



Hanford's High-Level Waste Facility

Overview

The U.S. Department of Energy (DOE) is committed to treating all Hanford tank waste in a safe, effective and efficient manner. DOE and its contractor partners are achieving important progress with Hanford's tank waste mission, demonstrated through preparations to treat low-activity waste under the Direct-Feed Low-Activity Waste (DFLAW) Program:

- 2022: Achieved large-scale tank waste treatment for the first time, using the Tank-Side Cesium Removal System, to treat waste to be fed directly to the Low-Activity Waste Facility at the Waste Treatment and Immobilization Plant (WTP) for vitrification, or immobilization in glass
- 2023: Successfully heated up the first WTP melter and produced the first test glass
- Achieved 76 of the 77 permits required to support the DFLAW Program

Hanford's progress in advancing the DFLAW Program is due in no small part to the alignment and shared focus among DOE and its contractor partners, the State of Washington, and the U.S. Environmental Protection Agency (EPA) on making tank waste treatment a top priority.

Building on that collaboration, and by applying lessons learned from recent DFLAW successes, DOE, the Washington State Department of Ecology (Ecology) and EPA are collaborating on establishing the path forward for the future vitrification of the high-level waste (HLW) fraction of the tank waste in the WTP HLW Facility.



The High-Level Waste Facility contains two identical, remotely operated melter caves.



Two 90-ton melters will produce a sturdy glass product in the High-Level Waste Facility.



High-Level Waste Facility (cont.)

Enhancing the High-Level Waste Treatment Strategy

- In 2018, various reports identified concerns about the affordability and technical achievability of the original tank waste treatment strategy to separate waste into high-level and low-activity waste streams in the Pretreatment Facility for vitrification in parallel at separate facilities.
- During collaborative discussions, DOE and Ecology worked together on an HLW treatment optimization study and an analysis of alternatives for preparing waste to be transferred to the HLW Facility for vitrification.
- DOE prepared an analysis of alternatives report which analyzed life-cycle costs, schedule and risks associated with several alternatives for preparing tank waste for vitrification in the HLW Facility.
- Several alternatives consider a direct-feed HLW approach, where HLW would be fed directly from a double-shell tank farm into the HLW Facility for vitrification.
- DOE, the State of Washington, and the EPA have worked together over the last three years in constructive and collaborative discussions with a federal mediator to work towards an agreement on the future of the tank waste treatment and disposition mission at Hanford.

The Path Forward for the High-Level Waste Facility

Through a series of workshops, DOE and contractor teammate Bechtel National Inc. (BNI) charted a revised approach to finish building the HLW Facility and supporting facilities. To reduce cost and schedule uncertainty, the collaboration produced a plan to implement a design-then-build strategy.

DOE and BNI agreed that the optimal way ahead was a two-phase approach:

- Design Completion Phase (2023 – 2027): Complete design of the HLW Facility and supporting facilities. The approach supports purchases of equipment and limited construction activities based on the maturity of design, to progress the project while minimizing the risk of future rework.
- Construction and Commissioning Phase (2028 – 2035): Construct and commission the HLW Facility and supporting facilities based on a validated design.

In 2023, an HLW “Firm the Foundation Team” was established. The team’s purpose was to promote the application of lessons learned, industry best practices and teamwork through the following objectives:

- Reinforce the importance of a collaborative team culture as an enabler for a successful project
- Document key information to ensure the team’s readiness before advancing to the design phase.
- Achieve an understanding of the project’s revised approach to ensure compliance with the contract as well as a consistent focus on safety and operational requirements, drawing from lessons learned from previous projects
- Develop an integrated approach to de-risk activities in design, procurement and construction phases
- Establish a high-confidence plan and baseline for completing the HLW Facility.

Way Ahead

Coordinated efforts by DOE, its contractor partners, as well as collaboration with Ecology and EPA, have played a pivotal role in establishing a success-oriented way ahead for the treatment of HLW at Hanford. The way ahead is based on lessons learned, optimization studies, industry best practices, and a commitment to strong teamwork. An essential element of the enhanced approach is the shift to a design-then-build approach that reduces risk to the project cost and schedule.

