

Sludge Treatment Project



The 100 K Reactor Area, where highly radioactive sludge is stored in a water-filled basin just 400 yards (365 meters) from the Columbia River.



Sludge is a mixture of tiny fuel corrosion particles, fuel rod and metal fragments and soil and sand less than 1/4 inch (6 millimeters) in diameter.

The U.S. Department of Energy and contractor CH2M HILL Plateau Remediation Company are developing tools and techniques to remove highly radioactive material from underwater storage at the Hanford Site in southeast Washington state.

Progress

Approximately 35 cubic yards (27 cubic meters) of highly radioactive material, called sludge, is currently stored under 17 feet (5 meters) of water in a concrete basin adjacent to Hanford's K West Reactor, one of nine former plutonium production reactors at the Hanford Site. Thirty-five cubic yards is approximately equal to the volume of a 20-foot (6-meter) long cargo shipping container. Sludge is a gray, silty substance created when irradiated reactor fuel rods stored in the basin began to deteriorate years ago after production activities stopped in the 1980s.

Mission

The sludge must be removed before the basin, now past its design life, can be demolished to both protect the Columbia River and enable decommissioning and interim safe storage of the K West Reactor. CH2M HILL Plateau Remediation Company (CH2M) is responsible for transferring the hazardous material to safe storage at the center of the Hanford Site.

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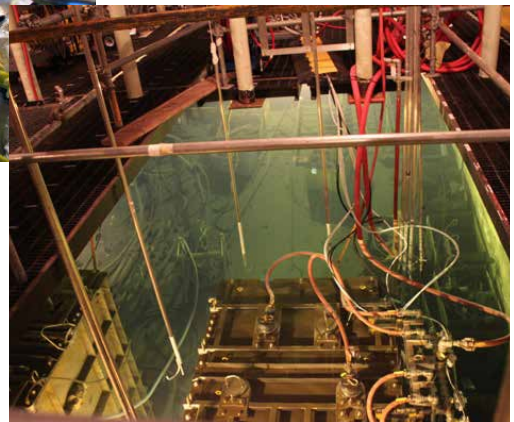
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Workers (Above) use long-reach tools to access engineered containers that contain sludge in the basin (Right).





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

Progress

CH2M has made significant progress on this multi-year, multi-phased effort including:

- Retrieved samples of the sludge for analysis and characterization
- Consolidated the sludge into engineered containers underwater
- Removed the first phase of the sludge (called knockout pot sludge)
- Developed or modified tools to retrieve and package the sludge for transportation
- Constructed a mock-up of the reactor basin where workers train and test on retrieval tools and techniques
- Completed construction of the K West Annex, a building that will house the equipment used for the last phase of sludge retrieval

Challenge

Sludge is highly radioactive, dense and difficult to handle. Its unique consistency (silt-like, but with some constituents almost twice as dense as lead), along with high levels of radioactivity (approximately 30,000 curies of radioactivity), makes it a challenge to remove. Disturbing the sludge increases clouds in the basin water, which affects workers and their ability to perform underwater operations.



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

Efficiency

CH2M engineers have utilized modern technology to invent tools and modify equipment to retrieve the sludge safely and efficiently. Workers train for sludge retrieval at the Hanford Site's Maintenance and Storage Facility (MASF). In MASF, CH2M constructed a full-size mock-up of the reactor basin. The replica allows workers to test engineered processes and become experts in using the retrieval tools.

Future

In 2016, CH2M will continue training workers and testing sludge retrieval systems and equipment at the mock-up facility before moving that equipment to the 100 K Reactor Area for installation and further testing.

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Construction of the K West Annex building that will house sludge retrieval equipment.