

**Potential Disposal at WIPP of Materials
Contained in High-Level Radioactive Waste Tanks**

**Remarks
By**

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I am pleased to have this opportunity to discuss the July 2, 2003 court judgment regarding the validity of the Department of Energy (“DOE) Order 435.1, and the implications of the court’s decision for disposal of the radioactive waste contained in the high-level radioactive waste (“HLW”) tanks at Hanford Reservation, Savannah River Site (“SRS”), Idaho National Engineering and Environmental Laboratory (“INEEL”) and West Valley.

The case, *NRDC v. Abraham*, 271 F.Supp.2d 1260 (D.ID. 2003), was argued before Judge B. Lynn Winmill, the Chief Federal District Judge of the U.S. District Court in Idaho.

A central issue in the District Court case was the definition of HLW. In the Nuclear Waste Policy Act (“NWPA”), Congress defined the term “high level radioactive waste” to mean

- (A) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and
- (B) other highly radioactive material that the [Nuclear Regulatory] Commission, consistent with existing law, determines by rule requires permanent isolation.” [42 U.S.C. 10101(12)]

In 1999, the DOE issued Order 435.1, which unlawfully permitted DOE to redefine HLW as “incidental waste” if the waste met criteria set forth in the order. Included in the criteria was the concluding phrase “or must meet such alternative requirements for waste classification and characterization as DOE may authorize.” NRDC argued that Order 435.1 conflicted with the NWPA definition of HLW and the concluding phrase gave DOE unfettered discretion to reclassify any HLW as “incidental waste.”

In his ruling, Judge B. Lynn Winmill, held that “DOE had violated the NWPA by promulgating Order 435.1 as it relates to incidental waste, and that portion of Order 435.1 is declared invalid . . .” In other words, DOE violated the law when it granted itself the authority to reclassify high-level nuclear waste so that it could abandon it at three nuclear weapons facilities. Judge B. Lynn Winmill said, “DOE does not have discretion to dispose of defense [high-level waste] somewhere other than a repository established under [the Nuclear Waste Policy Act].”

DOE has appealed the District Court judgment to the U.S. Court of Appeals for the Ninth Circuit in San Francisco, California. This appeal is currently being briefed. No oral argument has date has been set, but an argument is likely to be held this spring or early summer.

Barring a reversal or modification of Judge Winmill’s order by the Ninth Circuit, what are the implications of the District Court’s opinion? I will offer my views.

First, **the waste in the 251 HLW tanks at Hanford, SRS, and INEEL is by definition HLW.** The Court clearly stated that,

It is undisputed that the waste stored at Hanford, INEEL, and Savannah River is highly radioactive and the result of reprocessing. No solids have yet been extracted from the liquid waste at those sites and treated to reduce fission products. Thus, the waste at issue in this case falls within NWPAs definition of HLW. (Memorandum Decision, July 2, 2003, p. 11)

Under the NWPAs, HLW must be placed in its own repository or in a repository also used to store commercially-produced nuclear waste. Since President Ronald Reagan decided that defense HLW would be placed in the same repository with commercial spent fuel, **DOE must remove the HLW from the tanks and treat it to a form suitable for final disposal.** DOE cannot lawfully abandon tank waste in the tanks at Hanford, SRS or INEEL. The same is true with respect to the waste in the tanks at West Valley.

There is nothing in the Courts opinion that prohibits DOE from creating a variety of types of solid wastes after treating the HLW extracted from the tanks. DOE can segregate low-activity solid wastes from the high-activity solid waste. The high-activity solid waste must be sent to a geologic repository for HLW. In short, HLW liquids removed from the tanks could potentially be reclassified – if those liquids are removed from the tanks and solids are derived from those liquids (e.g., through evaporation and concentration), and after treatment of the wastes to reduce fission products, the fission products are no-longer “in sufficient concentrations,” *i.e.*, the isotopic concentrations in the solids meet the standards of 10 C.F.R. Part 61 for low-level waste. The District Court appropriately did not reach the question of what entity is ultimately responsible for this reclassification decision. That is a question for another day.

In the “Integrated Mission Acceleration Plan (IMAP),” RPP-13678, Revision 0, March 2003, CH2M Hill, the DOE contractor at Hanford, claims, “Not all Hanford Site Tank waste are HLW. The Hanford tanks contain TRU, LLW, and LAW (HLW)” (p. 4-33). Here, “LAW” is defined as “Waste residuals from high-level waste pretreatment or waste that has been determined to be low-activity waste based on the Waste Incidental to Reprocessing process defines in DOE O 435.1, *Radioactive Waste Management.*” (p. vii, emphasis in original).

Judge Winmill’s order decided this issue as a matter of law, when he found that “It is undisputed that the waste stored at Hanford, INEEL, and Savannah River is highly radioactive and the result of reprocessing.” (Memorandum Decision, July 2, 2003, p. 11)

CH2M Hill has identified 12 tanks at Hanford as potentially containing TRU waste (see table below)

Tank	Volume (kgal)	TRU ($T_{1/2} > 5$ y) (nCi/cm³)
T-201	43	671
T-202	27	208
T-203	47	188
T-204	47	134
B-201	40	795
B-202	37	209
B-203	64	203
B-204	63	249
T-111	558	226
SY-102	650	10,678
AW-103	954	192
AW 105	423	628

Table 1. Tanks at Hanford identified by CH2M Hill as “potentially containing TRU waste.”

The waste volumes and TRU concentrations in Table 1, were derived from Hanford reports and spreadsheets. I do not know the accuracy of these data.

The B-200 and T-200 series tanks at issue were constructed during 1944. These underground tanks are each 20 feet in diameter with a design capacity of 55,000 gallons (210,000 liters). (M.E. Johnson, “Origin of Waste in the B-200 and T-200 Series Single-Shell Tanks,” RPP-13300 Rev-0, CH2MHill, April 2003, p. 9) According to CH2M Hill,

Tanks 241-B-201 through 241-B-204 did not receive any high-level wastes. These tanks received transuranic waste from operations conducted at the 224-B plutonium concentration building and equipment decontamination waste. (Johnson, p. 9)

With respect to the B-200 series tanks, CH2M Hill goes on to say,

Tanks 241-B-201 through 241-B-204 did not receive any liquid wastes originating from the operation of the first cycle solvent extraction system, or equivalent, or the concentrated wastes from subsequent extraction cycles, or equivalent, in a spent fuel reprocessing facility. Rather, the wastes are either from a plutonium concentration process (not a subsequent extraction process) performed in a

separate facility, or concentration of the liquid from cleanup of the 221-B Bismuth Phosphate Plant and 224-B Concentration building. (Johnson, p. 13)

And with respect to the T-200 series tanks, CH2M Hill claims,

Tanks 241-T-201 through 241-T-204 did not receive any liquid waste originating from the operation of the first cycle solvent extraction system, or equivalent, or the concentrated wastes from subsequent extraction cycles, or equivalent, in a spent fuel reprocessing facility. Rather the wastes are either from a *plutonium concentration* process (not a subsequent *extraction* process) performed in a *separate* facility. (Johnson, p. 14, emphasis in original)

In other words, the claim that the contents of B-201 through B-204 and T-201 through T-204 do not constitute HLW appears to rest on the following arguments, that:

- the plutonium concentration process is not an integral part of the chemical separation (i.e., reprocessing) process;
- Building 224-B and 224-T were not an integral part of the B- and T-Plants, respectively, that is, these buildings were not part of the reprocessing plant, rather reprocessing took place in buildings 221-B and 221-T; and
- waste leaking from first cycle solvent extraction process and wastes from decontamination of first cycle solvent extraction processing equipment are not HLW.

If that indeed is their argument, the logic is faulty and I disagree with each of the claims.

I have not seen an analysis of the origin of the waste in the other four tanks. These tanks appear to contain some raffinate effluents from reprocessing.

One can also compare the radioactivity concentrations in the eight tanks with the concentrations in other HLW tanks. There is no dispute that the 51 HLW tanks at SRS contain HLW. The radioactivity concentration in the sludge, salt and supernate varies widely among the 31 SRS HLW tanks where data is available. The radioactivity concentration in the sludge varies from 0.22 Ci/gal in Tank 19 to 901 Ci/gal in Tank 34; in the salt from 1.75 Ci/gal in Tank 1 to 38.75 Ci/gal in Tank 38, and in the supernate from 0.0004 Ci/gal in several tanks to 40 Ci/gal in Tank 36. The radioactivity concentrations of the waste in the twelve Hanford tanks ranges from 0.00068 Ci/gal to 2.2 Ci/gal. While these are averages over the total tank waste volume—the liquid and sludge—they appear to fall within the range of values for the HLW tanks at SRS.

What does all this mean for the WIPP facility, you may ask? Clearly, no waste from the twelve tanks can go to WIPP without being first removed from the tanks, treated to reduce its fission content and solidified. As noted earlier Judge Winmill's opinion does

not prohibit DOE from creating high and low activity solid waste streams after removal of the waste from the tanks and after treatment. Thus, whether any of this waste can go to WIPP will depend on how DOE treats the waste after removal from the tanks, and whether it then meets WIPP waste acceptance criteria.