

H Canyon

H Canyon, which is located at the U.S. Department of Energy's (DOE) Savannah River Site (SRS), is the only hardened nuclear chemical separations plant still in operation in the United States. The facility's operations historically recovered uranium-235 (U-235) and neptunium-237 (Np-237) from aluminumclad enriched-uranium fuel tubes from site nuclear reactors and other domestic and foreign research reactors using a chemical separations process.

In addition, H Canyon was equipped with capabilities to recover Np-237 and plutonium-238 (Pu-238) from special irradiated targets. Plutonium-238 was produced by irradiating recovered Np-237 in SRS nuclear reactors. Plutonium-238 was then recovered and used in 30 of the National Aeronautics and Space Administration's deep space exploration programs, such as the Cassini spacecraft.

In 1992, the DOE concluded that recovery of enriched uranium for reuse in weapons programs was no longer necessary because of the reduction in the nation's nuclear weapons stockpile. However, there was an inventory of highly enriched uranium fuels and solutions in various stages of the SRS process. Through the remainder of the 1990s, DOE issued a series of decisions to resume chemical



H Canyon is the United States' only operational nuclear chemical separations plant



Blended uranium solution leaves H Area, bound for Tennessee, where it is converted into fuel for TVA power reactors

separation operations to stabilize and manage most of the remaining inventory of highly enriched uranium (HEU) materials at SRS including Np-237 stored in H Canyon and a number of plutonium solids that were stored in F Area vaults. The resulting HEU and Np solutions were stored until a disposition path could be determined.



In March 2003 the HEU Blend Down Project was completed, which provided the capability to blend down the HEU solution that was being stored with natural uranium (NU) to form low-enriched uranium (LEU). The LEU solution is transported to an off-site facility where it is used to make fuel for commercial nuclear power reactors. In July 2003, the first LEU shipment was sent to the Tennessee Valley Authority (TVA), which converts the LEU to fuel for their power reactors to generate electricity. Material from SRS is being used to generate electricity at the TVA nuclear reactors. To date, approximately 21.9 metric tons of HEU has produced approximately 286 metric tons of LEU. This equates to fueling every home in the United States for 50 days.

From 2006 to 2008, H Canyon completed processing of the neptunium solutions to make them ready for HB Line processing. This is the last neptunium inventory in the United States, a critical asset for future production of Pu-238 and space exploration. The last of the neptunium inventory was converted to an oxide and shipped to INL in November 2008.

In May 2006, DOE approved the Enriched Uranium Disposition Mission, which uses the H Canyon facilities for disposition of the large inventory of used nuclear fuel from foreign and domestic research reactors and excess enriched uranium and plutonium bearing materials across the DOE complex. This supports both the DOE environmental cleanup and nuclear non-proliferation goals, reduces the footprint and costs associated with maintaining the various DOE sites, and allows for the recovery of enriched uranium for blend down into low enriched uranium fuel. Since this mission was approved, H Canyon has successfully dispositioned materials from Y12, Los Alamos National Laboratory and Lawrence Livermore National Laboratory. As required by law, disposition paths will be identified for all nuclear materials brought to H Canyon.

A major challenge for H Canyon disposition is the integration of its waste streams with H Tank Farm and the Defense Waste Processing Facility. H Canyon recently completed several initiatives to reduce the amount of high level waste generated from disposition of uranium and plutonium materials ten-fold, as well as significantly reducing processing time. It is estimated up to \$75 million will be saved due to these waste reduction initiatives.

H Canyon was constructed in the early 1950s and began operations in 1955. The interior of the building resembles a canyon because the processing areas resemble a gorge in a deep valley between steeply vertical cliffs. It is 835 feet long, 122 feet wide and 66 feet tall, with several levels to accommodate the various stages of material stabilization, including control rooms to monitor overall equipment and operating processes, equipment and piping gallery for solution transport, storage, and disposition, and unique overhead bridge cranes to support overall process operations.

So that worker exposure to radiation is minimized, work in the canyon, including maintenance, is remotely performed by overhead bridge cranes. The six-foot thick, dense concrete walls that separate workers from the actual processing areas provide added protection.

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The Savannah River Site is owned by the U.S. Department of Energy and is managed and operated by Savannah River Nuclear Solutions, LLC.

