New Technology Holds Promise to Speed Waste Removal from Hanford Waste Tanks

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A new twist on old technology holds the promise to speed removal of waste from some of Hanford's old single-shell storage tanks. Funded with American Recovery and Reinvestment Act money, the new vacuum retrieval project is being led by Washington River Protection Solutions (WRPS).

The project is the next step in developing the Mobile Arm Retrieval System (MARS) technology. It is a modern use of an eductor, or venturi system that can vacuum waste out of tanks faster and better than earlier vacuum retrieval systems without using large volumes of liquids.

WRPS is responsible for eliminating the risk to the environment posed by 53 million gallons of radioactive and chemical waste stored in 177 underground tanks near the center of the Hanford Site. Waste is being transferred from aging, leak-prone single-shell tanks into newer, safer double-shell tanks where it will be safely managed until it can be treated in the nearby Waste Treatment Plant which is scheduled to begin operations in 2019.

Traditional waste retrieval methods are effective but they use large volumes of liquids to mobilize the solid material in the tank so the material can be pumped. In tanks that are known or suspected to have leaked, retrieval equipment that uses little or no liquid is desirable. This new system does not rely on liquids to mobilize the materials in the tank. And when liquids are required, the system removes them almost as fast as they are introduced.

The unique properties of the venturi effect were discovered in the late 1700s by Italian Physicist Giovanni Battista Venturi. The effect can be applied using both gasses and liquids and has been widely used in medicine, aviation, the chemical industry, gas stoves, and even musical instruments. The system uses no moving parts to create the vacuum. In the case of the MARS Vacuum Retrieval System a flow of liquid is injected through an intake pipe at the rate of 70 gallons per minute and 100 psi pressure. This creates the vacuum and the waste flows up the pipe in the direction of the liquid. The concept was used at Hanford for years to remove liquids from old tanks but this is the first application to remove solids.

The system was constructed by Columbia Energy and Environmental Services of Richland under its contract with WRPS and is being tested in a modified building in the Big Pasco Industrial Park in Pasco. The new system holds significant advantages and WRPS will continue to improve on the original design during the test period. Testing of the new system will continue into early next year.

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