H Canyon

H Canyon is the only operating, production-scale, radiologically-shielded chemical separations facility in the United States. H Canyon began operations in the early 1950s. The facility’s operations historically recovered uranium and neptunium from fuel tubes used in nuclear reactors at the Savannah River Site (SRS), to produce radioactive materials used in making nuclear weapons. After the end of the Cold War, the facility’s mission changed to one of nonproliferation and environmental cleanup.

The interior of the facility resembles a canyon, giving the facility its name. Most canyon operations are done from a control room using remote control cranes. One side of the canyon is considered “hot” because it has higher radiation levels, while the other side of the canyon is “warm” because it has lower radiation levels. No one has been inside the “hot” side of the canyon since it began operations.

Employees who work in the building are protected from radiation by the thick, steel-reinforced concrete walls. Irradiated spent fuel rods are transported to H Canyon in shielded cask cars from the Site’s L Area storage. The spent fuel rods are dissolved in nitric acid. Uranium liquid, also known as Target Residue Material, is also received from the Chalk River Facilities in Canada. The uranium from these sources is recovered through a complex chemical process, including solvent extraction cycle operations. The cycles remove impurities that are present in the feed. The impurities are then transferred to SRS’ waste management facilities.

The uranium is mixed with natural uranium in a process called “blend down” and is loaded in shipping containers for shipment off-site. Blending down uranium not only makes it undesirable for use in nuclear weapons, but also makes it able to be converted to fuel rods and used in commercial nuclear reactors operated by the Tennessee Valley Authority (TVA) to make electricity.

A new process, called Accelerated Basin Deinventory (ABD) is currently being pursued to replace the current “blend down” mission. This process would dissolve spent fuel in H Canyon and then discard it as waste instead of further processing. ABD would result in significant life-cycle cost savings, would accelerate the de-inventory of spent fuel stored in L Basin and allow for H Canyon to empty prior to the closure of the Defense Waste Processing Facility, solving long-term waste storage issues.

Although it is more than 60 years old, H Canyon has maintained and proven the flexibility originally intended for it, by adapting to the needs of its customers. H Canyon is a one-of-a-kind national asset that is serving the state, the nation and the world by processing weapons-grade nuclear materials for final disposition out of South Carolina.