



# Heart of America Northwest

The Public's Voice for Hanford Cleanup

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## Citizens' Guide to Hanford's Unlined Radioactive Waste "Burial Grounds"

**40 + Miles of Unlined Soil Ditches with Enough Plutonium to Make Dozens  
of Nuclear Weapons and Unknown Amounts of Chemical Wastes**



Radioactive wastes were dumped in unlined trenches at Hanford, like this one, until 2004.

*Will the Federal Energy Department (USDOE) be required to investigate and clean-up the trenches? Or, will USDOE be allowed to just put "covers" ("caps) over several square miles on Hanford's Central Plateau (200 Area)?*

Heart of America Northwest calls for "Clean-Up", not "Cover-Up"

### What is in the Trenches?

USDOE does not know what is in many trenches, nor does it appear to want to know. USDOE adopted formal "baselines" for its cleanup budgets which presume that USDOE will simply put dirt caps over the 40+ miles of trenches. When USDOE submitted plans to EPA and Ecology which did not include any investigation of the trenches – because USDOE presumed it would simply cap them – the regulators began a new process to consider to what degree USDOE will have to investigate the contents of the trenches before there is a report on alternatives for cleanup (RI/FS).

Washington State law requires **characterization** to determine the quantities and locations of wastes to make cleanup decisions, and especially if wastes are to be left behind. However, whether this law will be followed is now being debated.

### What USDOE acknowledges is in the trenches:

In just the pre-1970 burial grounds, USDOE estimates:

**Plutonium:** 363 kg - enough for 36 A-Bombs

**Uranium:** 485,340 kg

- Volume of Plutonium and Transuranic (TRU) contaminated soil which USDOE does not plan to retrieve: 3.8 million cubic feet, of which 1.6 million cubic feet is in the pre-1970 burial grounds.<sup>i</sup>

Powerful solvents and acids used for extracting Plutonium from liquid wastes. These include chemicals which are poisons and carcinogens, and which mobilize radionuclides to move through the soil.

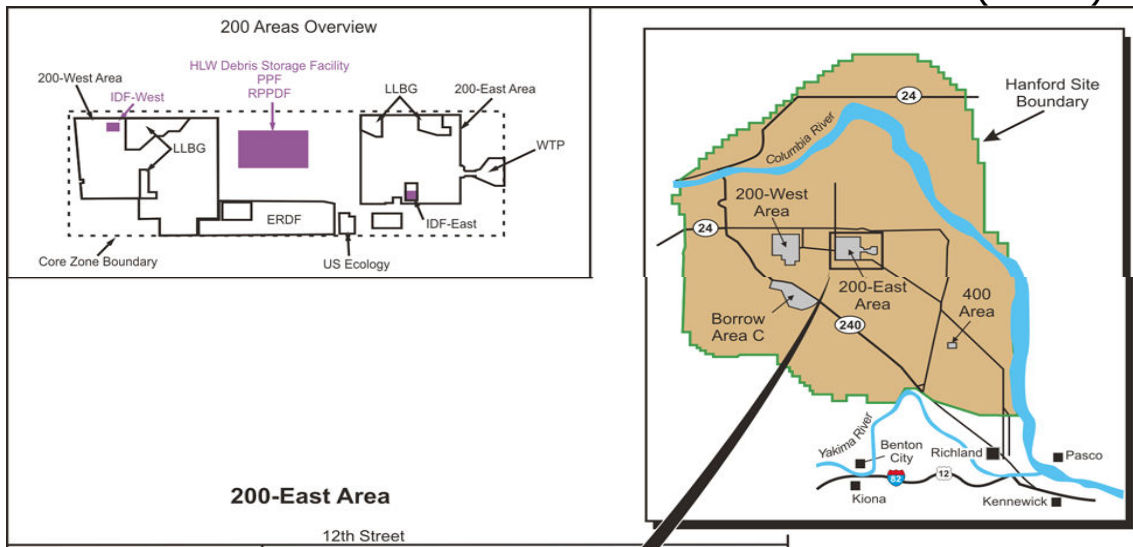
Boxes with Plutonium disposed prior to 1959 that "were 'damp with organics' (organic chemical solvents) and acids, which caused disintegration of the boxes and created a storage/fire hazard."<sup>ii</sup>

Many of the chemicals are "volatile" organics – forming gasses which move through the soil and which create exposure hazards, even if there is a cap placed over the burial grounds.

An aerial view of one of Hanford's 25 "Low-Level Burial Grounds" gives a sense of the scale of the area used by USDOE to bury radioactive and radioactive chemical wastes at Hanford. If laid end to end, the trenches in these burial grounds would stretch over 40 miles:



### Where are Hanford's Radioactive Waste Burial Grounds? (LLBGs):



USDOE calls the dotted rectangle the Central Plateau "core zone" encompassing the 200 East and 200 West Areas. In addition to the burial grounds, these areas also have 177 tanks with 54 million gallons of liquid High-Level Nuclear Waste, and old Plutonium processing facilities.

- "ERDF" in the center is a massive cleanup waste landfill; "IDF East" is the landfill USDOE proposes to use as a national radioactive and mixed radioactive waste landfill in the future.
- "US Ecology" (lower center) is the commercial radioactive waste dump with leaking unlined trenches run by the "US Ecology" company under lease from Washington State. The 12 unlined trenches are projected to release Uranium at levels so high that they will result in radiation doses at the "core zone boundary" with a cancer risk > 5% for Native American children. USDOE and Washington Ecology refuse to discuss retrieving the wastes from these unlined, leaking trenches as part of the conversation about the other unlined trenches.

- **What's the difference between "Pre-1970" and "post 1970" burial grounds?**

In 1970, the Atomic Energy Commission (now USDOE) decided that very long lived radioactive wastes, such as Plutonium, should no longer be buried in shallow landfills and trenches, but should go to a deep underground repository. Starting in 1970, Plutonium and **Transuranics (TRU** – wastes with an atomic number higher than Uranium) were "retrievably stored" in the unlined trenches. These are now being retrieved – with a new deadline of 2018. Many of the containers have deteriorated and breached. The quantities of Plutonium / TRU wastes buried before 1970 is likely 12 to 18 times higher than the quantity USDOE plans to retrieve. *Dilemma: The total capacity of the WIPP geologic repository for TRU waste would essentially be used just by the TRU volume in Hanford's soil.*

- **Are the "burial grounds being properly monitored" for releases to groundwater, the soil and air?**

***No, but we have large documented releases of poisons, carcinogens, etc...:***

"Ecology has concluded that the LLBG (Low-Level Burial Ground) groundwater monitoring networks and programs are significantly deficient."<sup>iii</sup>

Hazardous waste law (RCRA) requires groundwater monitoring wells, but Ecology has never required USDOE to install a compliant monitoring network. Some of the large "Waste Management Areas" such as WMA 3A and 3AE with 65 trenches covering 110 acres have just 3 to 5 wells. Many of the groundwater monitoring wells around the burial grounds no longer reach groundwater.

There is no soil column monitoring for early releases of contamination before they reach groundwater, or continuous air monitoring for the venting toxic gases, despite these also being required by hazardous waste laws.

Ecology has also found that the TRU stored in the burial grounds is the likely source of spreading hazardous wastes, including the highly poisonous and carcinogenic Carbon Tetrachloride. "Certain TRU containers are designed to vent... known inventories of organics (including carbon tetrachloride, xylene, toluene, trichloroethylene...)"<sup>iv</sup>

"(C)onsiderable evidence that shows waste constituent releases from LLWMA4."<sup>v</sup>

LLWMA 4 refers to the unlined Low-Level Waste burial ground designated Waste Management Area 4, West of the Plutonium Finishing Plant. This is a burial ground – where no hazardous wastes are supposed to have been disposed without violating federal and state hazardous waste laws. However, Carbon Tetrachloride vapor levels from buried TRU barrels were measured higher than the minimum level known to be fatal to humans and 176 times the OSHA Permissible Exposure Limit for Workers. USDOE was also issued a Notice of Violation by Ecology in 1996 for illegally disposing of Mixed Hazardous and Radioactive Wastes in the unlined Low-Level Burial Grounds, which were imported to Hanford from the Lawrence Berkeley National Lab. Heart of America Northwest identified numerous other violations of applicable waste characterization and land disposal restrictions in reviews of documents obtained through the Freedom of Information Act

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*Suggested Comments and Discussion Items:*

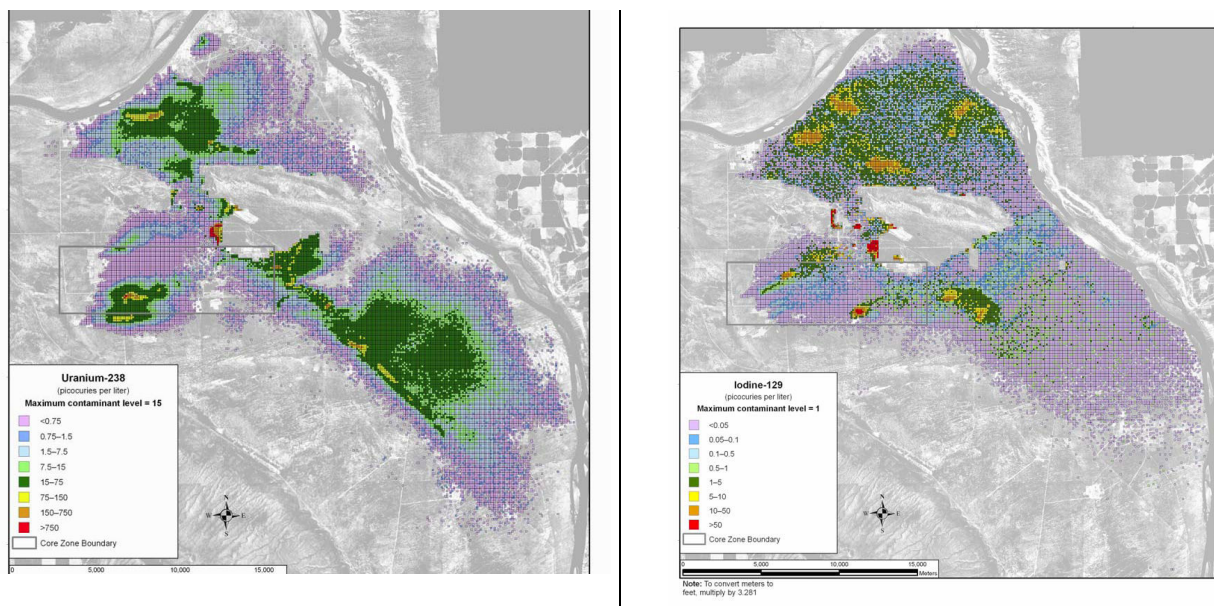
1. Given the high impacts to groundwater for thousands of years if waste in trenches is left under caps, instead of retrieved, why would we spend billions on Hanford Clean-Up and not also retrieve and treat waste from the unlined burial ground trenches? Will retrieving these wastes cost even a third as much as the Vitrification Plant?
2. If the unlined trenches at the commercial US Ecology landfill have been found to be releasing deadly levels of chemicals, isn't it likely that the USDOE trenches will also be found to be leaking high levels of chemicals – if USDOE is required to investigate and characterize them?
3. Since WA State hazardous waste law requires characterization of the quantity, location and spread of wastes, how can USDOE be allowed NOT to investigate and characterize the wastes in the burial grounds if they aren't going to be required to retrieve them?
4. Since Plutonium and TRU waste put into the trenches after 1970 required to be retrieved, why not require the same waste placed earlier (in larger quantities) to be retrieved and sent to a deep geologic repository?

## USDOE's Own Projections of the Contamination from its plans to "cover-up", rather than retrieve and clean-up burial grounds and other sites on Hanford's Central Plateau:

In USDOE's draft Tank Closure and Waste Management EIS, on which hearings were held in early 2010, USDOE projected that the **Plutonium 239** (Pu239) levels in groundwater at the edge of the Central Plateau would eventually reach **177 times the Drinking Water Standard** under USDOE's plan not to retrieve Plutonium and TRU wastes spreading from the burial grounds and unlined liquid waste.

The Drinking Water Standard is set at a level at which one adult in 10,000 who drink the water die of cancer. Children are 3 to 10 x more susceptible to cancer than an adult from the same dose, and Native Americans will have several times higher exposure.

Here are two of USDOE's maps showing projected contamination from Uranium in groundwater spreading towards the River in 125 years (left) and radioactive Iodine 129 in just under 2,000 years (right).<sup>vi</sup> The red areas are 50x the Drinking Water Standard. The Columbia River is shown in blue running for 50 miles on top (N) and right.



For More info: Heart of America Northwest (206)382-1014 [www.hoanw.org](http://www.hoanw.org)  
References:

<sup>i</sup> USDOE, 2000, "Buried Transuranic-Contaminated Waste Information for U.S. Department of Energy Facilities." Reported in Heart of America Northwest, "Transuranic Waste at Hanford: Large Quantities Lost", 2004 [www.hoanw.org](http://www.hoanw.org); Burial Ground figure of 45,400 m<sup>3</sup> (equivalent to 1.616 million cubic feet) is IEER calculation reviewed by USDOE. See HoA report ftntc 36.

<sup>ii</sup> USDOE presentation to HAB Workshop on Burial Grounds October 5, 2010 Slide 26 "Plutonium Recovery in Pre-1970 Waste"

<sup>iii</sup> Part B Application, Notice of Deficiency, Section 5, 2003; Washington Department of Ecology to USDOE.

<sup>iv</sup> Notice of Deficiency Sec. 5.3.3.2.

<sup>v</sup> Notice of Deficiency P. 5 of 15, comment #19.

<sup>vi</sup> Draft TCWMEIS Table 6-65 (Ur in groundwater in 2135) and 6-45 (Iodine 129 in groundwater year 3890)