

Sludge/water system installed in K Basins

Michele Gerber, *Fluor Hanford*

By installing the sludge/water system in the K East Basin, Fluor Hanford's Spent Nuclear Fuel Project has taken an important step in reducing the risk posed by radioactive sludge. Fluor Hanford, supported by Fluor Federal Services and COGEMA Engineering, installed the equipment inside the basin and began acceptance testing last month. In addition, the project received, inspected and began testing two systems for transporting sludge, each consisting of a transport trailer, a shielded cask and three canisters that will hold the sludge.



Workers at Fluor Hanford's Spent Nuclear Fuel Project test the interface of the large-diameter container as it fits into the cask on the transport vehicle that will move it to T Plant.

The sludge/water system will remove sludge and transfer it to compliant, safe storage at T Plant, according to the plan approved by the Department of Energy Richland Operations Office and its regulators in 2000. That agreement provided that sludge from the K Basins would be transported to T Plant and managed as remote-handled transuranic (TRU) waste. The system will begin moving sludge to T Plant in about two months.

"It's especially good news that the SWS equipment is installed and ready for testing," said Norm Boyter, Fluor Hanford vice president for the SNF Project. "Sludge has been difficult to manage and its disposition hard to plan for, so we are pleased that we're successfully into the next phase of this important work."

Sludge is defined as the combination of corrosion products and small fragments of degrading fuel elements, rusting storage racks, concrete from pool walls and particulates resulting from the storage of spent nuclear fuel under water over many years. Sludge is commonly found on the floors of both K Basins, in fuel canisters and in the basin pits. However, more than 90 percent of it is located in the K East Basin.

When the sludge is separated from the spent fuel and removed from the basins, it will be managed as a remote-handled TRU waste. For the purposes of differentiating fuel and debris from sludge, any material that is about a quarter of an inch in diameter or smaller is defined as sludge.

Large, complex system

Five contractors or vendors have contributed to designing, building and fabricating sludge/water-system equipment. The system consists of two major subsystems — the retrieval system and the transfer system. The retrieval system will remove sludge from the K East Basin and adjoining pits over the two-year period of the project by pumping floor, pit and fuel-canister sludge to a stainless-steel container mounted inside a shielded cask for safe transport.

The cask containing a filled canister will then be transported to T Plant on a specially designed transport trailer. Resulting debris and fuel pieces in the sludge slurry streams will be captured by strainer baskets and transferred via the fuel transfer system to the K West Basin for final disposition.

Continued on page 6.

Sludge/water system installed in K Basins, cont.

Transporting the sludge

The system includes equipment designed to transfer casks loaded with sludge from the K Basins to T Plant. The stainless-steel-and-lead sludge transportation cask is cylindrical and approximately 5 feet wide and 10 feet high. It shields personnel during operations and meets all safety requirements, exceeding the U.S. Nuclear Regulatory Commission requirements for transfer.

As sludge is being retrieved, the sludge transportation cask will be staged in the north transfer bay of the K East Basin. An empty container called a large-diameter container, or LDC, inside the cask will be filled with about two cubic meters of sludge. After the LDC is filled, the water cover level will be adjusted and the lid will be placed on the cask. The transportation cask will then be purged with helium and transported to T Plant on the transfer trailer.

The transfer trailer is specially designed so that, when fully loaded, it meets the physical size and weight requirements for entering the T Plant tunnel. From there, the large-diameter container will be unloaded from the cask and moved into one of four storage cells.

T Plant will be ready

During the past two years, T Plant has cleaned nuclear debris out of below-grade shielded concrete cells designated for storing sludge. Fluor Hanford has partnered with construction personnel from Fluor Federal Services to move in huge frames and cell-liner assemblies, complete with pumps and leak-detection equipment. Together, Fluor workers also have installed video cameras for monitoring the sludge and have completed many other readiness tasks. T Plant's contractor readiness assessment for receiving sludge is planned for this month.

Tony Umek, Fluor Hanford SNF deputy project director for the sludge project, said installing the sludge/water system and readying T Plant took teamwork. "Fluor Hanford teamed with FFS and COGEMA to address a number of difficult technical and fabrication issues facing the project," Umek said. "Our client, the DOE Richland Operations Office, has been actively involved, providing key input and approvals when needed to allow us to continue to move forward."

SNF Project bustling

K East Basin, currently one of the busiest facilities at Hanford, recently started fuel transfers to K West Basin and is preparing for both contractor and DOE operational readiness reviews on the sludge/water system in the next few months.

All of the spent fuel that was stored in the K West Basin at the beginning of the SNF Project — nearly 1,000 tons of irradiated uranium and more than 25 million curies of radioactivity — has been moved to safe storage. ■