



U.S. DEPARTMENT OF

**ENERGY**

# Office of River Protection

Retrieve and Treat Hanford's Tank Waste and Close  
Hanford's Tank Farms to Protect the Columbia River

Richland, WA  
Hanford Site  
Since 1998



Vitrified glass is the final form Hanford's tank waste will take when it completes the process of vitrification. Vitrification is a process that involves converting the tank waste to a stable glass form suitable for safe disposal at a permanent national repository.

Low-Activity Waste  
(LAW) Canister



High-Level Waste  
(HLW) Canister →



[www.hanford.gov/orp](http://www.hanford.gov/orp)

# The

The U.S. Department of Energy's (DOE) Hanford Site in Washington is a large area of land contaminated with radioactive waste, which resulted from more than four decades of nuclear weapons production. The waste is stored in 177 large underground tanks. The construction of the SSTs began in 1944. The newest tanks were built in 1986. The tanks are made of carbon steel surrounded by a concrete shell. The site, 10 miles from the Columbia River. Although there is no doubt that the cleanup will be a long and difficult process, the DOE is moving forward with removal and treatment of the waste.

## QUICK FACTS

# Tank Farms Project

### 177 tanks

- ... 53M gallons total waste to retrieve
- ... 149 Single Shell Tanks (SSTs)  
(Capacities: 530K to 1M gallon tanks)
- ... 28 Double Shell Tanks (DSTs)  
(Capacities: 1M to 1.25M gallon tanks)

### 7 retrieved SSTs

- ... retrieved for a total of 880,000 gallons, 12.2 million curies

### 4 partially retrieved SSTs

- ... retrieved at 85%

### 14 catch tanks

- ... 4 are inactive  
(Capacities: 780 to 44K gallon per tank)

### 44 misc. tanks

- ... tanks are inactive  
(Capacities <50K gallon per tank)

### ~ 33 ... miles of piping

### ~ 50,000 valves

### ~ 18,000 instruments

- ... 10,000 inactive and 8,000 active

## Tank Farms Project

The overall Tank Farms cleanup project including waste storage, retrieval, treatment, disposal, and tank/facility closures are subject to the Hanford Federal Facility Agreement or Tri-Party Agreement. The agreement is signed by DOE, Washington State Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA).

ORP and its Tank Farm contractor, Washington River Protection Solutions LLC, are removing and transferring salt cake and sludge waste from the remaining 142 single-shell tanks (SSTs) to the 28 double-shell tanks (DSTs). Transferring this waste reduces environmental risks posed by older tanks, and eventually, the waste in the DSTs will become "feed material" for the WTP, where it will be turned into a stable glass form for disposal.

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## ORP Timeline

1989	1990	1993	1997	1998	1999	2000	2001
DOE EM and Hanford Tri-Party Agreement Established	Wyden Safety Watch List Established to Provide Safety Oversight	Project Privatization Approved	Tank Waste Remediation System Record of Decision Issued	DOE ORP Established BNFL Selected	CH2M Hill Assumes Tank Farm Contract	Privitization Ends	WTP Construction Begins / Wyden Watch List Closed

# Challenge

East Washington State is home to 53 million gallons of chemical and plutonium production. The removal, treatment, and disposal of this waste is the largest project in the nation and the largest Federal construction project in the world. The majority of the tanks (149 of 177) are single-shell tanks (SSTs). The remaining 28 tanks, known as double-shell tanks (DSTs), were constructed between 1968 and 1970 and are made of steel and concrete. Hanford's tanks are located in the center of the Hanford site. Because any tanks are currently leaking, it is imperative DOE Office of River Protection remove, treat, and dispose of chemical and radioactive waste.

## Waste Treatment Plant Project

When complete and operational this complex of separations, treatment, support and packaging facilities will immobilize in glass radioactive and chemical High-Level Waste (HLW) and 40 to 50 percent of the Low-Activity Waste (LAW).

Construction of the WTP is underway and, when it is complete, will be a 60-acre industrial complex with five major components: Pretreatment (PT) Facility, HLW Facility, LAW Facility, Analytical Laboratory and the Balance of Facilities (comprised of over 20 facilities which will support the separations and treatment facilities).

The PT Facility will separate HLW constituents from primarily chemical LAW using filtration, ion exchange, washing, leaching, and other techniques as needed. The two waste streams will then be pumped to either the HLW or LAW Facilities where silica and other glass-forming materials will be mixed with the waste and heated to nearly 2,100 degrees Fahrenheit in electric melters. Once melted, the molten glass will be poured into large stainless steel canisters, cooled for several days before being welded shut and decontaminated. The HLW canisters will be shipped to a national geologic repository for permanent disposal. LAW canisters will be disposed on the Hanford site in a disposal facility on the central part of the site.

### 1998 to Today

First Concrete Placed at WTP	First Underground Tank Emptied	First WTP Pretreatment Vessels Installed	WTP Pretreatment and High Level Waste Slowed to Finalize Seismic Design	WTP Full Construction Resumes	WTP's Pretreatment Engineering Platform (PEP) is Built; New Tank Operations Contract Awarded to WRPS	PEP Testing Completed
2002	2003	2004	2005	2007	2008	2009

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ORP manages the storage, retrieval, treatment, and disposal of Hanford's tank waste. The goal of ORP is to complete nuclear tank waste cleanup safely and cost-effectively.

[www.hanford.gov](http://www.hanford.gov)



**Bechtel National, Inc. (BNI)**

**\$690 million contract**

BNI is ORP's prime contractor responsible for the design, construction, and start up of the Waste Treatment Plant.

[www.waste2glass.com](http://www.waste2glass.com)



washington river  
**protection solutions**

**Washington River Protection  
Solutions, LLC (WRPS)**

**\$350 million contract**

WRPS is ORP's prime contractor in charge of safely retrieving, treating, storing and disposing of Hanford's tank farm waste and closing single-shell tanks.

[www.wrpstoc.com](http://www.wrpstoc.com)



**Advanced Technology and  
Laboratories International, Inc.**

**Advance Technologies and Laboratories  
International, Inc. (ATL)**

**\$10 million contract**

ATL is ORP's contractor responsible for the Analytical Services production functions include receiving, handling, analyzing, and storing samples; performing special tests, and, reporting the results of these analyses and tests, to the Hanford/DOE contractors.

[www.atlintl.com](http://www.atlintl.com)