Low-Activity Waste Pretreatment System Update

Hanford Advisory Board Tank Waste Committee

Presented by: Steve Pfaff, LAWPS Federal Project Director

August 9, 2017
The DFLAW approach sends pretreated tank liquids to the Low-Activity Waste (LAW) Facility, enabling treatment operations as soon as practicable.
Direct Feed Low-Activity Waste Approach

• First step in sequential approach to tank waste treatment and disposal
• Provides earliest practicable tank waste disposition
• Completed 60% Design Review.
• Completed Preliminary Safety Design Report.
• Developing system testing reports.
• Permit modification available for public comment through Sept. 15, 2017; public meeting Aug. 21 at Richland Library.
• Requesting DOE HQ approval of Critical Decision 3A to begin site preparation and fabrication of selected equipment.
• Anticipating full construction start by mid-FY 2019.
Expected Results

- **20** Proposed waste feed delivery campaigns
- **1,000,000** Gallons per campaign
- **6.3** Million gallons of tank space generated*
- **9,600** Metric tons of sodium processed
- **15%** of Tank Farm sodium inventory
- **12,000** Immobilized LAW containers produced
• Demonstrate column hydraulics
• Evaluate distributor performance
• Resin removal
• Gas removal system
Key Support Tests

- Gas generation with sRF (rad and non rad)
- Gas retention and release with sRF
- CFF operation, cleaning, and corrosion
Critical Decision (CD)-1 approved: May 2015
- Initiated Preliminary Design phase; currently between 60% and 90% checkpoints
- Full scale column test and 1/9th scale integrated testing supporting design

Anticipate CD-3A approval by October 2017
- Long lead procurement and site prep activities

Anticipate CD-2/3 approval by February 2019
- Completion of 90% design phase; results of integrated engineering scale testing
- Initiate final design and begin construction activities

Coordinating startup timing with WTP

Supporting completion of Low-Activity Waste Facility hot commissioning by December 2023
**Dangerous Waste Permitting Process**

- DOE submitted the first permit application package for the LAWPS Facility to Ecology in July 2017.

- Class 3 permit modification will require the following:
  - 60-day public comment period on permit application, including a public meeting (led by DOE)
    - Comment period is July 17-September 15, 2017
    - Meeting set for 5:30 p.m. August 21 @ Richland Library
  - 45-day public comment period on the permitting decision to be held by Ecology (schedule TBD)
  - Public is informed of comment periods through the Hanford email and postal lists, newspaper ads, websites, HAB, etc.
Questions?
Provide a cesium and solids removal capability to support Direct Feed Low Activity Waste to WTP. The scope includes the following requirements:

- 40-year facility design life
- Cross Flow Filtration (CFF) for solids removal
- Spherical Resorcinol Formaldehyde (sRF) ion exchange resin for cesium removal
- Underground vaults with an above-grade weather enclosure
- Three treated LAW lag storage tanks
- Centralized control at the Tank Farms operations center (274 AW) with field control capability at LAWPS site
- Building and process vessel ventilation system(s)
- Spent Resin Removal and Handling System
- Cold Chemical Reagent Storage
- Transfer Lines from the AP Tank Farm boundary to the WTP interface point
Process Description

- Double-shell tank AP-107 will send liquids – roughly 90 gallons per minute – to the LAWPS filter feed tank
- The filter feed tank will return roughly 80 gallons per minute to AP-107
- The filter feed tank pump will send the tank waste liquids through the crossflow filter tubes (408 porous sintered metal tubes) at a rate of roughly 900 gallons per minute
- Filtrate (free of suspended solids) will flow from the crossflow filters to the ion exchange columns – 10 gallons per minute
- The IX columns (lead and lag) will undergo an elution cycle approximately every 7 days – cesium is stripped from the columns with dilute nitric acid
- The cesium and other miscellaneous small liquid waste streams (such as flushes) will be chemically adjusted and returned to the Tank Farm double-shell tanks
- LAW feed is collected in one of three lag storage tanks. At any given time, one tank will be filling with LAW feed, one will be undergoing confirmatory lab analysis, and one will be sending feed to the WTP LAW facility
- Each lag storage tank can hold roughly 7-10 days feed to the WTP LAW facility – feeding both melters at full capacity to produce 30 metric tons of glass per day, which is 5 of the ILAW containers (7.5 feet tall, 4.5 feet in diameter).
Facility Infrastructure:

- Site footprint is approximately 4 acres
- Process facility footprint is approximately 20,000 sq. feet
- Multiple below-grade process cells, with depth of cells varying from 23-48 ft.
- Main process tanks:
  - Filter Feed Tank – 6100 gallons
  - Treated Waste Transfer Tank – 2300 gallons
  - Cesium Product Tank – 35,000 gallons
  - Lag Storage Tanks (3) – 124,000 gallons each
- Reagent tanks:
  - NaOH tanks: 19M – 6200 gallons, 1M – 2800 gallons, 0.1M – 2600 gallons
  - Dilute HNO₃ tanks (2): 12,300 gallons each
- Waste transfer piping – permanent underground pipe-in-pipe design
  - Between AP tank farm and LAWPS – Three 2-inch diameter lines, ~2110 ft. long
  - Between LAWPS and the WTP interface point – One 3-inch line, ~1300 ft. long
  - Between WTP interface point and AP Tank Farm – One 2-inch line, ~2400 ft. long
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<tr>
<th>Milestones</th>
<th>2016 Consent Decree (Amended)</th>
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<tr>
<td>LAW Facility Construction Substantially Complete</td>
<td>12/31/2020</td>
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<tr>
<td>Start LAW Facility Cold Commissioning</td>
<td>12/31/2022</td>
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<tr>
<td>LAW Facility Hot Commissioning</td>
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<td>Pretreatment Facility Hot Commissioning</td>
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<td>HLW Facility Hot Commissioning</td>
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<td>WTP Hot Start</td>
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<td>WTP Begin Initial Operations</td>
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