

Maintenance and Storage Facility



Inside the Maintenance and Storage Facility where CH2M is developing and testing tools and techniques for retrieving highly radioactive sludge material.

What is sludge?

Sludge is highly radioactive and challenging to handle. Sludge's unique consistency (slit-like, but highly abrasive and difficult to suspend and move), along with high levels of radioactivity, make it a challenge to remove. Additionally, the uranium in the sludge reacts with water to generate hydrogen, a potentially flammable gas.

The U.S. Department of Energy contractor CH2M HILL Plateau Remediation Company workers are preparing to retrieve highly radioactive material using its cold test facility in Hanford's Maintenance and Storage Facility.

The Maintenance and Storage Facility (MASF) is a 28,000-square-foot (2,600-square meter) multi-purpose facility that was originally part of the Fast Flux Test Facility complex. Today, CH2M HILL Plateau Remediation Company (CH2M) has repurposed the building to support technology development and train workers who will support the retrieval of radioactive sludge from the K West Reactor basin.

Sludge was created when irradiated reactor fuel rods stored in the reactor basin began to deteriorate years ago after production activities stopped in the 1980s. Approximately 35 cubic yards (27 cubic meters) of the sludge remain stored under 17 feet (5 meters) of water in the concrete basin, just 400 yards (365 meters) away from the Columbia River. The U.S. Department of Energy and CH2M are working to develop a better understanding of sludge and to select the best approach for removal and transfer of the sludge to interim storage and, ultimately, for final disposition.

At MASF, CH2M engineers and technicians are utilizing innovative technology, developing tools and modifying equipment as it is tested for use in a radioactive environment. The facility was chosen, in part, because of its large size, but also because it contained two large steel tanks that could be removed and the resulting space modified to replicate the reactor basin. The 85,000-gallon (322,000-liter) simulated basin in MASF replicates the key structural features of the actual 125-foot (42-meter) long, 20-foot (7-meter) deep K West Basin. The setup is used to develop and test custom-designed retrieval equipment and to train operators how to use the equipment to retrieve radioactive sludge.

The simulated basin in MASF allows workers to master the retrieval tools and processes in a safe environment free from radioactive material. Developing and testing equipment and retrieval processes in a simulated environment reduces the overall cost and time it will take to complete the

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(Left) At MASF, workers practice with long-reach tools that will be used to retrieve sludge from the K West Basin. (Right) Workers deploy sludge retrieval tools at the actual reactor.





Workers in safety gear prepare the basin to receive sludge removal equipment.

Protecting the Columbia River

The K West Reactor fuel storage basin is located just 400 yards (365 meters) away from the Columbia River. Moving sludge away from the river will reduce the risk to the public and the environment and allow workers to decommission the K West Reactor and remediate contaminated areas under the reactor's basin.

Challenge

Sludge is highly radioactive, long-lived, dense and difficult to handle. The sludge's unique consistency (silt-like, but almost twice as dense as lead) partnered with high levels of radioactivity (approximately 30,000 curies of radioactivity) make it a challenge to remove and a high priority for Hanford cleanup. The material is difficult to pick up and move around, and its tiny, hardened particles are highly corrosive on equipment.



At a replica facility, workers train with tools and techniques that will be used to retrieve highly radioactive sludge.

Efficiency

At MASF, CH2M engineers utilize modern technology, invent tools and modify equipment to get the job done safely on the first attempt. The replica of the K West Reactor Basin constructed at MASF allows workers to master the retrieval tools and processes in a safe, radiologically-clean environment, ultimately reducing cost and schedule, before successfully deploying this approach in the actual basin.

Future

In 2016, CH2M will install and test sludge retrieval systems at MASF before moving those components to the 100 K Area in preparation for the final phase of sludge retrieval. The equipment will be installed in the K West Basin and in the newly completed Sludge Treatment Annex. CH2M completed the Annex in 2015; the building will house systems to safely transfer sludge to casks for transportation to the Central Plateau. CH2M is on schedule to begin moving the hazardous sludge away from the river to safe storage near the center of the Hanford Site in 2018.



Concrete placement for the K West Annex building that will house the sludge retrieval equipment.