EM Crews Think Outside the Box for Hanford Tank Waste

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A Hanford Site team created unique tools to remove a radiologically contaminated thermocouple from single-shell tank AX-103. The team built a radiation-shielding box and remote extension tools to allow workers to complete the task more safely.

RICHLAND, Wash. – EM's Office of River Protection tank operations contractor Washington River Protection Solutions (WRPS) recently developed unique tools to remove contaminated pieces of equipment from single-shell waste storage tanks at the Hanford Site.

WRPS developed a special shielding box and remote extension tools to safely remove a thermocouple, a device that measures the temperature of waste, from AX-103, a 1-million- gallon-capacity single-shell tank.

"The project team demonstrated a textbook approach on how to manage a high-hazard evolution by leveraging worker-generated solutions to solve complex challenges. These new tools and techniques will make future long-length equipment removals much safer for our workforce," WRPS President John Eschenberg said.

Thermocouples are among the more than 75 pieces of long-length equipment WRPS crews have removed to allow for the installation of new equipment to prepare for waste retrieval operations. The waste retrieved from single-shell tanks such as AX-103 is transferred to the double-shell tank system for safe storage until it is processed at Hanford's **Waste Treatment and Immobilization Plant**.

Extensive planning and innovation led to the removal of the 54-foot-long thermocouple from tank AX-103 in two sections. This allowed crane operators to control the long, thin device, which needed to be rotated from the vertical to horizontal position for placement into a shielded disposal box.

Workers removed the 7-foot-long top section of the thermocouple according to plan, but the 47- foot-long lower section took longer to remove safely. As workers raised the thermocouple from the tank, radiological surveys indicated higher dose rates where workers were planning to attach the crane rigging. The project team reevaluated the situation and set up additional safeguards.

The team improved the shielded box design so that workers were further away and could use remote reach tools to attach rigging. The team also built a shielded cover that allowed workers to secure the sleeving, all of which made the third attempt successful. The thermocouple is encased in plastic sleeving to prevent the spread of contamination.

"Using the shielding box and remote extension tools allowed workers to complete the thermocouple removal at safer levels," said Peggy Hamilton, single-shell tank retrieval project manager for WRPS. "The project team showed what can be accomplished by working together, communicating, and not giving in when you run into an obstacle. The team was determined to find a way to protect workers during the thermocouple removal process."

The thermocouple was one of three inside tank AX-103 and the second removed to date. The third will be removed in coming weeks. Five additional pieces of long-length equipment will be removed from AX-103 prior to installing new waste retrieval equipment.

"The project team was prepared for unexpected conditions, and along with conservative decision-making, reevaluated the situation and established addition engineering controls," Eschenberg said.