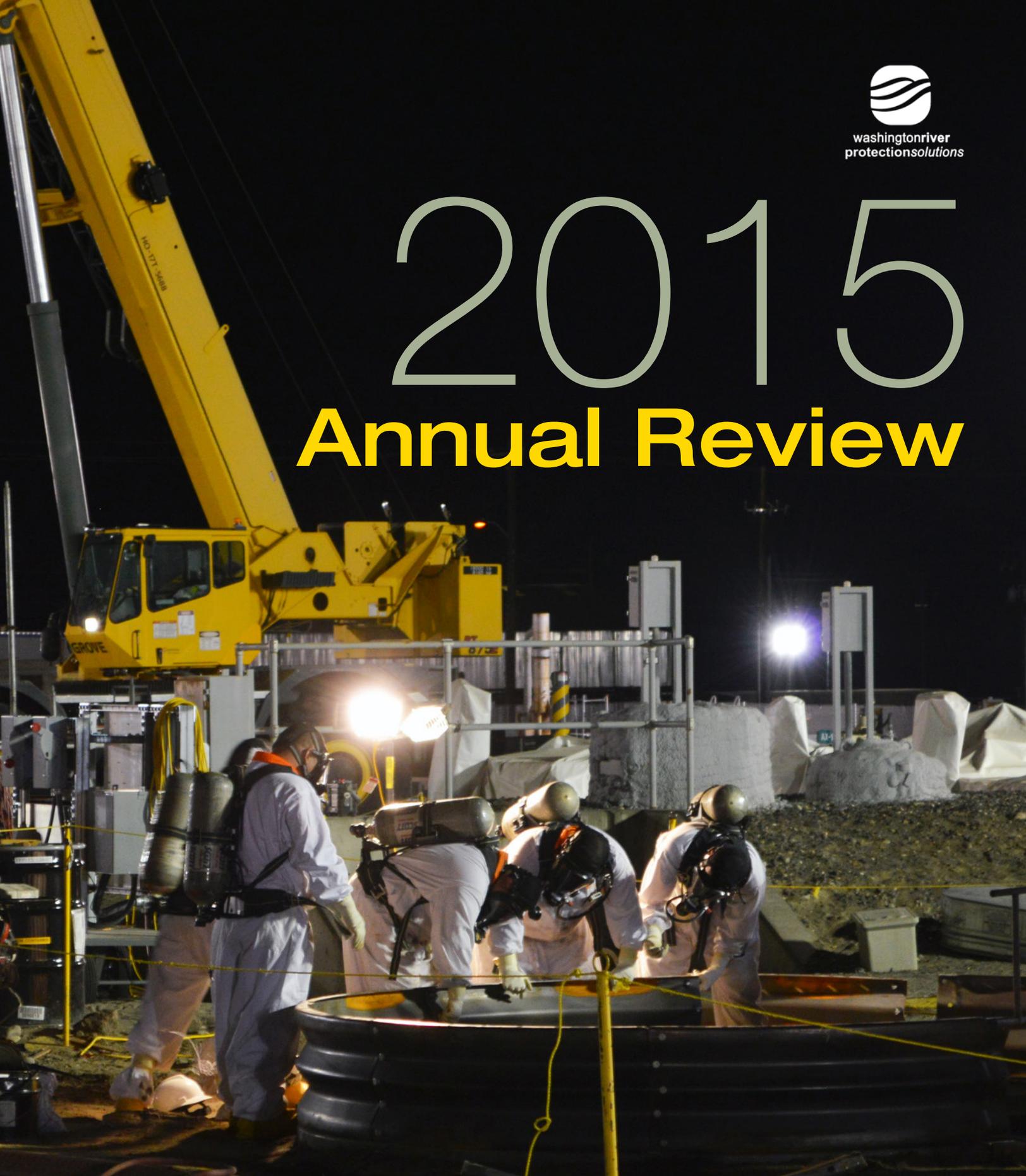




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2015

Annual Review



Hanford Tank Operations

Message From the President



Mark Lindholm
President and Project Manager
Washington River Protection Solutions

Washington River Protection Solutions (WRPS) completed a record amount of work in Fiscal Year (FY) 2015 as the Hanford Tank Operations Contractor. We completed 25 percent more work, worth more than \$100 million, than in FY 2014.

Increased funding and staffing enabled us to make significant progress on our strategic priorities. We have now completed waste retrieval from 14 of the 16 single-shell tanks in C Farm and are prepared to retrieve waste from the final two tanks.

We are also preparing to retrieve waste from tank AY-102 beginning in 2016. Retrieval of the double-shell tank, which was found to have a small leak from the primary tank into the annulus, is part of an agreement reached between the Department of Energy (DOE) and the state of Washington.

Preparations are also underway to get the infrastructure and plans in place for the next round of single-shell tank retrievals from A and AX tank farms.

Maximizing waste storage space

Maximizing available double-shell storage space is critical. A milestone was reached in 2015 when four operating campaigns were completed at the 242-A Evaporator, creating nearly 2 million gallons of available storage space in the double-shell tank system.

Prior to 2015, the evaporator underwent four years of upgrades to increase its efficiency and dependability. It is just one example of our major effort to upgrade the aging infrastructure in Hanford's tank farms.

The 222-S Laboratory is another critical operating nuclear facility. Both the laboratory and evaporator

are being upgraded and modernized to extend their operating lives.

Improvements are also being made to the Effluent Treatment Facility, which WRPS took over in April 2015, and to control rooms, exhausters, transfer systems and other vital equipment.

Preparing to feed the Waste Treatment Plant

A major milestone was reached in preparing to deliver tank waste to the Waste Treatment Plant for immobilization. In support of DOE's goal to direct feed waste to the Low-Activity Waste Vitrification Facility, WRPS completed the conceptual design of the Low-Activity Waste Pretreatment System or LAWPS.

Increasing key resources

To support our FY 2015 work scope, WRPS hired more than 500 new employees, boosting our team strength to more than 2,500, including contractors. Our hiring focused on key resources, such as engineers, operations personnel, health physics and industrial hygiene technicians, and safety professionals. I'm proud that WRPS was recognized by the state of Washington for hiring individuals with disabilities and for hiring veterans.

Maintaining one of the lowest injury rates in the DOE complex, while training new staff and increasing the work load, was a major achievement.

I am proud of everything our team has accomplished. We are well positioned to meet the challenges ahead.

Workers at Hanford's tank farms replaced funnel valves in waste transfer pits to improve waste retrieval from single-shell tanks.



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The Mission



Forty-five years of plutonium production at the Hanford Site have left a challenging legacy of the Cold War – 56 million gallons of radioactive and chemical wastes stored in 177 aging underground tanks.

The mission of the Department of Energy's Office of River Protection is to address the risks posed by the tank waste by retrieving waste, immobilizing the waste, closing the tank farms and decommissioning the treatment facilities. An integrated system of waste storage, treatment and disposal facilities is in varying stages of design, construction, operation or planning. Washington River Protection Solutions is the Tank Operations Contractor.

Enhancing Worker Safety

WRPS continued to have one of the lowest injury rates of all DOE contractors in FY 2015 and received two awards at the Voluntary Protection Programs Participants' Association (VPPPA) national conference. Along with a VPP Innovation Award for developing a tool to reduce worker radiation exposure, WRPS also received the VPP Star of Excellence as a VPP Star Site with injury/illness rates 75 percent below the national average.

A new heat-stress monitoring program, featuring real-time physiological data, was implemented in FY 2015. As the result, no employees experienced heat-related illnesses last summer.

To address chemical vapors concerns in Hanford's unique environment, WRPS has begun to implement external expert recommendations for enhancing its Industrial Hygiene (IH) program and providing enhanced protection for its workers.

The approach has two phases. In Phase 1 a range of data will be collected and evaluated and test technologies will be selected to detect, monitor and abate chemical vapors in the tank farms. Phase 2, beginning in FY 2017, will incorporate

new technology and findings from Phase 1.

Among the Phase 1 deliverables are sampling tank head spaces to further characterize chemical vapors; creating a rounds and routines program to map the tank farms to establish a baseline for vapors, and evaluat-

ing vapors detection and control technologies in the tank farms.

WRPS' state-of-the-art IH Program will continue to expand as recommendations from WRPS, DOE and external expert teams are evaluated and implemented.

Characterizing chemical vapors in Hanford's underground tanks by taking samples from the tank head space helps protect workers.



Retrieving Tank Waste

A main focus for WRPS in FY 2015 was the continued waste retrieval in C Farm. Of the 16 tanks in C Farm, 14 have now been retrieved. In FY 2015, retrieval of tank C-102 was completed with nearly 300,000 gallons of hard-to-retrieve waste removed using two different technologies.

Two additional tanks, C-111 and C-105, have been partially retrieved. In preparation for retrieving tank C-105, work crews successfully removed and replaced a plugged 40-foot long slurry distributor from tank AN-106, a double-shell receipt tank for waste retrieved from Hanford's C Farm. The slurry distributor is used to uniformly place sludge waste in the receiver tank.

In tank C-111, workers installed two new extended-reach sluicers

and completed waste-jumper and hose-in-hose transfer line connections that pave the way for C-111 hard-heel waste retrieval. The new sluicers were redesigned to address problems in earlier sluicers.

Preparations are also underway to retrieve waste from double-shell tank AY-102, which has a small leak between the inner and outer tank shells. To meet the terms of a settlement agreement with the state of Washington, WRPS will begin retrieving waste from the tank by March 2016.

Preparing AY-102 for retrieval is a major effort that presents many unique challenges

when compared to single-shell tank retrieval jobs. Before tank waste retrieval equipment can be installed, seven contaminated tank pits are being restored. Old equipment is being removed, the pits are cleaned and repaired and several coats of epoxy paint are being applied. Once the tank pits are restored, workers can install the sluicers and pumps needed for retrieval.

Tank C-105 waste retrieval using the Mobile Arm Retrieval System.



Work is continuing in C Farm, where 14 of 16 tanks have been retrieved.



Preparing for A/AX Retrieval

As WRPS works to finish retrieval of waste from tanks in C Farm, workers are also preparing for the next round of single-shell tank waste retrievals in the A and AX tank farms. The A/AX tank farms have 10 single-shell tanks containing mostly saltcake waste.

Retrieving waste from these tanks may require three different retrieval technologies: modified sluicing, chemical dissolution and the Mobile Arm Retrieval or MARS system.

Sluicing uses a fire hose-like nozzle to break up solid waste with a high-pressure liquid stream. Chemical dissolution uses a high-caustic soak to dissolve solid waste.

The MARS system consists of a mast mounted on the bottom of a turntable that extends into the tank. A boom on the mast can rotate 360 degrees and move up and down to remove hard-to-reach waste.



Workers are preparing the A and AX single-shell tank farms for retrieval that is scheduled to begin in 2017.

Before waste retrieval commences, old facilities and equipment must be removed and new and refurbished systems put into place. Work underway in FY 2015 included installing tank farm ventilation and exhaust-er systems, control-room trailers, changing-room trailers, lighting and refurbishing other vital infrastructure.

When retrieval begins in A/AX Farms in FY 2017 the lessons learned from C Farm retrieval will be incorporated into the project. By implementing these lessons learned, WRPS expects to realize substantial savings during A/AX retrieval.



Maximizing Tank Storage Space

Four operating campaigns have been completed since four years of upgrades to the 242-A Evaporator were completed in September 2014, creating a total of nearly 2 million gallons of waste storage space in Hanford's double-shell waste tanks.

Another 210,000 gallons of storage space was created by using engineering analyses to safely increase the storage capacity of tanks AP-104 and AP-107.

Since going into operation in 1977, the evaporator has removed more than 70 million gallons of water from Hanford's tank waste, reducing the volume stored in double-shell tanks and making room for waste retrieved from single-shell tanks.

Over the year, WRPS' Production Operations team, with support from Engineering, Radiological Control and Industrial Hygiene staff, along with round-the-clock support from workers in the field, transferred nearly 7 million gallons of waste between tanks and to and from the evaporator.

FY 2016 work scope is expected to increase with another three evaporator campaigns and 30 waste transfers scheduled.



Improving Vital Infrastructure

A five-year Infrastructure Stewardship Plan was initiated in FY 2015 to address the planned investment in Hanford tank farm infrastructure. The plan ensures that infrastructure-upgrade projects and maintenance activities receive the attention needed to maintain safe and compliant operations and includes the infrastructure-improvement projects that are critical to achieving the tank farm mission.

To improve overall infrastructure management, WRPS established a new Maintenance organization to reduce the backlog of preventive and corrective maintenance items, improve inventory, storage, materials, and property management, and enhanced maintenance and tracking of critical spare parts needed for safe operations.

WRPS took over managing the Effluent Treatment Facility (ETF) and associated facilities in FY 2015. The ETF receives waste water from Hanford sources and treats it to remove radioactive and hazardous chemical contaminants, but the facility hadn't operated for two years. Work crews used an innovative approach to remove a worn-out heat exchanger, saving \$1.5 million from the previous estimate. The 10,000-pound,



Workers remotely handle samples of radioactive waste in hot cells in the 222-S Laboratory in support of evaporator operations.

17-foot-long heat exchanger was removed through an existing roll-up door using a gantry and turntable, rather than through a hole in the roof using a crane.

WRPS manages two operating nuclear facilities at Hanford that are critical to the completion of the tank farms mission: the 242-A Evaporator and the 222-S Laboratory. The evaporator is needed to manage the storage space in the double-shell tanks and to process secondary waste from the Waste Treatment Plant. The 222-S Laboratory is used to analyze waste samples in support of waste retrieval, transfers, safe storage and delivery of

waste feed to the Waste Treatment Plant. Both of these facilities need to be maintained so they can continue to operate for decades to support tank-waste retrieval, treatment and disposition.

The 222-S Laboratory is undergoing continuous improvements that include upgraded analytical instruments, renovated laboratory rooms and a new climate-controlled warehouse.

Other infrastructure improvements included installing wireless communications panels in SY and AN tank farms for leak detection and temperature monitoring, replacing exhausters in AP Farm, replacing a failed pump in AY-101, and installing a transfer pump in AZ-101.

A temporary exhauster was installed on tank T-111 to evaporate more than 2,000 gallons of contaminated liquid that had collected on top of the waste.



The main heat exchanger (right) at the Effluent Treatment Facility was replaced in FY 2015. New exhausters (below) are being installed at the AP double-shell tank farm.



Improving Operations

WRPS is improving operations by identifying issues and resolving them through its Organizational Performance Improvement organization, utilizing industry best practices to continually improve WRPS operations.

Lean Management is a system of continuous improvement applied to work processes. It looks at work flow and identifies and removes inefficiencies. The company embraced LEAN Management in 2013 and in FY 2015 conducted 20 LEAN Management initiatives that identified an estimated \$13 million in cost avoidances. Results included reducing touch time in engineering spreadsheet processes; improving the issuing of self-contained breathing apparatus to field workers, and streamlining safety-issue screening processes.

In August, WRPS held the first meetings of the new Safety Culture Monitoring Panel, a subcommittee of the Executive Safety Review Board (ESRB) that reviews inputs that could be early indications of a declining safety culture and makes improvements.



WRPS utilizes Lean Management to identify inefficiencies and improve its operations.

Plans are in place to direct feed tank waste to the Waste Treatment Plant's Low-Activity Waste Vitrification Facility as soon as practicable. The facility will be capable of producing 30 tons of glassified waste per day.



Integrating with the Waste Treatment Plant

The One System organization is driving the integration of Hanford contractors and the national laboratories to enable waste treatment to begin as soon as practicable at the Waste Treatment Plant (WTP).

A major milestone was met in FY 2015 when the Department of Energy approved the conceptual design and gave WRPS the green light to proceed with preliminary design of the Low-Activity Waste Pretreatment System, or LAWPS.

Pretreatment of the tank waste will take place in below-grade vaults, where undissolved radioactive solids will be removed using filters and soluble cesium will be removed using an ion-exchange system.

Treated waste will be held in lag storage tanks until it is sampled and confirmed to meet the waste-acceptance criteria for the LAW Vitrification Facility. The facility bypasses the unfinished WTP Pretreatment Facility, where construction has been temporarily halted pending technical issue resolution.

Double-encased underground pipes will be used to transfer waste from the AP Tank Farm to LAWPS and

then to the LAW Vitrification facility. The LAWPS design includes three 75,000-gallon storage tanks for the treated LAW to allow the LAW Vitrification facility to operate at full capacity, producing about 30 tons of glass per day.

One System has developed program management tools, including an integrated flow sheet that maps how the waste moves through the system; a computer model that identifies challenges, risks and opportunities, and an integrated project schedule that brings all the elements together.

One System has also identified significant estimated lifecycle cost savings.



Conceptual drawing of the Low-Activity Waste Pretreatment System (LAWPS) facility.

Investing in 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 \$5 million to community programs and initiatives.

Highlights from FY 2015:

WRPS contributed nearly \$100,000 to various educational groups or activities, including providing local students with \$38,000 in college scholarships.

The company continued its support of local economic development and small businesses by giving approximately \$130,000 to various programs, including \$30,000 in grants up to \$2,000 to businesses for equipment, training or website development.

WRPS contributed to the health and well-being of Tri-Citians with a \$70,000 donation to the United Way of Benton and Franklin Counties and other gifts ranging from \$500 to nearly \$8,000 to several organizations, including the March of Dimes, the ARC, the Benton County Sheriff's Office and local food banks.



WRPS employees raised more than \$27,000 to fight cystic fibrosis (CF) as part of the local CF Cycle for Life event. WRPS was the top fundraising team locally and among the top in the nation.



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