

Fluor finishes major cleanup project at Hanford

Fluor workers at the Hanford Site in southeastern Washington state posted a huge achievement this month by finishing the containerization of sludge in the K East Basin. Pete Knollmeyer, vice president of the K Basins Closure (KBC) Project for Fluor Hanford, called the accomplishment a “major success for our employees who worked so hard, and for the overall cleanup and safety of the Hanford Site.” Fluor began pumping sludge from the main part of the K East Basin into four large underwater containers, in October 2004.

U.S. Rep. Jay Inslee (D-Wash., 1st District) called Knollmeyer and K East Closure Director Chris Lucas last week to congratulate K Basins employees on their accomplishment.

“Congratulations on this important milestone,” said Congressman Inslee. “We recognize that doing a job like this required people to dig deeper than the standard operating procedure. When you tackle a project like this, you’re going the extra mile.”

Hanford’s K Basins, two huge indoor concrete pools — each holding more than 1.3 million gallons of water — became contaminated with sludge after irradiated metal fuel was stored under water in them for approximately 30 years. The sludge is a combination of dirt, sand, rust, chemicals, fuel corrosion products, and decay or fission products.



Nuclear chemical operators (NCOs) Joanie Graves (left), Bruce Scott (middle) and Laurie Parchen (right, manipulating tool) coordinate sludge vacuuming work by watching monitors displaying underwater conditions in the K East Basin.

Fluor Hanford completed removing and drying the 2,300 tons of the spent nuclear fuel in 2004. Since that time, the company has worked — literally night and day — to vacuum the highly radioactive sludge into underwater containers and develop plans for stabilizing the sludge for long-term storage and closing the basins. “The conditions in the K East Basin and the characteristics of the sludge presented formidable challenges throughout the two years,” said Knollmeyer. “The sludge ranged from flighty to cake-like and hard-packed. The water was extremely murky, and most of the time, workers could not see the bottom of the basin. Further, the levels of airborne radiation inside the basin fluctuated as work was done, which required workers’ using respirators. Everyone — from project staff, to technicians and engineers — worked side-by-side to adapt to the changing conditions. Their effort was tremendous and I am extremely proud of them all.”

Of the two basins, the K East Basin had the majority of the sludge. Although early estimates placed the sludge volume in that basin at about 55 cubic yards (enough to fill a 40-foot-long motor home), the actual volume comes in closer to 46 cubic yards.

To containerize the sludge, workers stood on grates suspended above the 20-foot-deep basin and manipulated vacuuming equipment at the end of long poles — while using special underwater cameras and lights to guide their work.

The sludge was drawn into vacuuming hoses and discharged into each of the four containers through a “distributor” built to allow the



Fluor Hanford nuclear chemical operators (NCOs) manipulate long-handled tools for pumping sludge in the K East Basin.

sludge to settle more quickly, and provide a more even distribution inside the container.

Sludge vacuuming complex and surprising

While it sounds relatively simple, the vacuuming process was more complicated than expected. Visibility problems and large amounts of debris encountered while vacuuming the spent fuel pool slowed progress on the project. Workers alternated between sucking up the radioactive sludge and removing contaminated debris from the K East Basin. In total, they removed about 150 tons of debris and fuel racks during the two years. “We had more surprises than we ever anticipated,” says Rob Gentry, Fluor’s sludge and debris removal manager for the K E Basin. “There was much more small debris hidden in the sludge than we expected, and the physical characteristics of the sludge varied more across the basin than we foresaw.”

Settling the flighty sludge became a significant problem, as it often billowed back and clouded the water as it was being transferred into the containers. In late 2005, Project personnel developed and installed a “SCOOPS” (Sludge Containerization Overflow Pumping System) apparatus at the top of each container to address this problem. “The escaping particulate was the major contributor to our clarity problem,” says Gentry. “The SCOOPS device drew off about 100 gallons per minute of water off the top of the sludge containers and discharged it back through basin filtration systems. It was an effective tool in helping us manage water-clarity issues.”

“Despite some improvements,” says K East Basin Closure Director Chris Lucas, “we never had truly clear water, but workers rose above that challenge and learned to work expertly with cameras, lights and water conditions that were far from ideal.”

Workers found pumping sludge exhausting work, and compared it to “chasing smoke.” Knollmeyer made the analogy to “vacuuming under the couch in your living room from a small hole in the second story roof, without first picking up the kid’s toys from the floor.” Lucas admits that “there were discouraging times, but I never doubted that we’d finish. These crews are among the finest people I’ve ever worked with.”

Fluor Hanford last week also began transferring the sludge containerized in the K East Basin to underwater containers in the K West Basin, using a specially engineered hose-in-hose system. Getting the containerized sludge out of the K East Basin allows the rest of the debris to be taken out of the basin, in preparation for final decontamination and decommissioning next year.

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