



OFFICE OF
RIVER PROTECTION
United States Department of Energy

Hanford Advisory Board

U.S. Department of Energy, Office of River Protection
Agency Update

Presented by: **Kevin Smith, Manager**

June 10, 2015



Our Team

Office of River Protection (ORP)

ORP is responsible for planning, integrating, and managing the River Protection Program executed by contractors performing work under ORP overall management. ORP has 215 employees, both federal and contractor.

Washington River Protection Solutions (WRPS)

WRPS is the prime contractor responsible for safely managing and operating the Tank Farms. WRPS has 2,083 employees*.

Bechtel National, Inc. (BNI)

BNI is responsible for the engineering and construction of the Waste Treatment and Immobilization Plant.

BNI has 2,750 employees*.

Advanced Technology and Laboratories International (ATL)

ATL is the prime contractor responsible for managing the 222-S Laboratory. ATL has 73 employees.

*As of May 30, 2015





Our Mission

To safeguard the nuclear waste stored in Hanford's 177 underground tanks, and to manage the waste safely and responsibly until it can be treated in the Waste Treatment and Immobilization Plant (WTP) for final disposition.

Our Goal

To be a high performing organization that is the best in the Department of Energy's nuclear defense complex.









Legal Office of River Protection Commitments

Tri-Party Agreement

- A legally binding agreement among the U.S. Department of Energy, U.S. Environmental Protection Agency, and the Washington State Department of Ecology.



Consent Decree

- On May 11, 2015, U.S. District Court issues decision concluding that there has been a significant change in factual conditions warranting modification of the Consent Decree.

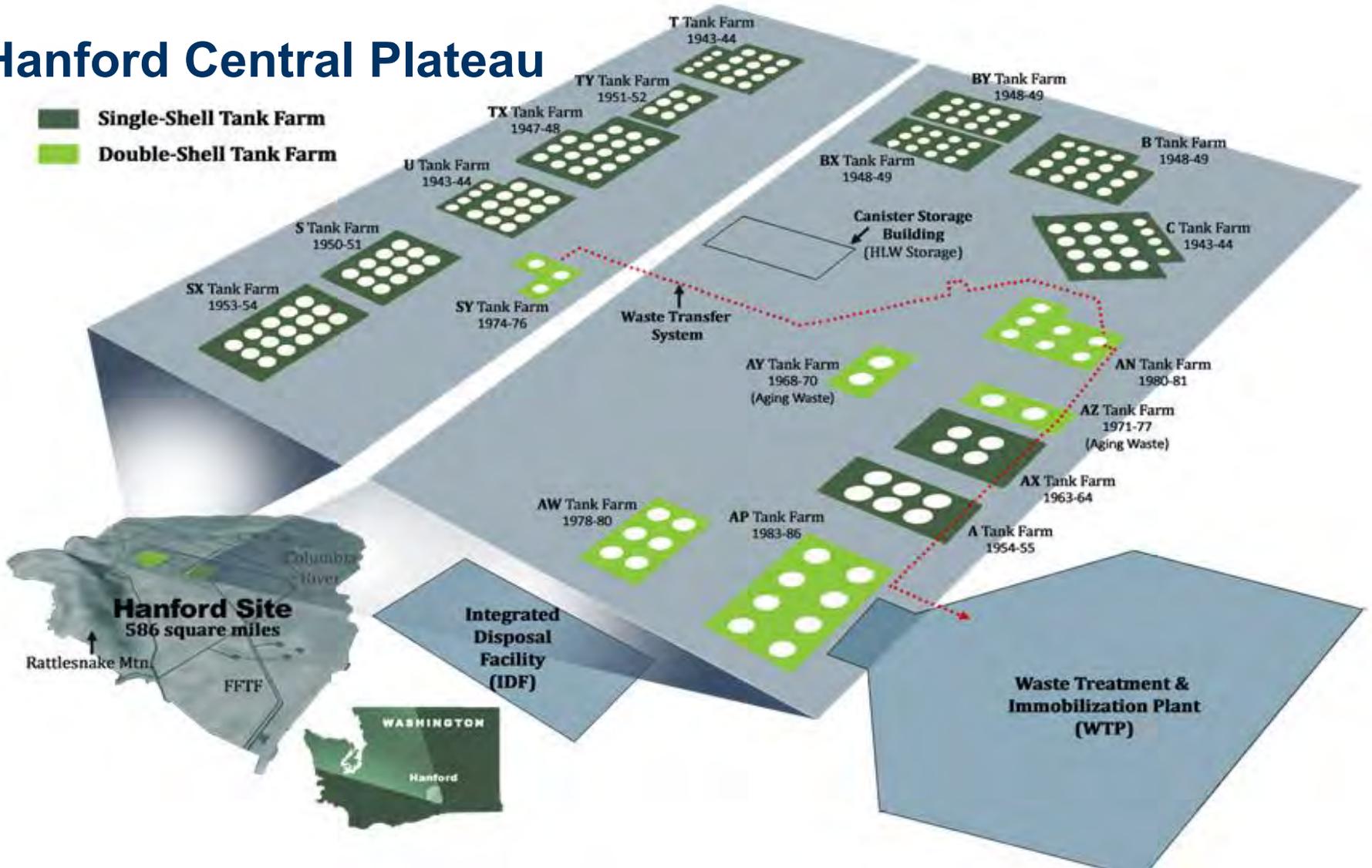
Settlement Agreement

- On September 24, 2014, DOE-ORP, Washington River Protection Solutions and Washington State signed a Settlement Agreement resulting in a safe and mutually agreed-upon path forward for the removal of waste from Hanford double-shell tank AY-102.





Hanford Central Plateau





Hanford's Greatest Challenge

- **1943-1964: 149 single-shell tanks constructed**
 - Up to 67 presumed to have leaked
- **1968-1986: 28 double-shell tanks constructed**
 - 1 leaking, waste contained within annulus

Disposition of **56** million gallons of radioactive and chemical waste





Single-Shell Tank Under Construction





Double-Shell Tank Under Construction





Tank Farms – Complex, Accessible Only from the Surface





Waste Treatment and Immobilization Plant



Pretreatment
Facility

Analytical
Laboratory

Low-Activity
Waste Facility

High-Level
Waste Facility

Balance of Facilities
(20 support buildings)

March 2015





Low-Activity Waste Facility



Melter refractory
brick installation





Analytical Laboratory





High-Level Waste Facility



Rebar installation



Melter bay





Pretreatment Facility





Balance of Facilities – Support Operations





One System Status - Driving to a Successful Startup

- Creating and maintaining the technical plan for the mission
 - Integrate flowsheet
 - Integrate schedule
 - Interface control documents
 - Program risks and opportunity plan
- Aligning the WTP and Tank Farms
- Identifying optimizations and efficiencies through integration
 - Solid waste management storage strategy
 - Optimizing secondary liquid waste effluent
- Leading the way for Direct Feed Low Activity Waste





Topics Specifically Selected for the Hanford Advisory Board





Tank Farm Work with Self-Contained Breathing Apparatus



Head space sampling being conducted on non-disturbed tank waste.

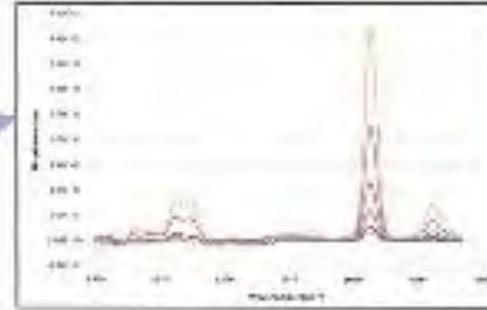




LaserWarn™ Quantum Cascade Lasers™ System



World's **fastest** tuning speed, **widest** tuning range, **smallest** package



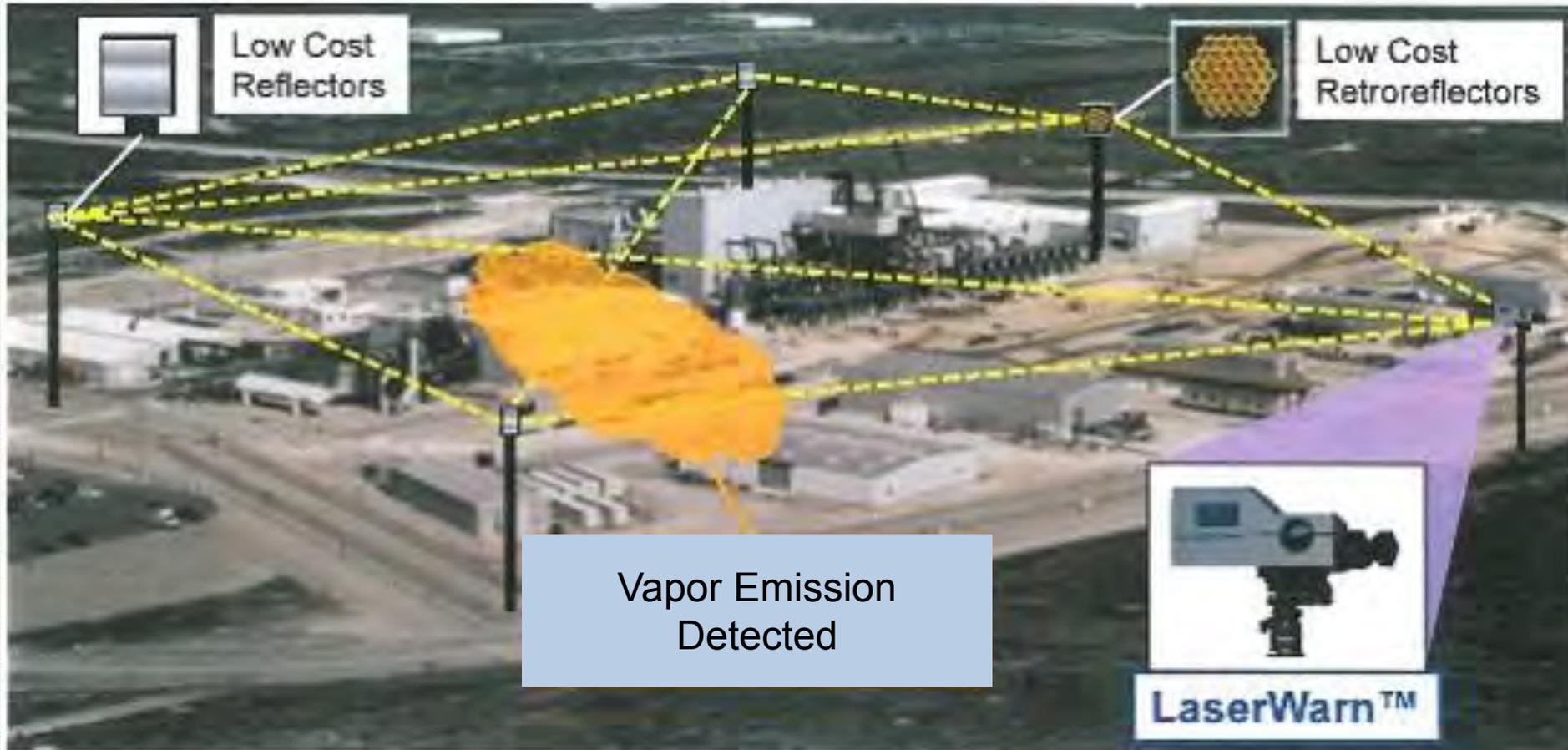
Chemical Detection Software

Vapor Detected



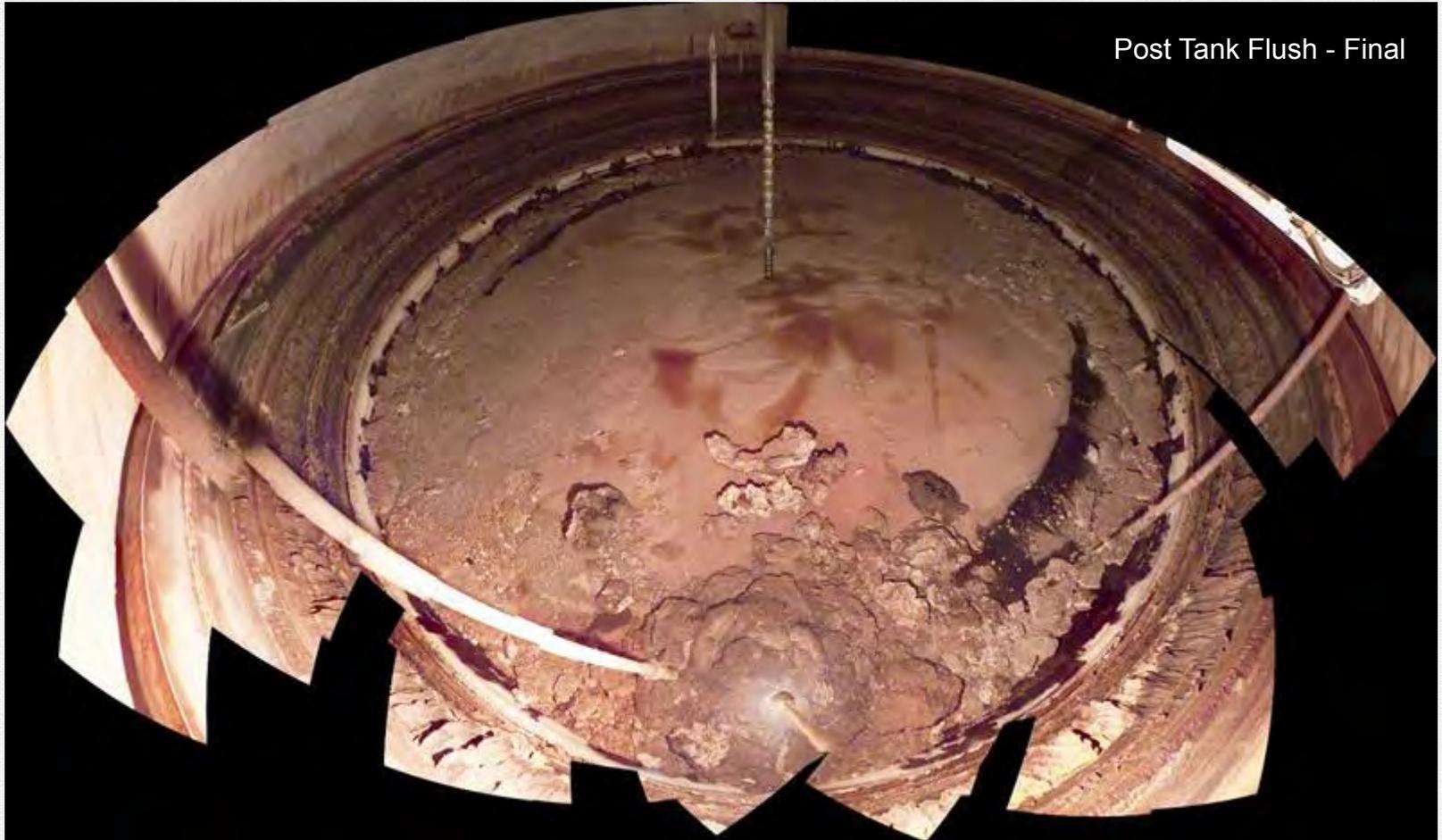


Potential Fence Line Monitoring





Single-Shell Tank C-102 – After Second Technology



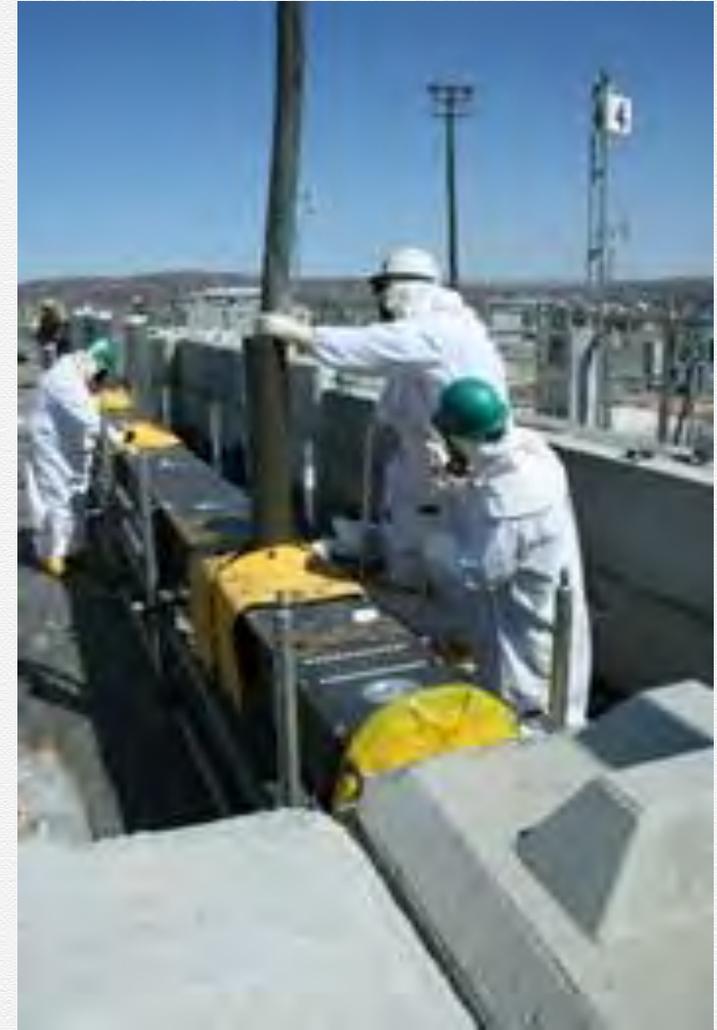
Tank video scans are performed on both floor and walls.



Double-Shell Tank AN-106



Crews successfully removed and installed newly designed slurry distributor.





AZ Double-Shell Tank Farm

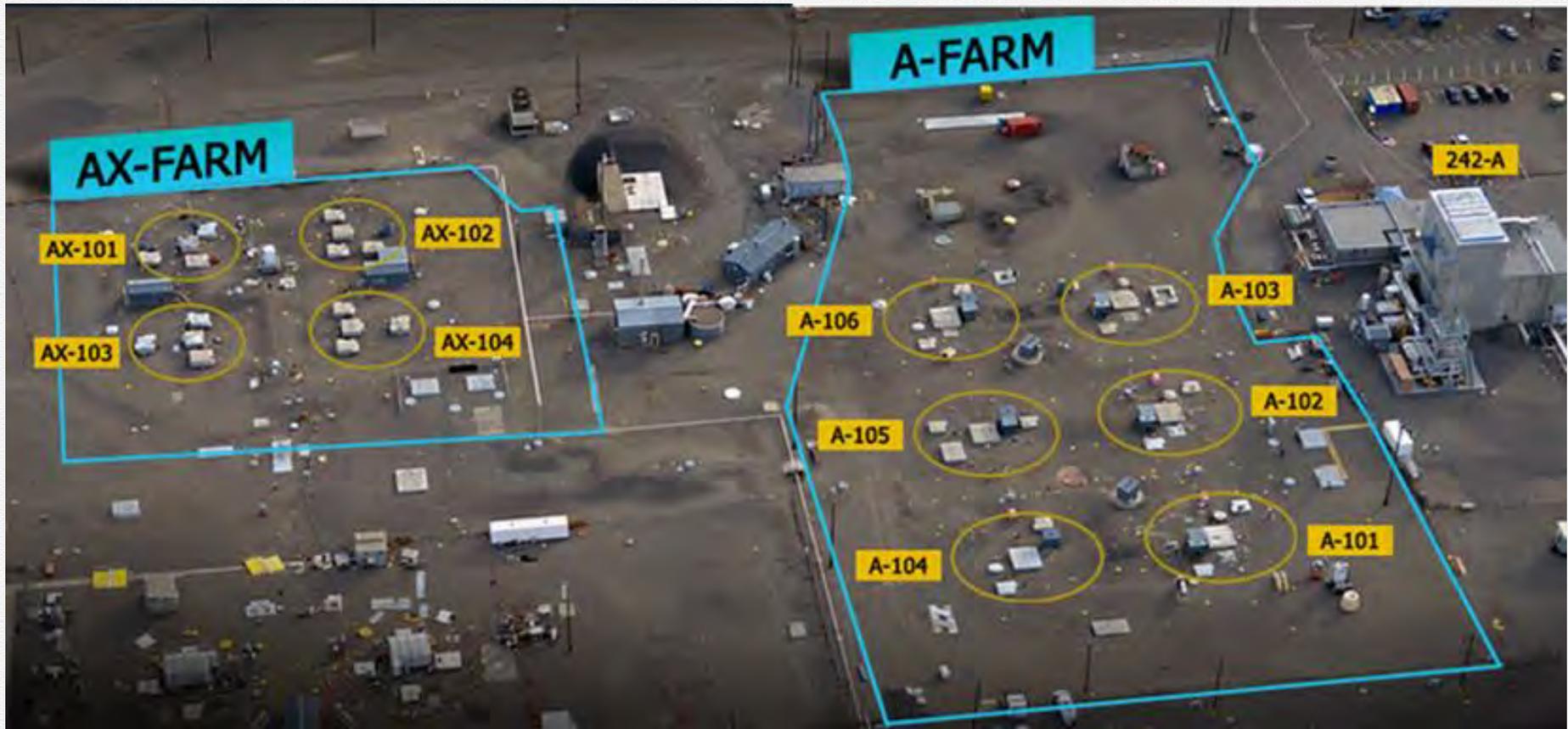


Crews installed a new pump and cleaned and replaced a series of obsolete jumpers.





A and AX Single-Shell Tank Farms

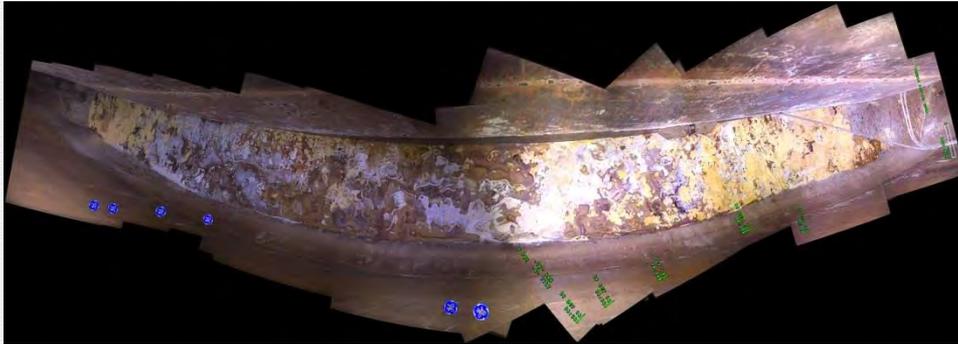


Designing the infrastructure for retrievals from the start.

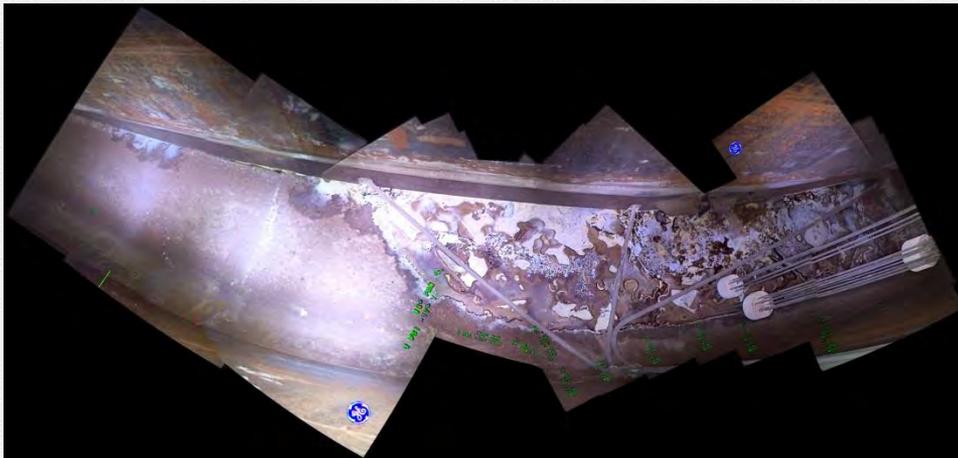




Status on Double-Shell Tank AY-102

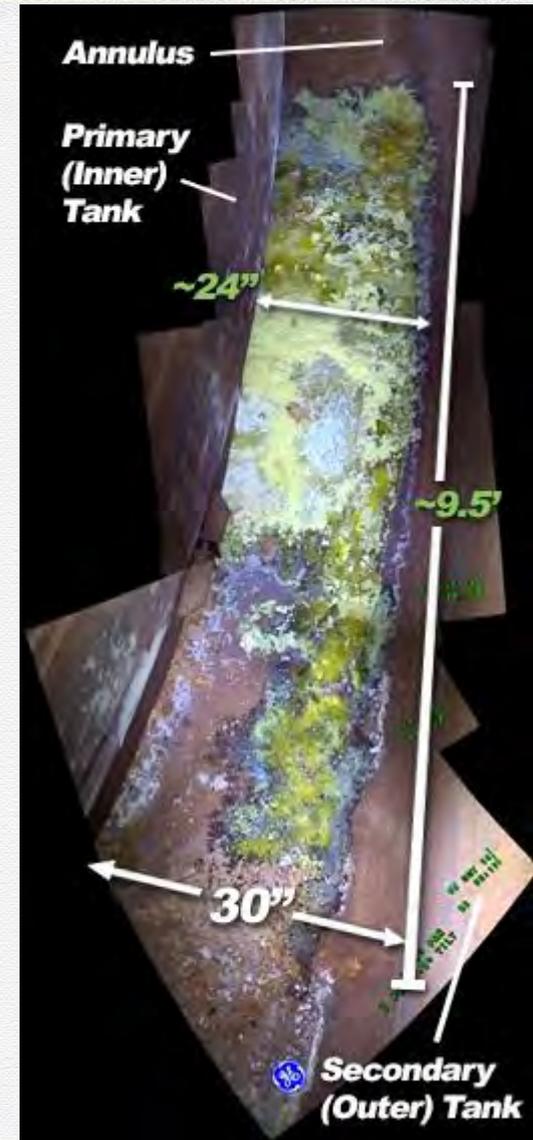


Riser 87



Riser 77

As of April 30, 2015



Riser 83

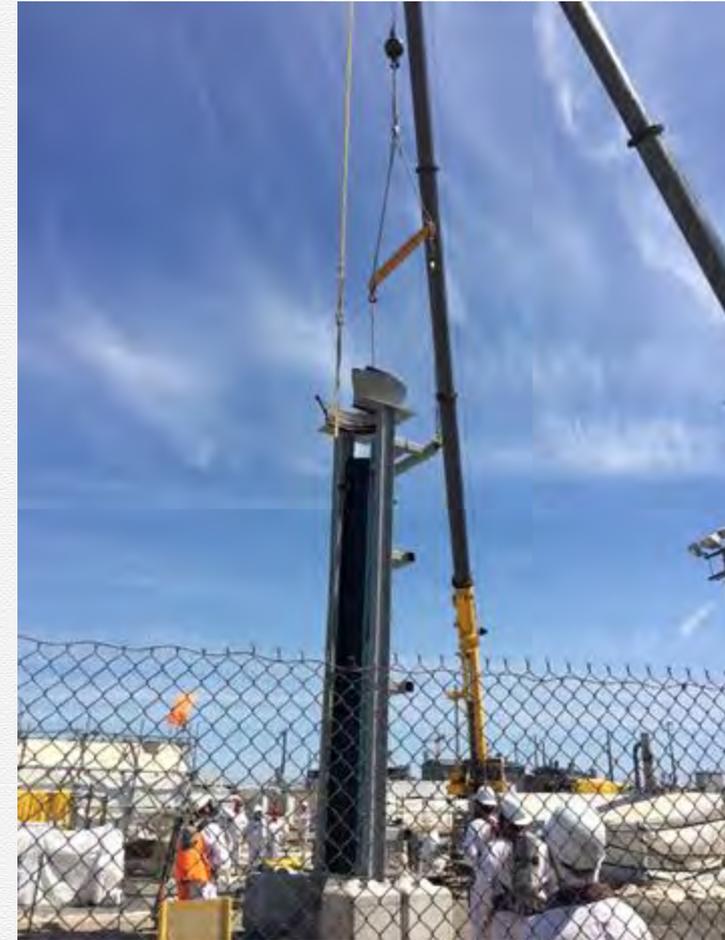




Double-Shell Tank AY-102 Preparation



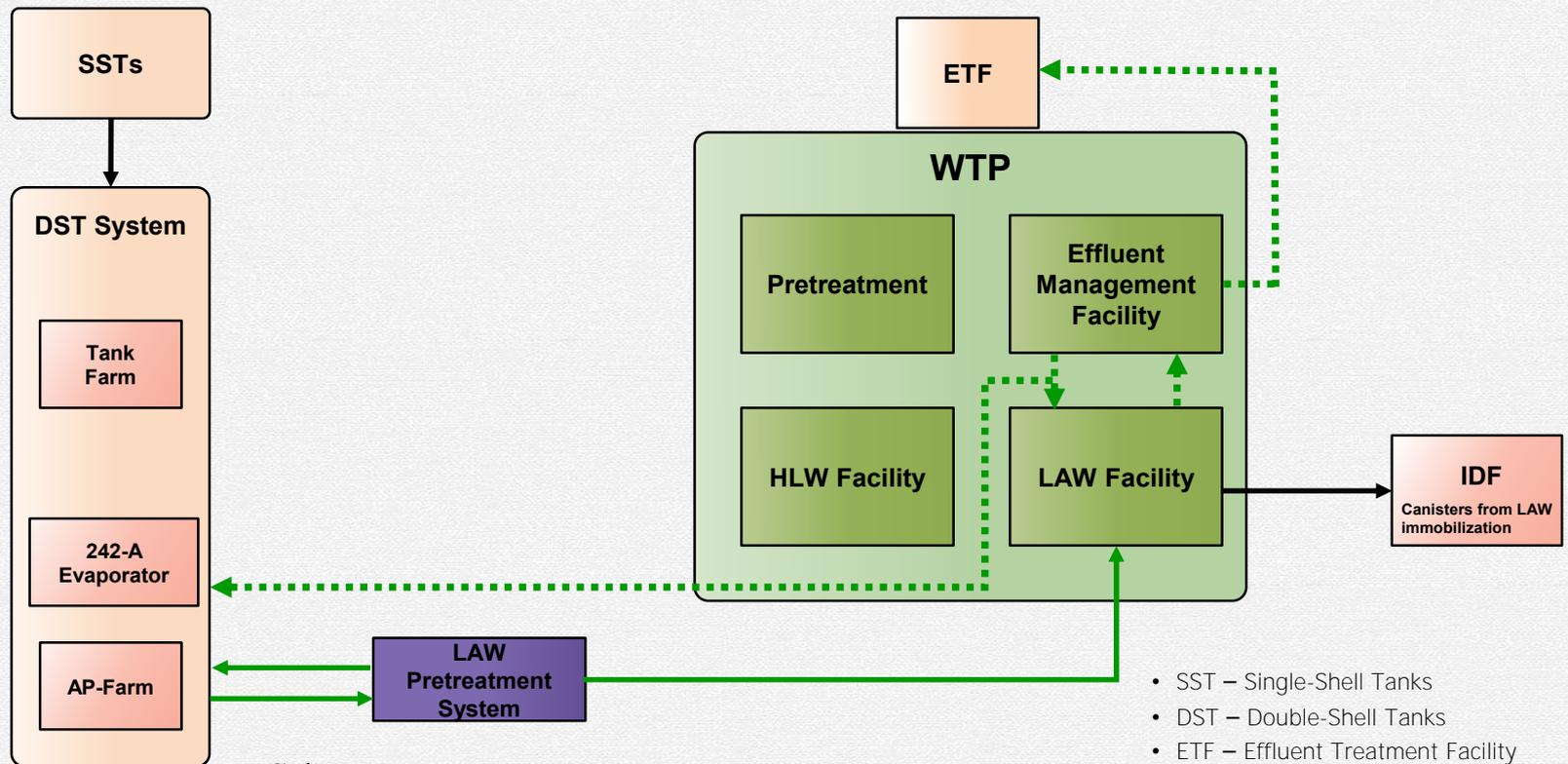
AY-02E Pit



Removal of existing pump from AY-02E Pit



Direct Feed Low Activity Waste Phased Start-Up – Phase 1 Flow Diagram



Color Key

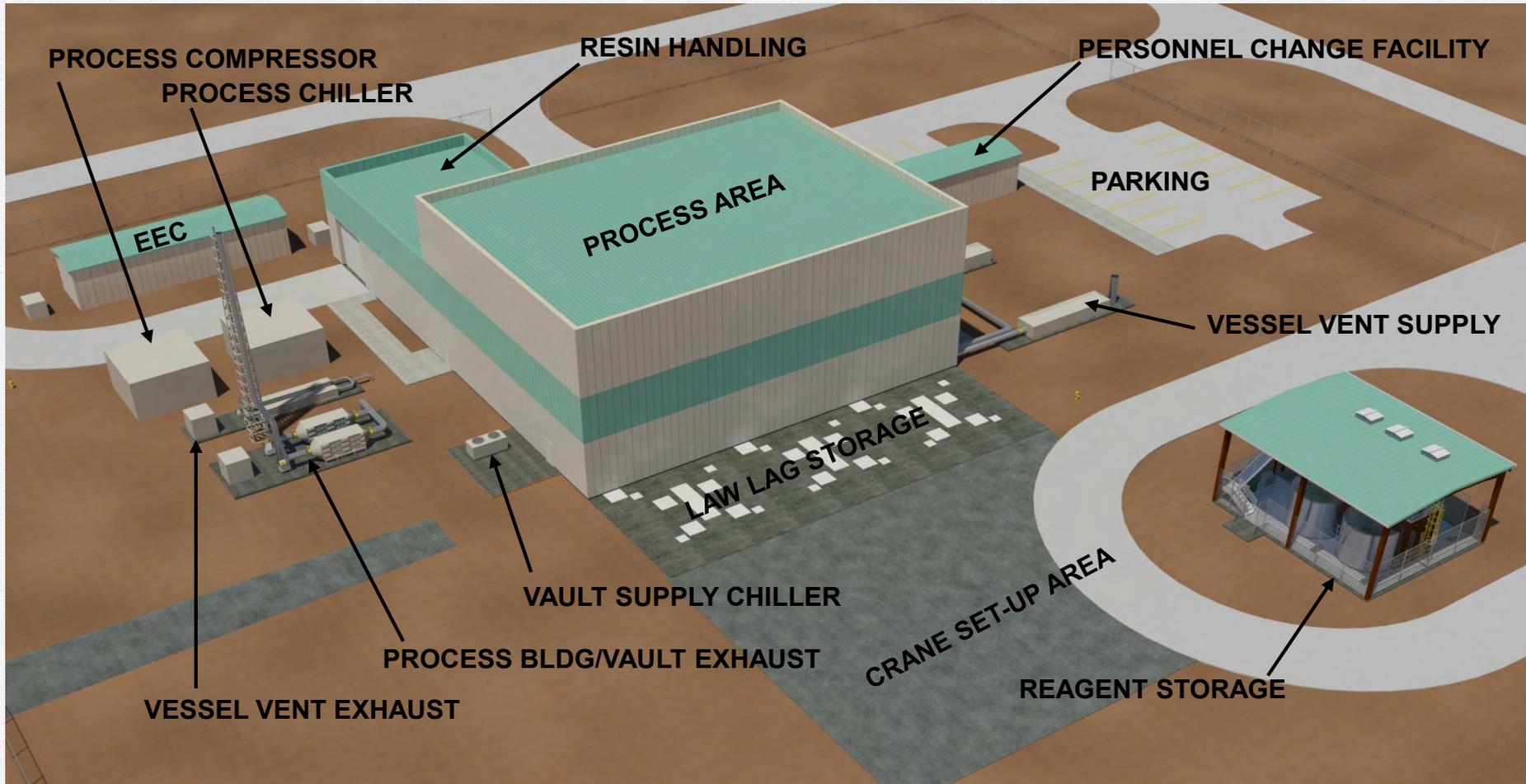
- Salmon** – Existing
- Green** – WTP in construction
- Purple** – New to support phased approach

- SST – Single-Shell Tanks
- DST – Double-Shell Tanks
- ETF – Effluent Treatment Facility
- HLW – High-Level Waste
- LAW – Low-Activity Waste
- IDF – Integrated Disposal Facility





Low Activity Waste Pretreatment System Facility Concept





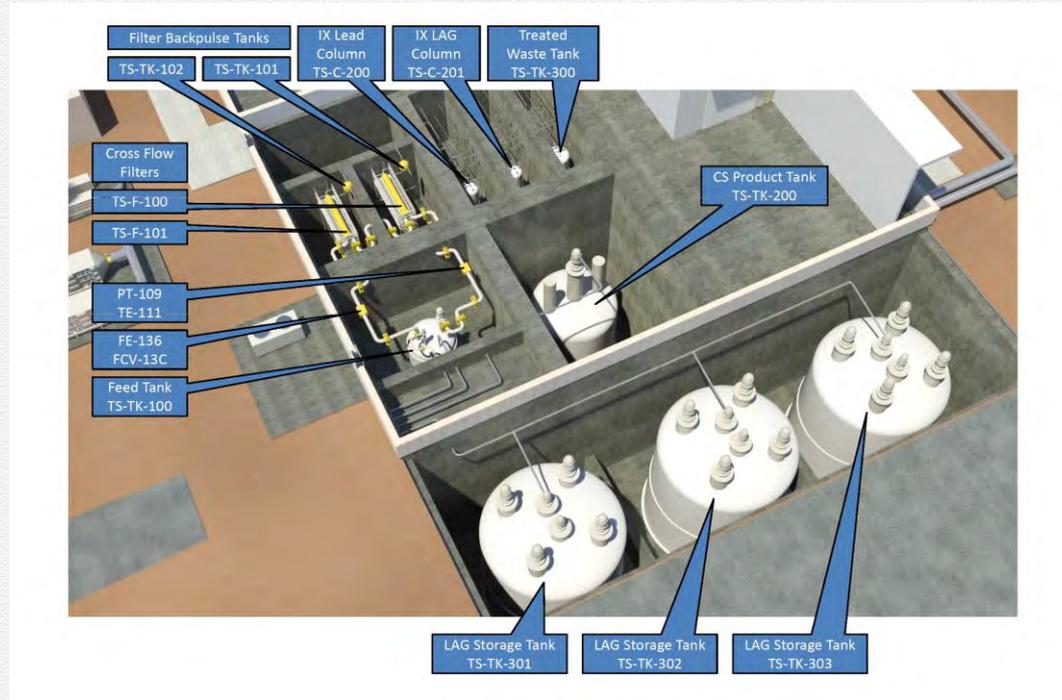
Low-Activity Waste Pretreatment System



Artist Concept of Low-Activity Waste Pretreatment System



Structural steel to support bridge crane

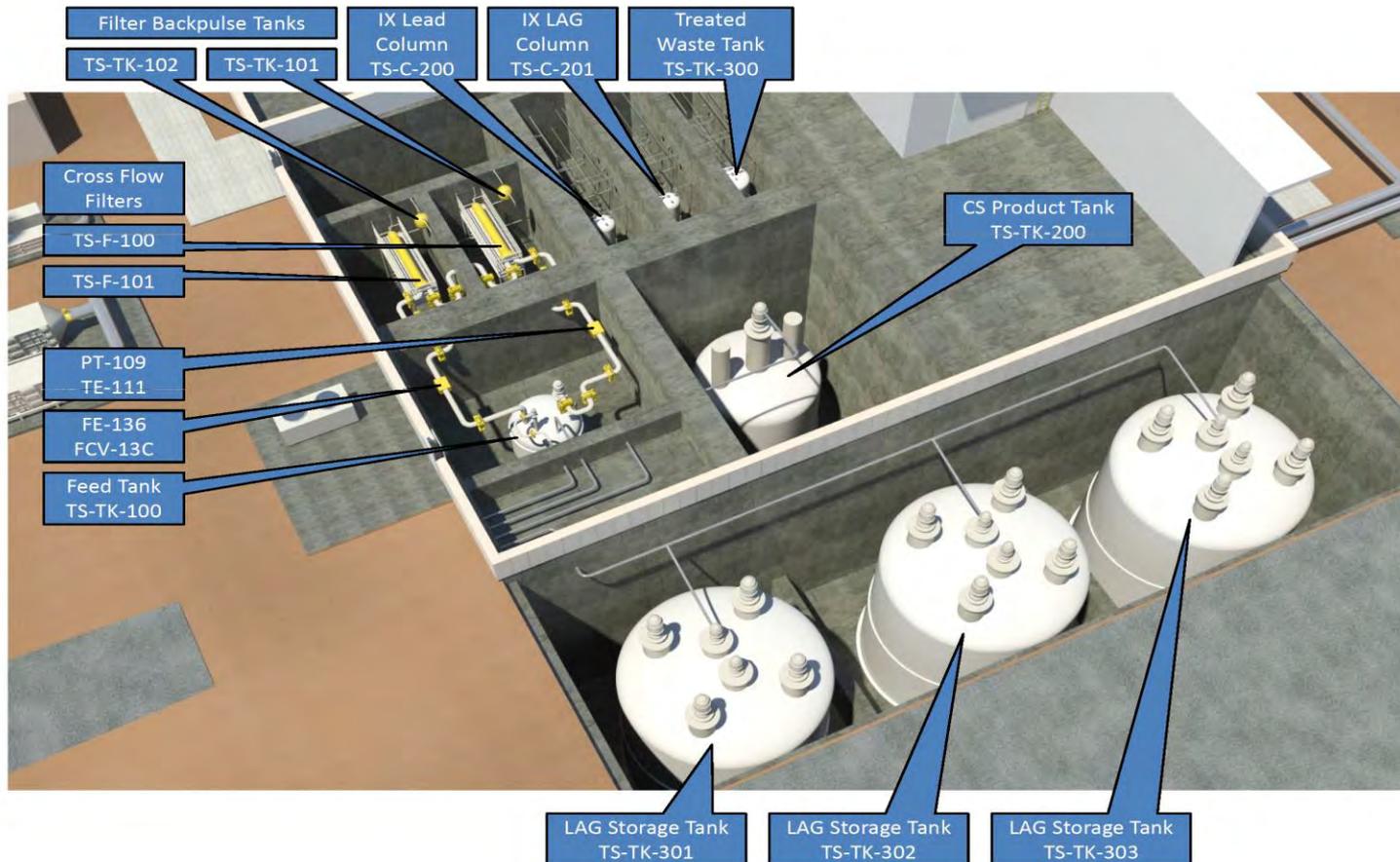


Low-Activity Waste Pretreatment System process looking belowground





Low Activity Waste Pretreatment System Process Equipment in Vault Facility





Pretreatment Facility Technical Issues

T1 Hydrogen Gas Events in Vessels

- Risk of combustion in the vessel headspace due to hydrogen accumulation
- Develop operational strategy to prevent/mitigate hydrogen event

T2 Criticality in PJM Vessels

- 16 tanks may contain Plutonium particles of size & density prone to settling
- Resolve criticality issues in high solids vessels through analysis & testing

T3 Hydrogen in Piping & Ancillary Vessels

- Concern over a deflagration event occurring in piping and ancillary vessels
- Develop piping design guide to mitigate & complete conceptual design for vessels based on quantitative risk assessment process

T4 PJM Vessel Mixing and Control

- Concern with adequacy of Pulse Jet Mixer mixing and control system
- Complete testing of Standard High Solids Vessel prototype

T5 Erosion/Corrosion in Piping & Vessels

- Uncertainties exist in waste feed characteristics and ability to meet 40-year service life
- Confirm erosion/corrosion design basis, including margin, through testing & analysis

T6 Design Redundancy/ In Service Inspection

- Perform Failure Modes, Effects, and Criticality analysis
- Complete conceptual design of Planning Areas 2, 3, and 4

T7 Black Cell Vessel/ Equipment Structural Integrity

- Seismic ground motion criteria for WTP changed around 2005
- Complete structural analysis of Standard Vessel & strategy for structural upgrades to installed vessels

T8 Facility Ventilation/ Process Off-Gas Treatment

- Multiple technical challenges associated with ventilation system, including HEPA filters
- Complete engineering/nuclear safety assessments to ensure ventilation meets requirements

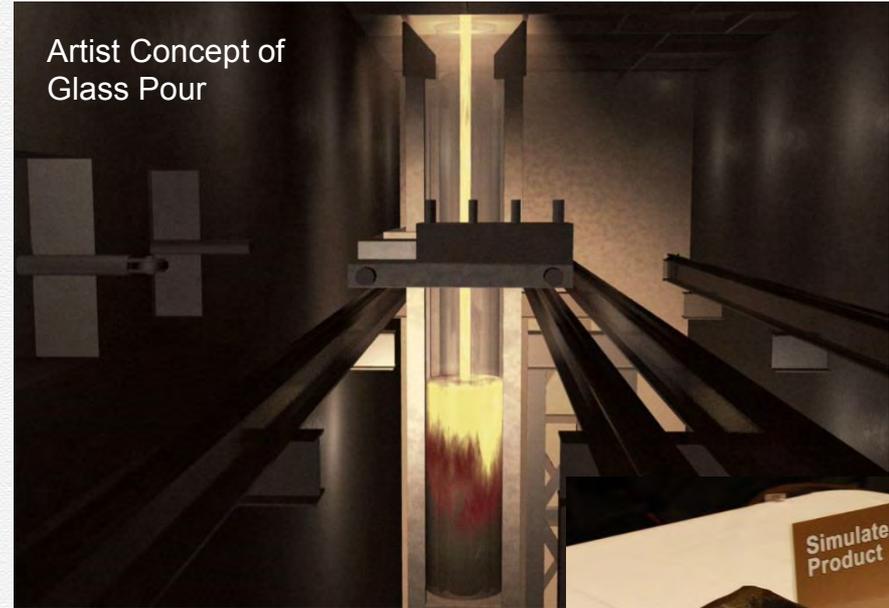


Manager's Closing Comments

- Mission accomplishment
- Transparency
- Community Involvement



Open House



Artist Concept of
Glass Pour



Grand Challenge Information Exchange



Hanford Site Public Meeting



Simulated Glass
Product

Board Advisory Board Meeting





Safety Always Comes First!

The Hanford Reach
White Bluffs Overlooking the Columbia River





Fiscal Year 2015 and 2016 Budget Overview

PBS	Project Baseline Summary (PBS) Title	FY 2015 Appropriation (\$ in Thousands)	FY 2016 President Budget (\$ in Thousands)
ORP-0014	Radioactive Liquid Tank Waste Stabilization and Disposition	\$ 522,000	\$ 649,000
ORP-0014	15-D-409, Low Activity Waste Pre-Treatment System	\$ 23,000	\$ 75,000
Subtotal	Radioactive Liquid Tank Waste Stabilization and Disposition	\$ 545,000	\$ 724,000
ORP-0060	WTP – Subprojects A-D	\$ 563,000	\$ 595,000
ORP-0060	WTP – Subproject E	\$ 104,000	\$ 95,000
Subtotal	Major construction – Waste Treatment and Immobilization Plant (WTP)	\$ 667,000	\$ 690,000
Total – ORP	Office of River Protection Funding Summary	\$1,212,000	\$1,414,000

