

MCO welding begins at Spent Nuclear Fuel Project

Fluor Hanford's Spent Nuclear Fuel Project has begun welding permanent cover assemblies onto the large Multi-Canister Overpacks that hold dried spent nuclear fuel for long-term storage in the Canister Storage Building. Welding operations began on schedule Feb. 3, fulfilling an agreement between the Department of Energy and the Defense Nuclear Facilities Safety Board.

The welding process enables the MCOs to withstand internal pressures up to 450 pounds per square inch, considerably higher than the 150-psi limit provided by traditional mechanical seals. SNF Project planners agreed during the developmental stages of the project that the additional safety margin offered by the welded assemblies was prudent and advisable, should pressure build up inside the MCOs during years of storage.

The canister cover assemblies are welded remotely from computerized consoles near the two weld pits in the south end of the CSB. Later, the access cover plates are welded on manually. Welding all 418 MCOs is expected to take more than two years to complete all 418 MCOs.

At the same time, the SNF Project continues to implement its plan to sample six representative MCOs several times before welding to check for the pressure and composition of internal gas. Thus far, all samples have shown gas constituents to be well within acceptable limits.

N-Stamp certification

The MCO cover assemblies, each weighing more than 500 pounds, are welded in up to six separate "passes" at the main seal to ensure a complete, reinforced bond. After a helium leak test is performed, a mechanical plug is inserted and a 4-inch-diameter steel cover plate is manually welded in place over an access port, all to meet strict "N-Stamp" quality specifications of the American Society of Mechanical Engineers code.

"Having the N Stamp applied to our final welded assembly, in addition to having the MCOs themselves manufactured to N-Stamp standards, gives us a high degree of assurance that these vessels can safely contain their spent-fuel loads as designed, for a very long storage period," said Norm Boyter, Fluor Hanford vice president for the SNF Project. "I'm extremely proud of the people who designed, built and are operating the MCO welding system."



In one of two weld pits in the Canister Storage Building, Fluor Hanford's Mark Flodin, a HAMTC welder, welds the 4-inch cover plate over the top of a canister cover assembly.

MCO welding begins at Spent Nuclear Fuel Project, cont.

Team effort

According to Ron Ruth, Fluor Hanford Environment, Safety, Health and Quality Assurance manager for the SNF Project, the timely startup of welding was “a real challenge, but an enjoyable one. We brought multiple groups together to meet testing objectives on an aggressive schedule to make the welding process a success.”

Fluor Hanford contracted with Amer Industrial Technologies, a Wilmington, Del., company with more than 25 years of experience serving the power, refinery and chemical industries throughout the world. AIT holds quality certifications in nuclear, pressure-vessel and boiler work.

In its home factory, AIT built a complete mock-up of the welding pit in the Canister Storage Building. It then modified previously fabricated weld hood assemblies and fabricated other equipment, working with Hanford Site personnel to test the equipment and lay out each step in the welding procedures.

Welders from the Hanford Atomic Metal Trades Council perform the actual welding, while four AIT staff members are assigned full-time to the CSB to provide oversight and perform weld tests and inspections. The MCO welding effort also received assistance from the Fluor Hanford Project Operations Center and Fluor Federal Services.

Welding design authority Doug Black said personnel from Engineering, Operations, Quality Assurance, Training and Procedures, Procurement, Maintenance and other organizations “juggled critical resources” to make the welding effort timely and successful. At the same time, the SNF Project was pushing hard to meet a Tri-Party Agreement milestone to remove 957 metric tons of spent fuel from the K West Basin. “Welding the MCOs could not have been accomplished on time without immense teamwork,” Black said.

Other project achievements

After a scheduled maintenance outage in January, the SNF Project resumed fuel movement out of the K West Basin and fuel transfers from the K East Basin to the K West Basin. Thus far, more than 1,000 metric tons of fuel have been removed from the K West Basin, dried and placed into safe storage in steel tubes below ground level in the CSB. Approximately 550 old fuel canisters have been transferred from the K East Basin to the K West Basin — about 100 ahead of schedule. ■



An N-Stamp, the highest nuclear quality-assurance certification of the American Society of Mechanical Engineers, is displayed on an MCO cover assembly.



This canister cover assembly has been welded to a Mutli-Canister Overpack, or MCO. The leak-test ring is installed in preparation for a test of the main weld. A test plate is installed over the cover test plug to remove the argon gas that was used during welding.