



THE HANFORD SITE

Effluent Treatment Facility Upgrades to Support Direct-Feed Low-Activity Waste

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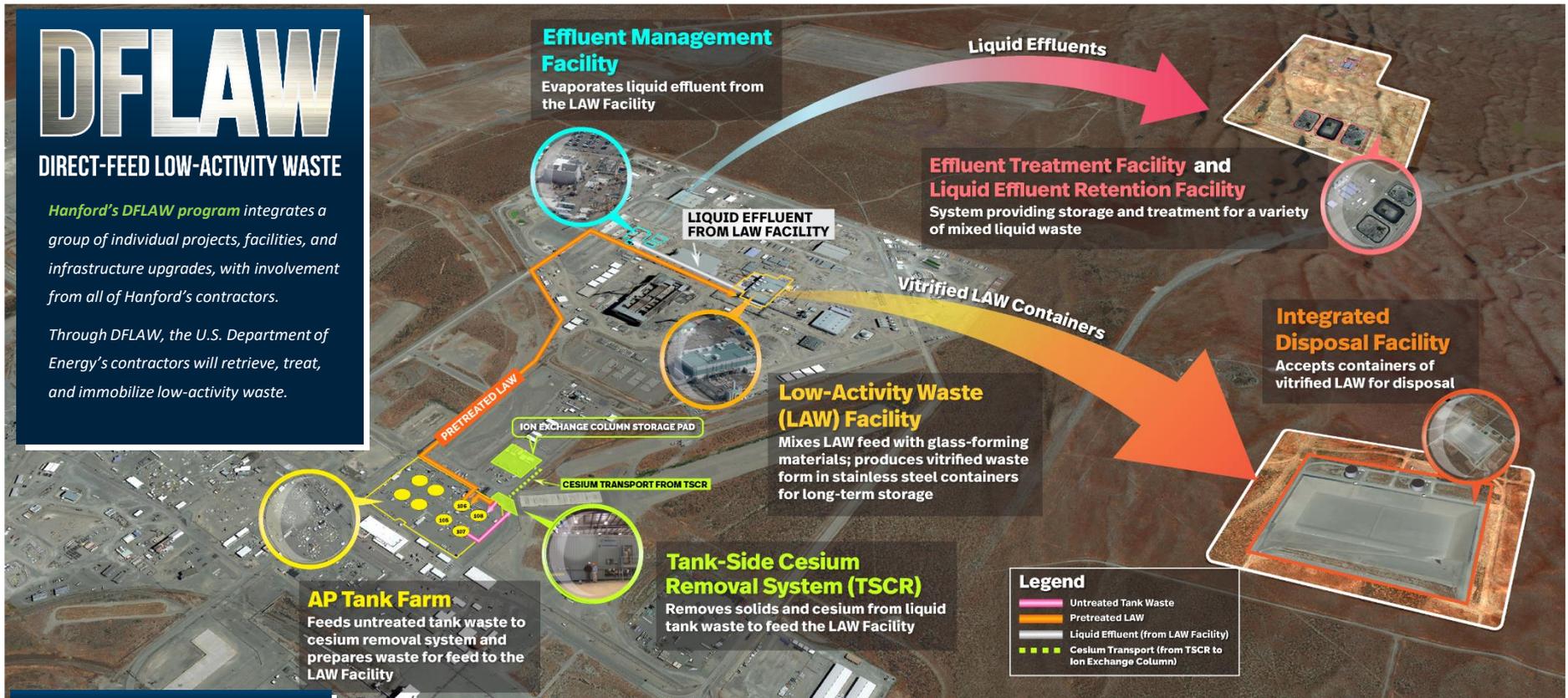
Direct-Feed Low-Activity Waste Overview

DFLAW

DIRECT-FEED LOW-ACTIVITY WASTE

Hanford's DFLAW program integrates a group of individual projects, facilities, and infrastructure upgrades, with involvement from all of Hanford's contractors.

Through DFLAW, the U.S. Department of Energy's contractors will retrieve, treat, and immobilize low-activity waste.



INFRASTRUCTURE

ELECTRICAL

WATER/SEWER

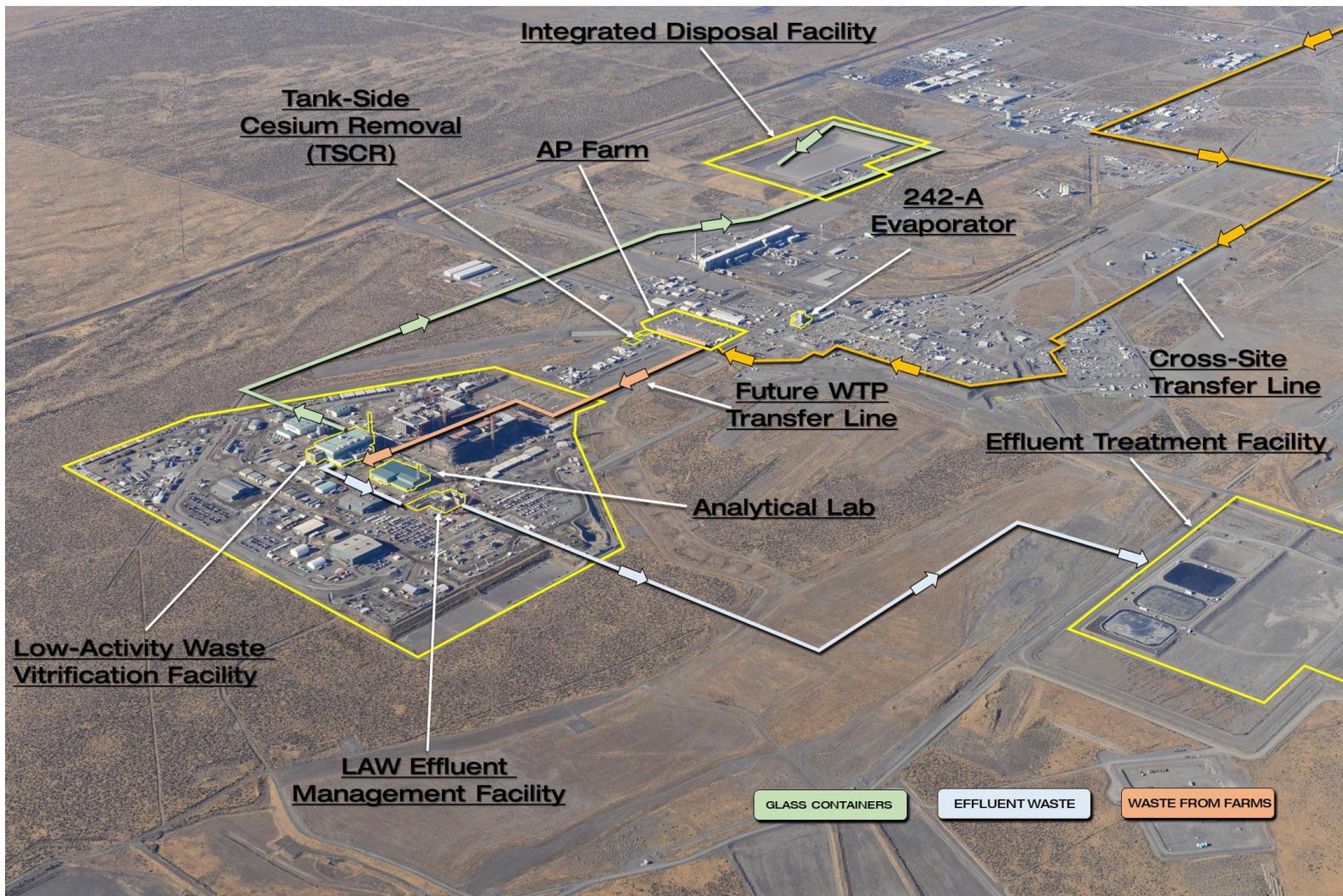
ROADS

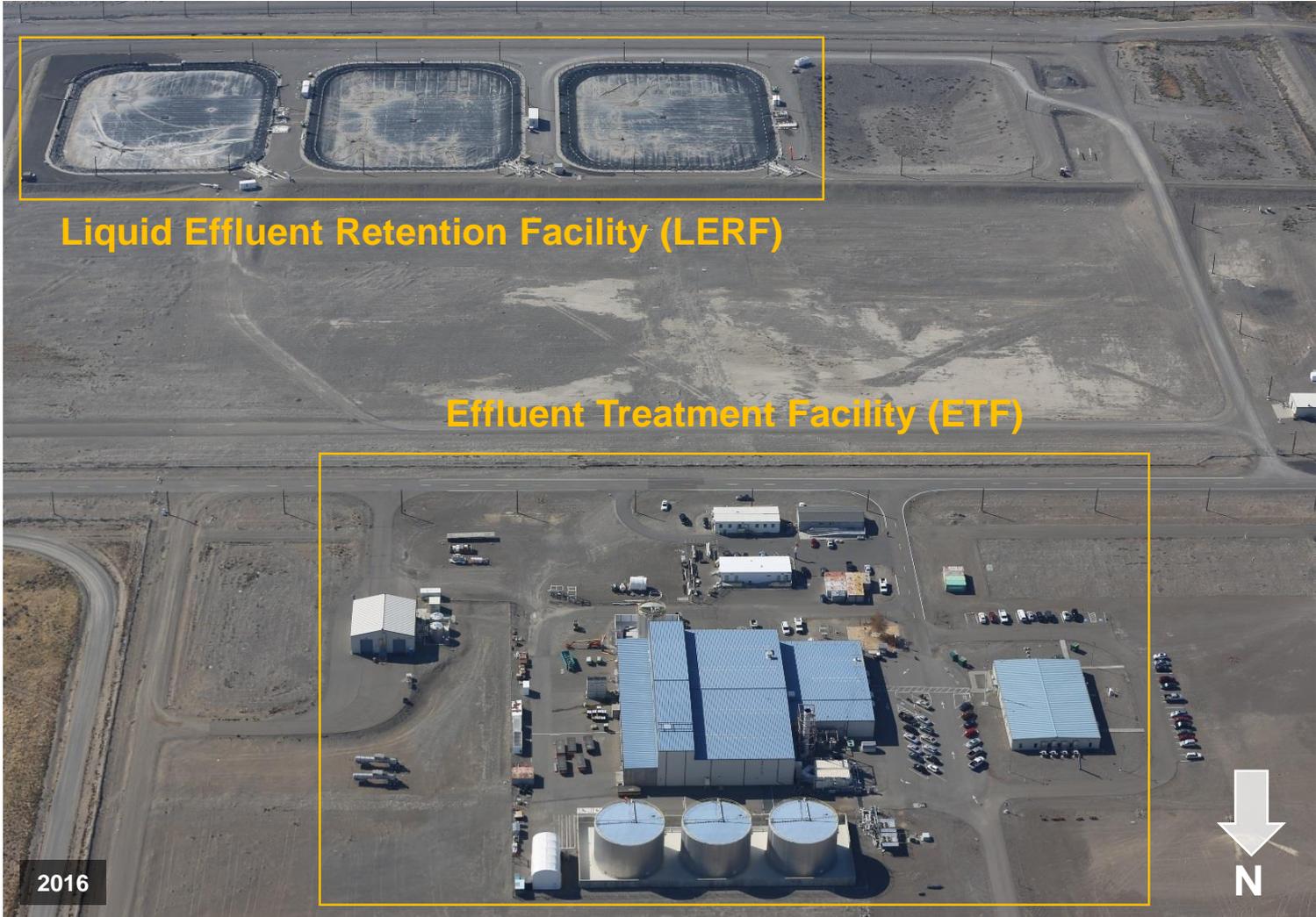
SECURITY

INFORMATION TECHNOLOGY

EMERGENCY PREPAREDNESS

Direct-Feed Low-Activity Waste Process Flow





Mission: Receive, treat, and dispose of liquid effluents from authorized programs and projects

The liquid waste processing facilities include:

- LERF
- ETF
- State-Approved Land Disposal Site (SALDS)
- Treated Effluent Disposal Facility (TEDF)

Liquid Effluent Retention Facility



2016

Purpose: The discharge of wastes to the soil is not allowed. LERF provides needed interim storage of large quantities of low-level, low-hazard liquid effluents

- Three *Resource Conservation and Recovery Act* (RCRA)-permitted surface impoundments, or basins
- Permitted storage capacity of 7.8 million gallons each
- During DFLAW operations, primary effluent streams consist of 242-A Evaporator, leachates, and the Waste Treatment and Immobilization Plant (WTP)

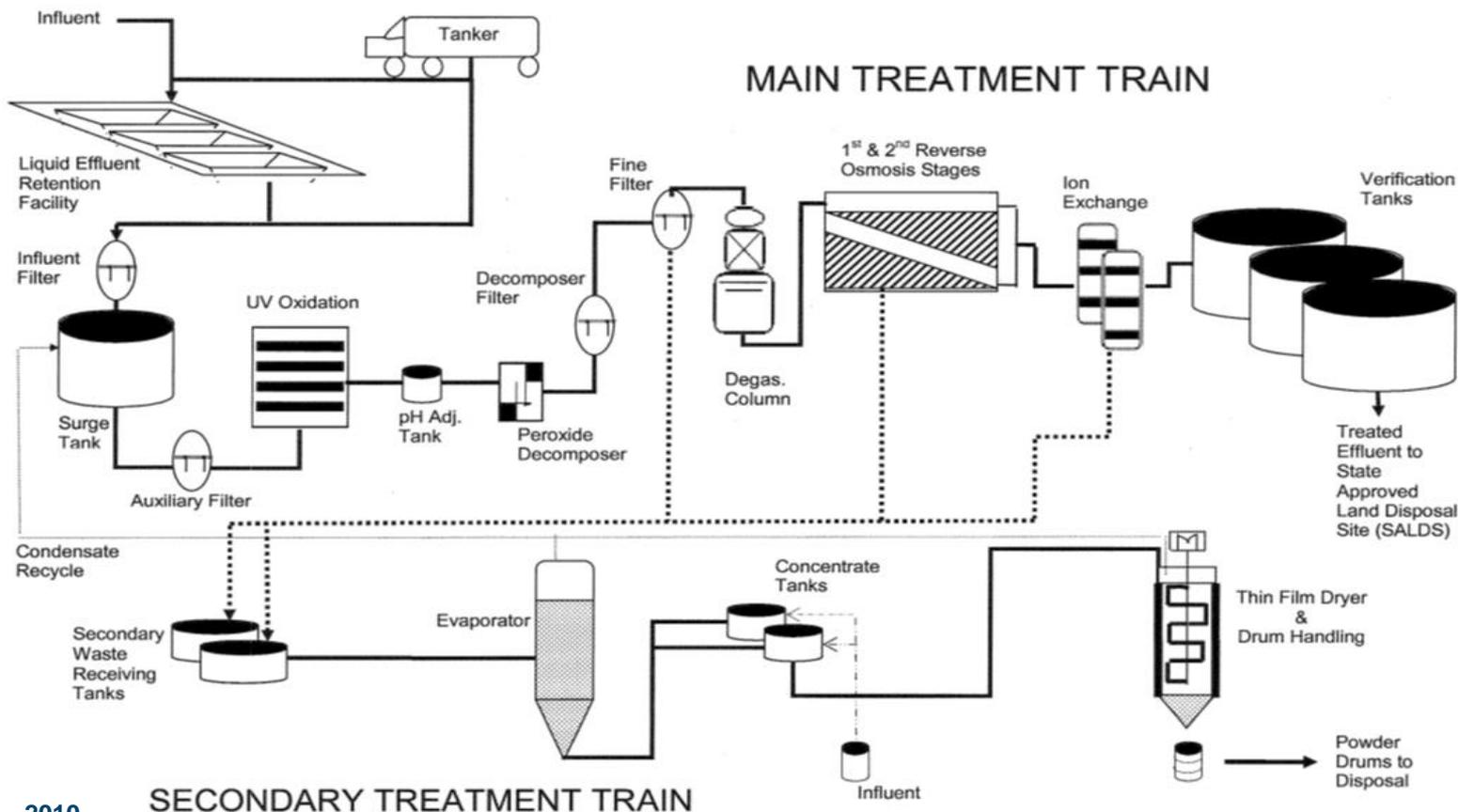
Effluent Treatment Facility



Purpose: The discharge of wastes to the soil is not allowed. ETF treats aqueous waste from LERF in a series of process units to remove or destroy waste constituents

- Aqueous waste is processed through the main treatment train (MTT). Reject streams from MTT are processed through the secondary treatment train (STT)
- Effluent treated by ETF is discharged to a SALDS north of the 200 West Area

Effluent Treatment Facility Unit Operations





2010

Purpose: SALDS is a gravel-filled drain field that provides a controlled and monitored location for water discharge after ETF treatment

- ETF cannot effectively remove tritium
- SALDS was sited within the Central Plateau to allow for the decay of tritium (half-life of approximately 12.5 years) to below drinking water standards before reaching any waters



2010

Purpose: TEDF is a separate collection system that accepts nonradioactive, nonhazardous effluent collected via pump stations in the 200 East Area and 200 West Area

- Effluent streams include steam condensate, cooling water, raw water, etc.
- The system consists of approximately 12 miles of pipeline, three lift stations, a sample station, and two adjacent 5-acre infiltration ponds

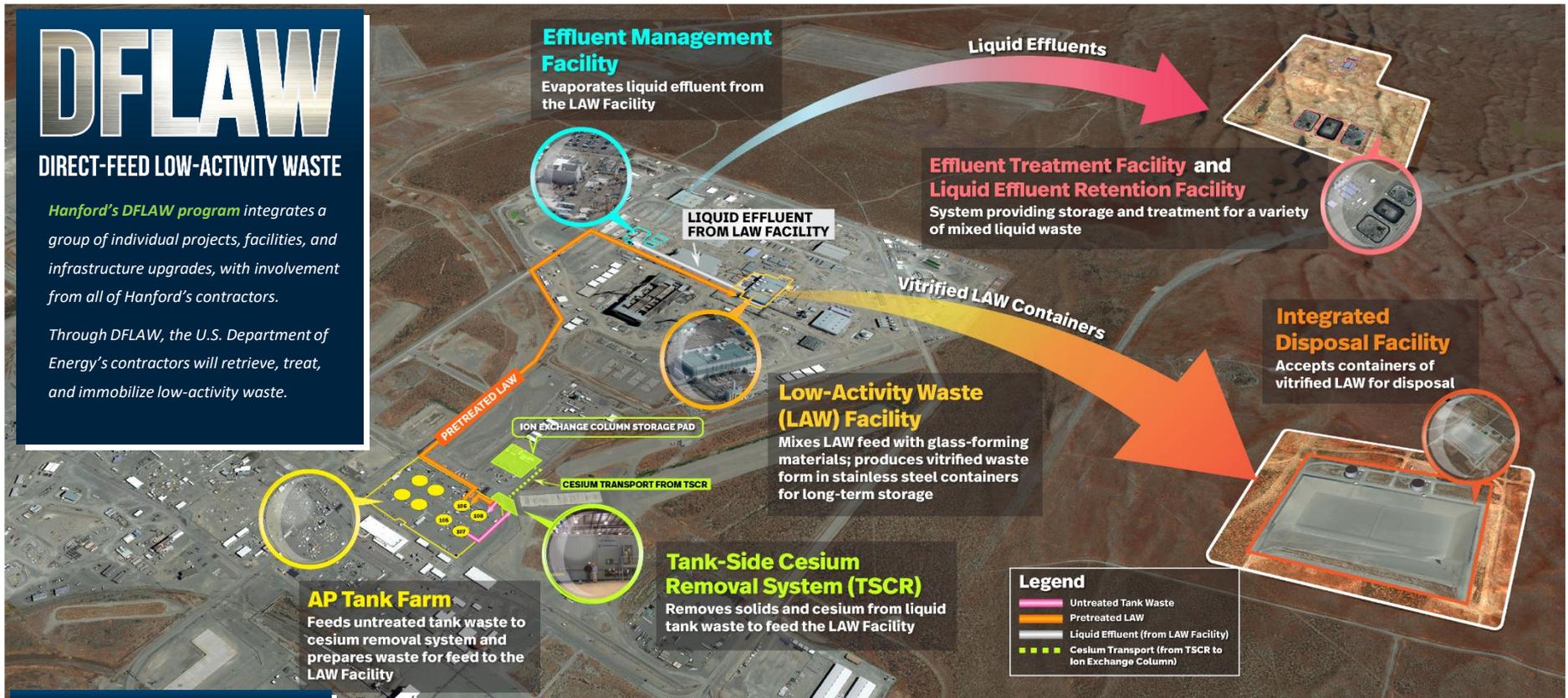
Direct-Feed Low-Activity Waste Refresher

DFLAW

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Upgrades to Support Direct-Feed Low-Activity Waste

In order to receive and treat DFLAW effluent, the liquid waste processing facilities must improve:

Area	Example
Capability	Connect WTP to LERF
Capacity	LERF Basin 41
Reliability	Air Compressor Upgrade

The U.S. Department of Energy, Office of River Protection (ORP) funds the work needed to ensure the facilities have the capability, capacity, and reliability to support DFLAW operation.

Direct-Feed Low-Activity Waste Projects List

- Treatment System Life Extension Projects:
 - Replace peroxide destruction modules
 - Install brine loadout system
 - Replace ultraviolet/oxidation units
 - Replace reverse osmosis pumps and valves
- Infrastructure Life Extension/Upgrades:
 - Replace HVAC chiller units
 - Replace transfer line leak detection systems
 - Replace compressed air and cooling water systems
 - Repair verification tank coating
 - Replace LERF covers and leachate systems
- Operational Reliability:
 - Conduct of operations, training, procedure improvements

Reliability: Air Compressor – Before



Reliability: Air Compressor – After



Purpose: The ETF compressed air system provides service air to process equipment and dry instrument air to process instrumentation and air-operated valves

- Compressed air system is critical to ETF – failure to supply air will shut down ETF processing operations
- Completed upgrade in fiscal year 2019 with new compressor system components
- Upgraded configuration by removing and replacing the single air compressor with two new compressors

Capability: Connect WTP to LERF

200-E-288-PL,
PC-5000 Pipeline

200-E-311-PL,
Backup WTP Pipeline

200-E-310-PL,
Primary WTP Pipeline



Purpose: The purpose of the transfer lines is to transport radioactive, dangerous waste liquid effluents from the WTP to the LERF for processing by the 200 Area ETF

- Transfer lines 200-E-310-PL (primary) and 200-E-311-PL (backup) were built in 2001
- Prior to these transfer lines being placed into service, integrity testing (along with some upgrades and/or modifications) must be performed

Capacity: LERF Basin 41



Purpose: Design, permit, and install an additional LERF basin to provide more storage capacity for Hanford Site generators

- Rough excavation was performed at the location of LERF Basin 41, but no further work to complete the basin
- Design is ongoing and will be similar to the existing LERF basins taking into account any changes in code (e.g., piping, electrical, dangerous waste, etc.)
- A piping configuration evaluation will be performed to assess potential operations improvements at LERF

- Liquid waste processing facilities are last step in DFLAW before treated effluent is discharged to the environment
- To receive and treat DFLAW effluent, liquid waste processing facilities must improve capability, capacity, and reliability
- ORP funds the work needed to ensure the facilities have the capability, capacity, and reliability to support DFLAW operation

Questions?