

# Homogenization of Sludge at Bethel Valley Evaporator Storage Tanks

## PROBLEM

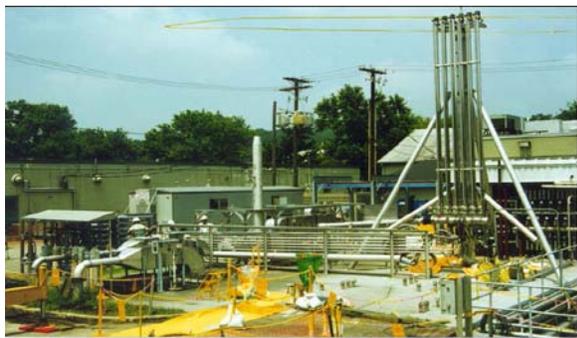
Bethel Valley Evaporator Storage Tanks (BVEST) at the Oak Ridge Site contained sludge generated from the production of nuclear weapons which rendered the tanks inoperable. There was therefore a requirement to homogenize and transfer the sludge to holding tanks, in order to return the BVEST to service. Removal of the sludge was also mandated by the DOE as part of the Transuranic Waste Disposal Program.

## SOLUTION

NuVision Engineering designed, fabricated, installed and operated a Power Fluidic™ mixing system to mobilize the sludge and enable transfer.

## BACKGROUND

Within the BVEST complex there are three waste tanks (W-tanks), which contained more than 33,000 gallons of sludge. The tanks measure approximately 12' in diameter and 62' in length, and have limited access with only one 19" manhole. Due to restricted access and internal obstructions within the tank, as well as cost and time constraints, various conventional methods of sludge homogenization were impractical.



Power Fluidic Pulse Jet Mixing System

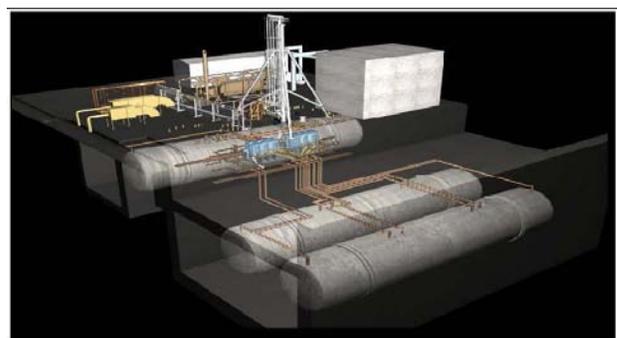
## TECHNOLOGY

Making use of the existing sludge jets in the tanks, NuVision Engineering designed a Power Fluidic system that was able to connect all three tanks through the existing Pump and Valve Vault (PVV). The system was able to mix sludge with existing supernate in the tanks to produce a homogenous mixture, which was suitable for transfer. This approach also enabled the transfer of supernate between the tanks thereby minimizing the amount of additional liquid (and therefore secondary waste) needed to homogenize all of the sludge. To minimize worker exposure, NuVision Engineering constructed a plywood mock-up of the PVV, which was used for training and dry run purposes. Use of this mock-up reduced the total worker dose from the ALARA estimate of 4000 mR to only 1230 mR. In all, the system homogenized more than 33,000 gallons of sludge (over 98% of the total) at 93% recycle of supernate. The project was completed in less than 50% of the DOE estimated schedule and for less than 25% of the DOE estimated baseline cost.

## BENEFITS

Power Fluidic technology offers a number of key benefits to DOE including:

- Cost savings through elimination of need for replacements for worn-out parts
- Increased plant productivity due to reduced maintenance schedules
- Reduction of secondary waste



CAD Drawing of W-Tank Arrangement