



washington **river**
protection solutions

2013

Annual Review



A URS-led company of URS, Energy Solutions, and AREVA



Overcoming Challenges

Moving the mission forward

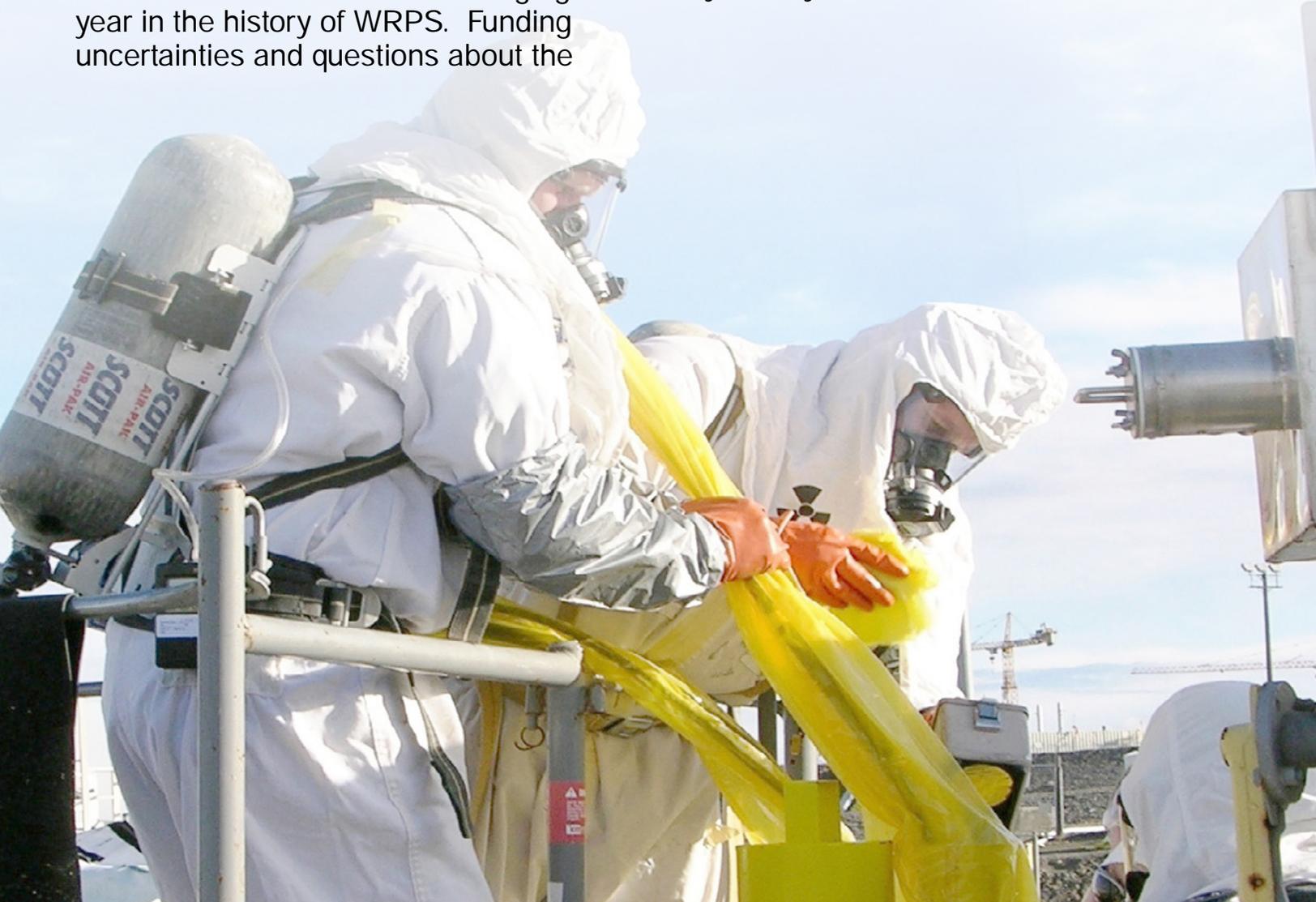
The mission of Washington River Protection Solutions (WRPS) is to safely manage the 56 million gallons of high-level radioactive waste in Hanford's 177 underground waste tanks while ensuring the safety of its workers, the public and the environment; safely and efficiently retrieve waste from the tanks, and prepare to reliably feed tank waste to Hanford's Waste Treatment Plant for immobilization.

Fiscal 2013 was the most challenging year in the history of WRPS. Funding uncertainties and questions about the

long-term integrity of tanks challenged the workforce in new ways. Despite this, fiscal year 2013 was a successful year.

WRPS accomplished much in the areas of safety, waste retrieval, efficiency improvements, and environmental protection.

At year end, the Department of Energy extended WRPS' original five-year contract by three years.



FY 2013 Year in Review

Working Safely

Safely worked more than 7 million hours without a lost-workday injury; an achievement unprecedented in the long history of Hanford's tank farms.



Retrieving Tank Waste

Continued to make progress in retrieving waste from C-Farm tanks and deployed new technologies to retrieve complex waste.



Improving Efficiency

Modernized old infrastructure with new computerized control systems.



Supporting the Waste Treatment Plant

Supported the development of the Department of Energy's plan for completing the Waste Treatment Plant.



Partnering with the Community

Improved the region's quality of life by supporting education, small businesses, and local social service groups.



Protecting the Environment

Employed state-of-the-art technologies to map and characterize legacy soil contamination.





Safely managing the tank farms

Performing work safely is a top priority for WRPS. Hanford's tank farm employees work in an environment that contains a number of hazards, including radiological and chemical hazards. They routinely work outdoors in the summer heat and bitter winter cold.

Despite the hazards, tank farm employees completed a record in fiscal 2013 that was unprecedented in the 70-year history of Hanford's tank farms: they worked more than 7 million hours without an accident serious enough to take time off work.

- Installed a proprietary Slip Simulator to train employees on how to safely maneuver during icy conditions, addressing a major cold-weather safety issue.
- Completed major upgrades to double-shell tank ventilation systems to address flammable gas safety concerns, including installing sample ports in ventilation exhaust to directly measure gases from the tank waste in the tank ventilation outlet.
- Implemented an improved asbestos abatement work plan to more easily identify and remediate hazards and speed tank work.
- Completed Safety Trained Supervisor national certification for 56 employees that ensures their proficiency in recognizing hazards, complying with regulations, training employees and correcting deficiencies.
- Assessed tank farms' safety culture, safety procedures and behaviors and implemented improvements.





Retrieving tank waste

Retrieving waste from Hanford's single-shell tanks and transferring it to newer, safer double-shell tanks is necessary to prepare to feed tank waste to the Waste Treatment Plant. Hanford's waste is a complex mixture of radioactive material and hazardous chemicals. Physically, the waste is a mix of liquid, sludges and saltcake that forms layers in the tanks.

Sludge, which varies from fine silt to sand and gravel, settles to the bottom of the tanks. The weight of the waste forms a rock-hard layer of sludge on the bottom of the tank called a heel.

Retrieval work is currently focused in C Farm, one of 18 tank farms at Hanford. Of the 16 tanks located in C Farm, 10 have been emptied, one is nearly complete and work continues on three additional tanks.

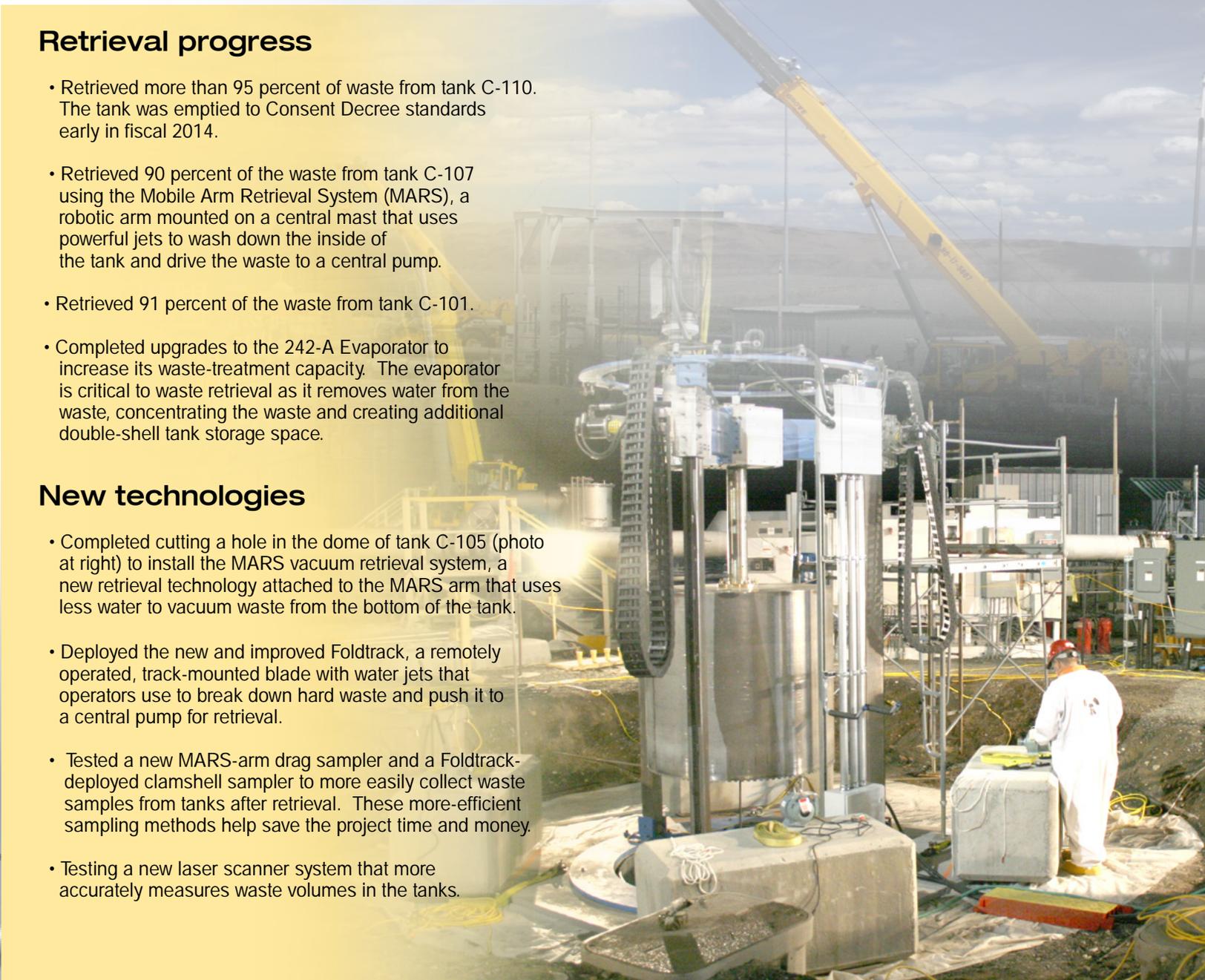
WRPS is developing, testing and implementing a tool box of retrieval technologies to overcome the challenges posed by Hanford's tank waste. Several different retrieval technologies are deployed in tanks depending on their waste characteristics.

Retrieval progress

- Retrieved more than 95 percent of waste from tank C-110. The tank was emptied to Consent Decree standards early in fiscal 2014.
- Retrieved 90 percent of the waste from tank C-107 using the Mobile Arm Retrieval System (MARS), a robotic arm mounted on a central mast that uses powerful jets to wash down the inside of the tank and drive the waste to a central pump.
- Retrieved 91 percent of the waste from tank C-101.
- Completed upgrades to the 242-A Evaporator to increase its waste-treatment capacity. The evaporator is critical to waste retrieval as it removes water from the waste, concentrating the waste and creating additional double-shell tank storage space.

New technologies

- Completed cutting a hole in the dome of tank C-105 (photo at right) to install the MARS vacuum retrieval system, a new retrieval technology attached to the MARS arm that uses less water to vacuum waste from the bottom of the tank.
- Deployed the new and improved Foldtrack, a remotely operated, track-mounted blade with water jets that operators use to break down hard waste and push it to a central pump for retrieval.
- Tested a new MARS-arm drag sampler and a Foldtrack-deployed clamshell sampler to more easily collect waste samples from tanks after retrieval. These more-efficient sampling methods help save the project time and money.
- Testing a new laser scanner system that more accurately measures waste volumes in the tanks.





Improving efficiency

Hanford's tank farms date back to World War II. WRPS is upgrading the aging tank-farm infrastructure and systems, including equipment, buildings, facilities and processes, to improve efficiency and to prepare to feed tank waste to the Waste Treatment Plant for immobilization.

Process-control computer systems and process-software applications, including wireless technology, are being installed to improve and modernize operations. These systems control leak detection, waste level measurements, tank temperature and pressure monitoring, ventilation systems and support waste-transfers.

These systems will be connected to a new central state-of-the-art control room that uses a software package that will interface with the Waste Treatment Plant software.



- Refurbished an office building to house a new Centralized Process Monitoring control room for tank farms, eliminating six separate and outdated control rooms.
- Installed a new building for for C-Farm workers to change into protective clothing. The new facility speeds work and improves worker safety
- Improved tank farm operations by installing an Operator Training Simulator to train workers who operate tank exhaustor systems.
- Updated the 1970s-era 242-A Evaporator to improve its reliability and efficiency and to meet the latest DOE safety standards.
- Upgraded analytical equipment at the 222-S Laboratory used to analyze tank-waste samples for waste retrievals, transfers and tank corrosion control.
- Implemented a new engineering software program to streamline work reviews and work flow.
- Completed a comprehensive review of field work processes and functions, and implemented 60 improvements.



Supporting the Waste Treatment Plant

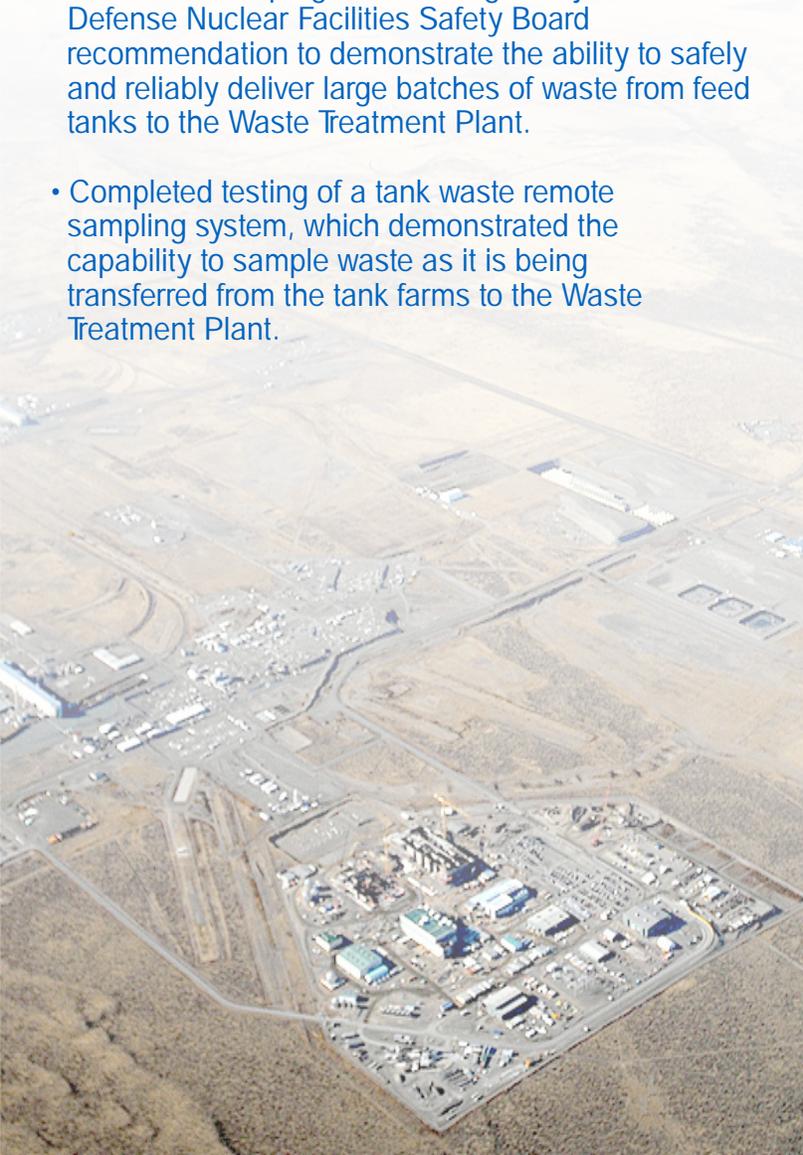
An integrated project team is made up of employees from WRPS and Bechtel National, Inc., the designer and builder of the Waste Treatment Plant. The team was established to integrate the tank farms with the Waste Treatment Plant to manage risk-based decision-making and implement mission-based solutions to support the startup and operations of the vitrification plant.

- Supported the development of DOE's "Hanford Tank Waste Retrieval, Treatment and Disposition Framework" for addressing the risks and challenges of treating tank waste and completing the Office of River Protection's mission.
- Completed the Tank Waste Mixing Demonstration program, meeting a major Defense Nuclear Facilities Safety Board recommendation to demonstrate the ability to safely and reliably deliver large batches of waste from feed tanks to the Waste Treatment Plant.
- Completed testing of a tank waste remote sampling system, which demonstrated the capability to sample waste as it is being transferred from the tank farms to the Waste Treatment Plant.

Partnering with the community

WRPS and its employees' support of community initiatives is broad, focusing on education, business support and quality of life. Since 2008, WRPS has contributed more than \$4 million to community events and initiatives. Highlights from fiscal 2013 include:

- Met a range of community needs by donating more than \$225,000 in employee contributions plus a \$100,000 company donation to the United Way of Benton and Franklin Counties.
- Provided \$150,000 to Washington State University Tri-Cities for scholarships, engineering faculty support, student internships and laboratory equipment.
- Donated \$125,000 to Columbia Basin College for scholarships, worker retraining and nuclear technology curriculum.
- Supplied \$75,000 to modernize and expand Kadlec Regional Medical Center's neonatal intensive care unit.
- Gave more than \$50,000 to Tri-Cities Regional Chamber of Commerce programs that strengthen local small businesses.
- Donated \$150,000 to the Washington State STEM Education Foundation to support construction of Delta High School. The donation will help improve education in science, technology, engineering and math.



Courtesy of Tri-City Herald and photographer Kai-Huei Yau



Protecting the environment

More than 60 of Hanford's 149 single-shell tanks have leaked waste to the surrounding soil. Additional soil contamination was caused by discharges of liquid waste to the soil during past plutonium production operations. Monitoring and tracking of this legacy contamination in the vadose zone, the area of soil between the surface and the water table, is essential to protect the environment.

- Used direct-push technology to investigate soil around single-shell tanks known to have leaked in the past. This technology is used to identify and map soil contamination.
- Tested soil vapor extraction technology to remove contaminated water from soil "hot spots." The technique could help treat soil contamination before it reaches groundwater.
- Used surface geophysical exploration system to map legacy soil contamination to evaluate the need for installing surface barriers at some tank farms to prevent surface water from spreading contamination in the soil.
- Increased inspections and monitoring of double-shell tanks in the wake of the unprecedented leak from the primary tank shell of double-shell tank AY-102.
- Completed full video inspections of the annulus space between the primary and secondary shells of Hanford's six oldest double-shell tanks to ensure their structural integrity.
- Evaluated waste-level changes in 20 single-shell tanks to identify potential leaks. Confirmed that level decreases in 19 of the tanks were due to evaporation.



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