Perspectives from the Government Accountability Office

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Nuclear Waste: Opportunities Exist to Reduce Risks and Costs by Evaluating Different Waste Treatment Approaches at Hanford (GAO-17-306)

GAO examined:

(1) DOE's reasons for choosing its treatment approaches for LAW at the Savannah River and Hanford Sites

(2) the status of DOE's treatment of LAW at these sites, and

(3) experts' views on the likely performance of approaches for treating Hanford's LAW.

Objective 1: DOE's reasons for choosing its treatment approach

- Studies from early 1990s showed vitrification to be safer.
- DOE sought to address public concerns about grout.
  - Studies raised concerns about the ability of grout to set, the volume of grouted waste, and the ease of retrieval.
  - The State of Washington agreed to accept a delay in treatment, and in exchange, DOE agreed to vitrify Hanford's LAW.
- DOE has not determined how it will treat supplemental LAW—one-half to two-thirds of Hanford's LAW.

Objective 2: Status of Treatment

- Savannah River:
  - DOE has treated 4 million gallons of LAW and 4 million gallons of HLW.
  - DOE is required to complete LAW treatment by 2028.
  - According to DOE documents, DOE aims to complete the majority of LAW treatment in 2032.
- Hanford:
  - DOE has not treated any waste to date.
  - DOE plans to start direct-feed low-activity waste in 2023, which may treat about 13 million gallons of LAW.
  - DOE is required to complete LAW treatment by 2047.
  - If DOE must vitrify supplemental LAW, DOE believes that completing treatment will take until at least 2061.

Objective 2: Status of Treatment – Technical Challenges at Hanford

- Challenges at Hanford related to:
  - Glass formulations
  - Off-gas systems
  - Tank space
  - Operating capacity

Objective 2: Status of Treatment – Costs

Comparisons of Total Estimated Costs for Grouting LAW at the Savannah River Site and Vitrifying LAW at the Hanford Site, Based on Best Available Information

	Savannah River Site	Hanford Site		
	Existing and new salt waste processing facilities	LAW Treatment facility	Vitrification facility for supplemental LAW[a]	Total
Estimated cost to construct treatment facilities (millions of dollars)	$2,700	$6,500[b]	$6,500	$13,000
Estimated cost to treat LAW (millions of dollars)	$2,800	$20,000[c]	$20,000	$40,000
Total estimated cost (millions of dollars)	$5,500			$53,000
Total LAW (gallons)[d]	36 million			49 million
Estimated average cost per gallon of LAW treated (dollars)	$153/gallon			$1,081/gallon

Source: GAO analysis of Department of Energy (DOE) data and interviews. | GAO-17-306

Objective 3: Experts Views

- According to experts, vitrification and grout could both effectively treat Hanford's LAW.
- Experts stated that new information shows grout will perform better than was assumed when DOE made its decision to vitrify Hanford's LAW.
- Some experts noted that a risk-informed decision-making process could help DOE possibly avoid significant costs and develop options to address certain risks sooner.

Recommendations

- We suggested that Congress consider specifically authorizing DOE to classify Hanford's supplemental LAW based on risk, consistent with existing regulatory authorities.
- We also recommended 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.
  - have an independent entity develop updated information on the lifecycle costs of treating and disposing of Hanford's supplemental LAW with alternate methods or at alternate disposal sites.
- DOE agreed with both recommendations.