

Hanford Tank Cleanup

September 2010

Update

C-111 Retrieval Begins

Removal of waste from another of Hanford's aging underground radioactive waste storage tanks began on September 15. Tank C-111 is one of 16 tanks located in C Farm in the 200 East Area and holds approximately 58,000 gallons of contaminated sludge and other radioactive and chemical waste left over from decades of producing plutonium for the nation's defense.

Waste from single-shell tanks is transferred through temporary, above-ground hose-in-hose transfer lines to nearby double-shell tanks. The above-ground lines, developed specifically for Hanford, meet all environmental regulations and eliminate the time and expense of installing permanent infrastructure. This is the 13th Hanford waste tank to undergo waste removal.

Preparation for C-111 retrieval

Preparing for the future

Teamwork spells success for new pump installation

A new pump essential to the successful removal of waste from single-shell underground storage tanks has been installed successfully in double-shell tank AN-101. It replaces an older pump that failed earlier this year. It was first used in the retrieval of waste from tank C-111 and will be used in retrieval of waste from additional tanks as well.

Waste is removed from most of Hanford's 149 single-shell tanks using modified sluicing technology which uses liquids to thin and mobilize the waste sludge so it can be pumped. When possible, liquid waste from nearby double-shell tanks is used instead of water to avoid adding to the overall waste volume.

The successful pump replacement required teamwork from across all organizations within WRPS to not only get this new pump installed but to remove the old pump two weeks ahead of schedule.



AN-101 work

Tank farm personnel work under difficult conditions to remove old equipment and install new equipment necessary to remove waste from aging single-shell tanks. Dressed in multiple layers of protective clothing they often work in the heat of summer and the cold of winter to accomplish their tasks.

Planning ahead

Even before retrieval began from single-shell tank C-111, attention was already focusing on the next big retrieval project which is tank C-107 where WRPS will first use the Mobile Arm Retrieval System (MARS). This robotic arm will do the work of a variety of individual tools and is expected to speed waste retrieval and reduce overall costs.

An intricate rehearsal is now under way as WRPS and its subcontractors prepare to cut a 55" diameter hole in the dome of tank C-107 to allow the insertion of MARS. The cutting technology is routinely used in industry and workers are now rehearsing how to do the job by remote control. Lessons are being learned as rehearsals go forward to ensure the work can be done quickly and safely. The installation of MARS is expected this fall.



Subcontractor personnel slide a 20-inch concrete cutting bit over a riser mock-up as they rehearse for the cutting open of the dome of single-shell tank C-107 to insert the Mobile Arm Retrieval System.

Creating additional tank space

Evaporator serves Hanford cleanup

After a series of upgrades and improvements, Hanford's only nuclear processing facility, the 242-A Evaporator, began its first operating campaign of the year to reduce the volume of waste in double-shell storage tanks by more than 500,000 gallons, creating additional space to store high-level radioactive and chemical waste that will be transferred from aging single-shell tanks.

The evaporator last ran in 2009, when it reduced the waste volume in the double-shell tanks by more than 940,000 gallons. The evaporator is critical to the safe and timely cleanup of Hanford's tank waste.

Originally expected to operate for 10 years, upgrades have kept the evaporator operating safely for more than 30 years. Major upgrades completed between 1994 and 2004 extended the evaporator's life to 2018. A series of additional upgrades are expected in the future to keep the facility operational until 2040.

Since it began operating in 1977, the 242-A Evaporator has reduced the total volume of waste in Hanford's 28 double-shell storage tanks by 67 million gallons, thus avoiding the time and expense of building new storage tanks.



Following a series of upgrades and improvements the 242-A Evaporator resumed operations reducing the volume of waste stored in Hanford's double-shell tanks. This creates additional storage space for waste transferred from aging single-shell tanks and avoids the time and cost of building expensive new storage tanks.

Modification project increases tank storage space

Construction crews have completed work on eight tanks in the AP Tank Farm that will allow the tanks to store more waste. This will increase the operating level of the tanks by about 100,000 gallons per tank. This roughly equates to an additional million gallon tank to the AP Farm.

The level-rise modification project, paid for with funding provided by the Recovery Act, increases tank space to allow additional retrieval and storage of waste from the single-shell tanks until it can be sent to the Waste Treatment Plant (WTP). The change in maximum operating level of the tanks will also enable WRPS to provide a continuous feed of waste to the WTP.

To ensure safety of the project a mockup was developed and exercises were thoroughly reviewed with all members of the work crew. Changes were made to the work packages based on the lessons learned.



Stack extensions aim to reduce worker exposure

Two exhauster stack extensions have been installed on ventilation systems in C Farm to help disperse tank waste vapors away from worker breathing space.

The existing stacks are seventeen feet tall. The extension adds another 23 feet, bringing the total stack height to 40 feet. The extensions were designed by the WRPS Engineering organization as part of the Vapor ALARA program that is intended to reduce worker exposure to tank waste vapors.

The stacks won't eliminate odors but they will help improve conditions in the farm. Computer modeling shows that there should be an additional 80 percent reduction in the concentration of chemicals in the worker breathing space.



Stack extensions have been placed on two ventilation systems in Hanford's C Tank Farm to move tank waste vapors well above worker breathing space. The 23-foot extensions are expected to reduce vapor concentrations by up to 80 percent.

WRPS supports WSU Tri-cities growth

Washington River Protection Solutions has contributed \$450,000 to build and maintain science and engineering programs at Washington State University Tri-Cities.

WRPS will provide the money over the next three years to the WSU Tri-Cities Signature 2020 fundraising campaign. The campaign goal is for WSU Tri-Cities to become a destination campus for science and engineering. This gift will support the hiring of a WRPS Faculty Fellow in Engineering.

The latest pledge brings WRPS' total gift to WSU Tri-Cities to \$700,000 over the past seven months. Quality higher education opportunities, especially in technical fields are critical to the success of the company's environmental cleanup mission and the community's overall economic health and vitality. This is the first time a professor at WSU Tri-Cities has been sponsored by a community donation in this manner.



WRPS Workforce Resources Manager Dom Sansotta announces a \$450,000 contribution to WSU-Tri-Cities. The donation will fund a new engineering faculty position at the campus.

Local small business benefits from WRPS subcontracts

Fiscal Year 2010 has been a good year for small businesses in general and local small businesses in particular doing business with Washington River Protection Solutions. The company awarded more than \$50 million to local small businesses for a wide variety of products and services. That was an increase of \$18 million over the previous year. Regionally, the amount spent with small businesses topped \$54 million, nearly double the amount spent in FY09.

New protective barrier installed over tank farm

Washington River Protection Solutions has completed the installation of an asphalt barrier over what is known as the TY Tank Farm. The nearly \$3 million project was funded with money provided by the American Recovery and Reinvestment Act.

TY Farm, constructed in 1951, contains six underground storage tanks. Five of the six tanks are classified as assumed leakers. The interim barrier covers the entire TY Farm and is designed to prevent rain and snow melt from percolating into the soil and pushing contaminants deeper into the soil or to the water table. The barrier built over TY Farm is similar in function to an interim barrier that was constructed two years ago over portions of nearby T Farm. It will remain in place until a decision is made as to the best way to deal with the soil contamination.

Precipitation collected on the barrier will flow to an evaporation basin just outside the farm. The basin was excavated and lined with a geo-membrane material to prevent it from leaking. The basin was then covered with soil and planted with native grasses to take up the moisture.



An interim barrier was installed over TY Farm. Moisture collected on the barrier is diverted to a retention basin that is filled with soil and planted with native vegetation.

Recovery Act Recap

With more than a year of experience now under its belt, Recovery Act (RA) work is in full swing at Hanford's tank farms. Of the \$326 million in RA funds awarded, Washington River Protection Solutions has spent nearly \$140 million through August 2010. This funding has allowed WRPS to improve and upgrade tank farm infrastructure, extend the life of essential nuclear operating facilities, and prepare to provide a consistent feed of high-level waste to the Waste Treatment Plant (WTP) for processing and storage. The money also helps create a safer, more efficient workplace for WRPS employees.



Recovery Act funds tank mixing and sampling demonstration

A new tank waste mixing platform at Hanford is up and running, helping engineers understand how to accurately sample and consistently feed large batches of high-level waste to the WTP now under construction. Two instrumented mixing tanks, built and housed at a local small business near the Hanford site, provide data on waste particle concentration and distribution throughout the tank. The testing aims to break up the sludge, mix it to distribute the solid particles, and deliver consistent 150,000-gallon batches of waste to the WTP.



A new tank waste mixing test platform is gathering data on waste particle concentrations and distribution throughout the tank. The information will be used to decide how to accurately sample and consistently feed large batches of high-level waste to the Waste Treatment Plant.

RA-funded upgrades improve monitoring of Hanford tanks

Workers have successfully installed a corrosion probe into another one of Hanford's double-shell tanks, an upgrade that is important to monitoring waste chemistry and potentially reducing the cost of treating tank waste. The probe is a 50-foot long piece of monitoring equipment installed in the tank that provides a real-time measurement of the impact of waste on the integrity of the tank. Sensors installed at various points along the probe help measure chemical makeup of the waste and simulate the expected



Workers successfully installed a probe into tank AW-104 to monitor tank chemistry, an important upgrade to ensure the long-term integrity of the storage tanks.

corrosion rate of the tank wall. This monitoring system provides confidence that Hanford's double-shell tanks can safely store high-level radioactive waste during the time it is waiting to be processed for disposal.

RA-funded crane provides lift to tank waste retrieval at Hanford

A state-of-the-art, 135-ton all-terrain crane will provide a big lift to tank waste retrieval efforts at Hanford. The crane—purchased with nearly \$2 million in RA funding—will be used to hoist the Mobile Arm Retrieval System (MARS) up and into Hanford's aging single-shell tanks.



A 135-ton crane purchased with Recovery Act funding will see a lot of use in Hanford tank farms in support of waste retrievals. The new crane will save up to \$35,000 a week in rental costs.

MARS is a remotely operated, articulating arm installed on a mast in the center of a tank that will use high-pressure water nozzles to break apart waste and rake it towards a centralized pump for retrieval. The crane will support a number of other projects, with a cost savings of about \$35,000 a week in crane rental fees.



MARS

RA funds important transfer line upgrade

Crews at Hanford are using RA funds to replace eight pipe-in-pipe transfer lines that no longer meet regulatory requirements. The new transfer lines are necessary to safely transfer waste during retrieval, blending, and delivery operations. The project supports the long-term mission of the tank farms by accelerating essential upgrades needed to prepare the farms for delivery of waste to the WTP.