OFFICE OF
RIVER PROTECTION
United States Department of Energy

Hanford Advisory Board

Annual Agency Update

for the

Office of River Protection

Presented by: **Kevin Smith, Manager**
U.S. Department of Energy – Office of River Protection

September 9, 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 management. ORP has 225 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 2,054 employees*.

Bechtel National, Inc. (BNI)

BNI is responsible for the engineering, construction, startup and commissioning of the Waste Treatment and Immobilization Plant. BNI has 2,864 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 July 2015

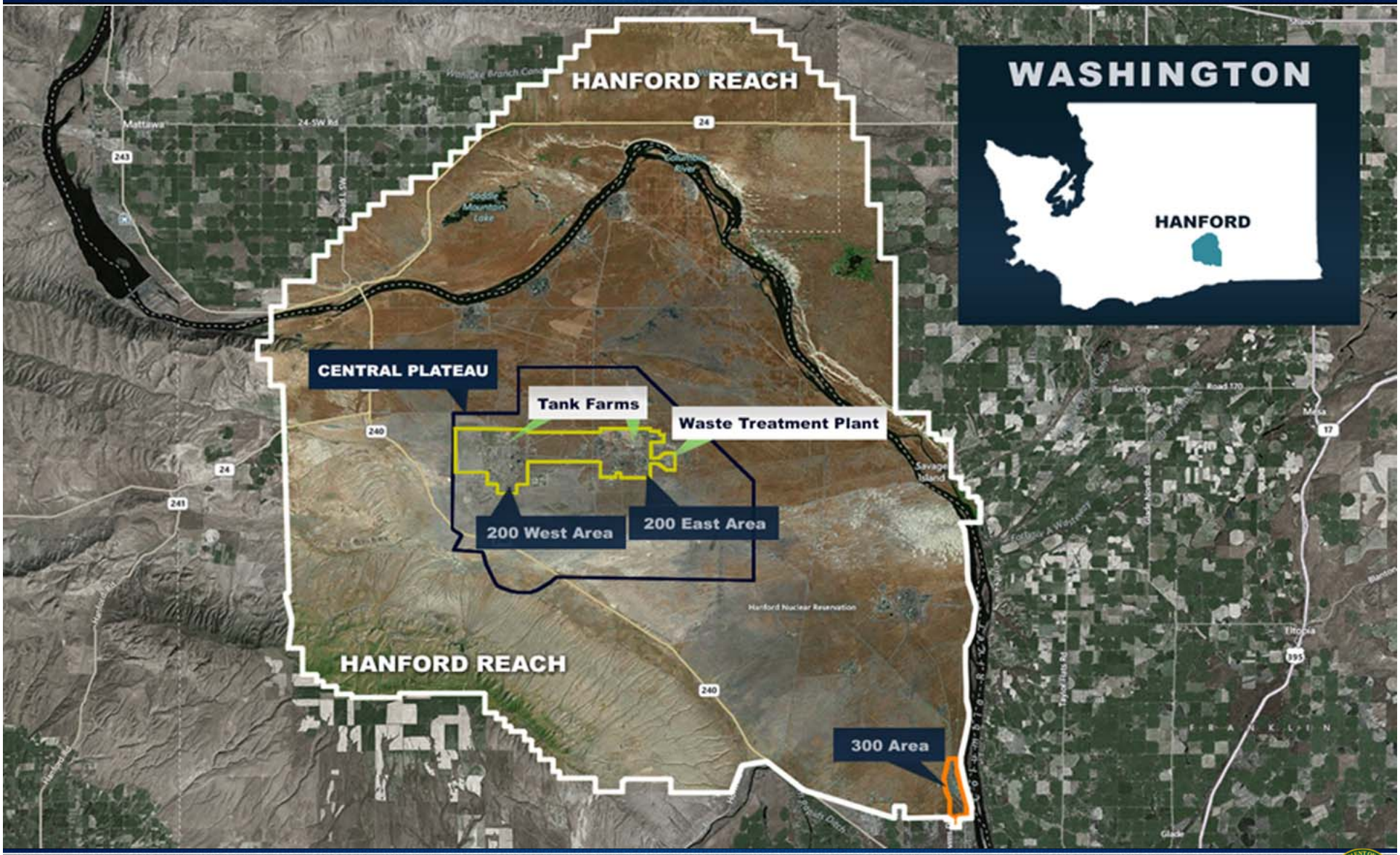
Our Mission and Vision

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.

Vision

To be a high-performing, innovative organization that is safety-conscious and employee-focused, and committed to achieving our mission with environmental and fiscal responsibility.


HANFORD REACH
WASHINGTON
HANFORD
CENTRAL PLATEAU
Tank Farms
Waste Treatment Plant
200 West Area
200 East Area
HANFORD REACH
300 Area

The Tank Farms
A 200 Area Aerial Overview
200 West Area
SX
S
U
TX
TY
T
SY
200 East Area
BX
BY
B
C
AW
A
AY
AX
AZ
AN
AP
Effluent Treatment Facility Ponds
Waste Treatment and Immobilization Plant
Single-Shell Tank Farm
Double-Shell Tank Farm

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Tank Farms

Tank Farm Mission

Safely maintain 56 million gallons of radioactive and chemical waste

- 1943-1964: 149 single-shell tanks (SST)
- 1968-1986: 28 double-shell tanks (DST)

What's in the Tanks

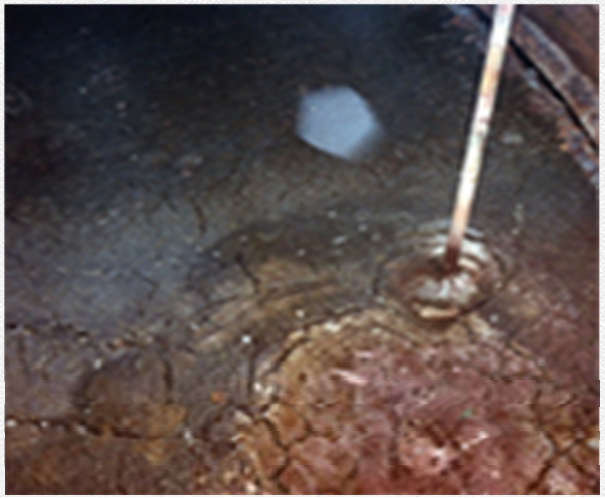
Saltcake
23M gallons

Mostly water-soluble salts; small amount of interstitial liquid

Supernate
21M gallons

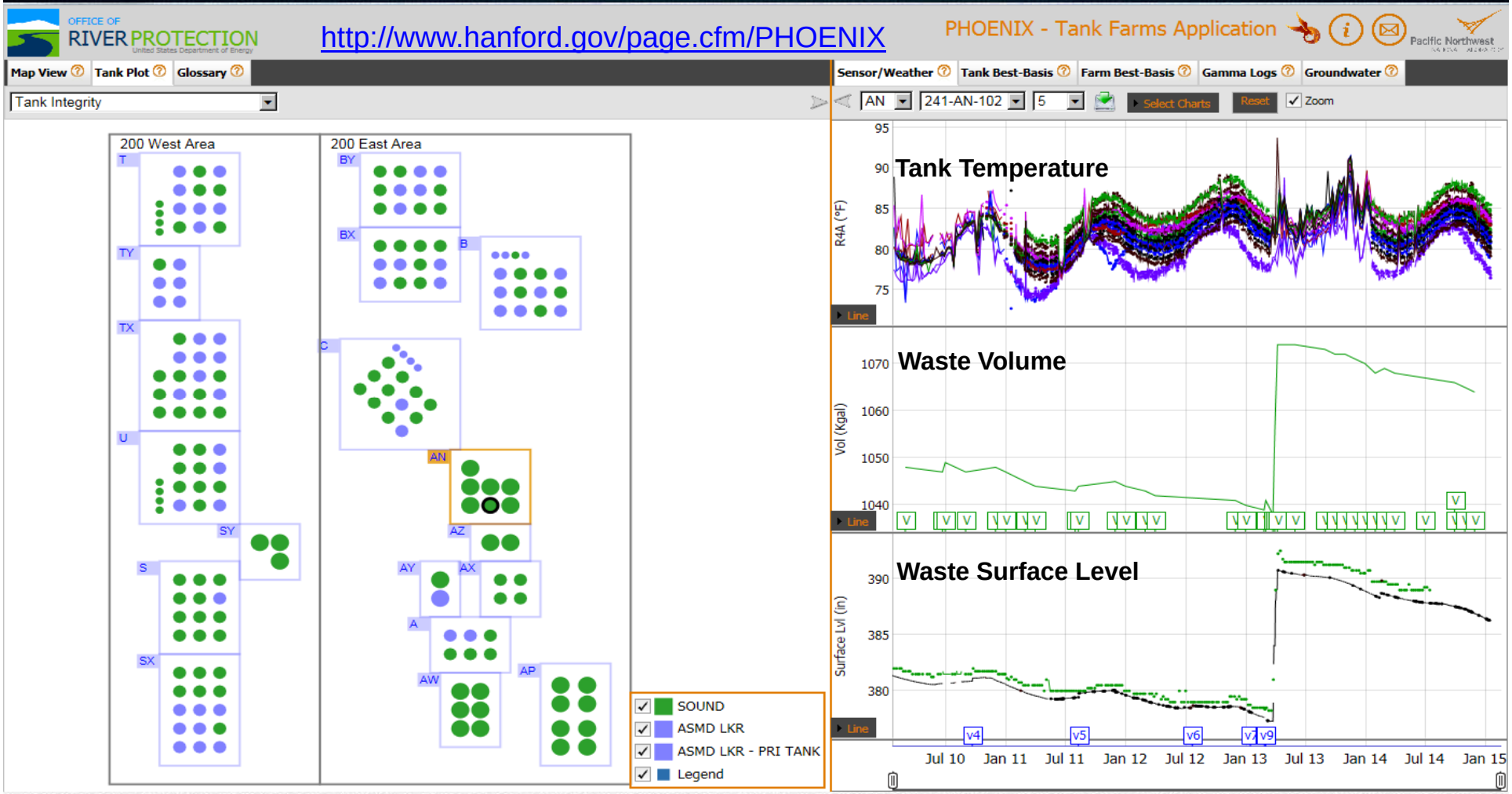
Any non-interstitial liquid in the tanks – similar to saltcake in composition

Sludge
12M gallons



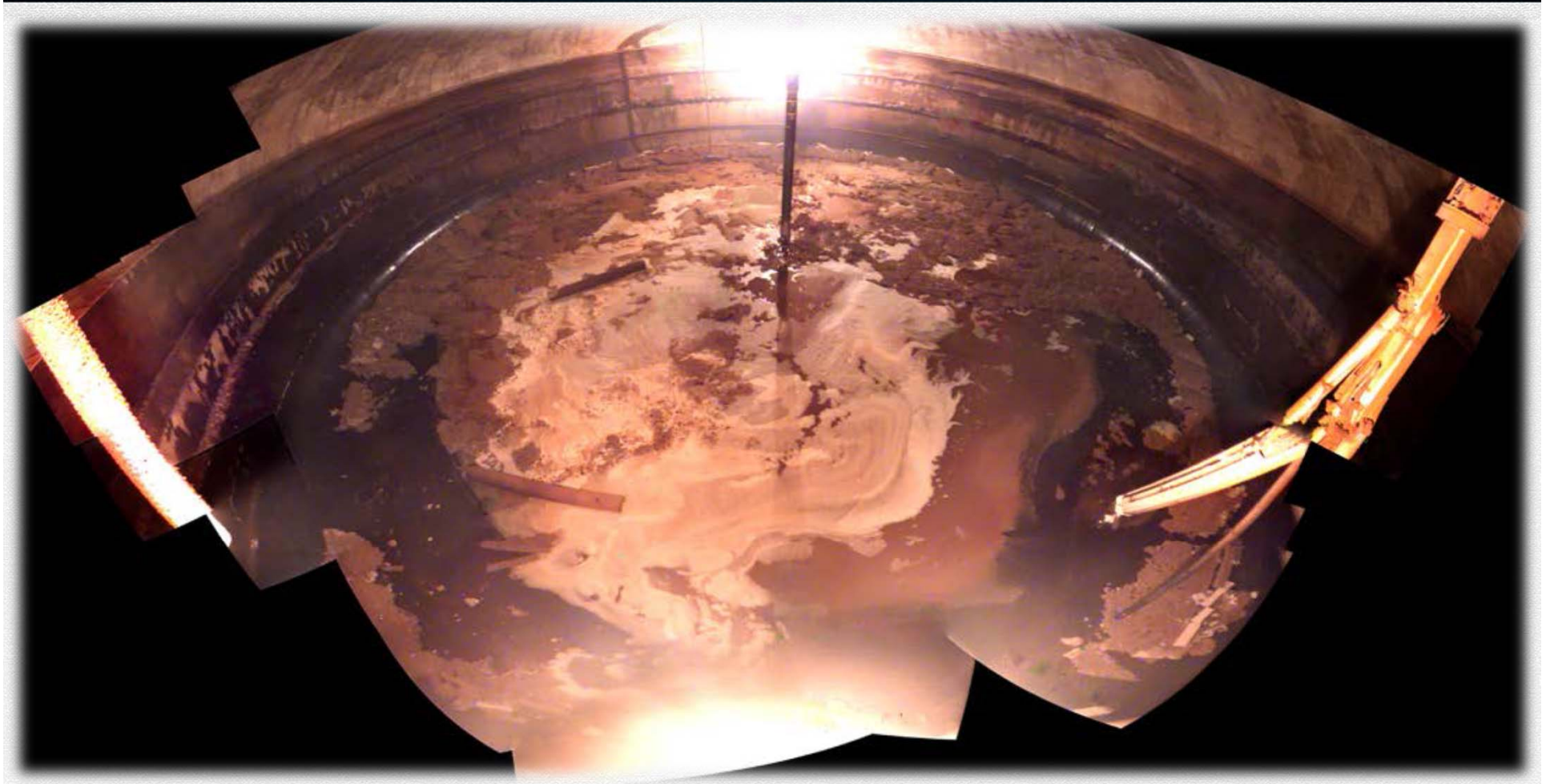
Water-insoluble metal oxides, significant amount of interstitial liquid – texture similar to peanut butter

PHOENIX
Tank Farm Application



Historical and current in-tank sensor data
(surface level; interstitial liquid level; and temperature readings)

Single-Shell Tank C-112

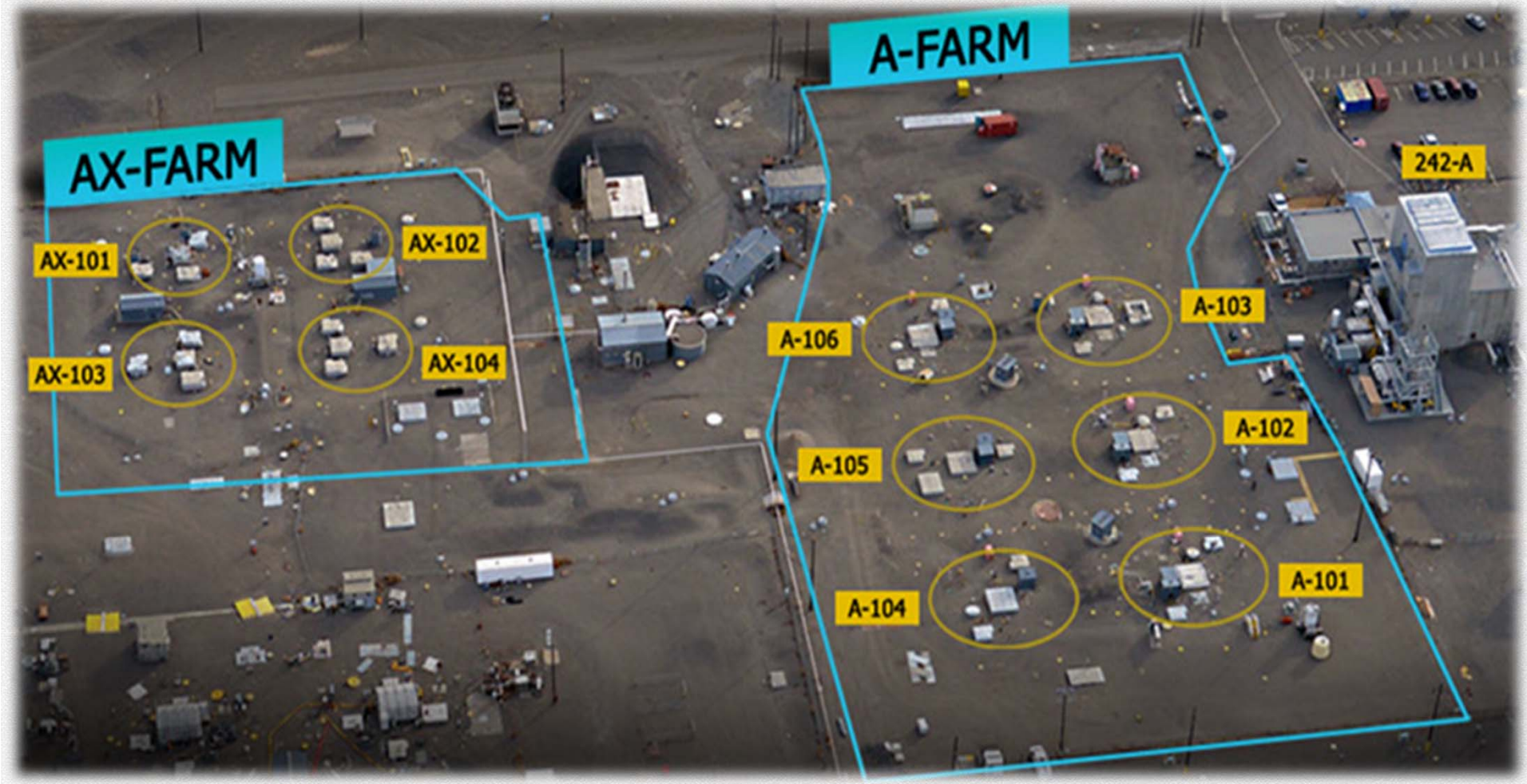


Retrieval activities complete and retrieval certification provided to Washington State Department of Ecology

Single-Shell Tank C-102

First and second technologies retrieved to “limits of technology”
Request to forego third technology pending

A and AX Single-Shell Tank Farms

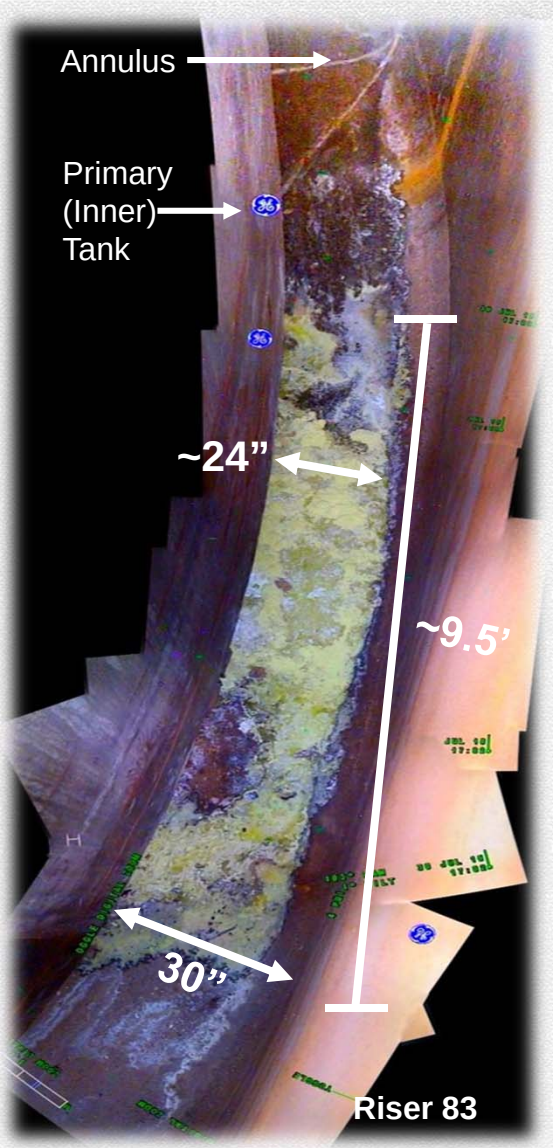


Aerial view of A and AX Single-Shell Tank Farms

A and AX Single-Shell Tank Farms

Retrieval preparations continue on next SST farms

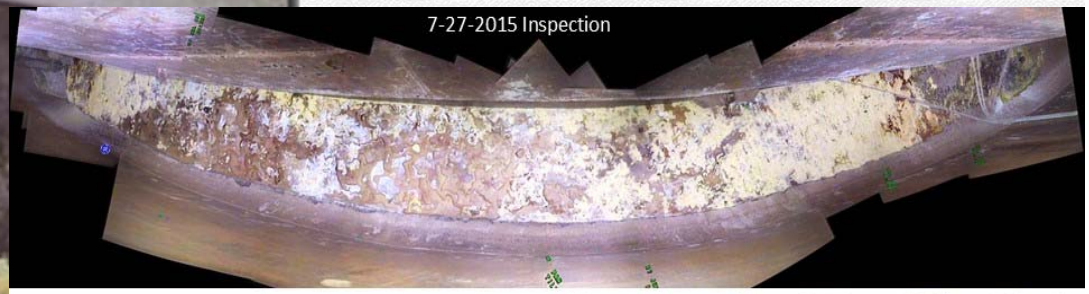
Double-Shell Tank AY-102

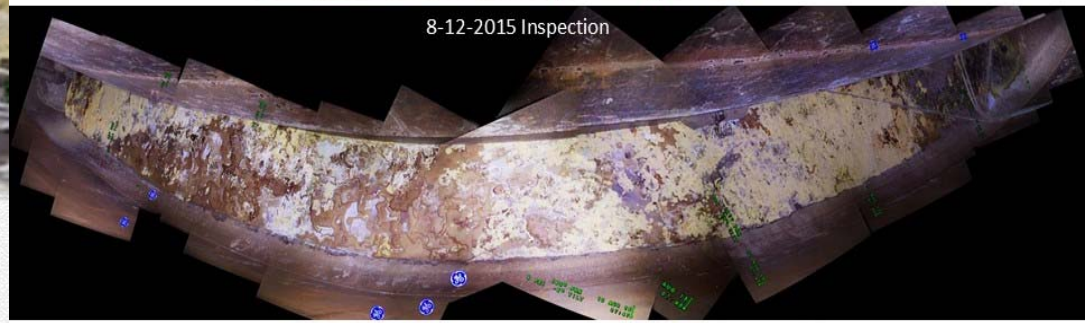


On track to begin pumping DST AY-102 in March 2016

Double-Shell Tank AY-102

Close up view of the ventilation air slot looking towards Riser 90 as seen from Riser 87





Monitoring and visual inspections of DST AY-102 annulus

Double-Shell Tank Inspections

AP Tank Farm

AW Tank Farm

DST fiscal year (FY) 2015 visual inspections completed with no additional issues

Double-Shell Tank AN-106

Infrastructure work continues with installation of newly designed slurry distributor

AZ Double-Shell Tank Farm

Simplified jumpers and new pump installed in waste transfer pit

AP Double-Shell Tank Farm

Refurbished exhauster units and exhaust stack installed

Effluent Treatment Facility

Innovative approach to remove the worn-out heat exchanger
(12,000-pounds, 17-feet long)

222-S Facility

Completed replacement of the heating, ventilation and air conditioning chiller

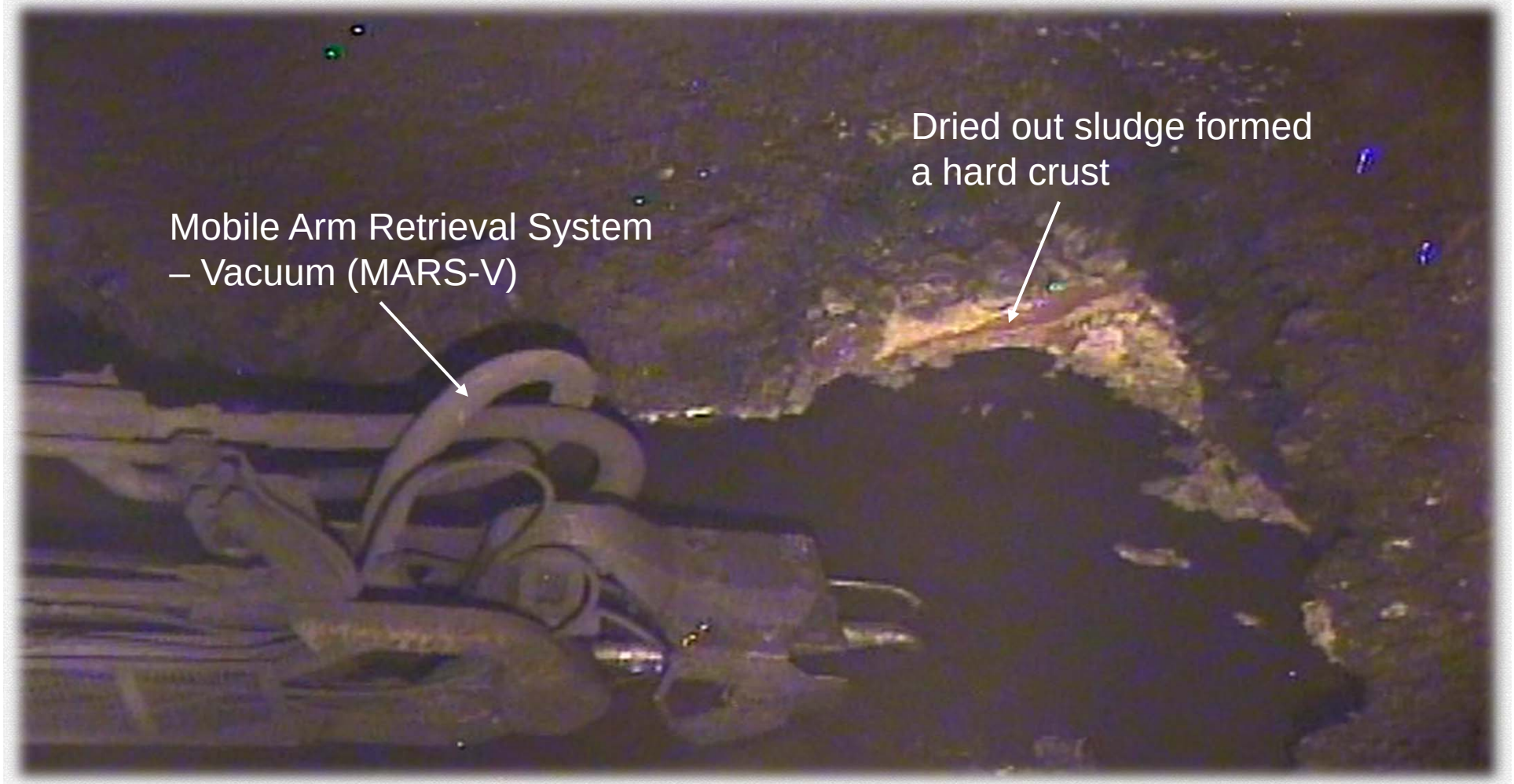
Tank Space Management (242-A Evaporator)

Carefully managing tank space, reduced ~784,000 gallons of excess water

Single-Shell Tank C-111

New slurry pump installed and pre-operational testing is scheduled

Single-Shell Tank C-105



High pressure water broke up crust allowing MARS-V to resume retrieval

Tank Farm Vapors

Extensive efforts on-going to address the tank farm vapor concerns:

- Increased work controls
- Increased Personal Protective Equipment
- Reinstituted Chemical Vapors Solutions Team (CVST)
- Commissioned Tank Vapor Assessment Team (TVAT) external assessment

Committed to protecting workers from hazardous chemical vapors

Tank Farm Vapors

- Hired additional Industrial Hygiene (IH) staff
- Researching personal protective equipment improvements
- Developing functions and requirements for new field monitoring and alarm equipment
- Evaluating and procuring new personal monitoring and alarming instruments
- Sampling and characterizing tank head space gases
- Developing new training programs
- Enhancing communications
- Strengthening vapor event documentation processes

Moving forward with implementing Phase 1 near-term actions

Industrial Hygiene Technicians Conduct Tank Farm Surveys

IH technicians completed initial walk downs of AN, BX and A Farms

Phase 1 Instrumentation Under Evaluation

Open-Path Fourier Transform Infrared (FTIR) Spectroscopy

Improved Portable Air Quality/ Meteorological Station

Portable forward looking infrared (FLIR) Optical Gas Imager

Personnel Global Positioning System Location

Meteorological Station

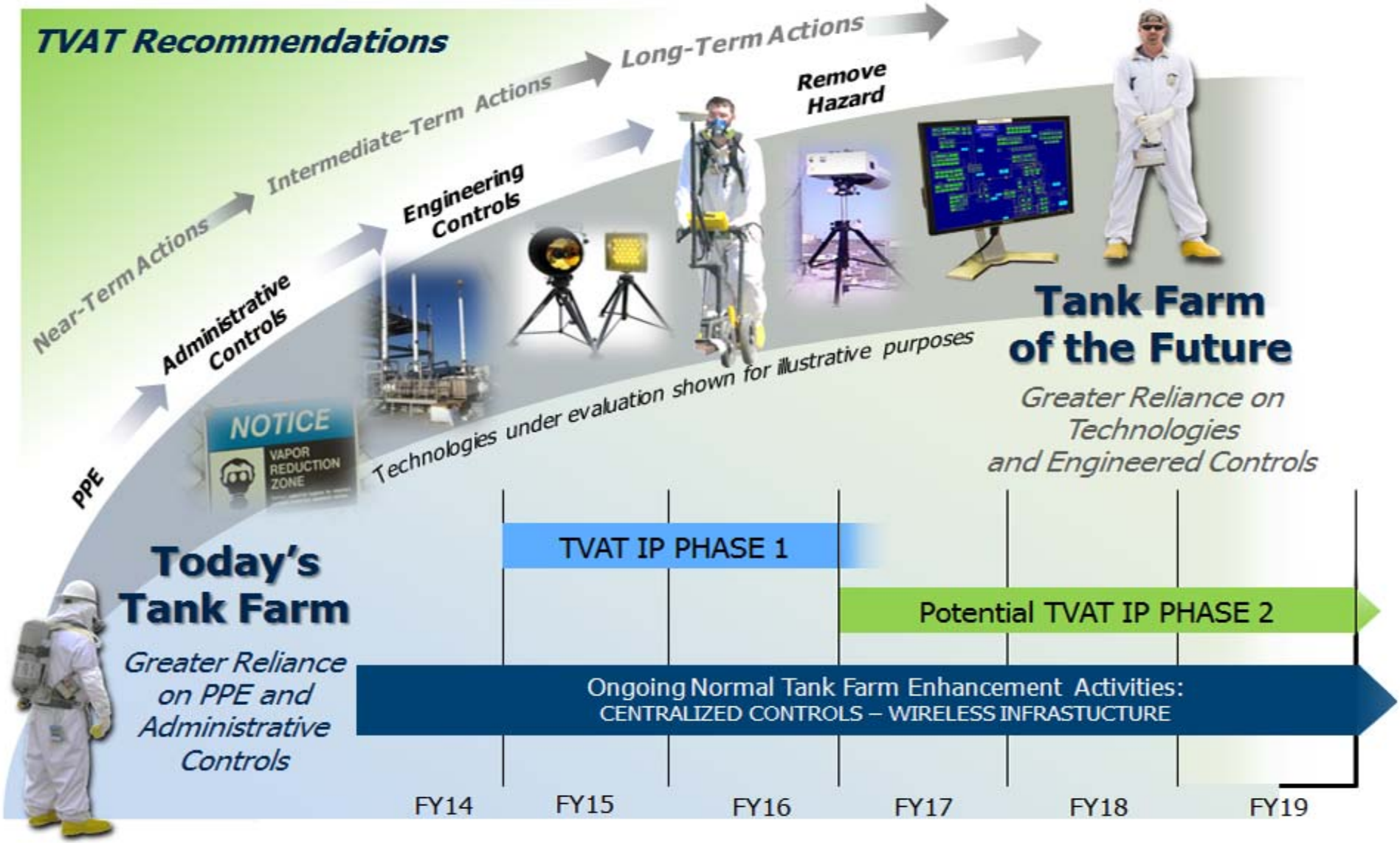
Ultraviolet Differential Optical Absorption Spectroscopy FTIR Stack Monitor

Fixed FLIR Optical Gas Imager

RAE™ Systems Wireless Sensors

Some of the technologies being evaluated for use in monitoring chemical vapors and development of enhanced IH program standards and requirement

Path Forward to Tank Farm of the Future



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Waste Treatment and Immobilization Plant

Waste Treatment and Immobilization Plant

March 2015

Progress continues on the Waste Treatment and Immobilization Plant

Low-Activity Waste Facility

Melter refractory brick installation

Low Activity Waste (LAW) Facility is the furthest along and is expected to produce glass as early as practicable

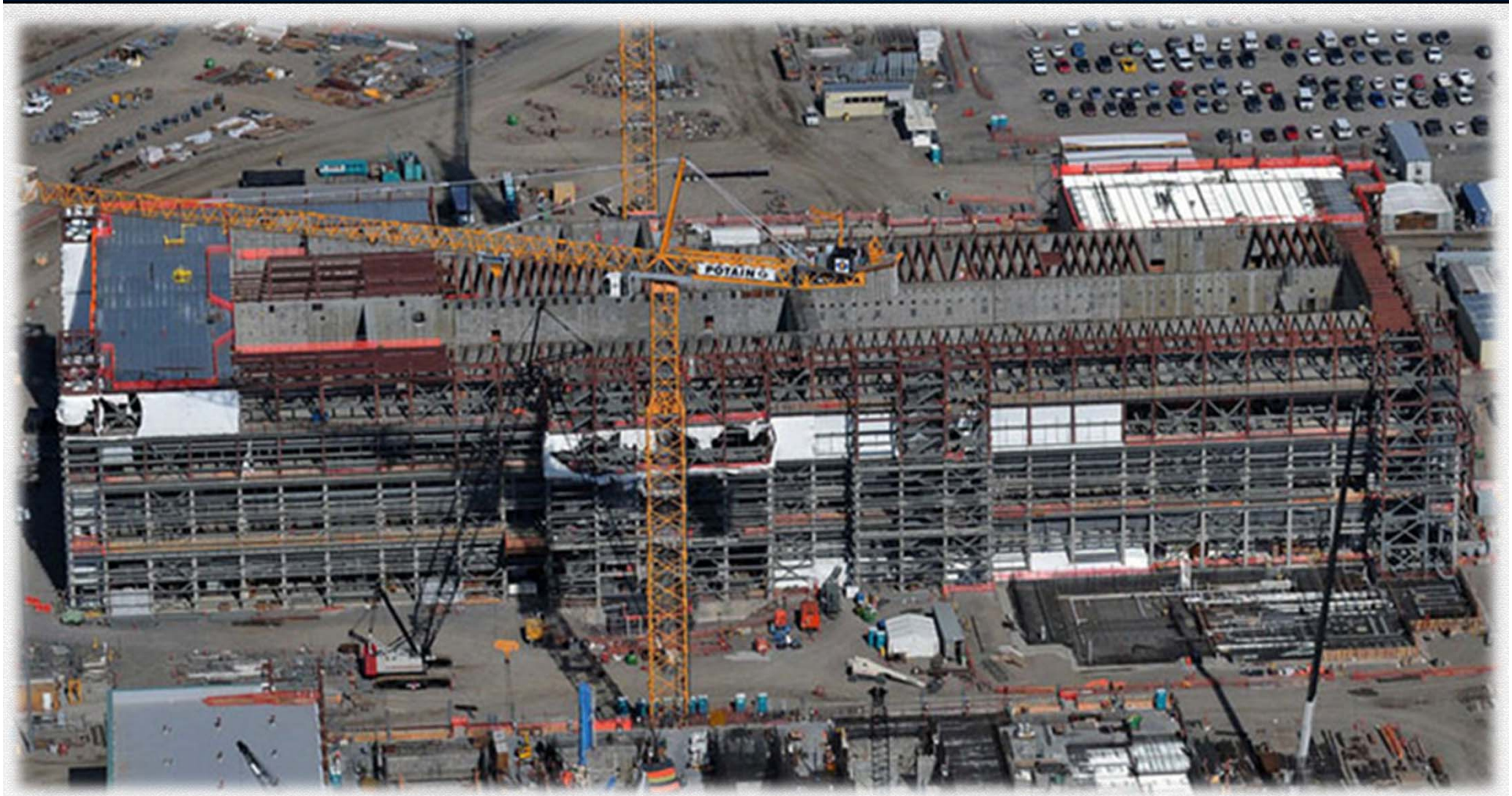
Analytical Laboratory

Remaining construction to be completed in parallel with modifications required to support Low Activity Waste treatment

High-Level Waste Facility

Limited construction is continuing with the concrete placements, installation of support steel, and crane rails in the canister decontamination cave

Pretreatment Facility



ORP remains focused on resolving technical issues

Balance of Facilities

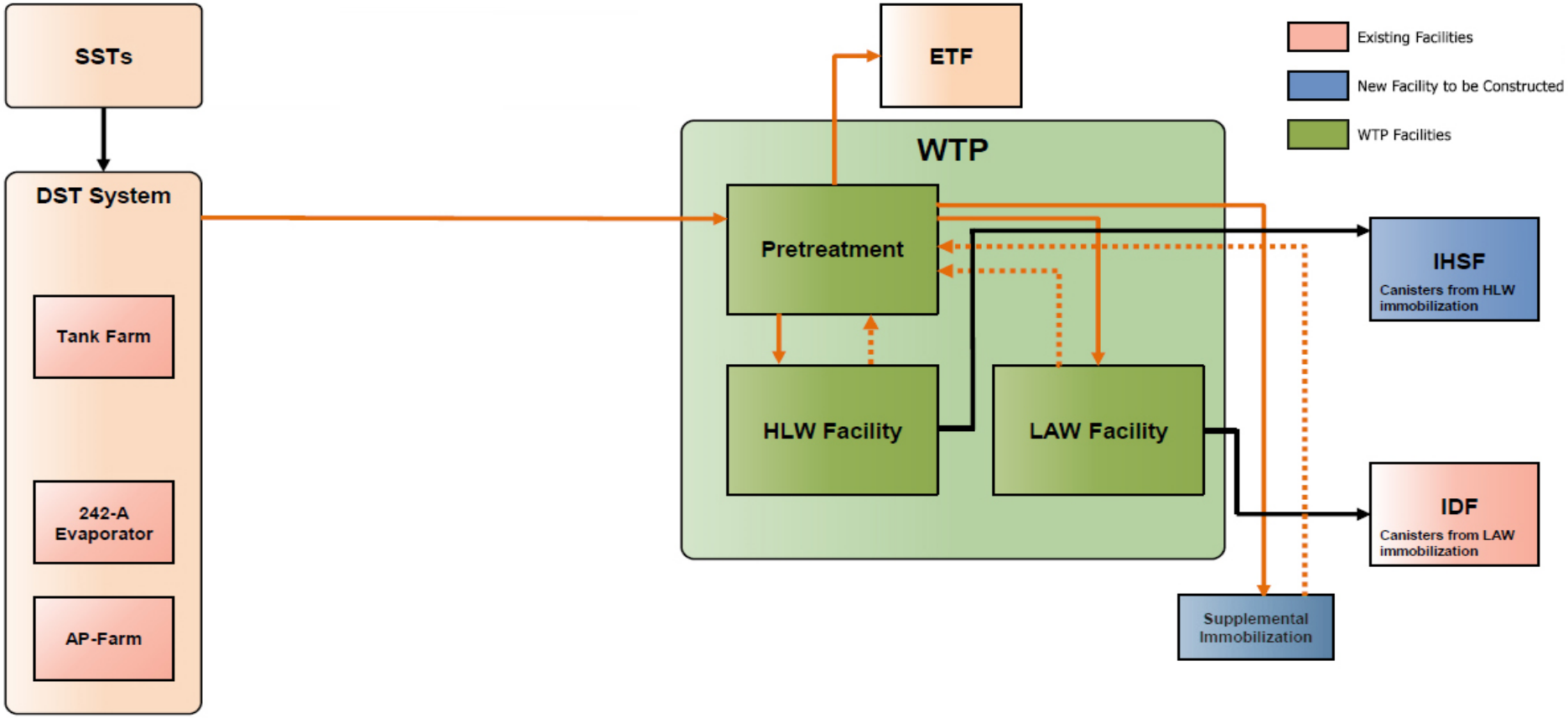
Engineering activities are underway to develop the preliminary design for Balance of Facilities systems in support of DFLAW

Direct Feed Low Activity Waste

- Treats supernate (liquid) portion of the tank waste
- Requires new facility to pretreat waste stream prior to vitrification
  - Filtration to remove solids
  - Ion Exchange to remove cesium
- Enable glass production of 30 metric tons/day of glass

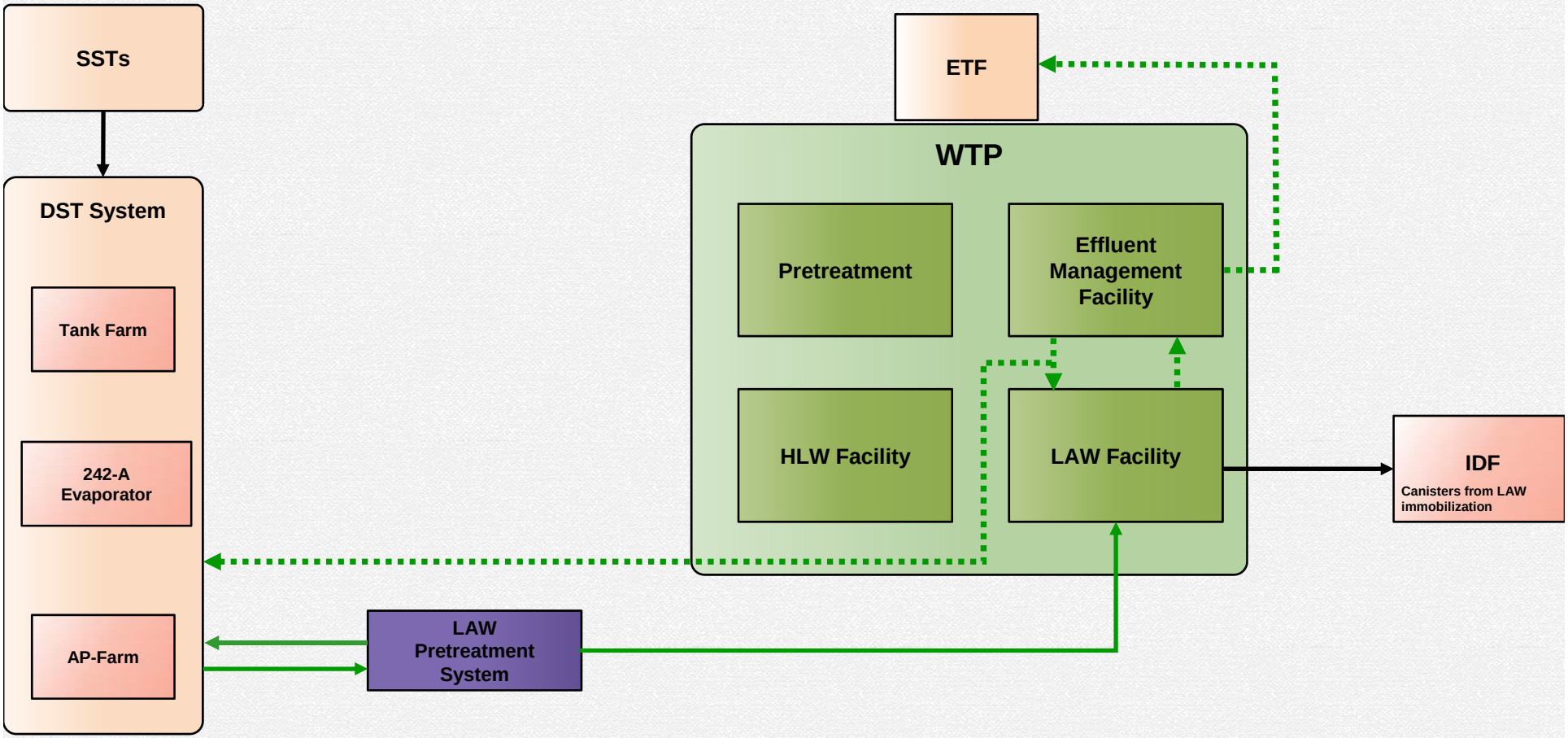
Tank Waste Treatment starting with Direct Feed Low Activity Waste as early as practicable

Baseline Treatment Approach



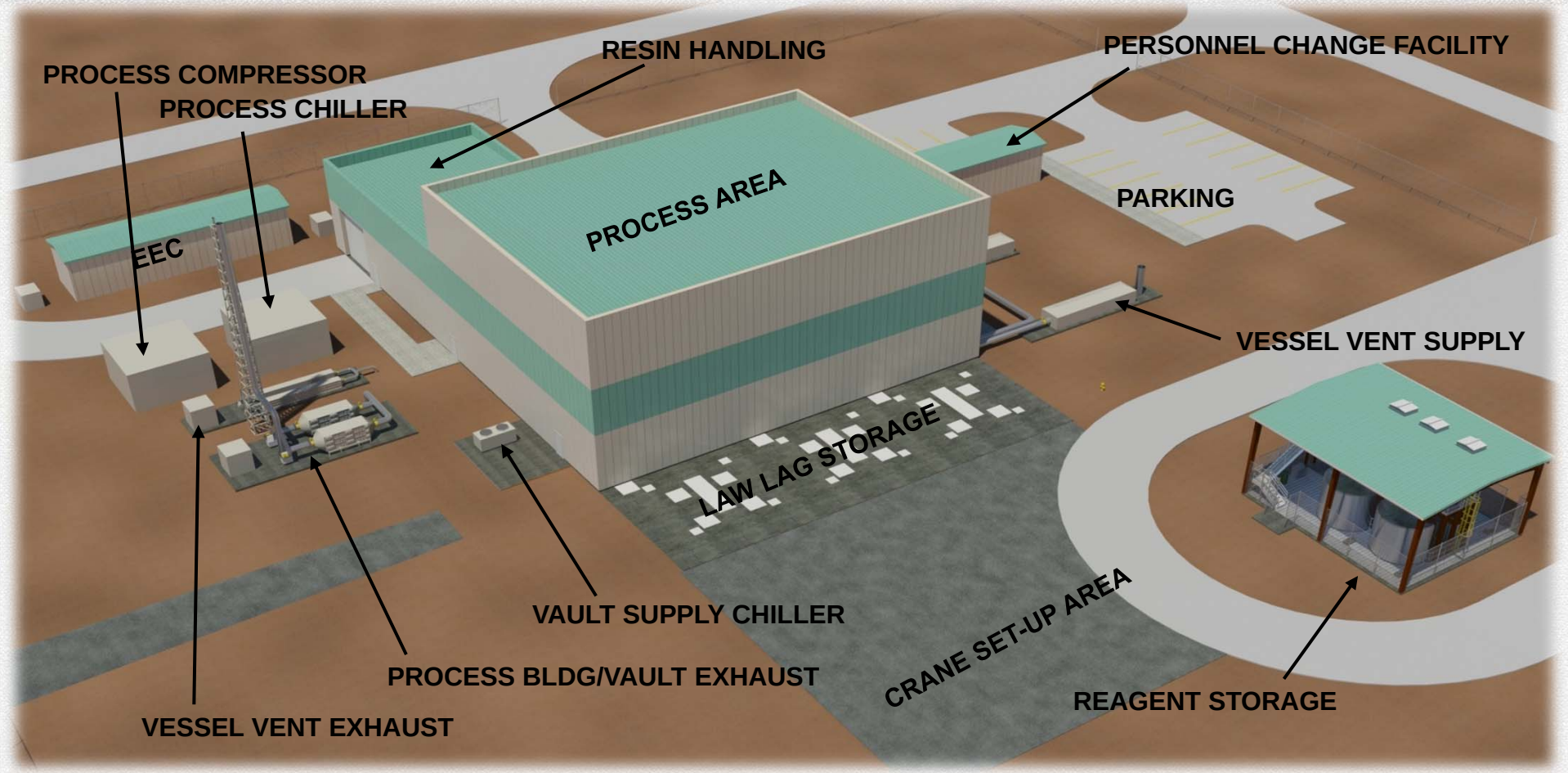
Original waste treatment approach sent all tank waste through the WTP Pretreatment Facility first, producing feed for the two melter facilities

Direct Feed Low Activity Waste



DFLAW approach sends pretreated tank liquids to the LAW Facility, enabling treatment operations as soon as practicable

Low Activity Waste Pretreatment System



Low Activity Waste Pretreatment System (LAWPS) will remove suspended solids and cesium from DST liquids to provide LAW feed to the WTP LAW Facility for vitrification

One System Status

Managing interfaces between Tank Farms, Waste Treatment and Immobilization Plant, and the Hanford Site

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Fiscal Year 2016

Legal Commitments

Tri-Party Agreement

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

Tri-Party Agreement

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 2010 Consent Decree.
- On July 23, 2015, U.S. District Court decided to appoint a three-member expert panel to help the Court understand technical material.
- On August 13, 2015, U.S. District Court directed DOE and the State are required to submit proposals in accordance with the Court's direction.

DST AY-102 Settlement Agreement

On September 24, 2014, ORP, WRPS, and Washington State signed a Settlement Agreement resulting in a safe and mutually agreed-upon path forward for the removal of waste from Hanford DST AY-102.

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Fiscal Year 2015 funding 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**

Tank Farms
FY 2016 Planned Activities

- Continue activities necessary to commence A/AX Tank Farm SST retrievals
- Continue DST AY-102 actions
- Continue C Farm retrievals
- Direct Feed Low Activity Waste preparations
- Continue design of LAWPS project and integrated tests from Critical Decision 0 (CD-0) through CD-2/3
- Phase 1 Implementation Plan work continues as a priority

Waste Treatment and Immobilization Plant FY 2016 Planned Activities

- Direct Feed Low Activity Waste
- Low Activity Waste Pretreatment Facility
- One System Integration
- High Level Waste Technical Issues Resolution
- Pretreatment Full Scale Vessel Testing and Technical Issues Resolution

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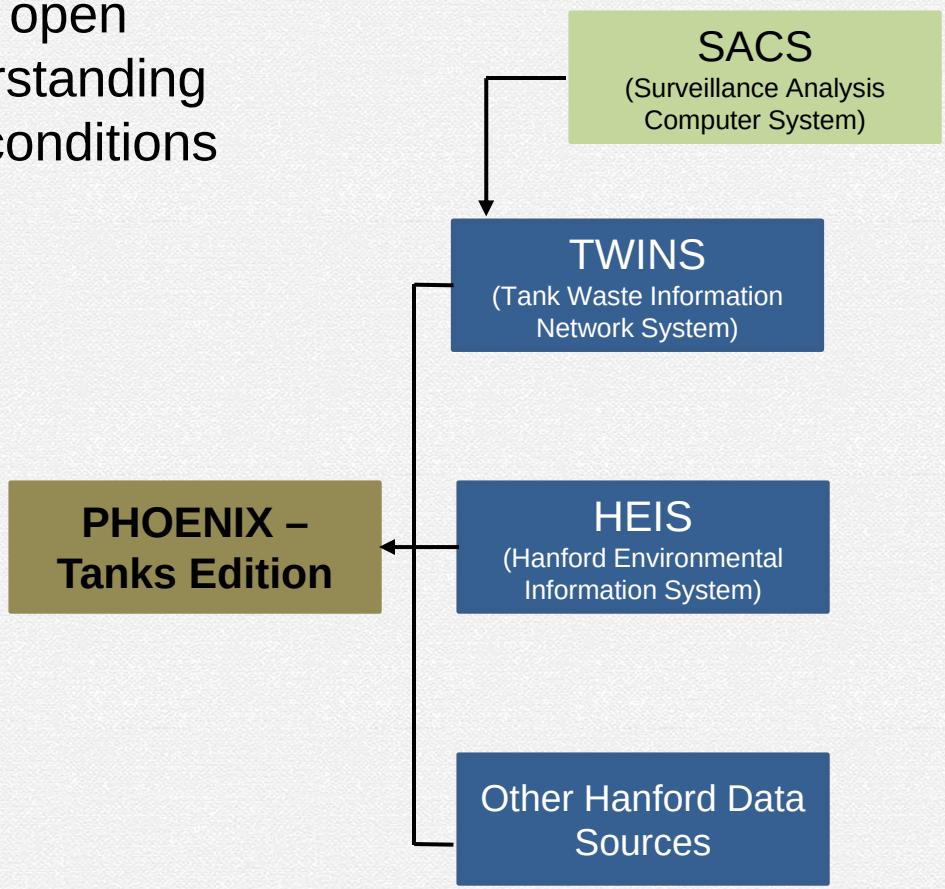
Manager's Assessment

"Protecting our workers,
the public, and the environment"
The Hanford Reach
White Bluffs Overlooking the Columbia River

Back-Up Slides

PHOENIX Tank Farm Real Time Data Available

PHOENIX provides transparent and open access to information to aid in understanding tank farms and tank waste storage conditions

- Accessible over the internet using standard web browsers at: http://www.hanford.gov/page.cfm/PHOENIX
- PHOENIX Tanks Edition provides a **single** web portal to multiple data sets that are currently available to the public through separate access points