



HIGH-LEVEL WASTE VITRIFICATION FACILITY

Waste Treatment Plant Project

www.hanfordvitplant.com

BACKGROUND

The Hanford Site, located in southeastern Washington state, was the largest of three defense production sites in the U.S. Over the span of 40 years, it was used to produce 64 metric tons of plutonium, helping bring an end to World War II and playing a major role in military defense efforts during the Cold War. However, as a result, 56 million gallons of radioactive and chemical wastes are now stored in 177 underground tanks on the Hanford Site.

To address this challenge, the U.S. Department of Energy contracted Bechtel National, Inc., to design and build the world's largest radioactive waste treatment plant. The Hanford Waste Treatment and Immobilization Plant (WTP), also known as the "Vit Plant," will use vitrification to immobilize most of Hanford's dangerous waste. Vitrification involves blending the waste with molten glass, heating it to high temperatures, then pouring it into stainless steel canisters. In this glass form, the waste is stable and impervious to the environment, and its radioactivity will dissipate over hundreds to thousands of years.

Construction of the WTP began in 2002. The plant will be operational in 2019.

CONSTRUCTION FACTS

- **Building volume:** 8,600,000 cubic feet
- **Concrete:** 88,000 cubic yards
- **Structural steel:** 9,764,000 tons
- **Heating and ventilation ductwork:** 1,142,000 pounds
- **Piping:** 165,000 feet
- **Electrical cable:** 1,610,000 feet
- **Craft hours to build:** 5,251,000 hours



HLW Facility in April 2011

The Hanford Waste Treatment and Immobilization Plant (WTP) will cover 65 acres with four nuclear facilities – Pretreatment, Low-Activity Waste Vitrification, High-Level Waste Vitrification and Analytical Laboratory – as well as operations and maintenance buildings, utilities and office space.

The waste treatment process will begin in the Pretreatment Facility, where waste will be divided into high-level solids and low-activity liquids. From there, the high-level waste will be transferred via underground pipes to the High-Level Waste Vitrification Facility, also known as the HLW Facility. When complete, the HLW Facility will be 440 feet long and 275 feet wide, approximately the size of three football fields, and 95 feet, or six stories, high.

In the HLW Facility, high-level waste will be mixed with glass-forming materials in two 90-ton melters and heated to 2,100 degrees Fahrenheit. The mixture will then be poured into stainless steel canisters that are approximately 2 feet in diameter, 14.5 feet tall and weigh more than 4 tons. When fully operational, the HLW Facility will produce an annual average of 480 canisters.

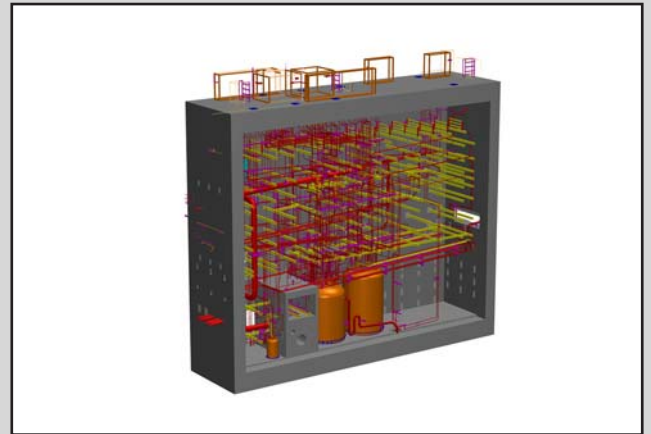
The full canisters will be temporarily stored at a canister storage facility in Hanford's 200 Area. Eventually, they will be shipped to a federal repository for permanent disposal.



A CLOSER LOOK INSIDE THE HIGH-LEVEL WASTE FACILITY

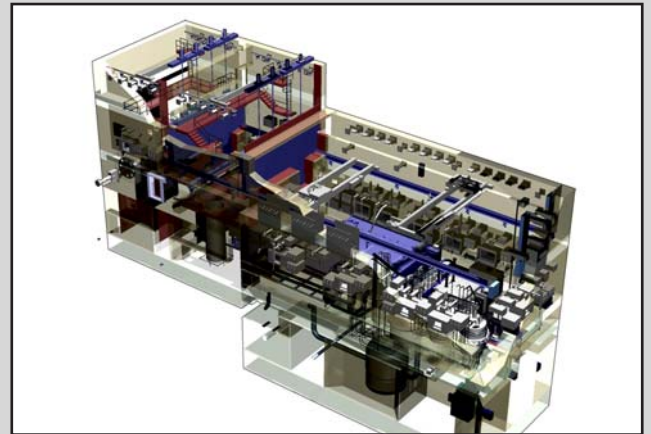
THE WET CELL

High-level waste arrives from the Pretreatment Facility in the wet cell. The cell rests inside a facility black-cell area, behind steel-laced, high-strength concrete walls, and is inaccessible to workers. Once inside the HLW Facility, the pretreated waste is transferred through shielded pipes into a series of melter preparation and feed vessels before reaching the melters. Liquids from various facility processes also return to the wet cell for interim storage before recycling back to the Pretreatment Facility.



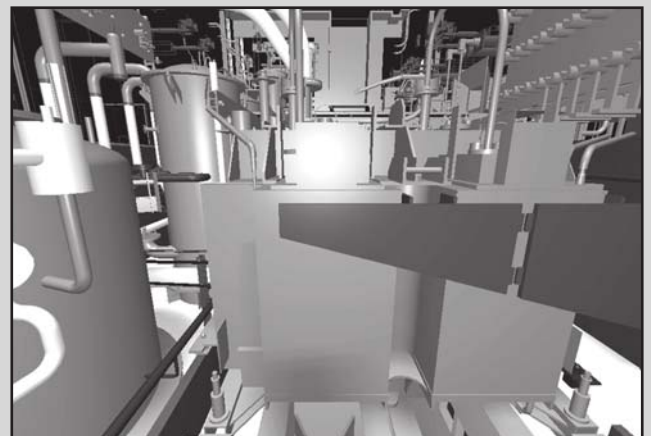
THE MELTER CELL

The facility contains two identical, remotely operated melter caves. Due to potential high levels of radioactivity in the caves, all operations and maintenance activities are performed using remote-handled large overhead cranes and manipulators. Each cave contains a series of complex utilities to support two high-level waste vitrification melters. The melters are supported by offgas cleaning systems that include a submerged bed scrubber vessel and two high-efficiency mist eliminators.



PRODUCTION AND OPERATIONS

Two identical 90-ton melters, each 14 feet by 14 feet and 11 feet high, will produce a sturdy glass product that consists of about 30 percent waste and 70 percent additives. The facility will annually produce an average of 480 canisters.



High-Level Waste Vitrification Facility (Elevation 0'-0")

