

Reissue of the Hanford Facility Dangerous Waste Permit

(commonly called the “site-wide permit”)

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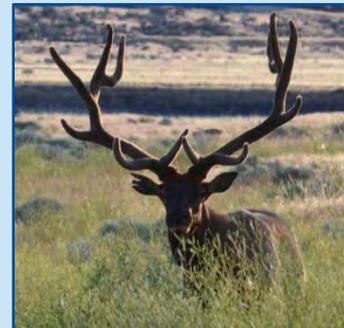
Nuclear Waste Program

February 21, 2012

Ecology's role at Hanford



- Ensure that Hanford cleanup protects the Columbia River by following state laws to protect our air, land and water
- Protect, preserve and enhance the state's environment



Why is there a permit?

- Hanford made plutonium for nuclear weapons
- Hanford created literally millions of tons of waste to deal with “later”
- Nation enacted most environmental laws in the 1970s
- Hanford regulation begins



A Hanford Timeline

1940s – Building Hanford



1945-1985 – Weapons Production



Present – Cleanup



1990s – Decommissioning



What we're working to clean up

- About 70 square miles of contaminated groundwater
- 56 million gallons of radioactive and chemical wastes in underground tanks
- Hundreds of contaminated buildings
- Hundreds of contaminated soil sites
- Millions of tons of contaminated soil



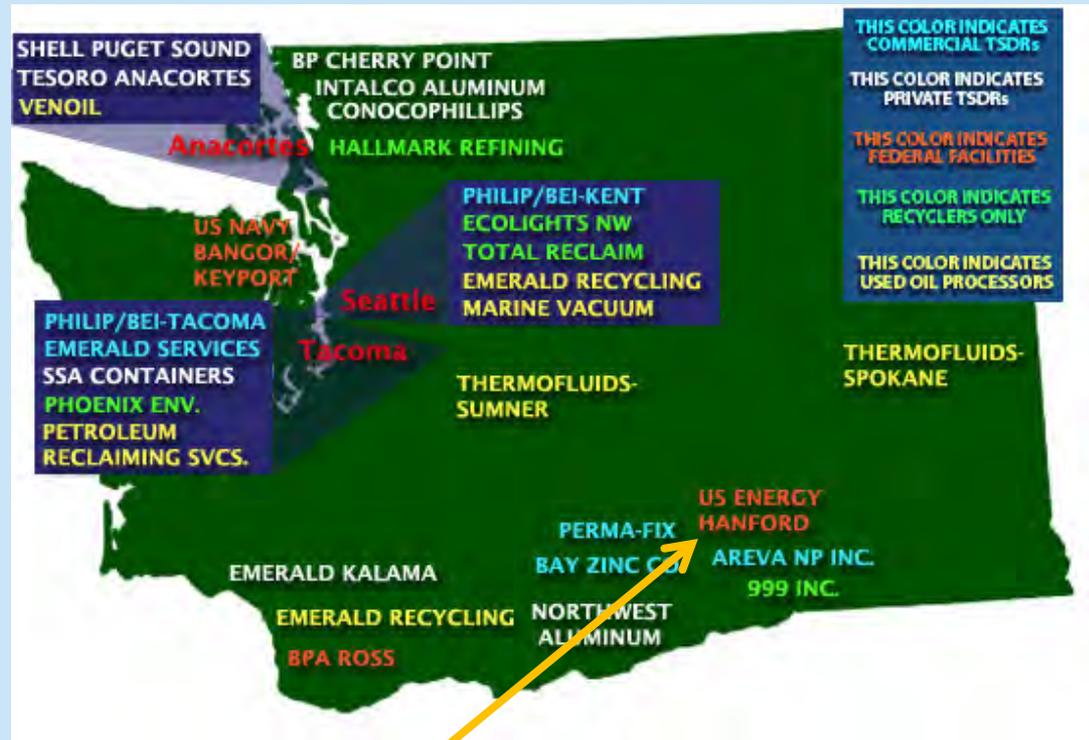
Federal environmental laws



- Atomic Energy Act (AEA) – 1954
- Resource Conservation and Recovery Act (RCRA) - 1976
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - 1980 -- more commonly known as Superfund
- Federal Facilities Compliance Act - 1992

How the state implements RCRA

- Hazardous Waste Management Act - 1976
- Dangerous Waste Regulations



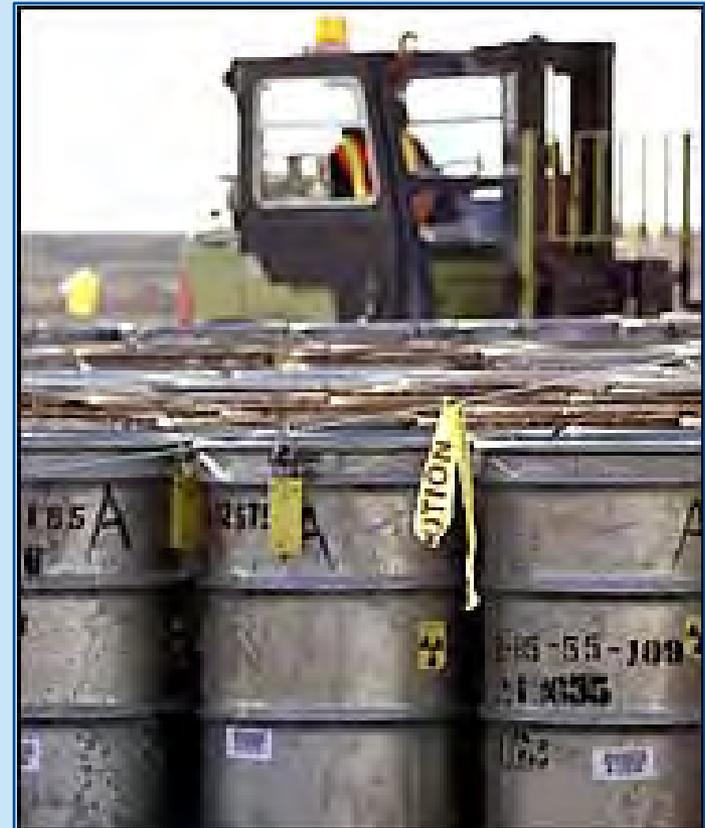
Tri-Party Agreement



- Hanford Federal Facility Agreement and Consent Order (May 15, 1989)
- Rules: How DOE, EPA, and Ecology coordinate their regulations and work together to clean up Hanford
- Schedules: to get Hanford into compliance with environmental laws – including permitting!

What the permit covers

- Treatment, storage, and disposal of dangerous (chemically hazardous) wastes
- Also mixed wastes (both radioactive and chemically hazardous)
- Across entire Hanford Site (“Facility”)



What the permit does NOT cover



- Solely radioactive materials
- Superfund sites



How does the permit protect?

- Requirements for managing wastes safely from “cradle to grave”
- Safe waste storage, treatment, and disposal
- Inspections
- Rules to prevent hazards, such as keeping incompatible wastes from mixing
- Prompt spill response, notifications, and cleanup



How does the permit protect?

- Criteria for knowing what waste you have and what waste you can accept
- Plans for how to manage emergencies
- Requirements for cleanup of contamination
- Liners and monitoring for disposal sites
- Financial and criminal penalties for violations



The living permit

- First issued: 1994
- Modified: many times!
 - To add units (other parts of Hanford)
 - To remove units that are cleaned up
- Size: full permit is over 14,000 pages!
- Reissue: required every 10 years (old permit is in force during reissue)



Permit organization

- Part I – General, standard conditions
- Part II – Conditions applying to entire site
- Part III – Conditions for **operating units** - facilities that actively treat, store, or dispose of waste
- Part IV – Conditions for **corrective action units** - old waste disposal sites to be cleaned up under CERCLA
- Part V – Conditions for **closure units** - inactive sites to be investigated and “closed”
- Part VI – Conditions for **postclosure units** - closed sites with groundwater contamination

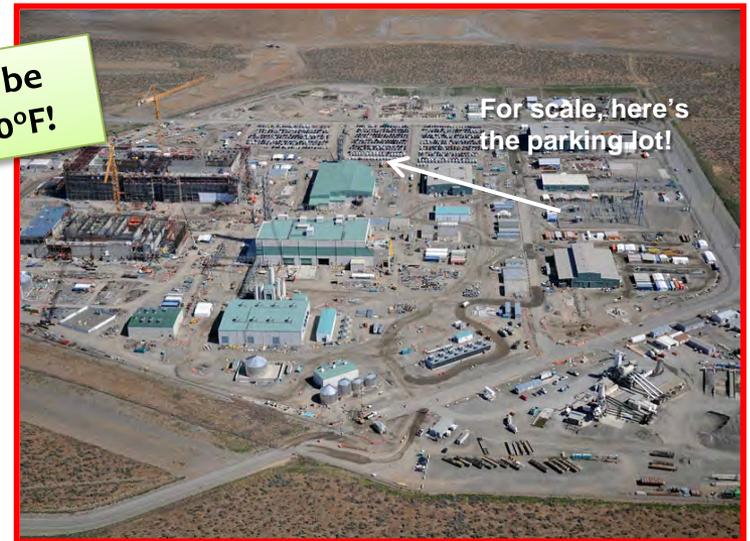


Waste Treatment and Immobilization Plant (vit plant)

Operating Unit #10

- On 65 acres east of 200 East Area
- Permitted for storage and treatment in unique phased permit agreement
- Under construction; starts operation in 2019
- Four main facilities, plus support buildings:
 - Pretreatment facility (PTF), to separate waste into low-activity and high-level waste streams
 - High-level waste vitrification facility (HLW)
 - Low-activity waste vitrification facility (LAW)
 - Laboratory to support all this work

The waste will be heated to 2,100°F!

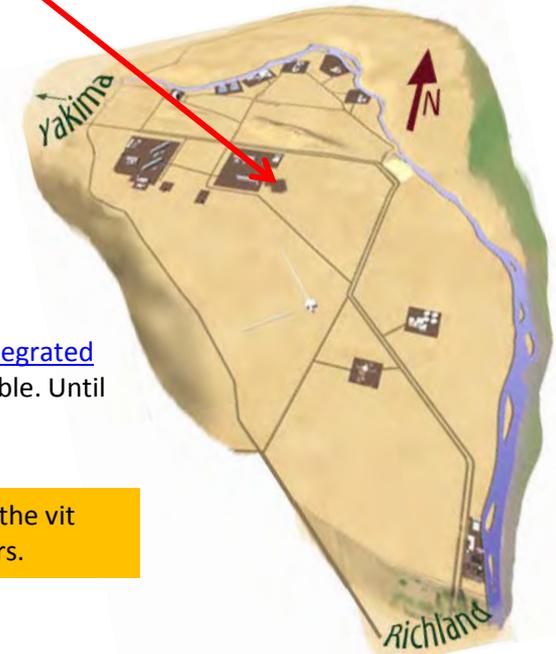


Aerial view of construction, July 2011

Where does the waste come from? 56 million gallons of waste from World War II and Cold War plutonium production await treatment in 177 enormous, aging [underground tanks](#). There is enough waste for everyone in the USA to have one 22-oz glass of it. All 308,400,408 million of us!

How will the waste be treated? The waste will be thoroughly mixed with super-heated, liquefied glass – a process called [vitrification](#) (where the “vit” in “vit plant” comes from). Then it will be poured into large, stainless steel canisters and sealed. The waste canisters will still be radioactive, but will be safer because waste can no longer seep into places it shouldn’t, like our water and soil.

Where will the waste go? LAW canisters will go to shallow disposal at Hanford’s [Integrated Disposal Facility](#). HLW canisters will go to a deep geologic repository when one is available. Until then, it will be stored on-surface at Hanford in a facility not yet designed.



What's the risk?

Safe disposition of our nation’s most dangerous waste relies on the vit plant’s safe completion and ability to process waste for 20+ years.



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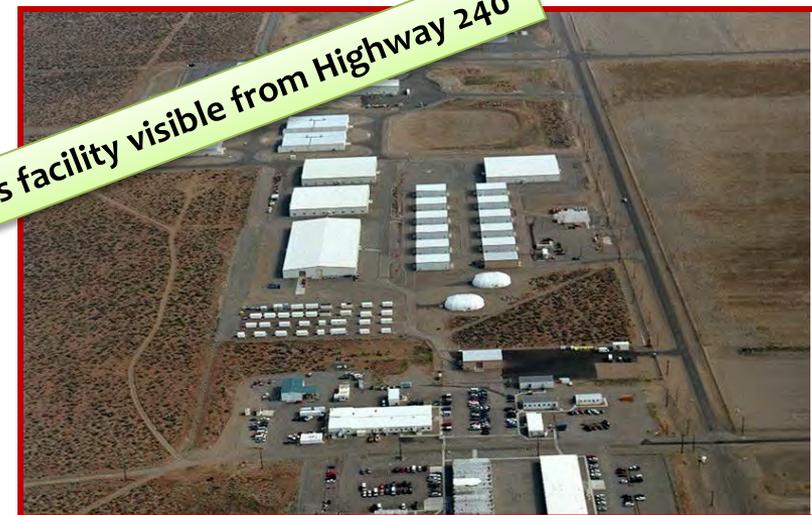
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Central Waste Complex

Operating Unit #6

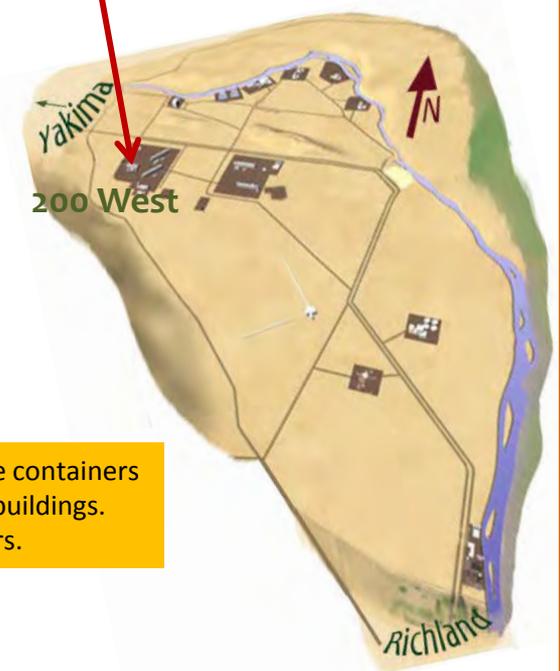
- Stores (mostly – also does a little treatment for waste)
- Started receiving waste in 1988
- 7 large storage buildings, 12 small storage buildings
- 27 storage modules for low-flashpoint wastes
- 12 storage modules for alkali metal waste
- 6 areas for outdoor storage
- Offices and maintenance buildings
- Stores waste, lots of kinds
 - Radioactive and chemical
 - Small amounts of low-level waste
 - Capacity is 64,000 drums or equivalent
 - Has 300,000 square feet of storage about 6 football fields!

This facility visible from Highway 240



Where does the waste come from? Onsite and some offsite sources, such as retrieved waste from burial grounds and new wastes from [WRAP](#) and [T Plant](#). CWC has lots of space, so may be used to store waste from other cleanups and closures at Hanford.

Where does the waste go? Eventually, the waste stored in CWC goes [to trench 31 or 34](#) or to the [Waste Isolation Pilot Plant](#) for disposal.



What's the risk?

CWC handles a huge variety and quantity of waste. Not all waste containers are verified before they arrive. Leaks have occurred in storage buildings. There is also industrial risk to workers from moving big containers.



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Burial Ground Trench 94

Operating Unit #18

- Holds the defueled submarine and cruiser reactor compartments from our nation's nuclear navy
- 1.5 million-cubic-meter capacity dedicated to this waste
- Waste has lead and residual solid PCBs. The lead (about 100 tons per compartment) can be disposed without treatment because it's encapsulated in thick metal casing

Where did the waste come from? They come from our nation's nuclear navy. (The reactor fuel goes to Idaho.) In the 1980s, a Navy environmental study led to the compartments coming here. An EIS in the 1990s led to more reactor compartments coming to Hanford.

The compartments come from the Puget Sound Naval Shipyard, where workers drain piping systems, tanks, vessels and other components, seal the radioactive systems, remove the reactor compartment and seal it in steel package. Compartments arrive via barge from Puget Sound, through the Strait of Juan de Fuca, down the Washington coast, and up the Columbia River to Hanford. These days, one or two come each year. More than 117 of them are disposed at Hanford today.

What will happen to the waste? The 'management' of waste here is disposal. The waste will remain at Hanford. Reactor compartments are expected to keep their integrity for more than 600 years.



2010 Aerial. Photo courtesy US Navy



Sub reactor compartment coming ashore in Richland October 2011



What's the risk?

The major risk is transporting the cores to the trench --from Bremerton, in Puget Sound, the ocean, and the Columbia River. Hazards include possible capsizing, which could disturb the riverbed or shore, disrupt navigation, and injure workers.



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Single-Shell Tank System

Closing Unit #4

Description

- 149 tanks in 12 groups called tank farms
- Most tanks (133) are 75 feet across
- Capacity ranges from 53,000 to 1 million gallons
- The tanks hold about 30 million gallons of waste in the form of sludge, salt cake, and a small amount of liquid
- SST system also has numerous ancillary equipment, including vaults, diversion boxes, catch tanks, pits, pipelines, miscellaneous structures, and significant soil contamination.

History

- Built between 1943 and 1964
- Pumpable liquids removed before 2010
- 67 tanks suspected of leaking or of being overfilled
- Tanks hold radiological and chemical waste

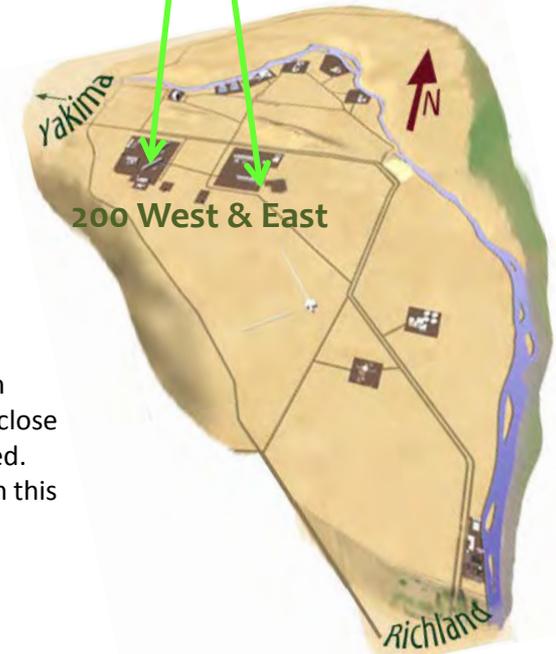
Where did the waste come from? It came from dissolving fuel rods to recover plutonium. Extracting plutonium created huge quantities of radioactive and dangerous wastes. After the waste was put into the SSTs, workers added a wide variety of chemicals to the tanks to neutralize the acids and extract certain products. Those chemicals remain in the tanks and may form toxic compounds.

What's the risk?

The tanks and contaminated soil are one of Hanford's greatest challenges. We don't really know the full extent of the risks yet. Removing wastes from the tanks will greatly reduce the risks. An ongoing risk assessment for the SSTs closures will make sure the risks are under acceptable levels.



T tank farm construction in 1944. See the truck for scale!



How does this part of the permit differ from the usual? SSTs do not comply with regulations, so the permit requires SSTs to be closed as soon as possible. But they can't close yet! The waste must be retrieved and the soil remediated before the tanks can be closed. There is no place to put all the retrieved tank waste until the [vit plant](#) is running. Though this is a closing unit, it will have conditions to allow retrieval, storage, monitoring, etc.



300 Area Process Trenches

Post-closure Unit #1

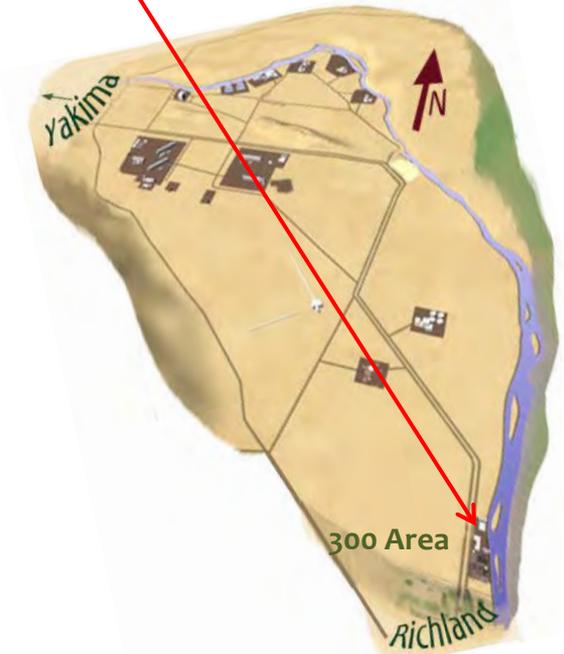
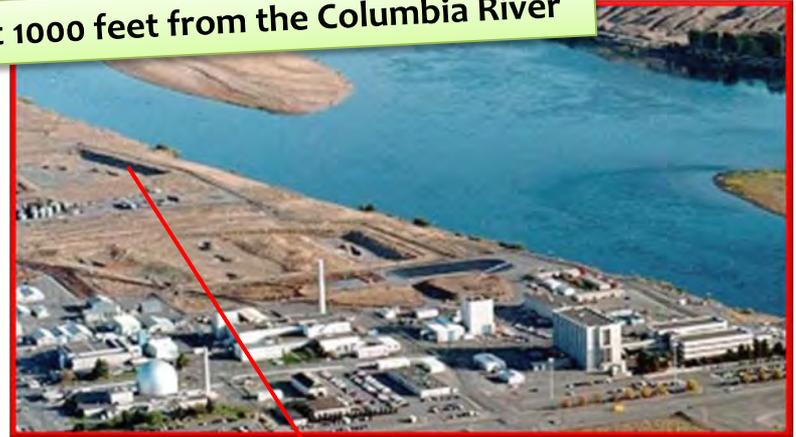
- 2 trenches, each 1500 ft long, 15 ft deep, 10 ft wide at bottom
- Operated 1975 through 1994.
- Workers removed some of the contaminated soil in 1991 in an expedited response action. The rest of the contaminated soil was removed in 1994.
- Received as much as 2.9 million gallons/day of contaminated wastewater from uranium fuel making and several laboratories
- We approved the site closure in 1998, but required long-term (post closure) monitoring.
- Trenches received discarded chemicals, corrosive waste, chromium, and spent solvents

In 1982 and in 1984 there were two releases of tetrachloroethene to the trenches. The expedited response action in 1991 reduced the impact to groundwater. But in 1998 groundwater contamination still exceeded legal limits. Recent monitoring reveals a persistent presence of organics (tetrachloroethene, cis-1,2-dichloroethene, trichloroethene) in the groundwater.

Through the permit Ecology will require USDOE to:

- Continue post-closure care (based on the approved plan)
- Continue the cleanup for toxic uranium in groundwater
- Meet the requirements of RCRA through a CERCLA remedy
- Monitor the groundwater

Only about 1000 feet from the Columbia River



What part of this permit differs from the usual? We are integrating future groundwater monitoring for any past releases with EPA and the CERCLA process.

What's the risk?

Groundwater contamination in close proximity to the Columbia River is a concern.



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How to participate

- Comment period: May 1 – September 30, 2012
- Public workshop: May 3, Richland (**date tentative**)
- Public meetings (**dates tentative**)
 - Seattle and Vancouver (week of May 14-18)
 - Spokane – June 4
 - Richland – June 6



How to learn more today

- Our website
 - FAQ
 - Unit cards
 - Permit's Fact Sheet
- Presentations
- Hanford@ecy.wa.gov



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Nuclear Waste

Keeping people and the environment safe from the dangers of mixed radioactive and chemically hazardous waste

NUCLEAR WASTE

- Hanford News
- About Hanford
- Projects
- Public Involvement
- [Non-Hanford Work](#)

Forms
Publications
Contacts

- Overseeing the U.S. Department of Energy's Hanford cleanup activities
- Regulating mixed wastes at the Puget Sound Naval Shipyard complex
- Regulating commercial nuclear facilities in the Tri-Cities area

ABOUT HANFORD

[News](#) | [Nuclear Waste Program History](#) | [Hanford History](#) | [Información General de Hanford en Español](#) | [Key Documents](#) | [Frequently Asked Questions](#) | [Contacts](#)

PROJECTS

[Groundwater](#) | [Hanford Facility Dangerous Waste Permit](#) | [Environmental Restoration Project](#) | [Tank Storage, Operations & Closure Project](#) | [Tank Waste Disposal Project](#) | [Facility Transition Project](#) | [Waste Management Project](#) | [More about projects...](#)

PUBLIC INVOLVEMENT

[USDOE Calendar](#) | [TPA Public Events Calendar](#) | [Public Comment Periods](#) | [Just for Kids](#) | [Mailing](#)

://www.ecy.wa.gov/programs/nwp/lrw/lrw.htm

Internet

Nuclear Waste Program: ecy.wa.gov/programs/nwp

Questions?

www.ecy.wa.gov/programs/nwp

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