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# **Hanford Tank Wastes from Past Production of U.S. Nuclear Weapons: Statutory Authorities and Related Issues**

Presentation for National Academies of Sciences,  
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# Topics

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# Radioactive Tank Waste Inventory

Production of radioactive materials for the development of U.S. nuclear weapons generated a substantial volume of radioactive wastes stored in tanks at three DOE sites in three states:

- 56 million gallons in 177 tanks at the Hanford Nuclear Reservation in the state of Washington (pumpable wastes moved to double-shell tanks)
- 37 million gallons in 49 tanks at the Savannah River Site in the state of South Carolina (some wastes treated and some tanks grouted)
- 9 million gallons in 11 tanks at the Idaho National Laboratory in the state of Idaho (900,000 gallons of liquid wastes remaining in tanks)

West Valley Demonstration Project in the state of New York also generated 600,000 gallons of radioactive tank wastes that DOE treated under a cooperative agreement with the state



# Treatment and Disposal Challenges

Treatment and disposal of the DOE tank waste inventory present some of the most complex technical challenges and funding needs resulting from decades of U.S. nuclear weapons production

Tank wastes at Hanford present greater challenges and funding needs due to their volume and constituency, safety issues, and number of tanks to decommission

Once the wastes are removed, how to decommission the tanks in a manner that mitigates risks to workers and the environment also has been an issue

Tank waste treatment also has broader implications for national strategies to manage nuclear waste generated at other sites across the United States

Congress has addressed these issues in legislation, annual appropriations, and oversight, and has directed numerous studies by DOE, GAO, and the National Academies of Sciences to examine challenges and potential alternatives



# Statutory Authorities

DOE Office of Environmental Management administers the tank waste inventory under multiple federal statutes, as amended, including:

Atomic Energy Act of 1954 — 42 U.S.C. Chapter 23

Nuclear Waste Policy Act of 1982 — 42 U.S.C. Chapter 108

National Defense Authorization Act for FY2005 — P.L. 108-375

Solid Waste Disposal Act — 42 U.S.C. Chapter 82

(Mixed Waste and Federal Facility Compliance Provisions Applying State Law)

Executed through compliance agreements between DOE and the U.S. Environmental Protection Agency (EPA) and the states



# High-Level Waste Disposal Requirements

The Nuclear Waste Policy Act generally requires “permanent deep geologic disposal” as the method of disposal for high-level radioactive waste and defines such waste primarily with respect to its source:

*The term “high-level radioactive waste” means—*

*(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 Commission, consistent with existing law, determines by rule requires permanent isolation.*

42 U.S.C. 10101(12)



# DOE Order 435.1

In 1999, DOE issued Order 435.1: *Radioactive Waste Management* that guides the implementation of its statutory authorities to manage tank wastes

*Radioactive Waste Management Manual* (DOE M 435.1-1) accompanying the Order outlines criteria to classify a portion of the tanks wastes as “incidental to reprocessing” and manage them as transuranic or low-level wastes

Litigation challenged the statutory authority to manage these wastes as other than high-level (NRDC v. Abraham, 271 F. Supp.2d 1260, 1266, D. Idaho 2003, vacated as unripe 388 F.3d 701 , 9th Cir. 2004)

P.L. 108-375 subsequently provided the authority for DOE Order 435.1 in the states of Idaho and South Carolina, but not Washington or New York

Statutory authority to classify and manage a portion of the tank wastes at Hanford as other than high-level therefore may remain a potential issue



# DOE “Framework” for Hanford Tank Wastes

Current DOE framework is to separate the Hanford tank wastes into high-activity and low-activity streams at the Waste Treatment and Immobilization Plant to vitrify the wastes in glass for stabilization

## DOE Goal

High-activity wastes

- 90% of the curies
- 10% of the volume
- Repository disposal

Low-activity wastes

- 10% of the curies
- 90% of the volume
- On-site disposal



DOE also expects potential for some contact-handled transuranic wastes from certain tanks for disposal at the Waste Isolation Pilot Plant in New Mexico

DOE, *Hanford Tank Waste Retrieval, Treatment, and Disposition Framework*, September 24, 2013

# GAO May 2017 Recommendations

GAO examined the DOE Hanford framework and made two recommendations for alternative treatment of a portion of the low-activity volume

- *“Congress should consider specifically authorizing DOE to classify Hanford’s supplemental LAW [low-activity waste] based on risk, consistent with existing regulatory authorities.”*
- *“GAO also recommends that DOE develop updated information on the performance of treating LAW with alternate methods, such as grout, before it selects an approach for treating supplemental LAW.”*

GAO noted that *“DOE agreed with both recommendations.”*

GAO, *Nuclear Waste: Opportunities Exist to Reduce Risks and Costs by Evaluating Different Waste Treatment Approaches at Hanford*, GAO-17-306, May 2017



# Congressional Study Directive

National Defense Authorization Act for FY2017 (P.L. 114-328) requires DOE to analyze approaches for treating the portion of the low-activity waste at Hanford intended for supplemental treatment, including:

- Potential for removal of long-lived radioactive constituents
- Vitrification, grouting, steam reforming, and other alternatives
- Risks of each treatment alternative and final disposition
- Benefits and costs
- Schedules
- Regulatory compliance
- Potential “obstacles”

National Academies of Sciences review and public comment

Consultation with the state of Washington

Two-year deadline for submission to congressional defense committees



# QUESTIONS?



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