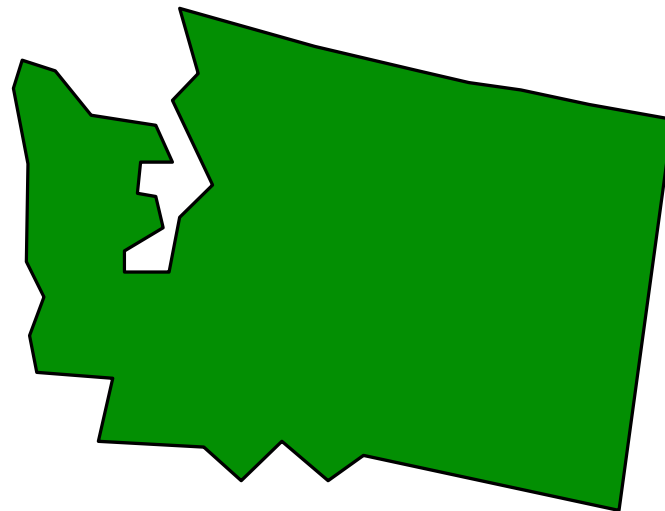


Case Study 1:

The Hanford Tank Waste Remediation Program

Hanford Background

The Hanford site occupies 560 square miles within the Columbia River Basin in Washington State.



Hanford Background

Beginning in the 1940s, Hanford site activities included:

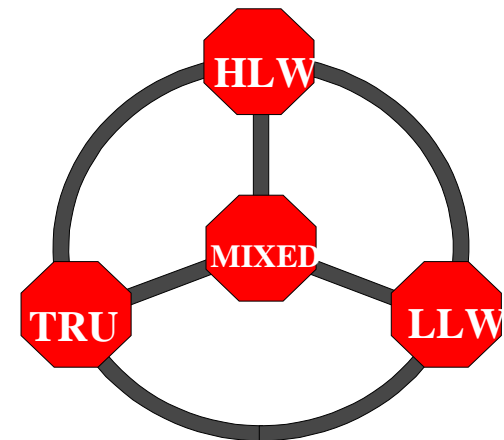
- **Plutonium production and separations**
- **Advanced reactor design and testing**
- **Basic scientific research**
- **Renewable energy technologies development**



Hanford Background

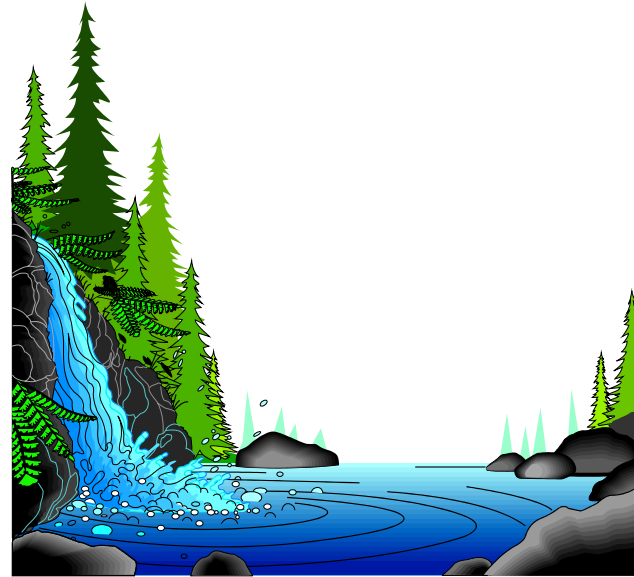
During its past production activities, the Hanford site generated:

- **High-level waste (HLW)**
- **Transuranic (TRU) waste**
- **Low-level waste (LLW)**
- **Mixed LLW and TRU waste**



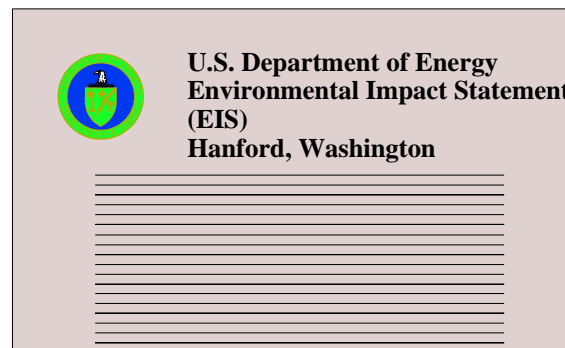
Hanford Background

Currently, the site's activities are focused on environmental restoration and waste management.



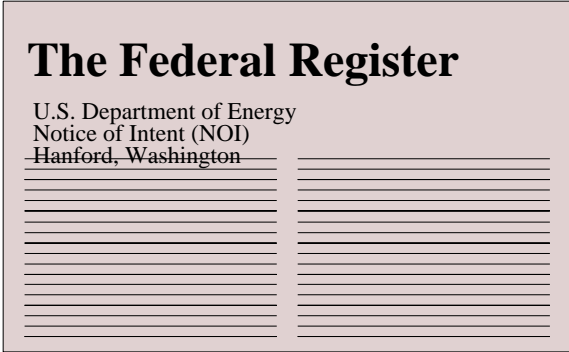
The Hanford EIS Process

During the 1980s, an environmental impact statement (EIS) was prepared to evaluate and select alternatives for final disposal of Hanford's production waste, including an evaluation of alternative tank waste disposal strategies.



The Hanford EIS Process

On April 1, 1983, the DOE published in the Federal Register a Notice of Intent (NOI) to prepare an EIS on Disposal of Radioactive Defense High-Level and Transuranic Wastes at Hanford.

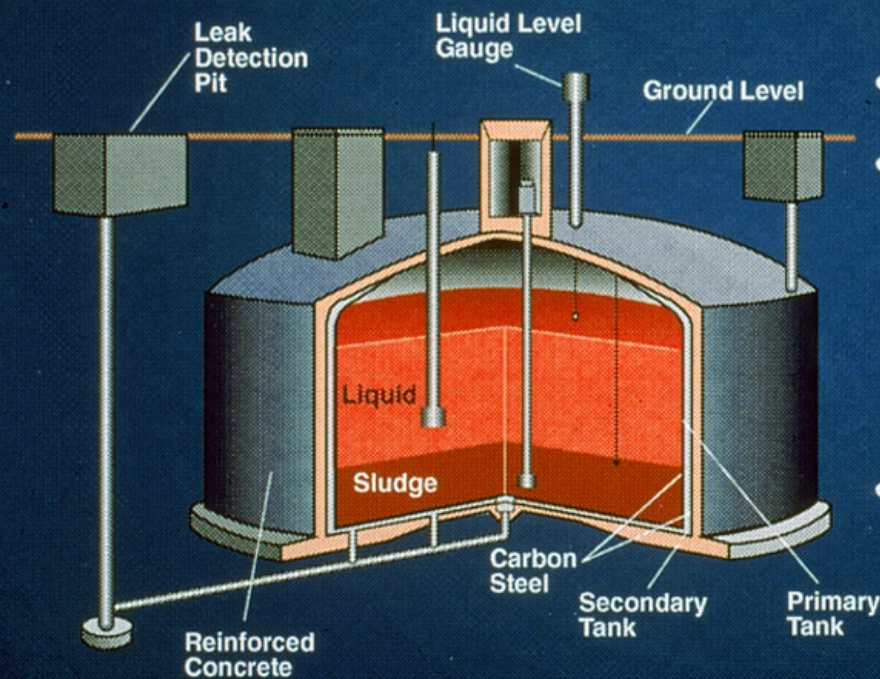


Double-Shell Tanks Under Construction



Computer-Generated Schematic of the Interior of a Double-Shell Tank

Double-Shell Tanks

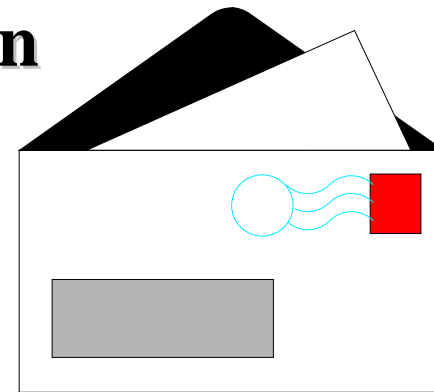


- 28 Tanks Constructed Between 1968-86
- 1 to 1.14 Million Gallon Capacity
- Tanks Currently Contain
 - ~ 24 Million Gallons of Mostly Liquids (Also Sludges and Salts)
 - ~ 110 Million Curies
- None Have Leaked

The Hanford EIS Process

The draft EIS (DEIS) was published in March 1986. During the 120-day comment period:

- **243 letters were received that provided approximately 2,000 substantive comments**
- **Oral testimony was heard in public hearings**



The Hanford EIS Process

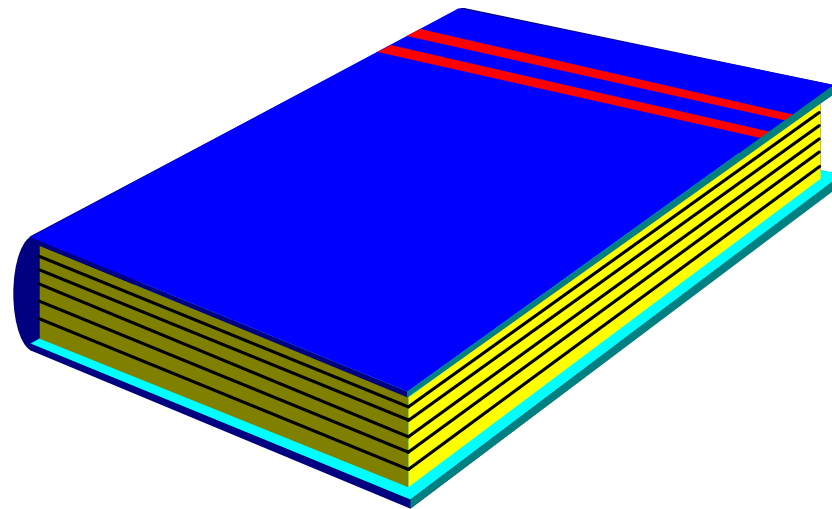


The Draft EIS identified preferred alternatives for stored TRU and HLW, and pre-1970 buried TRU waste

- **Stored TRU waste certified for WIPP disposal**
- **Most buried waste to be isolated in place**
- **Double-wall tank waste to be vitrified for repository disposal**
- **Single wall tank waste to be isolated in place**

The Hanford EIS Process

The final EIS (FEIS) was published in December 1987.



The Hanford EIS Process



In accordance with NEPA and CEQ requirements, the FEIS was written early in the decision making process to ensure that environmental values and alternatives were fully considered before any decisions were made that might have led to adverse environmental impacts or limited the choice of reasonable alternatives.

The Hanford EIS Process



The record of decision (ROD) was published in April 1988. Among other decisions, the ROD determined that the DOE would:

- **Retrieve double-walled tank waste**
- **Pretreat the retrieved waste to separate it into high activity and low activity fractions**

The Hanford EIS Process

- **Immobilize the low activity fraction in a cementitious grout form in vaults on the Hanford site**
- **Build and operate a facility [the Hanford Waste Vitrification Plant (HWVP)] to immobilize the HLW in a borosilicate glass waste form**



The Hanford EIS Process



The ROD also determined that:

- **Stored and buried TRU waste would be addressed consistent with the preferred alternatives**
- **A decision on single-walled tank waste would be deferred to a future evaluation**

A New Proposal

Since publication of the ROD in 1988, there have been a series of developments that have prompted the DOE to reconsider some of its tank waste decisions, predominately:

- **Public concerns about:**
 - **The grout waste form**
 - **Quantity of radioactivity in the grout**



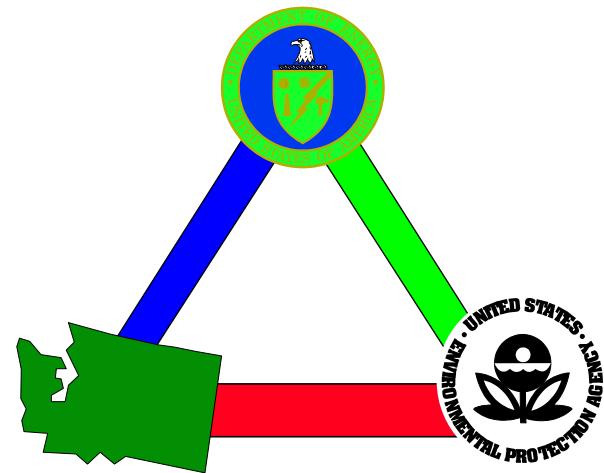
A New Proposal

- **Heightened concern about the potential for explosive mixtures in both single- and double-walled tanks**
- **A desire to accelerate treatment and disposal of single-walled tank waste**
- **Regulatory and stakeholder pressure to retrieve all waste from single-walled tanks rather than to treat and dispose in place**

A New Proposal

These and other considerations led to a major revision to the Tri-Party Agreement (TPA), which is a Federal Facility Compliance Agreement between:

- **The DOE**
- **The EPA**
- **The State of Washington**



A New Proposal



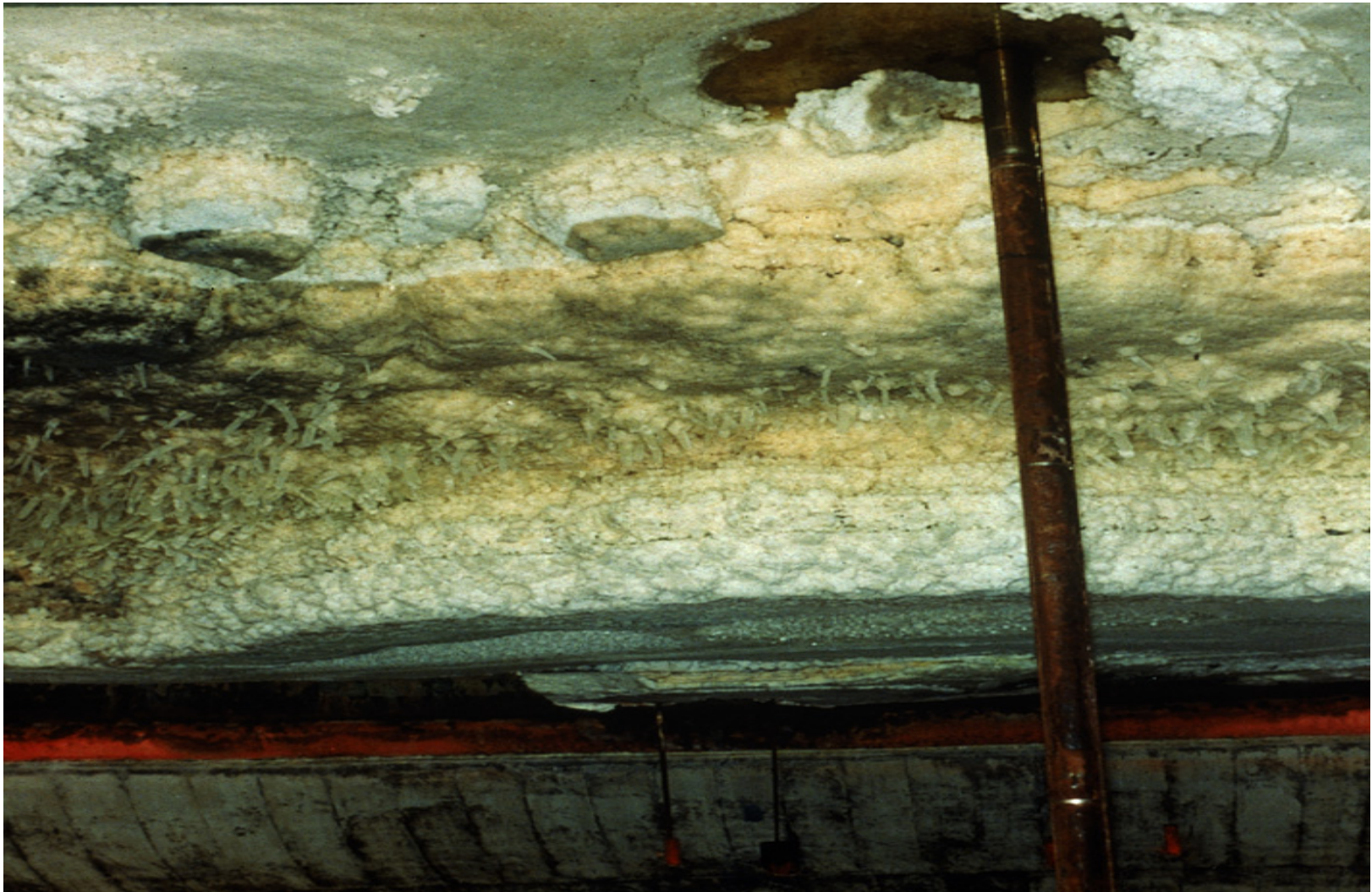
Proposed TPA revisions were issued for public review in October 1993 and included agreements and associated milestones to:

- **Retrieve single- and double-walled tank waste**
- **Separate retrieved waste into low activity and high activity fractions (pretreatment)**

A New Proposal

- **Construct and operate a LLW vitrification facility**
- **Dispose the LLW glass on the Hanford site**
- **Construct and operate a HLW vitrification facility**
- **Store HLW borosilicate glass until it can be shipped to a Federal repository**

Actual View of a Double Shell tank



NEPA Aspects of the New Proposal

The new TPA, signed in early 1994, relates to a previous NEPA agreement:

- **The Department committed in the 1988 ROD to prepare a supplemental EIS prior to decision on single-walled tank waste**

NEPA and the TPA

Negotiated agreements do not take the place of a NEPA analysis.

The Tank Waste EIS

DOE/EIS-0189 - Tank Waste Remediation System Environmental Impact Statement

- **To determine appropriate means to manage, treat, store, and dispose of existing and future HLW at Hanford.**

The Tank Waste EIS

Nine discreet alternatives explored:

- **No action alternative**
- **Long term Maintenance**
- **Two in-situ alternatives**
- **Five ex-situ alternatives**
- **Phased Implementation of ex-situ alternatives**

The Tank Waste EIS

Factors for comparison of alternatives:

- **Accidents associated with implementation**
- **Health effects from implementation**
- **Habitat disturbed**
- **Long term impacts to potential inhabitants**
 - **On site farmer**
 - **Industrial worker**
 - **Recreational user**
 - **Native American user**

The Tank Waste EIS

Factors for comparison of alternatives (Cont):

- **Long term impacts to the environment**
- **Other concerns**
 - **Cost**
 - **Technical uncertainty**
 - **Environmental compliance**

The Tank Waste EIS



- **Draft EIS issued April 12, 1996**
- **Public Comment period ended May 28, 1996**
- **750 comments received from**
 - **Agencies**
 - **Tribal Nations**
 - **Other stakeholders**

The Tank Waste EIS

- **Final EIS issued August 30, 1996**
- **ROD issued February 1997**
- **Preferred alternative was selected - phased implementation**

The Preferred Alternative



Low activity waste disposition:

- **Construct up to two demonstration-scale facilities to operate for up to 10 years**
- **Dispose of waste on site in near surface vaults**

The Preferred Alternative



HLW stream disposition:

- **Construct demonstration vitrification facilities to operate for up to 10 years**
- **Store Waste until HLW repository available for off site disposal**

Review Question

Hanford will immobilize the low activity waste removed from high level waste tanks in glass. Previously, the plan was to immobilize the waste in grout. Why was the plan changed?

- a. To comply with NEPA.**
- b. To address stakeholder concerns.**
- c. Because glass will be less expensive for this waste than grout.**
- d. To comply with the Tri-Party Agreement.**