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INL Site Project Explores Virtual Reality to Improve Safety, Work Performance

IDAHO FALLS, Idaho – Once the subject of futuristic movies, virtual reality (VR) technology is being used by Idaho National Laboratory (INL) Site cleanup contractor Fluor Idaho with the aim of reducing potential radiation exposure to workers and improving work performance.

The Calcine Retrieval Project created a VR laboratory to plan for challenges in retrieving the granular, high-level radioactive waste. Calcine is the dried byproduct of a liquid waste generated during the INL Site's spent nuclear fuel reprocessing mission, which ended in 1992.

In an agreement with the state of Idaho, the Department of Energy Environmental Management Program is required to retrieve, treat, repackage and prepare the 4,400 cubic meters of calcine to ship for out-of-state disposal by 2035. The material is in storage in six separate bin sets inside concrete vaults at the Calcined Solids Storage Facility at the Idaho Nuclear Technology and Engineering Center. The bins are a series of long cylinders, and the number of bins in each set varies.

Fluor Idaho is designing a technology that could be used to retrieve calcine from an older bin set and transfer the material to a newer one. The emptied bin set would then be closed in compliance with state and federal environmental laws.

The project's design team worked with 3-D computer models of the facilities where the calcine is stored, based on original construction drawings. Using those models and the VR lab's newly acquired equipment, the team can place the likeness of engineers, technicians and management into a virtual mock-up of hazardous areas and simulate the work tasks without the risk of exposure.

"It gives us a more complete picture of the challenges that exist within the bin set and how to overcome them," Fluor Idaho Calcine Retrieval Project Manager Howard Forsythe said. "Using VR technology gives us a distinct advantage that we wouldn't have otherwise had even a few years ago."

Fluor Idaho plans to incorporate VR into more aspects of the project.

Testing of a retrieval system continues on a full-sized replica of one of the bins using a simulated calcine material. Piping and other internal obstacles were added to the mock-up to replicate the actual bin as closely as possible.

In addition to testing robotic and other technologies for calcine retrieval from one bin set, the project is developing a strategy to retrieve and close the five other bin sets. Mock-up testing will help engineers recommend a final end state for the bin sets.

Fluor Idaho, LLC is a wholly owned subsidiary of Fluor Corporation with subcontractor partners CH2M, North Wind Inc., Portage, and Waste Control Specialists. Fluor Idaho manages the Idaho Cleanup Project Core contract at the Department of Energy's Idaho National Laboratory Site located 45 miles west of Idaho Falls. The 5-year, $1.4 billion project, funded through the

U.S. Department of Energy's Office of Environmental Management, focuses on safely remediating the Idaho National Laboratory site including dispositioning transuranic waste, managing spent nuclear fuel, and treating high-level radioactive waste.

For more information visit the Idaho Cleanup Project on the Web at https://fluor-idaho.com

Suggested Image Captions

The image of the calcine bin set "Cyclone Vault" shows what the user is seeing in his virtual reality goggles.

Graphic of calcine bin set #1.