



# LOW-ACTIVITY WASTE VITRIFICATION FACILITY

Waste Treatment Plant Project

[www.hanfordvitplant.com](http://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.



LAW 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 low-activity waste will be transferred via underground pipes to the Low-Activity Waste Vitrification Facility, also known as the LAW Facility. The LAW Facility is 330 feet long and 240 feet wide, approximately the size of one and a half football fields, and 90 feet, or seven stories, high.

In the LAW Facility, concentrated low-activity waste will be mixed with silica and other glass-forming materials. The mixture will be fed into the LAW's two melters and heated to 2,100 degrees Fahrenheit. The 300-ton melters are approximately 20 feet by 30 feet and 16 feet high. The glass mixture will then be poured in to stainless steel containers, which are 4 feet in diameter, 7 feet tall and weigh more than 7 tons.

The low-activity waste containers will be stored on the Hanford Site in permitted trenches and covered with soil.

## CONSTRUCTION FACTS

- **Building volume:** 6,500,000 cubic feet
- **Concrete:** 28,500 cubic yards
- **Structural steel:** 6,200 tons
- **Heating and ventilation ductwork:** 943,500 pounds
- **Piping:** 103,000 linear feet
- **Electrical cable:** 843,000 feet
- **Craft hours to build:** 2,337,000 hours



# A CLOSER LOOK INSIDE THE LOW-ACTIVITY WASTE FACILITY

## PROCESS CELL

The process cell consists of six large stainless steel vessels: three for feeding waste to two low-activity waste melters and three for treating the melters' offgas. The concentrate receipt vessel receives waste feed from the Pretreatment Facility; a melter feed preparation vessel mixes the waste feed with glass formers; and another melter feed vessel supplies the mixed waste feed to the melters. The three offgas treatment vessels are a submerged bed scrubber to cool melter offgas and remove large particulates, a wet electrostatic precipitator to remove finer particulate, and a submerged bed scrubber condensate vessel to store and re-circulate liquid between a scrubber and the vessel.



## POUR CAVE TURNTABLES AND ELEVATORS

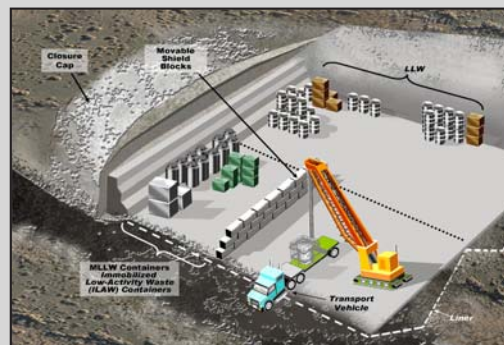
Each low-activity waste melter has two pour spouts leading down to a pour cave with two turntables and elevators. Each turntable has positions for three low-activity waste containers. An elevator raises a container under the melter pour spout. Once filled with glass, the container is lowered to the turntable and rotated to the second position to cool. The third position is for removal of the filled, cooled container and replacement with a new empty container.



## PRODUCTION AND OPERATIONS

The LAW Facility will contain two identical melters that will produce a sturdy glass product consisting of about 20 percent waste and 80 percent additives.

The facility will annually produce approximately 1,100 containers.



## Low-Activity Waste Vitrification Facility (Elevation 3'-0")

