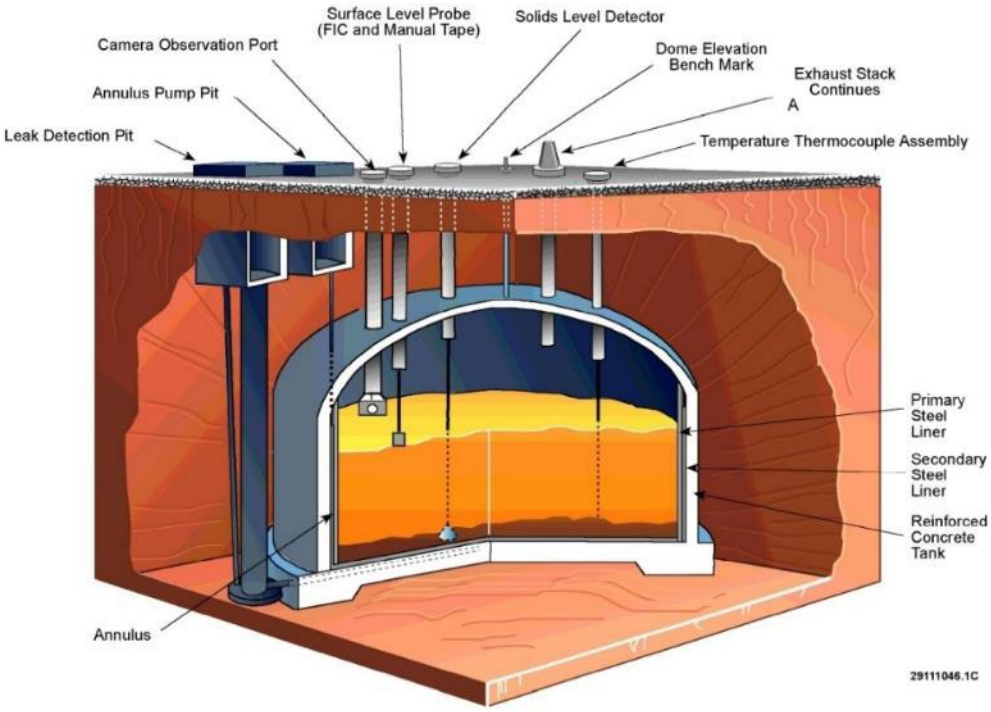
THE HANFORD SITE

Hanford Double-Shell Tanks

Fact Sheet – December 2022



The U.S. Department of Energy (DOE) and contractor Washington River Protection Solutions (WRPS) are committed to maintaining the integrity and safe operating condition of Hanford's double-shell tanks (DST). The DSTs store waste and receive additional waste from Hanford's single-shell tank retrieval (transfer) actions. The DSTs will support feeding waste to Hanford's low-activity waste vitrification (immobilization in glass) facility at the Waste Treatment and Immobilization Plant.

Hanford's 28 DSTs were constructed between 1968 and 1986. The DSTs range in capacity from 1 million to 1.265 million gallons and contain three waste forms: sludge, saltcake and supernatant. The sludge contains insoluble metal wastes and fission products. The saltcake contains evaporated soluble salts. The supernatant is liquid containing dissolved salts and soluble fission products.

Each DST consists of a primary carbon-steel tank inside a secondary carbon-steel liner, surrounded by a reinforced concrete shell. The primary tank rests atop an 8-inch insulating slab, separating it from the secondary steel liner and providing air circulation and leak detection slots under the bottom of the primary tank. A 30-inch-wide air space called the annulus exists between the secondary liner and primary tank walls. This annulus supports various inspections of the outside of the primary tank and inside of the secondary liner. Tank monitoring technologies include use of robotic equipment for visual and ultrasonic inspections of the walls and tank bottoms.

Tank AP-106 Operational History

Tank AP-106 is one of eight DSTs that make up Hanford's AP Tank Farm. The tank was placed into service in 1986 and has recently been emptied of all waste in preparation to be repurposed for other waste storage.

The tank is key to DOE's direct-feed low-activity waste approach to treating tank waste. The tank will receive waste treated by the Tank-Side Cesium Removal System and be used as the feed tank for low-activity waste vitrification (immobilization in glass).

Tank capacity: Approximately 1.2 million gallons

Waste: 414,000 gallons

Most recent core sample: 2019

Most recent annulus visual inspection: 2020

Next annulus visual inspection: 2024

Most recent ultrasonic testing inspection: 2014

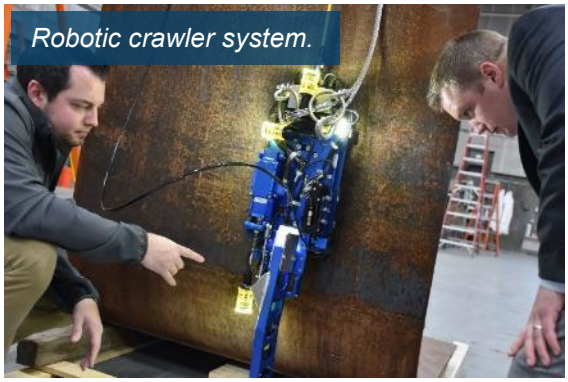
Next ultrasonic testing inspection: 2024

Air-slot visual inspection: 2024

Hanford Double-Shell Tanks (cont.)

DST Integrity Program

WRPS engineers monitor DSTs through a robust tank integrity program. The program includes visual and ultrasonic inspection of primary tanks and secondary liners via the annulus; waste chemistry control, supported by laboratory testing, in-tank corrosion monitoring and chemistry adjustment; structural analysis and operating and seismic loads; and continuous leak-detection and monitoring systems.



Robotic crawler system.

Visual Inspection

WRPS inspects the DST annulus surface conditions of the primary tank and secondary liner using high-resolution, remote video equipment. Inspections of in-tank conditions typically focus on the point where the sidewall and bottom curved surface of the tank meet, and the liquid-air interface. In 2018, WRPS successfully performed visual inspection of the difficult-to-access primary tank bottoms by deploying a robotic crawler with a unique camera system. The primary tank rests on an insulating pad within the secondary liner. The 8-inch-thick ceramic-like pad contains a network of 2½-by-2½-inch air slots that provide limited access to the tank bottoms.

Ultrasonic Inspection

WRPS routinely measures the thickness of DST primary and secondary tanks via ultrasonic inspections. This nondestructive examination technique uses sound waves to measure and track the thickness of the tank walls to ensure the tanks can continue to safely store waste.

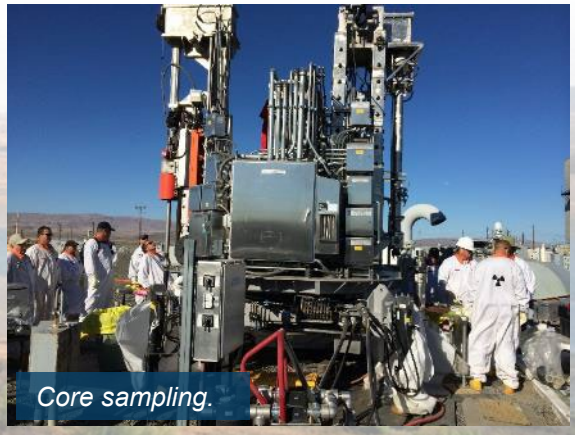
Ultrasonic testing of tank bottom.

Core Sampling

WRPS also performs core sampling to gain a better understanding of the waste in contact with the primary tank bottoms. Scientists analyze the waste samples for compliance with corrosion specifications that address general corrosion, pitting and cracking. Core samples help engineers learn more about corrosion rates, corrosion potentials and propensity for pitting, which in turn aids in the development or modification of mitigation strategies that can extend the service lives of DSTs.

Expert Panel

DOE and WRPS engineers work with experts from other DOE sites and national laboratories, industry and academia. The group meets several times a year to provide independent advice and recommendations to DOE and WRPS on existing and emerging tank integrity issues, with a focus on safety and supporting the useful life of the storage tanks.



Core sampling.