5 metric tons of weapon-grade plutonium into MOX fuel assemblies annually. The facility will be licensed for 20 years, with operations expected to continue into the 2030s.

On August 1, 2007, construction of MFFF began; the facility will be operated by Shaw AREVA MOX Services. In 2009, construction of the Waste Solidification Building began; this facility will treat liquid waste generated from operations of the Pit Disassembly and Conversion Facility (PDCF) and MFFF. PDCF, which will disassemble pits from nuclear weapons and convert the plutonium to a form usable in MFFF, is still in the design phase. It may not be constructed as a standalone facility, pending engineering and planning studies and evaluation of environmental impacts in this *Surplus Plutonium Disposition Supplemental Environmental Impact Statement*.

Pit Disassembly and Conversion Facility

Pit Disassembly and Conversion (PDC) is a first-of-a-kind capability that will disassemble surplus nuclear weapon pits for material recycle and disposition. PDC will recover the plutonium metal and convert it into a plutonium oxide powder. The plutonium oxide powder will be sent to MFFF, where it will be blended with depleted uranium oxide and manufactured into MOX fuel.

The PDCF was originally conceived as a complex of facilities consisting of a main hardened building that would contain the pit disassembly plutonium processes and a number of conventional buildings and structures that would contain personnel, systems, and equipment.

DOE is considering an alternative to the construction of a new PDCF that would install the PDC capability in the K Area Complex (KAC) at SRS in lieu of constructing a new facility. Under this alternative, the PDC Project would be combined with DOE's Office of Environmental Management's Plutonium Preparation Project to eliminate duplicate capabilities and equipment required for the two projects.

H Canyon/HB Line

SRS's chemical separations facility, called H Canyon – together with HB Line, which is located atop the canyon – are where nuclear materials historically have been chemically recovered and purified.



H Canyon / HB Line

H Canyon and HB Line are supporting the DOE Highly Enriched Uranium Blend Down Program and Plutonium Disposition Program. SRS has “blended down” weapons-usable highly enriched uranium to make low enriched uranium, which is being converted to commercial reactor fuel for use by the Tennessee Valley Authority. This material is now providing electricity for homes throughout the Southeast.

H Canyon and HB Line continue to disposition plutonium-bearing materials at SRS that are not suitable for MFFF. The plutonium-bearing materials are transferred to storage tanks and then to the Defense Waste Processing Facility (DWPF) for final processing into forms not suitable for weapons use.



Defense Waste Processing Facility

Defense Waste Processing Facility

Nuclear material production produced unusable byproducts, such as radioactive waste. About 36 million gallons of radioactive liquid waste are stored in 49 underground tanks.

DWPF is processing the high-activity waste, bonding radioactive elements in borosilicate glass, a stable storage form. Since DWPF began operations in March 1996, more than 10 million pounds of radioactive glass have been produced and poured into stainless steel canisters. Filled canisters are stored in the Glass Waste Storage Buildings.



Glass Waste Storage Building

K Area Complex

Operations at SRS’s KAC provide an interim safe storage location for much of DOE’s excess plutonium. This makes SRS the Nation’s cornerstone of excess plutonium management and disposition.



K Area Complex

Over the last several years, DOE has been seeking viable alternatives to properly secure and disposition the Nation’s special nuclear material. SRS assisted DOE in saving millions of taxpayer dollars through the safe receipt and storage of the excess plutonium from the Rocky Flats Environmental Technology Site in Colorado and Hanford Site in Washington. Today, KAC is receiving shipments of excess plutonium from Lawrence Livermore National Laboratory and Los Alamos National Laboratory.

KAC is the designated safe storage facility for plutonium at SRS. The principal operations building formerly housed K Reactor, which produced nuclear materials to support the United States during the Cold War for nearly four decades. It was DOE's last operating production reactor, shutting down for the last time in 1992. In recent years, significant security upgrades and plutonium surveillance capabilities have been implemented in KAC to ensure the continued safe storage of special nuclear material until final disposition is achieved.

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