

News from the Savannah River Site

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Dissolver reconfiguration allows continued processing, highlights flexibility of SRS facility

AIKEN, S.C. (February 21, 2024) - Employees at the Department of Energy's Savannah River Site recently highlighted the flexibility of the over 75-year-old H Canyon chemical separations facility when they reconfigured dissolvers in order to maximize planned operations in FY24.

H Canyon's current mission is to dissolve spent nuclear fuel, currently stored in the Site's L Basin underwater storage facility. Dissolution involves lowering the fuel into one of two chemical dissolvers that dissolve aluminum clad fuel using a nitric acid solution, or an electrolytic dissolver, which adds electricity to the dissolution process for stainless-steel clad fuel.

H Canyon recently installed the electrolytic dissolver as part of a new mission to dissolve Fast Critical Assembly (FCA) stainless-steel clad fuel from the Japan Atomic Energy Agency. Japan and the United States removed the plutonium and highly enriched uranium from the FCA reactor in 2016, fulfilling a commitment made at the 2014 Nuclear Security Summit. The plutonium fuel is currently stored on-site and will be transferred to the canyon for processing upon the completion of all preparation tasks. After the FCA campaign, the electrolytic dissolver could be used for dissolution for other unique fuels in L Basin supporting DOE's plan to de-inventory the facility. H Canyon last ran an electrolytic dissolver from 1969 to 1980 as part of previous dissolution missions.

The two chemical dissolvers have most recently been used to dissolve two different kinds of aluminum clad fuel – Material Test Reactor (MTR) fuel and High Flux Isotope Reactor (HFIR) fuel. Although these two types of fuel are both aluminum clad, they are shaped differently due to their unique bundle configurations.

"The chemical dissolvers have to be configured with the right sized insert to fit the fuel," said H Canyon Facility Manager Matt Arnold of the Site's managing and operating contractor, Savannah River Nuclear Solutions. "The inserts are specifically designed for each type of fuel and help lower the fuel into the dissolver slowly, allowing it to be dissolved from the bottom, up."

"Mission needs dictated that we dissolve MTR fuel at the same time as we are dissolving FCA fuel," manager of Environmental Management Mission Planning James Therrell said. "To do so, we needed to move the MTR dissolver insert to the second chemical dissolver due to the configuration of the facility and its requirements for running multiple dissolvers at a time. This flexibility will ultimately allow us to safely meet our long-term processing needs for SNF while supporting the FCA mission."

Arnold explained that changing the inserts on the dissolver is not an easy process. Since all work in the canyon must be done using remote cranes to protect workers from radiation, months of planning, preparation and coordination between departments are needed before the actual work could be performed.

“The reconfiguration was completed safely and successfully, thanks to the hard work from current employees, but also thanks to the engineers who designed this canyon back in the early 1950s,” Therrell continued. “It continues to amaze me that their foresight allowed the canyon to be the flexible and adaptable facility it is to this day.”

Both the chemical and electrolytic dissolving processes produce a liquid that is sent through the site’s liquid waste facilities, where it is made into glass through a process called vitrification. It is then safely stored onsite until a federal repository is identified.



A fuel insert is raised from a chemical dissolver in the Savannah River Site’s H Canyon. Removing the insert allows for a different type of fuel insert to be placed in the dissolver.

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