Amended Record of Decision

Spent Nuclear Fuel Management, Recovery of Uranium and Production of High Assay Low Enriched Uranium (HALEU) in the H-Canyon Facility, at the Savannah River Site (DOE/EIS-0279)

United States Department of Energy

Office of Environmental Management

PUBLIC AVAILABILITY AND CONTACT INFORMATION:

- This Amended Record of Decision (AROD) and the associated National Environmental Policy Act (NEPA) Documents are available at: www.energy.gov/nepa and www.srs.gov/general/pubs/envbul/nepa1.htm.

For further information on this project or the AROD, contact:

- Mr. Jeffrey Bentley
  NEPA Document Manager
  Savannah River Operations Office
  U.S. Department of Energy
  P.O. Box B
  Aiken, South Carolina 29802
  email: jeffrey.bentley@srs.gov

For further information on the Department of Energy (DOE) – Office of Environmental Management (EM) NEPA process, contact:

- Bill Ostrum
  NEPA Compliance Officer
  Office of Environmental Management
  1000 Independence Ave, SW
  Washington, DC 20585
  Email: william.ostrum@hq.doe.gov

DECISION: The U.S. DOE is amending its August 7, 2000, Record of Decision (ROD) (65 FR 48224) to the *Savannah River Site (SRS) Spent Nuclear Fuel (SNF) Management Final Environmental Impact Statement* (DOE/EIS-0279, SRS SNF EIS). DOE is also rescinding its April 8, 2022, Amended ROD (AROD) (87 FR 23504) that implemented the Accelerated Basin De-inventory (ABD) program, discussed in **Background**, below. Instead, DOE will revert

H-Canyon Operations to include uranium recovery, as described in the Preferred Alternative of the SRS SNF Environmental Impact Statement (EIS) and ROD selecting the Preferred Alternative, with minor changes and their impacts discussed in **Differences** below. DOE will process approximately 16.2 metric tons heavy metal (MTHM) aluminum-clad spent nuclear fuel (ASNF) in H-Canyon. This would be below the 29.2 MTHM SNF analyzed under the Supplement Analysis (SA) for ABD Mission for H-Canyon (DOE/EIS-0279-SA-07, ABD SA), and, when added to the 25.9 MTHM already processed in H Canyon, below the 47.7 MTHM analyzed in the SRS SNF EIS. The remaining 13 MTHM SNF would remain in wet storage pending a future processing decision. Processing would begin around 2028 and continue for approximately 13 years with an average processing rate of 1.25 MTHM SNF per year. H-Canyon will recover highly enriched uranium from SNF stored at SRS and down blend it to high-assay low-enriched uranium (HALEU) to fuel advanced nuclear reactors, supporting America's energy independence.

The SNF stored in L-Basin will be transported in a cask on a rail car to H-Canyon. Inside the airlock doors to the hot canyon, the SNF will be unloaded and placed in lag storage to await processing or be fed into the top of a dissolver tank. The SNF will be dissolved in hot nitric acid, producing a solution of uranium, fission products, aluminum, and small amounts of transuranic materials, such as neptunium and plutonium.

Head-end processing would be used, including two clarification steps to remove undesirable contaminants that could impede the subsequent solvent extraction process. First, Gelatin is added to precipitate silica and other impurities. The clarified solution is then adjusted with nitric acid and water in preparation for the first-cycle solvent extraction. The waste stream

generated from the head-end process is chemically neutralized and sent to the liquid waste (LW) system.

The first-cycle solvent extraction in the hot canyon removes the fission products and other impurities and then separates the uranium from the other actinides. The first-cycle solution, containing purified uranyl nitrate, could be stored temporarily in a holding tank in H-Canyon facilities or sent to second cycle prior to being down-blended. If necessary, a second-cycle solvent extraction is used to further purify the uranium solution. The solvent is recovered for reuse, the acid solution containing the fission products are neutralized and transferred to the storage tanks, and the uranium in a uranyl nitrate solution is transferred to H-Area tanks to be down-blended to less than 20-percent uranium-235. This down-blended HALEU will be stored at the H-Canyon facility until ready for transfer to an advanced reactor fuel fabricator, instead of Tennessee Valley Authority (TVA) as described in the SRS SNF EIS and 2013 AROD. Transfer will include approximately 12 shipments per year for approximately 13 years starting as early as 2029.

DIFFERENCES FROM PROPOSED ACTION AND ENVIRONMENTAL IMPACTS IN 2000 EIS/ROD

Since this action closely parallels the analysis conducted in the SRS SNF EIS, the majority of impacts are expected to be comparable to or encompassed by those detailed in the SRS SNF EIS. However, some minor changes to the process will occur.

- Down-blend to less than 20 percent uranium-235 (HALEU) instead of less than 4.95 percent uranium-235 (Low Enriched Uranium (LEU)).

- Transportation of HALEU to an advanced reactor fuel fabricator instead of LEU to TVA. For analytical purposes, DOE assumes shipment from SRS to the BWXT facility in Virginia, as described in the 2025 Highly Enriched Uranium Blend Down to High-Assay Low-Enriched Uranium at SRS (DOE/EIS-0240-SA-02 and DOE/EIS-0279-SA-08, 2025 HALEU SA) and Amended ROD (90 FR 25292).
- Fissile Loading: Under the Current Action, the fissile material concentration in the vitrified glass was increased to be as much as 9,644 grams per cubic meter (g/m^3), more than the 2,500 g/m^3 analyzed in the ABD SA and 897 g/m^3 stated in the SRS SNF EIS, and analyzed in the Sandia National Laboratories report, SAND2025-02559R, "Results of Re-evaluation of FEPs Related to Higher Fissile Content in HLW Glass at SRS". The current fissile loading limit will remain unchanged in the Proposed Action.

There would be no construction and no land disturbance under the Proposed Action. Operational impacts such as water effluents, air emissions, noise, and employment would be bound by or like those described in the SRS SNF EIS. Impacts to geology, water resources, air resources, ecological resources, socioeconomics, cultural resources, and utilities would be similar to those analyzed in the SRS SNF EIS. This includes a reduction in electricity use compared to the SRS ABD SA due to the fact that the electrolytic dissolver would be used only sparingly where required for actions with independent NEPA analyses (e.g., Supplement Analysis Disposition of Fast Critical Assembly Plutonium (DOE/EIS-0283-S2-SA-02) and AROD (86 FR 13359, March 8, 2021)).

As discussed in the SRS ABD SA, operational impacts in the ABD and conventional processing scenarios would be the same, but several factors (including population and dose-conversion

factors), have changed since development of the SRS SNF EIS. These differences result in minor changes to worker and population impacts. However, impacts to worker and public health would remain as discussed in sections 4.1 and 4.2 of the ABD SA including, over the life of SRS SNF Operations:

- 5×10^{-7} risk of latent cancer fatality (LCF) to the maximally exposed individual,
- 0 LCF (calculated 6.8×10^{-3}) in the exposed population, and
- 1 LCF in the exposed worker population.

Accidents: This action will reverse the reduction in material at risk described in the ABD SA and be like that described in the SRS SNF EIS. However, similar to the changes analyzed in the ABD SA, population growth and updated dose conversion factors would increase the consequences of potential accidents compared to the SRS SNF EIS by approximately 1.7 times for the population and 1.5 times for workers.

In addition, when combined with the 25.9 MTHM already processed in H Canyon, this action will result in a total SNF amount that is 11.7 percent less than the 47.7 MTHM analyzed in the SRS SNF EIS. This reduces accident probability by a similar amount, rather than 16 percent higher under ABD. Accident probability would be similar to that discussed in the SRS SNF EIS, since relevant changes to processes described in the ABD SA will be canceled.

Waste Generation: Operation of H-Canyon under the Proposed Action would produce similar waste streams and annual volumes as evaluated in the SRS SNF EIS. The point of generation for the waste streams would not change. Therefore, most of the annual impacts of the Proposed Action on waste management would be similar to, or bound by, the impacts described in the SRS SNF EIS and are not discussed further. LW would be reduced compared to ABD, due to reduced

total fissile mass being discarded. Additionally, by returning to recovery operations, the quantity of HLW would be significantly reduced, decreasing the total needed HLW glass canisters to 55 from 505 under ABD. Total HLW glass canisters generated at H Canyon would be below the number analyzed in the SRS SNF EIS.

Transportation: Under this 2025 AROD, the uranium solution will be down-blended to up to 20 percent uranium-235 and transported to commercial fuel fabricators to be converted into HALEU fuel. Shipments would begin around 2029, when the shipments analyzed in the 2025 HALEU SA are complete, and continue for approximately 13 years. In the 2025 HALEU SA, DOE analyzed similar material, shipped under similar conditions, which would have similar per-shipment impacts.

In the 2025 HALEU SA, DOE found that shipment of HALEU from SRS to the BWXT facility in Virginia could result in per-shipment impacts of approximately 2×10^{-5} LCF risk to the population and 1×10^{-5} LCF risk to the crew. Accident risks would be approximately 2×10^{-9} LCF per shipment. DOE estimates approximately 12 shipments per year over the 13-year life of the action. The total risk of these shipments will be approximately 3×10^{-3} LCF risk to the population and 2×10^{-3} LCF risk to the crew. Accident risks would be approximately 3×10^{-7} LCF.

DOE concludes that the changes to the proposed action are not a substantial change relevant to environmental concerns, nor are there substantial new circumstances or information about the significance of the adverse effects; as described in NEPA and the DOE NEPA Implementing Procedures (June 30, 2025). No further NEPA documentation is required.

BACKGROUND

DOE's purpose and need for action, as described in the SRS SNF EIS, is to develop and implement a safe and efficient SNF management strategy that includes preparing SNF and target materials stored at or expected to be shipped to SRS for ultimate disposition offsite.

In the SRS SNF EIS**,** DOE evaluated the potential environmental impacts of alternatives for management of the SNF and target material. DOE analyzed five reasonable alternatives that could be used to manage SNF: No Action, Minimum Impact, Direct Disposal, Maximum Impact, and the Preferred Alternative. The action alternatives represent combinations of technologies applied to fuel groups. Under the Preferred Alternative in the SRS SNF EIS, DOE would prepare about 97 percent by volume (about 60 percent by mass) of the ASNF for disposition using a melt-and-dilute process. The remaining 3 percent by volume (about 40 percent by mass) would be managed using chemical processing.

DOE issued the Final SRS SNF EIS and issued a ROD, selecting the Preferred Alternative. Since the ROD was issued, DOE has not implemented the melt-and-dilute technology. DOE has explored various scenarios to address storage capacity limitations and technical issues associated with SNF and target materials at SRS. Due to the vast variety of ASNF at SRS, implementing a dry storage program as a potential alternative to the melt-and-dilute process that would be effective for all SNF presents technical challenges. Considering the storage capacity for non-aluminum SNF (NASNF) and the future availability of processing capabilities (H-Canyon) and liquid HLW systems (Defense Waste Processing Facility and Tank Farms) at SRS, DOE has reevaluated the management approach for SNF at SRS.

In the ABD SA and AROD, DOE decided to manage up to 29.2 MTHM of SNF using conventional processing without uranium recovery in H-Canyon at SRS. DOE anticipated

processing these materials beginning as early as 2022, and continuing approximately 12 to 13 years, consistent with program and policy priorities and funding. DOE would use three dissolvers in order to cost-effectively utilize H-Canyon and expeditiously complete the mission, although only two dissolvers would be operated at any one time. Meanwhile, SNF would continue to be stored in L-Basin at SRS, pending processing in H-Canyon. DOE determined that this change was not a substantial change relevant to environmental concerns that would require a new or supplemental EIS. This 2025 AROD reverses this change, thereby reinstating the allowance for uranium recovery.

Signed in Washington, D.C., on January 21, 2026.

TIMOTHY WALSH

Digitally signed by TIMOTHY WALSH
Date: 2026.01.21 10:21:22 -05'00'

Timothy J. Walsh
Assistant Secretary
for Environmental Management
U.S. Department of Energy