



OFFICE OF
RIVER PROTECTION
United States Department of Energy

DFLAW and the Road to Near-Term Tank Waste Treatment





Cold War Legacy: 56 million gallons of chemical and nuclear waste from plutonium production stored in 177 underground tanks at Hanford

- 149 single shell tanks (SSTs), 28 double shell tanks (DSTs), >60 presumed leakers
- Each tank is unique – various chemicals and 150 million curies of radionuclides

ORP Mission: To safeguard the nuclear waste stored in Hanford's underground tanks, deliver the Waste Treatment and Immobilization Plant, and treat waste for final disposition

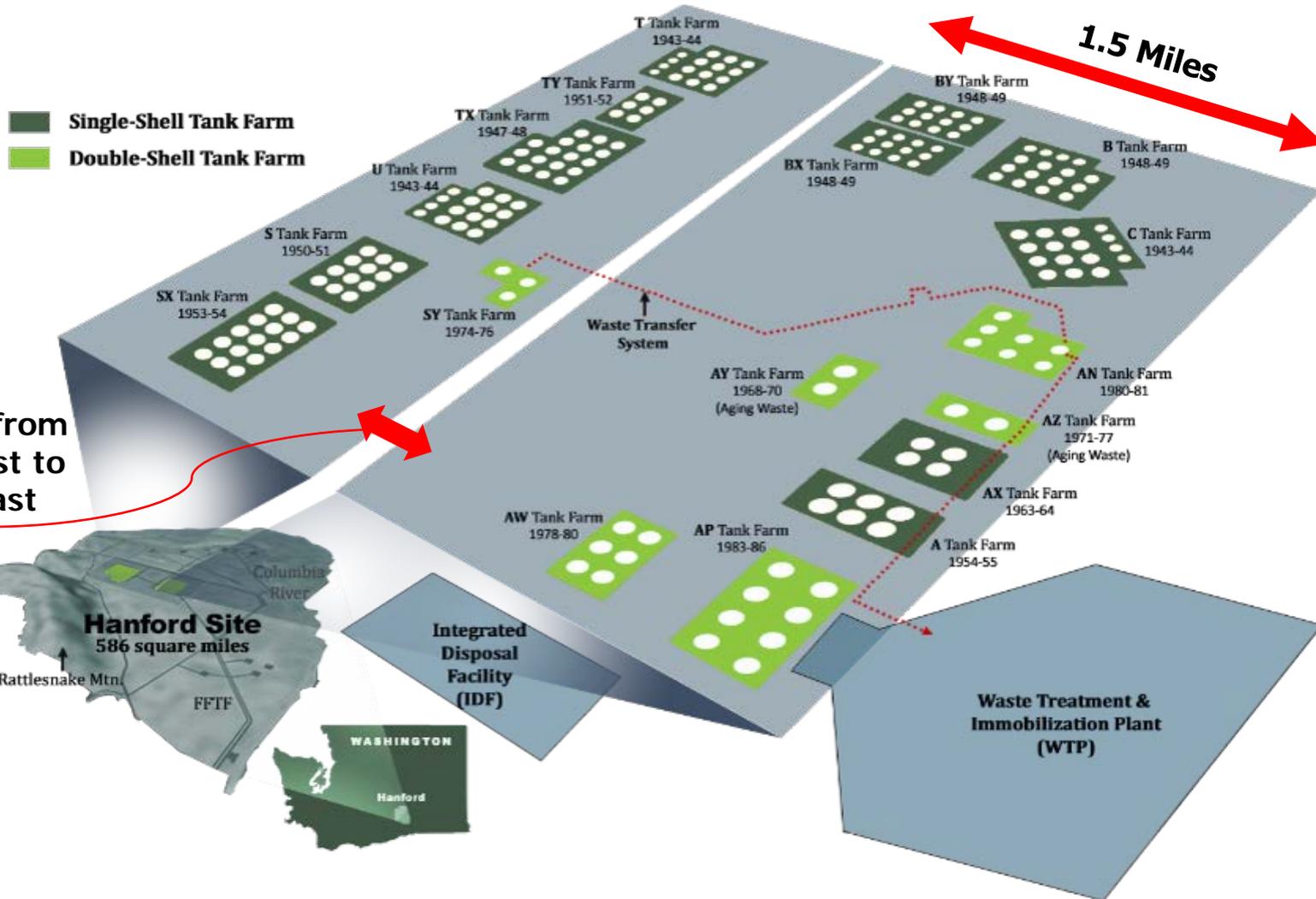
ORP Vision: To be a high-performing, innovative organization that is safety-conscious, employee-focused, and committed to achieving our mission with environmental and fiscal responsibility

Priorities defined by – Amended Consent Decree and the Tri-Party Agreement establish the milestones by which progress in tank waste management and WTP construction are measured





Tank Waste Treatment: Hanford Site





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*

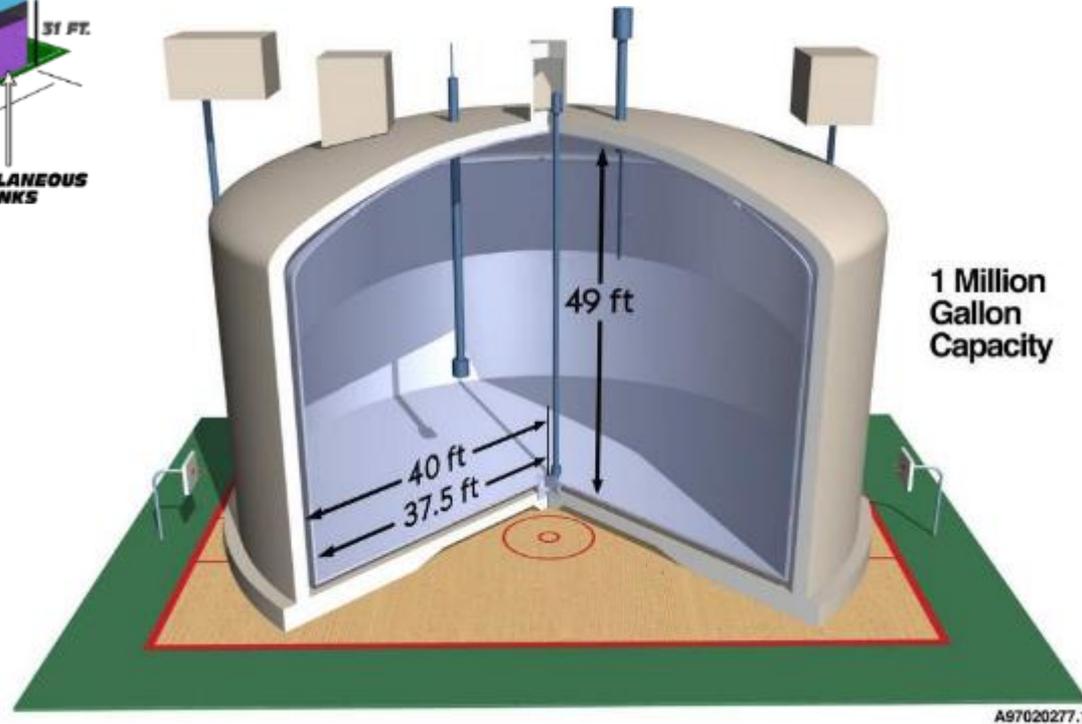
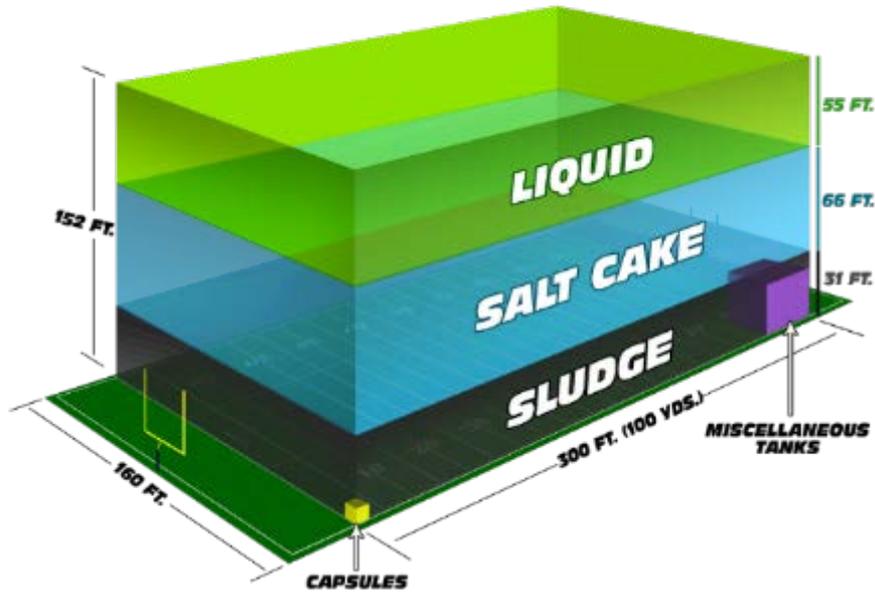


Water-insoluble metal oxides, significant amount of interstitial liquid - texture similar to peanut butter





Tank Waste Treatment: Composition



Typical Double Shell Tank





WTP Project – \$16.8B+ capital project (largest in DOE)

- Pretreatment (PT) Facility
- High Level Waste (HLW) Facility
- Low Activity Waste (LAW) Facility
- Analytical Laboratory
- Balance of Facilities (BOF)

LAW

- LAW / Lab nearing completion
- BOF in startup / commissioning
- Direct Feed plan for startup

HLW

- Technical issues caused delays
- BOF also supports HLW/PT

PT

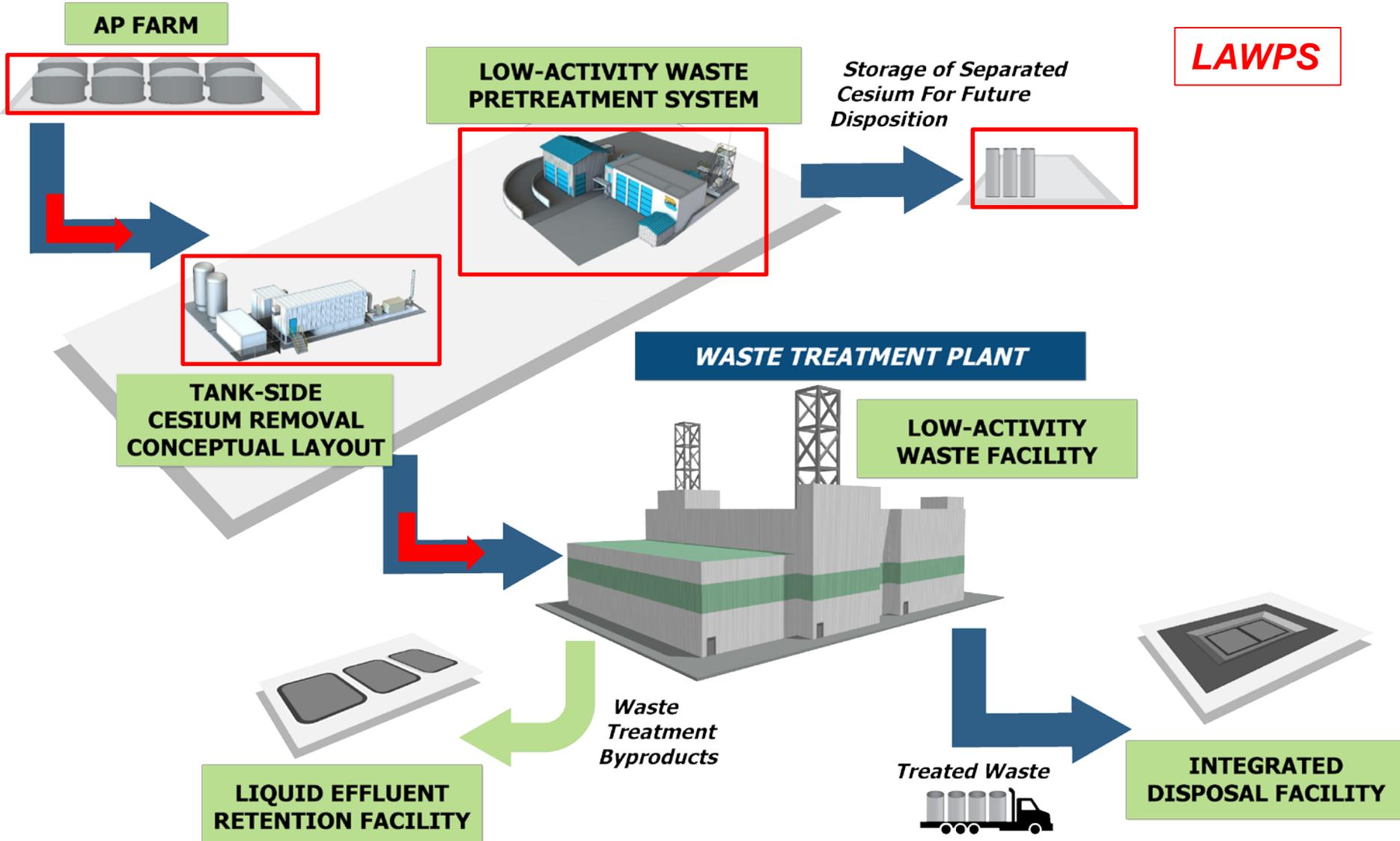
- Three remaining technical issues
- Resolution anticipated in FY2018



Direct Feed Low Activity Waste – Phased feed approach using a tank-side process to provide initial feed for LAW Facility operations

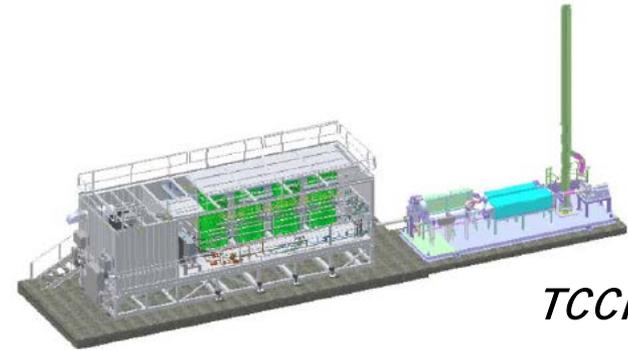
DFLAW Advantages:

- Enables near-term waste treatment and places approximately 75% of the WTP in operation
- Addresses liquids, the most mobile form of tank waste and creates double-shell tank space
- Near-Term - supports organizational, cultural, and skills / experience development through the transition from construction to operations
- Longer Term - provides valuable lessons-learned to aid construction, startup, and commissioning and of the remaining portions of WTP

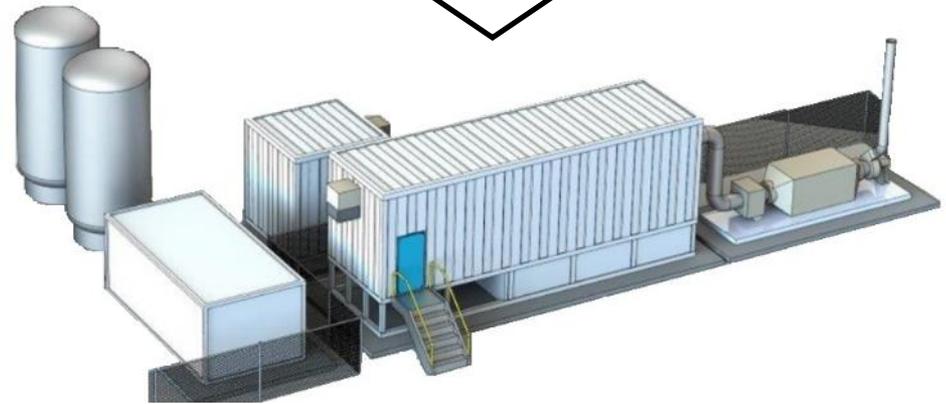
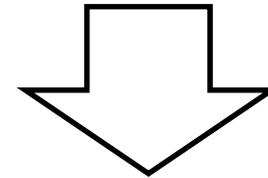




- Ion-exchange to remove Cesium (proven technology – Fukushima)
- Leverages functional characteristics of Tank Closure Cesium Removal (TCCR) system designed for Savannah River Site
- Tank-side / limited infrastructure requirements
- Design, build, test, delivery cycle supports DFLAW schedule
- Pre/post-ion exchange filtration to remove undissolved solids and media fines
- Hydrogen retention mitigation and enclosure ventilation skid



TCCR



TSCR Conceptual Layout

*Options for feed production beyond TSCR
are under evaluation*





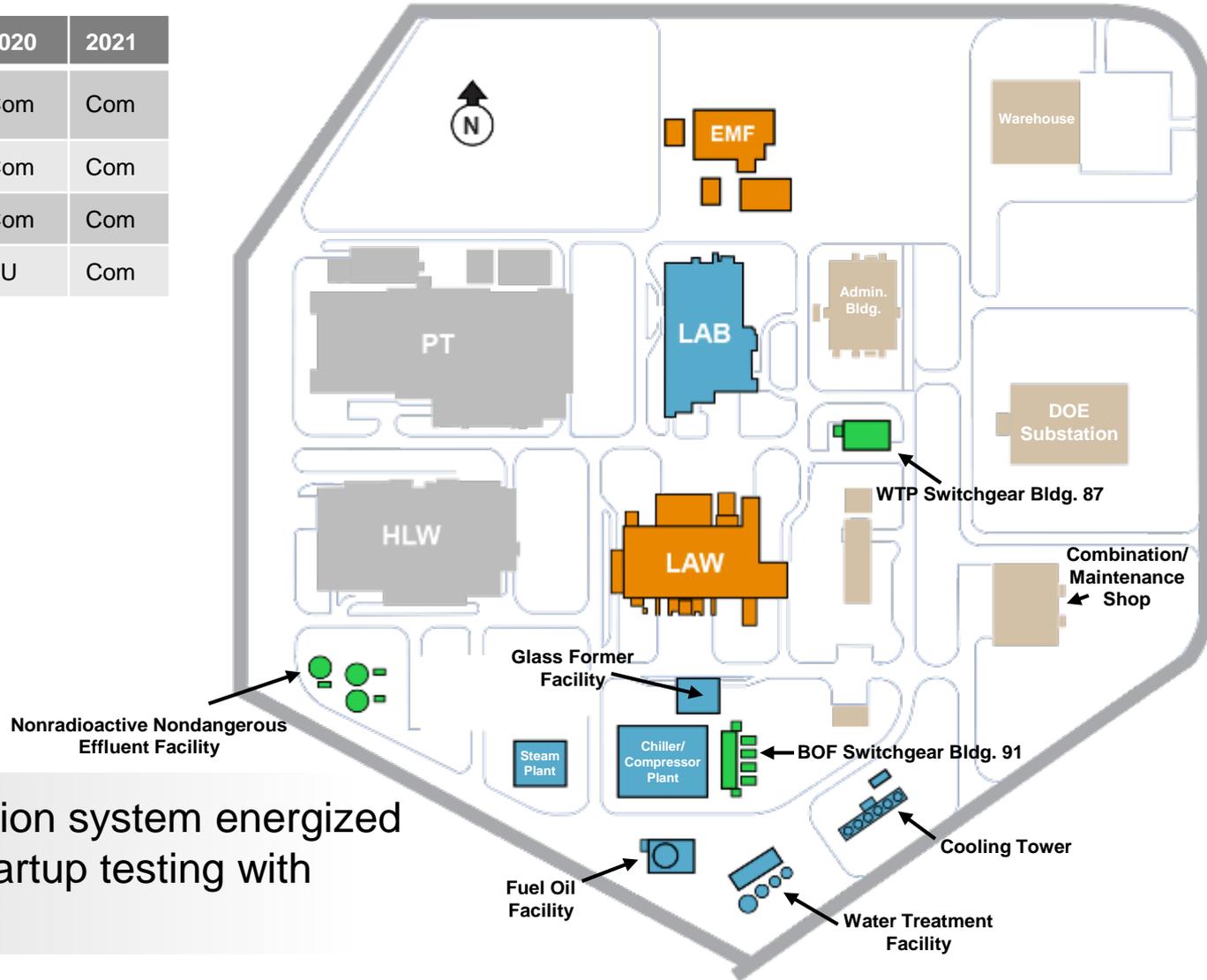
	2017	2018	2019	2020	2021
BOF	SU	SU/Com	Com	Com	Com
LAB	SU	SU	Com	Com	Com
LAW	C	C	SU	Com	Com
EMF	C	C	C	SU	Com

Legend *

- C = Construction
- SU = Startup
- Com = Commissioning
- Maintenance/Operations

* Reflects DFLAW systems status

- BOF = Balance of Facilities
- LAB = Analytical Laboratory
- LAW = Low-Activity Waste
- EMF = Effluent Management Facility



WTP electrical distribution system energized and supporting BOF startup testing with permanent plant power





	2017	2018	2019	2020	2021
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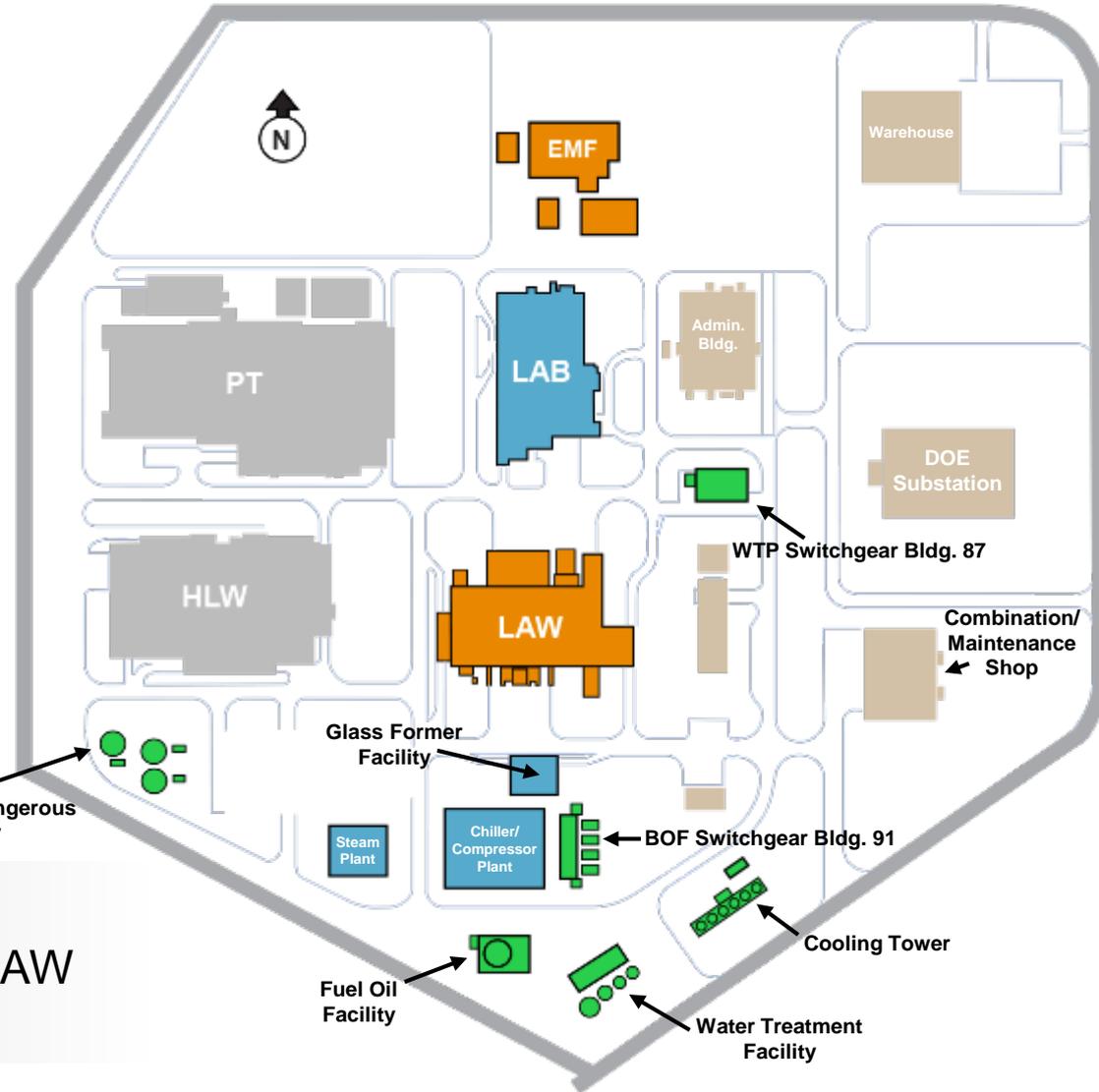
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TSCR in design



WTP startup testing nearing completion for BOF systems and LAW systems commence startup testing





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TSCR design complete



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LAW startup testing in progress





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LAW	C	C	SU	Com	Com
EMF	C	C	C	SU	Com

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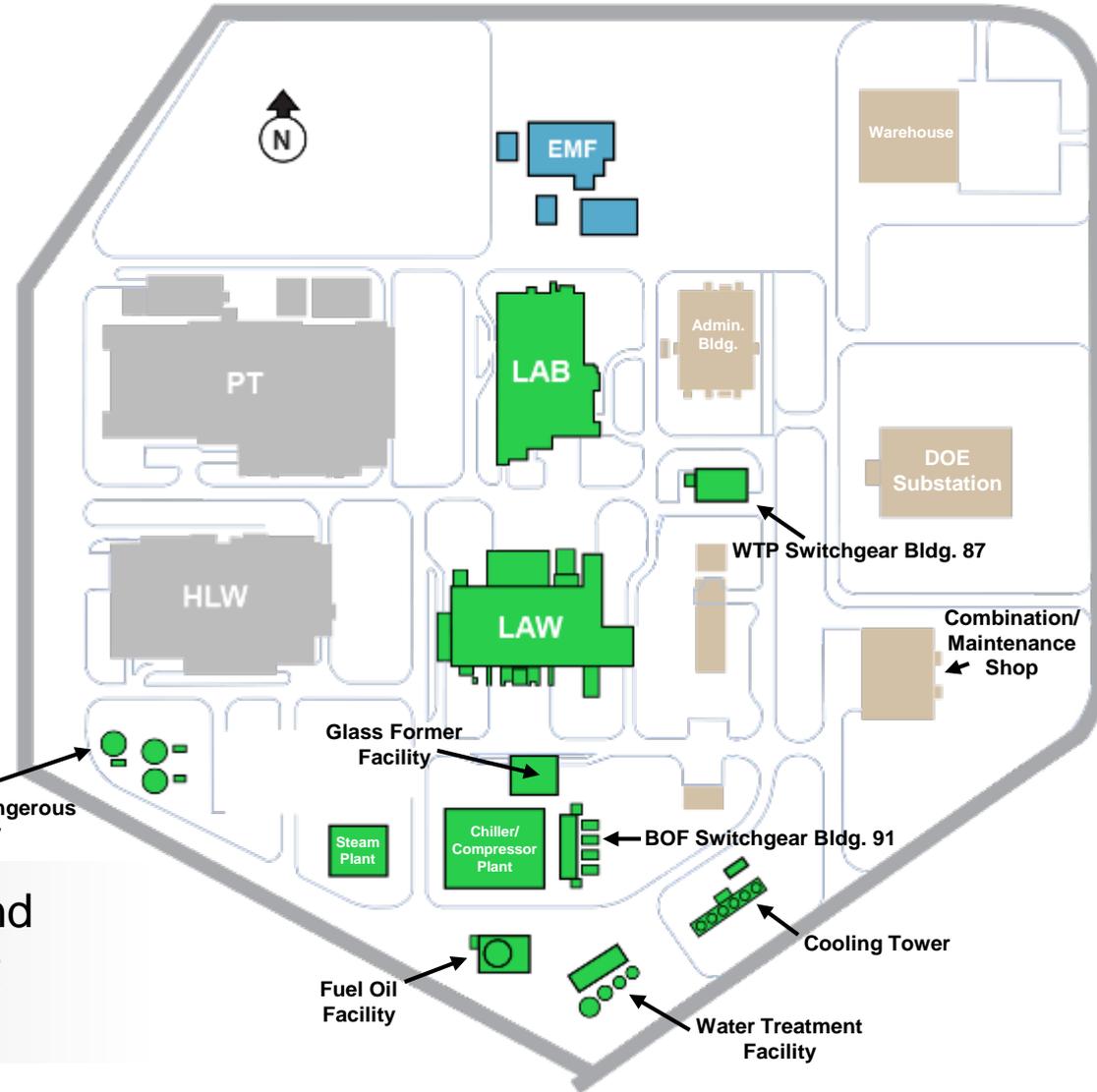
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TSCR fabrication / delivery complete



EMF system startup in progress and WTP systems preparing to support LAW Cold Commissioning





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LAB	SU	SU	Com	Com	Com
LAW	C	C	SU	Com	Com
EMF	C	C	C	SU	Com

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TSCR commissioning / testing complete



LAW Feed



WTP ready to support DFLAW operations





DOE recognizes the urgency of the cleanup mission and the need to continue to achieve safe and efficient progress

Continuing to make progress towards DFLAW operations

DOE and its contractors are aligned on the approach and are working to increase confidence in achieving DFLAW operations as soon as December 2021 and no later than December 2023

DOE is committed to continuing to work with regulators and other stakeholders

