Proposed Plutonium Pit Production at SRS

Plutonium pits are critical components of every nuclear weapon; nearly all pits in the current U.S. stockpile were produced from 1978 to 1989. Today, the United States’ capability to produce plutonium pits is limited. Under Federal law and to meet national security requirements, the National Nuclear Security Administration (NNSA) must implement a strategy to provide the enduring capability and capacity to produce not less than 80 war reserve plutonium pits per year during 2030.

NNSA analyzed multiple alternatives before proposing a two-pronged approach to meet this need: having a capability of 50 pits per year at the Savannah River Site (SRS) during 2030 and a capability of 30 pits per year at Los Alamos National Laboratory (LANL) during 2026. This approach would provide an effective, responsive, and resilient nuclear weapons infrastructure with the flexibility to adapt to shifting requirements and counter future threats.

Two-Site Strategy

Studies of NNSA's approach show that having two geographically separated plutonium pit production facilities supports resilience from external threats and hazards, and provides NNSA with the flexibility and resilience to mitigate shutdowns, incidents, or other impacts to operations at a given site. Diversifying this work across LANL and SRS would provide both long-term resiliency as well as lower short-term risk for producing no fewer than 80 pits per year during 2030.

Proposed Savannah River Plutonium Processing Facility (SRPPF)

SRS would achieve its part of this objective by re-purposing the unfinished Mixed Oxide (MOX) Fuel Fabrication Facility (MFFF) as the proposed Savannah River Plutonium Processing Facility (SRPPF). Repurposing this unfinished facility would allow NNSA to make use of an existing seismically-qualified structure, with numerous supporting facilities, including office, assembly, and fabrication space; construction facilities; and existing SRS services and infrastructure, such as security, fire protection, and emergency response.
Structure
The structure was designed to high safety and security standards, with exterior walls and roofs designed and constructed to resist all credible manmade and natural phenomena hazards. Standing approximately 73 feet tall, the facility contains three floors and more than 400,000 square feet of available Hazard Category-2 space, which would meet the pit production requirements. Interior walls are reinforced concrete to provide personnel shielding and durability for the 50-year facility design life.

Repurposing the MFFF would require internal modifications and installation of manufacturing and support equipment directly associated with the pit production mission. Preparations at SRS would also include removing some existing facilities, along with adding some new support facilities and modifying some existing ones.

Critical Decision Path
With the 2018 announcement of the proposed two-site approach, engineers at SRS began working on a conceptual design for the proposed SRPPF.

In order to initiate the conceptual design and meet the schedule for having a capability of 50 pits per year during 2030, Savannah River Nuclear Solutions (SRNS), the management and operating contractor for SRS, has assembled a project team that includes staff from multiple National Laboratories and two external engineering firms. Working closely with LANL, this team is developing a concept built on plutonium pit production technologies that have been improved and developed over the past three decades.

The resulting SRPPF process would make use of SRS’ core competencies in operations, safety, and security. The team members’ roles in the conceptual design of the proposed SRPPF include:

• SRNS is responsible for the overall project management, design integration, design authority, nuclear safety, and criticality safety.
• Fluor Corporation is designing the balance-of-plant systems for the production process, such as electrical, plumbing, and ventilation.
• Merrick and Company, an external firm that has assisted LANL with the design of their plutonium confinement systems (gloveboxes), is providing the same service for the proposed SRPPF.
• The Physical Security Center of Excellence (PSCOE) at Sandia National Labs is designing the Perimeter Intrusion Detection and Assessment System (PIDAS).
The resulting conceptual design, along with the planned cost range, schedule and other important factors, will make up the package of information NNSA uses for Critical Decision-1 (CD-1), the determination whether to proceed with the proposed SRPPF. That decision is expected in 2021. If CD-1 is approved, the project would formally launch the proposed SRPPF into preliminary design, followed by further critical decisions related to detailed design and construction.

Plutonium Pit Production Process
The process to produce pits at SRPPF would begin with the receipt of specific plutonium reserves held by the NNSA. The plutonium would be prepared by removing impurities that have accumulated through radioactive decay. The plutonium metal would then be formed into shells and machined to final dimensions. The shells would be assembled into the final pit, inspected, and accepted by NNSA.

Upon reaching steady-state operations, it is expected that the proposed SRPPF would require more than 1,800 personnel. This would include highly-skilled personnel to perform machining, welding, and testing of plutonium metal parts. As part of current operations, SRS is working with local colleges and technical schools to expand training programs. The SRPPF conceptual design includes an on-site Training and Operations Center (TOC) to support the project and accelerate the workforce development pipeline. The proposed TOC would provide workers with hands-on experience with non-radioactive materials while facility construction work continues.

Record of Decision
The proposed SRPPF is subject to the National Environmental Policy Act (NEPA), which requires that potential environmental impacts be considered before a government agency decides to undertake an action. That evaluation was completed for the proposed SRPPF in November 2020, with the publication of the Record of Decision announcing NNSA’s decision to implement the Proposed Action to repurpose the MFFF to produce war reserve pits.

The evaluation process included a public comment period in 2019 to guide the drafting of a detailed Environmental Impact Statement (EIS), followed by another public comment period after the Draft EIS was published in April 2020. Following consideration of the comments received, and the resulting changes to the Draft EIS, the Final EIS was published in October 2020, and formed the basis for the Record of Decision.
The Savannah River Site is owned by the U.S. Department of Energy. Savannah River Nuclear Solutions is the management and operations contractor at the Savannah River Site. Savannah River Remediation is the current liquid waste contractor at the Savannah River Site.

Acronyms appearing in this fact sheet

- U.S.: United States
- NNSA: National Nuclear Security Administration
- SRS: Savannah River site
- LANL: Los Alamos National Laboratory
- MOX: Mixed Oxide
- MFFF: Fuel Fabrication Facility
- SRPPF: Savannah River Plutonium Processing Facility
- PSCOE: Physical Security Center of Excellence
- PIDAS: Perimeter Intrusion Detection and Assessment System
- TOC: Training and Operations Center
- NEPA: National Environmental Policy Act
- EIS: Environmental Impact Statement
- WR: War Reserve