



PRETREATMENT 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, 53 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:** 13,900,000 cubic feet
- **Concrete:** 114,000 cubic yards
- **Structural steel:** 17,000 tons
- **Heating and ventilation ductwork:** 1,796,000 pounds
- **Piping:** 540,000 linear feet
- **Electrical cable:** 1,491,000 feet
- **Craft hours to build:** 8,200,000 hours



PT Facility in July 2010

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 Pretreatment Facility, also known as the PT Facility, is the first step in the process of vitrifying Hanford's tank waste. The PT Facility is the largest of the four major nuclear facilities that compose the WTP. It is 540 feet long and 215 feet wide, the size of nearly four football fields, and 120 feet tall, or 12 stories, high. When complete, its total area will be more than 490,000 square feet.

Waste will be pumped from the Hanford tanks via underground pipes to the PT Facility's interior waste feed receipt vessels. There, during the first phase of pretreatment, the waste will be concentrated using an evaporation process. Solids will be filtered out, and the remaining soluble, highly radioactive isotopes will be removed using an ion-exchange process.

The high-level solids will be sent to the High-Level Waste Vitrification Facility, and the low-activity liquids will be sent to the Low-Activity Waste Vitrification Facility for further processing.



A CLOSER LOOK INSIDE THE PRETREATMENT FACILITY

WASTE FEED RECEIPT VESSELS

Four waste feed receipt vessels, each with a 375,000-gallon holding capacity, are the first stop for Hanford's tank waste entering the Pretreatment Facility. The stainless steel vessels contain a series of internal pulse jet mixers to keep incoming waste properly mixed. The vessels are inside the facility's black cell areas, completely encapsulated behind thick steel-laced, high-strength concrete walls in an area inaccessible to workers.



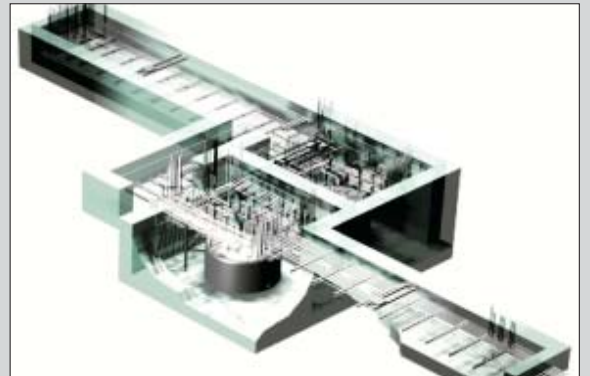
PIPING MODULE ASSEMBLY

The Pretreatment Facility includes more than 100 miles of piping. Several on-the-ground piping modules are being fabricated while civil construction activities and vessel installations continue inside the building. The piping modules are an intricate assembly of piping spools and hangers attached to structural steel beams that will be placed inside the facility. The modules are being constructed on the ground to ensure worker safety and high quality standards.



45-FOOT-DEEP PIT AND TUNNELS

A 45-foot-deep pit and adjoining tunnels lie at the center of the Pretreatment Facility. The pit is a collection point for any potential overflows from piping inside the underground tunnels during hot operations. It is made of steel-laced, high-strength concrete and lined with 1/8-inch stainless steel. The pit is also a secondary overflow unit for two 60-ton stainless steel vessels at the bottom of the pit. One vessel collects overflow from the Pretreatment Facility's primary storage tanks; the other vessel collects liquids from the High-Level Waste Facility and Analytical Laboratory drains.



Pretreatment Facility
(Elevation 0'-0")

