

# Hanford Tank Cleanup Update

April 2011

**Improved tank  
access sets stage  
for accelerated  
retrieval**

*Access to Hanford's single-shell radioactive waste storage tank C-107 was significantly improved when workers completed the cut of a 55-inch diameter hole in the top of the tank. The core and its associated cutting equipment were removed from the tank and encased in a plastic sleeve to prevent any potential spread of contamination. The larger tank opening will allow use of a new more efficient robotic arm to complete tank retrieval.*

# Focus continues on waste retrieval

## Accelerating tank waste retrieval

WRPS is using innovative techniques and technologies to accelerate retrieval of waste from single-shell tanks. During the past two years, WRPS has initiated or completed waste retrievals to the limits of technology in multiple single-shell waste tanks.

In FY11 WRPS will re-enter one of these tanks (C-108) to complete removal of the bottom layer known as the heel. Also during FY11 we will do the necessary above-ground construction work that will allow us to enter three additional tanks (C-104, C-109, C-110) in FY12 to complete retrievals.

Retrieval of waste requires extensive planning and construction activities that include design work, installation of a variety of infrastructure such as piping and electrical systems and transfer lines. Planning is also performed to keep dose rates to our workers as low as reasonably achievable and protect them from all hazards.

## 55-inch hole cut in the top of single-shell tank C-107



*Single-shell tank C-107*

a rate of approximately three gallons per minute at a pressure of 48,000 psi. The equipment is commonly used in the concrete coring industry and took about 23 hours to complete the cut.

The MARS unit will be installed in the spring. Retrieval of waste from C-107 is planned to begin this summer.

A 55-inch diameter hole was successfully cut in the top of underground single-shell tank C-107, greatly improving access to install the Mobile Arm Retrieval System (MARS) that will be used to remove approximately 247,000 gallons of radioactive and chemical waste.

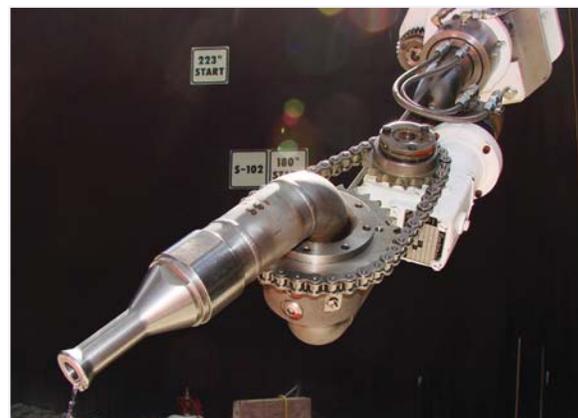
More than a year of planning and rehearsals went into preparing for the project. The hole is the largest ever cut in an active DOE radioactive waste storage tank.

The hole was cut through 15 inches of concrete and steel using conventional technology that employed high-pressure water with a fine grit of garnet. Water flowed through the cutting equipment at

## New hardware will improve tank waste retrieval

A new type of nozzle may become the standard sluicing apparatus to retrieve waste from Hanford's single-shell radioactive waste storage tanks. Sluicers are like fire hose nozzles. They spray liquid onto waste solids to mobilize them so they can be pumped.

The new sluicers have improved movement capabilities and are mounted on robotic arms that will be able to extend the nozzles further into the tank than previous systems. This puts them closer to the waste than existing sluicers so they can reach portions of the tank that are not now accessible. When fully extended, they will reach about 30 feet into the tank, delivering more spraying power than current equipment.



*New sluicer nozzle*

## Waste retrieval resumes in tank C-104

Waste retrieval from single-shell tank C-104 resumed in February following the successful removal of an obstacle at the bottom of the tank. The obstruction, directly below the pump, prevented it from being lowered all the way to the bottom and brought retrieval to a halt last year after 75 percent of the waste had been removed.

To remove the obstacle a robotic arm known as the Articulating Mast System was inserted into the tank and successfully moved the obstruction aside, allowing the pump to resume retrieval. By the end of March approximately 89 percent of the waste had been removed.



*Articulating Mast System*

## Discussions begin to close C Farm

A dialogue has been initiated with stakeholders and other interested parties to discuss long-term plans to close C Tank Farm in Hanford's 200 East Area once its waste tanks are empty. C Farm is slated to be the first tank farm to be closed under terms of the Tri-Party Agreement which governs Hanford cleanup, and even though closure is not slated until 2019, the time to start talking about it is now.



*C Farm*

Multiple steps are required to close a tank farm and the process will involve the public. These steps take time and it is essential that the process begin now in order to complete the work on time.

The draft environmental impact statement currently in review calls for what is termed a landfill closure, meaning the tanks would be emptied, then filled with grout and the entire farm would be covered with an impermeable layer of material followed by several feet of clean soil. Other options, including digging up contaminated soil and removing the tanks, are also up for consideration.

Efforts to locate and understand the extent of soil contamination in C Farm have been under way for some time and a number of analyses are also taking place that will determine how much, if any, contaminated soil would have to be removed under any closure scenario.

C Farm contains 16 single-shell tanks built between 1946 and 1953. Seven of the tanks are categorized as assumed leakers.

## Organization links projects with WRPS' long-term mission of waste vitrification

WRPS is putting into place the systems necessary to help transition the Waste Treatment Plant (WTP) from design, construction and commissioning to operations.

In addition to safely managing Hanford tank waste, WRPS has a long-term operations mission that includes preparing to operate the world's largest radioactive waste treatment plant. The massive facility is currently under construction near the center of the Hanford Site. The WTP is designed to treat and immobilize Hanford's tank waste by turning it into a sturdy glass waste form through a process called vitrification. This process has proven an effective solution at other Department of Energy (DOE) sites for immobilizing radioactive waste and making it resistant to the environment while its radioactivity decays.

Hanford's tank waste presents a particularly tough challenge because of the various types of waste and chemicals involved and the different consistencies of the waste itself. The Waste



*Waste Treatment Plant*

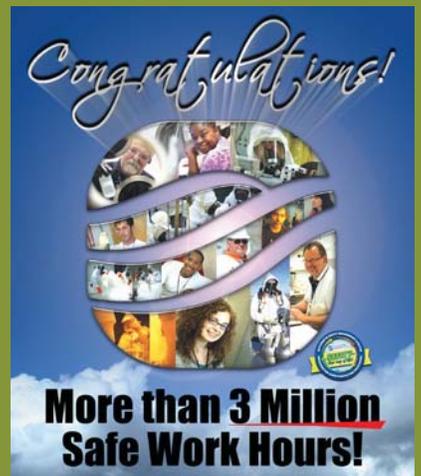
Treatment Plant Support Organization is preparing now to be able to feed the WTP a consistent and reliable diet of high-level radioactive waste once the plant starts operations. But getting to that point takes a lot of planning and years of dedicated work.

WTP Support is focusing on six major categories: strategic planning, technology development, WTP integration and readiness, waste feed delivery, WTP product & secondary waste management and disposition, and supplemental waste treatment.

## WRPS employees set all-time safety record

For the first time since Hanford's tank farms were made a separate project in 2000, tank farm employees worked more than 3 million hours without a lost workday injury. Tank farm employees worked from April 2010 into January 2011 without a lost workday injury.

WRPS has more than 1,600 employees and is responsible for a wide range of activities including operating the 222-S Laboratory and the 242-A Evaporator – the only operating nuclear facilities at Hanford. The company is also responsible for managing 53 million gallons of high-level radioactive and chemical waste stored in 177 underground tanks and preparing the infrastructure necessary to feed it to the Waste Treatment Plant for processing.



## Recovery Act funding advances work at tank farms



*A rheometer is a device used to measure the way in which a liquid, suspension or slurry flows in response to applied forces.*



*Vacuum alternative for Mobile Arm Retrieval System (MARS)*



*Tank waste transfer lines*

### Recovery Act helps modernize critical Hanford laboratory

Washington River Protection Solutions celebrated the completion of \$15 million in Recovery Act (RA) projects at Hanford's 222-S Laboratory, a mission-critical facility that analyzes radioactive waste.

Recent changes at the lab include new analytical equipment, a climate-controlled storage facility, energy-efficient lighting, and more office space. Upcoming RA projects will convert the heating system from steam to an environmentally friendly electric system and replace aging buildings with new facilities.

An additional \$17 million in RA funds will be used in fiscal year 2011 to tackle additional upgrades at the lab, which is essential to tank-waste retrieval and delivery efforts at Hanford. The RA-funded projects are on track to be completed by September 2011.

### RA-funded technology aims to improve waste removal from Hanford tanks

Using money provided by the Recovery Act (RA), Washington River Protection Solutions is developing a new vacuum retrieval system that may speed up the removal of waste from some of Hanford's single-shell storage tanks.

The vacuum system is the next development in the Mobile Arm Retrieval System (MARS), a remotely operated, telescoping arm mounted on a mast in the center of the tank. MARS is capable of reaching all parts of the tank and is articulated, allowing it to maneuver around obstacles.

The new vacuum system is mounted on the MARS and creates the necessary suction by injecting an upstream flow of high-pressure liquid through the intake pipe, creating a vacuum strong enough to effectively retrieve tank waste. This design means the system can vacuum waste out of tanks without using large volumes of liquids. In tanks that are known or suspected to have leaked, retrieval equipment that uses less liquid is desirable.

### Transfer lines upgrade project more than a quarter complete

Workers have removed two of eight waste transfer lines that no longer meet regulatory requirements from a Hanford tank farm. Over the course of the project, crews will extract more than 700 linear feet of pipe. The old lines will be sent to a nearby facility for disposal. Crews will install new and refurbished lines connecting the underground waste storage tanks.

The project, funded by more than \$16 million from the Recovery Act, is slated for completion in August 2011. The project supports the long-term mission of the tank farms by accelerating essential upgrades needed to prepare the farms for safe and reliable delivery of waste to the Waste Treatment Plant.