

# Hanford Tank Cleanup Update

January 2012

*Crews install a modified sluicer with an extended reach into Tank C-112 to retrieve waste from the single-shell tank.*

# Double-duty: WRPS retrieves waste from two tanks

*The MARS turntable and mast were lowered through a 55-inch diameter hole cut in the top of the tank.*

For the first time since the 1980s, WRPS is retrieving waste simultaneously from two waste tanks.

Crews began retrieving waste from C-112, a single-shell tank containing 104,000 gallons of radioactive and chemical sludge, in December. Workers are also soaking the 10,000 gallons of concrete-like solids remaining in tank C-108 so they can be broken down into a liquid and pumped out.

“This is the first time we’ve delved into multiple tanks at the same time in quite a while,” says Retrieval & Closure Manager Kent Smith. “This is going to become the new norm as we accelerate our pace to meet the consent decree commitment of having all C Farm tanks emptied by the end of 2014.”

WRPS is using a new technology known as enhanced-reach sluicing to remove waste from tank C-112. A high-pressure stream of liquid is being sprayed at about 100 gallons per minute through a telescoping arm onto a hard waste layer several inches thick covering the mud-like waste.

Tank C-108 is undergoing a three-phase chemical dissolution process to break down the solid waste so it can be pumped from the tank.

## Mobile Arm Retrieval System used for waste retrieval

The innovative Mobile Arm Retrieval System (MARS) is being used to retrieve waste from tank C-107. MARS is a remotely operated, telescoping arm installed on a mast in the center of the tank. It uses multiple technologies to scrape, scour and rake the waste toward a pump for removal. During a four-week period, MARS removed 67,000 gallons of waste, or 27 percent of the volume in C-107. Retrieval stopped when a pump used to transfer the waste to a double-shell tank failed. A new pump will be installed in February.



*Valve pit refurbishment.*



## 222-S Laboratory wins DOE award for Recovery Act-funded upgrades

WRPS received an Environmental Star, or E-Star, award from the Department of Energy for upgrades made to the 60-year-old 222-S Laboratory that minimize waste, increase energy efficiency and prevent pollution.

WRPS received the award, which recognizes the project in the DOE complex that best typifies energy-efficient design, use of recycled materials, energy consumption reduction and other environmentally sustainable practices.

The award was given for more than \$15 million in projects completed at the lab that included additional office space, a large administration building, a climate-controlled storage facility, roof replacement, light replacement, lab upgrades and HVAC replacement. "Green thinking" was part of the design and construction process to minimize the impact on the environment. For example, several of the buildings use awnings to reduce glare and large windows to take advantage of natural light. The insulation and siding are made from recycled materials and the landscaping uses native plants that require less water to survive.

The 222-S Laboratory is a full-service, analytical facility handling samples of highly radioactive tank waste. Samples are tested to ensure waste compatibility and the presence of physical characteristics essential to tank transfers, corrosion rate studies and evaporator campaigns.



*New 222-S Laboratory office building.*

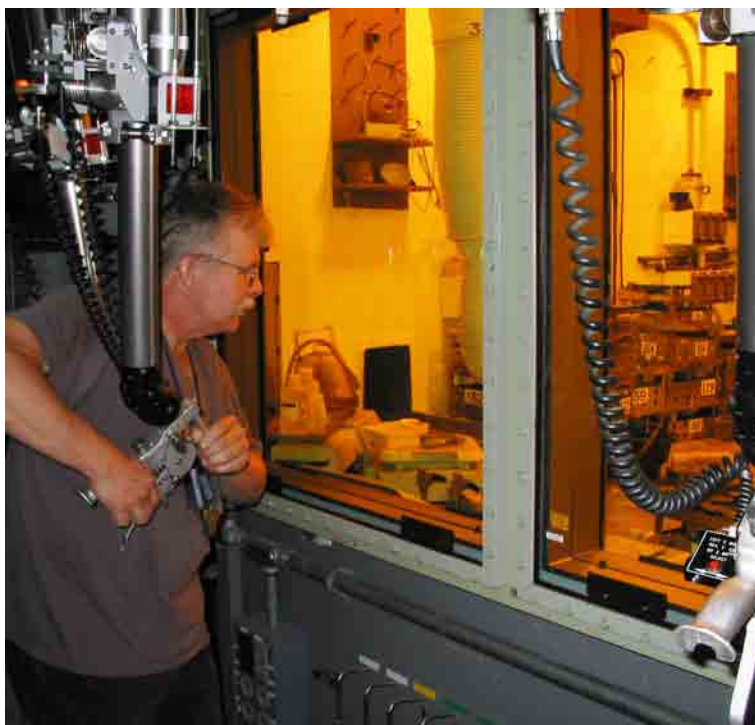
## New manipulator installed in 222-S Laboratory hot cell

A new manipulator, used to remotely handle samples of high-level radioactive tank waste, was recently installed in one of the 222-S Laboratory's 11 hot cells.

Hot cells are sealed rooms that are shielded to protect workers from radiation exposure. Operators use complex electro-mechanical manipulators to remotely handle the waste samples from outside the hot cell.

The 700-pound manipulators are carefully balanced to allow skilled operators to perform delicate tasks inside the hot cells.

The 222-S Laboratory plays many roles, including testing of waste compatibility and physical characteristics to support tank-to-tank waste transfers and performing corrosion rate studies and chemical testing to support tank corrosion inhibition. The laboratory also studies the physical and chemical characteristics of waste to provide data to support tank-closure requirements, and supports the studies of ground contamination.



*Operators use manipulators to handle highly radioactive samples in hot cells.*

# Waste Treatment Plant support gains momentum

The latest update of the River Protection Project System Plan, the strategic plan that outlines the Office of River Protection's mission to retrieve and treat Hanford's tank waste and close the tank farms, was recently released.

The System Plan shows how the Waste Treatment Plant (WTP), together with a second Low-Activity Waste Vitrification Facility and other small-scale processes, will treat all the Hanford tank waste by the 2047 Tri-Party Agreement deadline. It is the technical basis for the WRPS schedule and budget baseline and outlines how DOE is working to protect the Columbia River.

The System Plan evaluates the schedule and cost baseline and measures it against specific criteria, such as budget, schedule, life-cycle cost, and Tri-Party Agreement milestones. It also compares the life-cycle cost of different scenarios to the baseline and evaluates their risk on achieving the overall mission.

Key issues and uncertainties are identified in the plan that must be addressed to ensure the success of the tank waste cleanup mission, including the ability to sustain single-shell tank waste retrievals; managing storage space in double-shell tanks, and reliably and consistently feeding tank waste to the Waste Treatment Plant.

The plan also provides input for future decisions on supplemental pretreatment of tank waste and treatment of low-activity waste; accelerated startup of the Low-Activity Waste Vitrification Facility; options for improved double-shell tank space management; greater efficiencies for tank waste retrieval; analysis of equipment reliability, availability and maintainability, and continued improvement and evaluation of waste glass formulations.

## Design begins on facility to treat WTP liquid waste

A major project is being designed to treat about 10 million gallons of liquid effluent a year that will be generated by the vitrification plant. The Secondary Liquid Waste Treatment Project is a major upgrade to the existing 200-Area Effluent Treatment Facility.

About 90 percent of the secondary liquid waste will come from evaporators at the WTP Pretreatment facility, with the remaining waste from the Low-Activity Waste Vitrification Facility's off-gas treatment system. The effluent will contain both radioactive and hazardous materials that will require treatment prior to disposal on the Hanford site.



*The existing 200-Area Effluent Treatment Facility will be upgraded to treat WTP secondary waste.*

## Interim Hanford Storage project being designed

A major project critical to the operation of the Hanford Waste Treatment Plant is moving from the idea stage to reality. The Interim Hanford Storage project will store the first 4,000 canisters of immobilized high-level radioactive waste glass produced by the vitrification plant -- enough to support about 10 years of operation.

The facility will use an open rack to store the 15-foot long, two-foot diameter canisters of waste, which require remote handling. The Interim Hanford Storage building will be 218 feet wide, 300 long and 50 feet high and contain twin vaults with independent vault cranes.

The vitrification plant will mix high-level waste with silica and other glass-forming materials and heat it to 2,100 degrees F. in an electric melter. The molten waste/glass mixture will be poured into stainless-steel canisters that will weigh about four tons.

## SY transfer lines replaced and upgraded

Crews at Hanford's SY Tank Farm have finished work to remove and replace eight underground waste transfer lines that will play an integral part in carrying waste from Hanford tank farms to the Waste Treatment Plant (WTP).

Workers replaced 765 feet of pipe and excavated 750 cubic yards of soil. The project required extensive engineering and planning to minimize exposure of workers to high radiation levels. Workers had to make sure the old transfer lines were clear of any liquids and potentially hazardous chemical vapors prior to cutting them. Then, using the Guzzler—a truck equipped with a high-powered vacuum—workers excavated the old lines, removed the surrounding insulation and monitoring equipment, and installed glove bags to contain the lines as they were cut and removed from the trenches.

The removed lines were sent to Hanford's Environmental Restoration Disposal Facility for burial. New lines, connectors and control systems were then installed.

The SY transfer-line project was funded by the Recovery Act and supports the long-term mission of the tank farms by accelerating essential upgrades needed to prepare the farms to deliver waste to the WTP.



*Workers contained old transfer lines in glove bags as they were cut and removed from the trenches.*



### National DOE Award given to WRPS Procurement Services manager

WRPS awarded more than \$155 million in subcontracts to 327 companies in Fiscal Year 2011. Almost 65 percent, or \$101 million, was awarded to small businesses, exceeding the company's goal. About \$73 million was awarded locally to companies located in Benton, Franklin, Yakima and Walla Walla counties.

WRPS Procurement Services Manager John Robinson was named the Management & Operations Procurement Director of the Year by DOE's Office of Small and Disadvantaged Business Utilization. The award

recognizes Robinson for his leadership and commitment to maximizing small business utilization through policies, procedures and outreach to create a small-business-first atmosphere throughout their organization.

"John's leadership of the WRPS procurement program has resulted in a significant increase in the number of opportunities for small businesses at Hanford," said Susan Johnson, Small Business Program manager and contracting officer for the DOE Office of River Protection. "He views small businesses as our teaming partners. They provide much-needed talent, skills and resources that help support our mission."

# WRPS sets safety records in Fiscal Year 2011

WRPS had record-setting safety performance in fiscal year 2011. Tank farm employees:

- worked three million hours without a lost work-day
- achieved the lowest average “days away” rate in tank farm history
- worked more than one million hours without a recordable injury

Since WRPS assumed the Hanford Tank Operations Contract responsibilities in October 2008, the recordable injury rate has decreased 43 percent. During the same time period the lost work-days rate decreased by 30 percent.



## Tank farm Recovery Act work successfully completed

Recovery Act (RA) work at Hanford’s tank farms is now complete with WRPS finishing nearly \$326 million worth of work and 100 percent of its key milestones by the Sept. 30 deadline.

WRPS used RA funding to upgrade tank farm infrastructure, extend the life of critical operating facilities and prepare to feed waste to the Waste Treatment Plant. State-of-the art technologies were developed to retrieve and consolidate tank waste. Systems to mix and sample tank waste so it can be consistently fed to the vitrification plant were also tested.

“In April 2009, the charge given to ORP to spend Recovery Act funding in just two-and-a-half short years seemed almost insurmountable,” said ORP Deputy Federal Project Director for Recovery Act Isabelle Wheeler. “Our workforce took on the challenge and did what some considered impossible – they immediately put the funding to good use, accomplishing a record amount of tank waste cleanup in that time.”

Over the course of the two-and-a-half year ARRA program, WRPS issued 850 subcontracts totaling more than \$152 million with nearly 76 percent of that total awarded to small businesses.



*MARS turntable being installed on test stand.*



*Tank waste mixing demonstration project.*