U.S. GOVERNMENT ACCOUNTABILITY OFFICE

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Congressional Committees

Nuclear Waste Cleanup: Hanford Site Cleanup Costs Continue to Rise, but Opportunities Exist to Save Tens of Billions of Dollars

The Hanford Site in Washington State is home to one of the largest and most expensive environmental cleanup projects in the world. After decades of research and production of weapons-grade nuclear materials at the 586-square-mile campus ceased in the late 1980s, the Department of Energy (DOE) began cleanup of hazardous and radioactive waste created as a byproduct of producing nuclear weapons. At Hanford, this waste includes 54 million gallons stored in 177 large underground waste storage tanks. This waste must be retrieved and treated—or immobilized—before disposal, according to legal requirements and agreements made with federal and state environmental regulators.

As a matter of policy, DOE manages Hanford's tank waste as "high-level waste" (HLW) unless and until it is classified as another waste type. Under current regulatory requirements, certain HLW generated during reprocessing and mixed with certain hazardous chemicals must be vitrified—a process in which the waste is immobilized in glass—prior to land disposal. "Low-activity waste" (LAW) is DOE's term for the portion of this tank waste with relatively low levels of radioactivity (less than 10 percent of the radioactivity and more than 90 percent of the volume).[1] LAW is primarily the liquid portion of the tank waste that remains after as much radioactive material as is technically and economically practical has been removed.

The Waste Treatment and Immobilization Plant (WTP) is DOE's current planned approach to treating Hanford's tank waste. The WTP, which has been under construction since 2000, includes several waste treatment facilities, including a facility to vitrify all of Hanford's HLW and a separate facility to vitrify about 60 percent of its LAW.[2] DOE's current plan to treat the remaining LAW (which is referred to as "supplemental LAW") is to construct and operate a second vitrification facility. DOE is also evaluating alternatives to constructing a second LAW vitrification facility. In May 2017, we reported that experts believed that much of Hanford's supplemental LAW could be safely grouted—that is, immobilized in a concrete mixture—and, in December 2021, we reported that several options existed for shipping the grouted waste off-site

[1]Low-level radioactive waste is defined by the Low-Level Radioactive Waste Policy Amendments Act of 1985 as radioactive material that (1) is not HLW, spent nuclear fuel, or byproduct material; and (2) the Nuclear Regulatory Commission (NRC) classifies as low-level radioactive waste.

[2]The WTP has been under construction for over 20 years and has faced many challenges, including significant technical challenges with the pretreatment facility, such as facility ventilation and explosion prevention during waste treatment. Because of these challenges, DOE stopped design and construction of the pretreatment facility in 2012. DOE does not have a current estimate for when the entire WTP will be complete but does expect one portion, the LAW vitrification facility, to begin operating in August 2023.

for disposal.[3] We found that this approach to treating and disposing of the supplemental LAW could save tens of billions of dollars and reduce certain risks, compared with vitrification.

Senate Report 117-39 includes a provision for us to continue periodic briefings on the treatment of waste at the Hanford Site.[4] This report describes the status of DOE's cleanup efforts at the Hanford Site, focusing particularly on the approaches, costs, and alternatives for the tank waste cleanup mission.

To conduct this work, we reviewed prior GAO reports and synthesized key findings and recommendations related to the Hanford Site cleanup, challenges, alternatives, and opportunities. We updated data using publicly available reports, including DOE's budget requests and Hanford Site life-cycle cost estimates and long-term plans for completing the cleanup. To assess whether the cost estimates were sufficiently reliable for our purpose, we compared them with other independent cost projection analyses by the National Academies of Sciences, Engineering, and Medicine (National Academies) and a Federally Funded Research and Development Center Technical Team, as well as with our previously reported cost analysis. We also relied on our previous data reliability and sensitivity analyses to validate our findings. We found that DOE's estimates were sufficiently reliable to determine that grouting a portion of Hanford's low-activity waste would likely be cheaper than vitrifying it, and we note uncertainties in the precision of these estimates, as appropriate.

In summary, we found that DOE continues to face cost and schedule challenges related to its efforts to address the tank waste at the Hanford Site and that DOE's current plans for treating the waste assume significant increases in annual appropriations in the next 10 years. We also found that opportunities exist for Congress and DOE to take steps now that could potentially save tens of billions of dollars while reducing certain risks posed by the waste. Enclosure I provides information on the status, funding needs, and possible savings for DOE's Hanford Site cleanup and tank waste cleanup mission, including waste treatment and waste management. It also includes key GAO recommendations and their implementation status, where appropriate. A list of related GAO products is at the end of this report.

We conducted this performance audit from February 2022 to July 2022 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Energy, and other interested parties. In addition, the report is available at no charge on the GAO website at http://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-3841 or andersonn@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report were Amanda

[3]GAO, *Nuclear Waste: Opportunities Exist to Reduce Risks and Costs by Evaluating Different Waste Treatment Approaches at Hanford*, GAO-17-306 (Washington, D.C.: May 3, 2017); *Nuclear Waste Disposal: Actions Needed to Enable DOE Decision That Could Save Tens of Billions of Dollars*, GAO-22-104365 (Washington, D.C.: Dec. 9, 2021).

[4]Accompanying S. 2792, a bill for the National Defense Authorization Act for Fiscal Year 2022.

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Enclosures – 2

List of Committees

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Source: Department of Energy. | GAO-22-105809

Hanford Site Cleanup

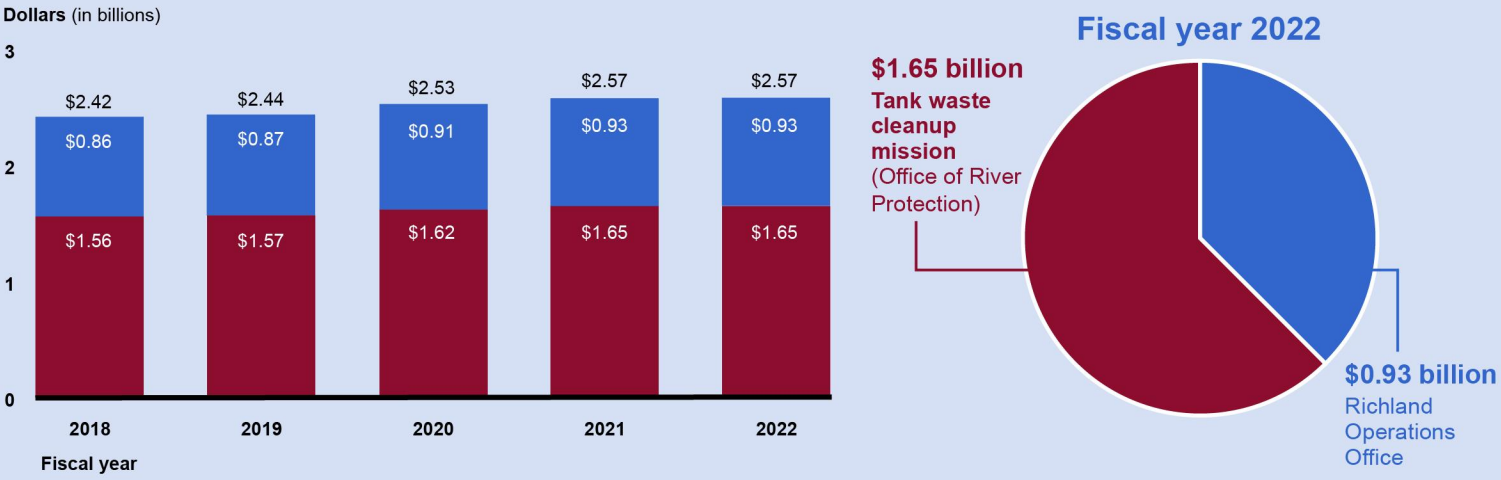
The Hanford Site in Washington State is home to one of the largest environmental cleanup projects in the world. It comprises a 586-square-mile campus established in 1943 to conduct research on and produce weapons-grade nuclear materials. After these activities ceased in the late 1980s, the Department of Energy (DOE) began cleanup of the resulting hazardous and radioactive waste.

This waste includes 54 million gallons of liquids and sludge stored in 177 large underground waste storage tanks at the site. This waste must be retrieved and treated (immobilized) before disposal, according to legal requirements and agreements made with federal and state environmental regulators. Other cleanup activities at the site include decommissioning old facilities and decontaminating soil and groundwater.

In 2022, DOE estimated that completing cleanup of the entire site would cost between $300 billion and $640 billion and take decades.[5] Over the last 5 fiscal years, the site has received annual appropriations of about $2.4 billion to $2.6 billion.

DOE manages the Hanford cleanup through two separate offices: the Office of River Protection, which oversees the tank waste cleanup mission, and the Richland Operations Office, which oversees site cleanup not related to the waste in the tanks. For each of the last 5 fiscal years, the tank waste mission received appropriations of about $1.6 billion dollars, while the Richland Operations Office received about $0.9 billion (see fig. 1).

Figure 1: Hanford Site Cleanup Appropriations, by Fiscal Year



Source: Department of Energy. | GAO-22-105809
Note: Totals may not match because of rounding.

[5]All costs and cost estimates in this report are presented in 2020 dollars unless otherwise noted. See Department of Energy, *2022 Hanford Lifecycle Scope, Schedule and Cost Report* (Richland, WA: January 2022).

Data table for Figure 1: Hanford Site Cleanup Appropriations, by Fiscal Year

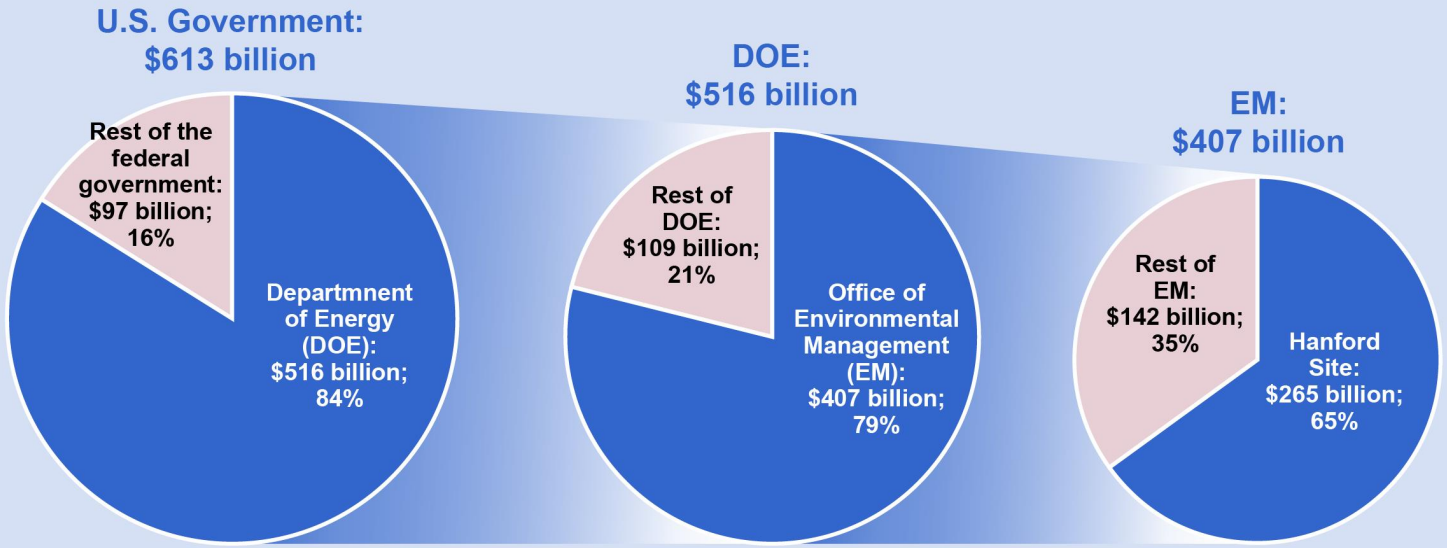
	2018	2019	2020	2021	2022
Tank waste cleanup mission	1.56	1.57	1.62	1.65	1.65
Richland Operations Office	0.86	0.87	0.91	0.93	0.93
Hanford Site	2.42	2.44	2.53	2.57	2.57

DOE is responsible for the largest share (about 84 percent) of the federal government's $613 billion estimated cost for its future environmental cleanup, known as "environmental liability." In fiscal year 2021, DOE's environmental liability was about $516 billion. DOE's Office of Environmental Management (EM)—which is responsible for most of DOE's cleanup activities—accounted for $407 billion (79 percent) of this amount. EM's portion of the liability reflects cleanup estimates for 15 sites across the U.S.

As we reported in 2021, EM's environmental liability grew every year in the previous decade—even though EM has spent billions of dollars on cleanup (see GAO-21-585R). Its liability may continue to grow, in part because DOE may have underestimated the cost to complete some of its largest cleanup projects, such as the Waste Treatment and Immobilization Plant (WTP) at Hanford.

As shown in figure 2, the Hanford Site accounted for $265 billion (over 65 percent) of EM's environmental liability in 2021.

Figure 2: Hanford Site's Share of U.S. Environmental Liability (fiscal year 2021)



Source: GAO analysis of U.S. Treasury and DOE data. | GAO-22-105809

Data table for Figure 2: Hanford Site's Share of U.S. Environmental Liability (fiscal year 2021)

	Amount in $ billion	Percentage
US Government	$613	
Department of Energy	$516	84%
Rest of the federal government	$97	16%
Department of Energy (DOE)	$516	
Office of Environmental Management	$407	79%
Rest of DOE	$109	21%
Office of Environmental Management (EM)	$407	
Hanford Site	$265	65%
Rest of EM	$142	35%

Source: Department of Energy. | GAO-22-105809

Tank Waste Cleanup Mission

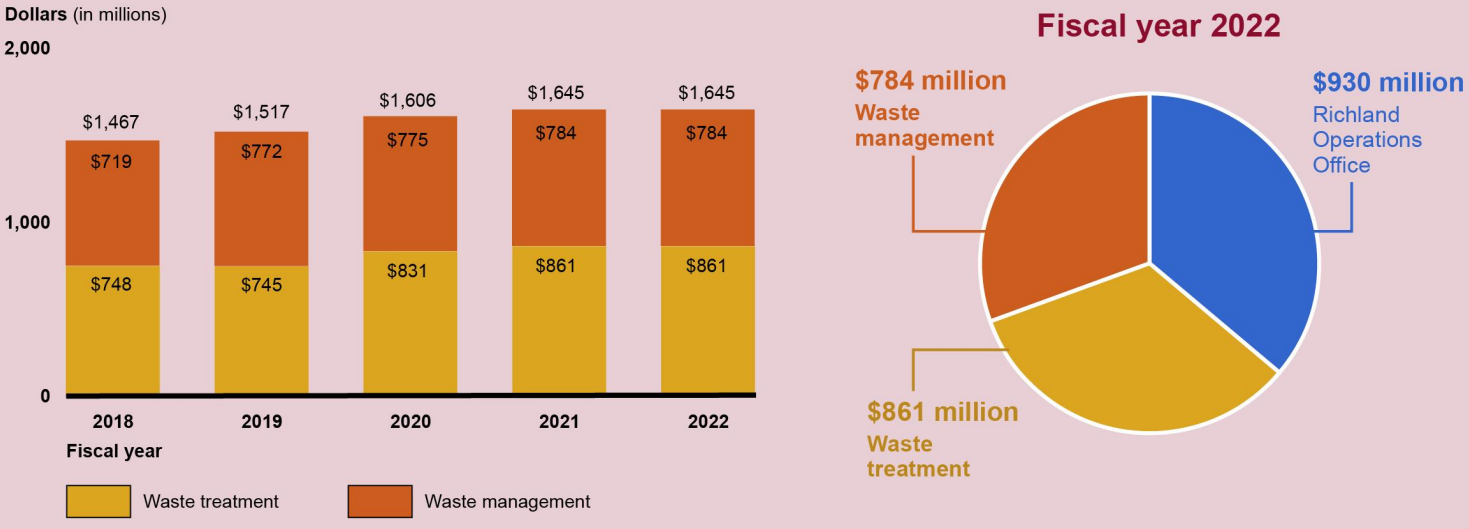
As a matter of policy, DOE manages Hanford's tank waste as "high-level waste" (HLW), unless and until it is classified as another waste type. Under current regulatory requirements, certain HLW generated during reprocessing and mixed with certain hazardous chemicals must be vitrified—a process in which the waste is immobilized in glass—prior to land disposal.

Hanford's tank waste cleanup mission consists of two main efforts:

- **Waste treatment.** DOE is currently constructing the WTP, which comprises several facilities that will, among other things, pretreat the waste for vitrification and vitrify the HLW (roughly 10 percent of the total waste by volume) and a portion of the remaining, less radioactive waste (low-activity waste, or LAW). DOE is also currently developing a new and more rapid system to prepare some of the LAW to be vitrified. DOE is in the process of deciding how it will treat the remaining LAW (called "supplemental LAW").
- **Waste management.** DOE has been working to retrieve waste from certain underground storage tanks that have a single-steel shell—58 of which have leaked into the environment. DOE is in the process of transferring this waste to newer, more durable double-shell tanks. DOE plans to later retrieve the waste from the double-shell tanks, treat both the HLW and LAW, and dispose of it.

DOE typically distributes funding about evenly between the waste treatment and waste management efforts in the waste cleanup mission. DOE allocated $861 million and $784 million, respectively, for these efforts in fiscal year 2022 (see fig. 3).

Figure 3: Hanford's Tank Waste Treatment and Management Appropriations, by Fiscal Year



Source: Department of Energy. | GAO-22-105809

Data table for Figure 3: Hanford's Tank Waste Treatment and Management Appropriations, by Fiscal Year ($ million)

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Waste Treatment	$748	$745	$831	$861	$861
Waste Management	$719	$772	$775	$784	$784
Total	$1,467	$1,517	$1,606	$1,645	$1,645

$930 million = Richland Operations Office
$861 million = Waste treatment
$784 million = Waste management

Note: Totals may not match because of rounding.

DOE reported in 2019 that it would need a significant increase in annual appropriations beginning in fiscal year 2023 to sustain its current course of constructing and operating waste treatment facilities and maintaining waste tanks.[6] The National Academies of Sciences, Engineering, and Medicine reported a similar finding in 2020.[7]

According to DOE's estimate, annual spending on the tank waste cleanup mission at Hanford would need to reach almost $6 billion in fiscal year 2030 (see fig. 4). The main drivers for the increased costs in the next 10 years are as follows:

- Completion of construction of the pretreatment facility (estimated to cost about $8 billion)
- Construction of a second vitrification facility to treat supplemental LAW (about $7 billion)
- Operation of the treatment facilities and transfer of waste from existing tanks to staging tanks for treatment (about $17 billion)

Figure 4: Actual and Projected Appropriations Under the Current Approach to the Hanford Tank Waste Cleanup

Source: Department of Energy. | GAO-22-105809

Note: These cost projections include the following key assumptions: (1) a second low-activity waste vitrification facility will be built and operated with the same technical assumptions as the first one; (2) facilities currently under construction will be completed and operated as planned (including the Direct-Feed Low-Activity Waste Project, the pretreatment facility, and the high-level waste facility); (3) the underground tanks will remain fully operational for the duration of the waste treatment mission; (4) the final disposal alternative for treated high-level waste will be at a yet-to-be-determined off-site national repository; and (5) the treated low-activity waste will be permanently disposed of on-site at Hanford. There are also substantial uncertainties associated with these cost projections, including the availability of key treatment facilities, the ability of the facilities to operate at planned rates, and the future condition of the aging waste tanks. To attempt to account for these uncertainties, DOE adds a contingency amount (about 4 percent) to its annual cost projections. All costs and cost estimates in this table are presented in 2020 dollars. Totals may not match because of rounding.

[6]Savannah River National Laboratory, *Report of Analysis of Approaches to Supplemental Treatment of Low-Activity Waste at the Hanford Nuclear Reservation,* SRNL-RP-2018-00687 (Aiken, SC: October 2019).

[7]National Academies of Sciences, Engineering, and Medicine (National Academies), *Final Review of the Study on Supplemental Treatment Approaches of Low-Activity Waste at the Hanford Nuclear Reservation: Review #4* (Washington, D.C.: The National Academies Press, 2020).

Data table for Figure 4: Actual and Projected Appropriations Under the Current Approach to the Hanford Tank Waste Cleanup

Year	Waste Treatment	Waste Management	Total
2018	0.7	0.7	1.5
2019	0.7	0.8	1.5
2020	0.8	0.8	1.6
2021	0.9	0.8	1.6
2022	0.9	0.8	1.6
2023	2.1	0.9	3.1
2024	2.4	1.3	3.7
2025	3.0	1.4	4.4
2026	2.7	1.5	4.1
2027	2.7	1.7	4.4
2028	3.5	1.7	5.2
2029	3.7	1.8	5.5
2030	3.7	2.0	5.7
2031	2.4	1.9	4.3
2032	1.9	1.9	3.8

Source: Department of Energy. | GAO-22-105809

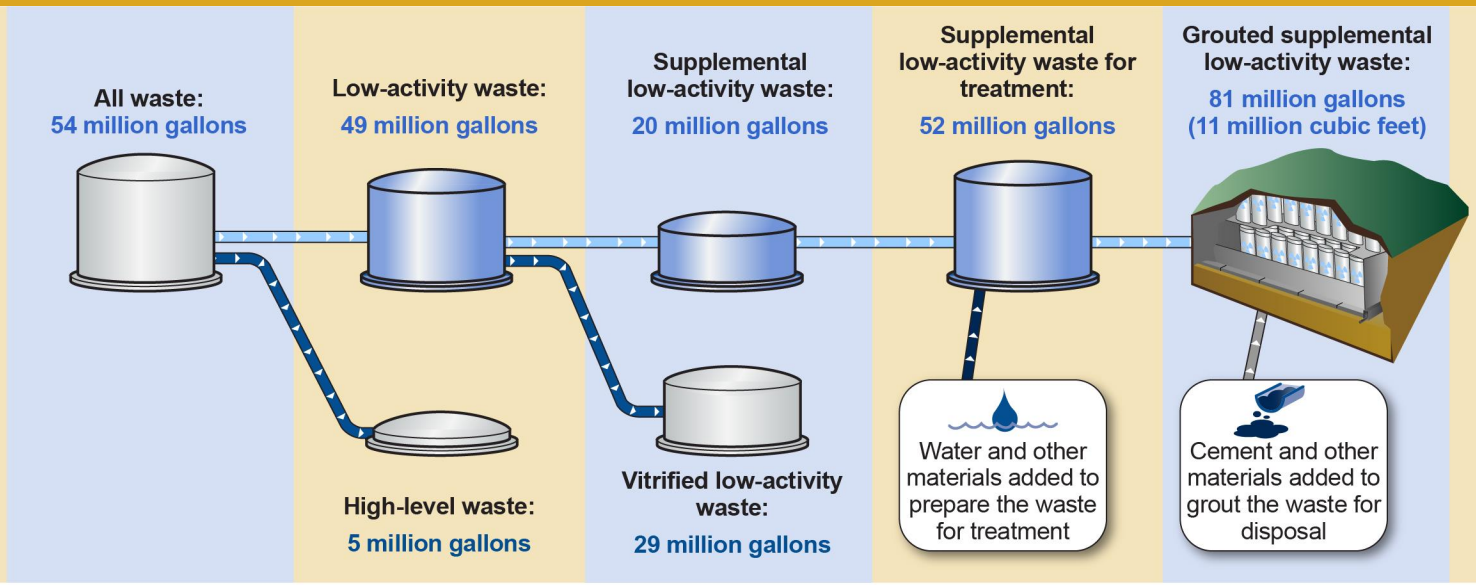
Waste Treatment

DOE plans to vitrify 60 percent of Hanford's LAW in the WTP and plans to construct a second vitrification facility to treat and dispose of the remaining roughly 40 percent (comprising about 20 million gallons of waste and referred to as supplemental LAW). DOE is also evaluating alternatives to constructing a second vitrification facility to treat supplemental LAW, as currently planned. Using alternative treatments, such as immobilizing the waste in a concrete mixture—known as "grouting"—could reduce certain risks by treating the waste faster and could save tens of billions of dollars (see GAO-17-306). However, DOE faces legal and regulatory challenges in attempting to consider disposal options for its supplemental LAW.

Each of DOE's options for classifying and managing the supplemental LAW as anything other than HLW faces limitations. Providing clear statutory authority to DOE to use alternative approaches to treat the Hanford Site's supplemental LAW could allow disposal options that reduce risks and cut costs (see Related GAO Recommendations).

As figure 5 illustrates, out of the 54 million gallons of tank waste at Hanford, LAW comprises about 49 million gallons. If the supplemental LAW were grouted, the volume of waste would increase from 20 million to 52 million gallons because of the need to add water while removing the waste from the tanks, transferring the waste, and pretreating it. The grout treatment process will further increase the volume of the waste (to about 81 million gallons) because water and other materials, such as cement, are added during the process. (The vitrification process also includes the addition of water and other materials during waste treatment.)

Figure 5: Low-Activity Waste Volume Changes during Treatment



Source: GAO. | GAO-22-105809

Text of Figure 5: Low-Activity Waste Volume Changes during Treatment

1) All waste = 54 million gallons.
    a) Low activity waste = 49 million gallons;
        i) high level waste = 5 million gallons.
    b) Supplemental low-activity waste = 20 million gallons
        i) Vitrified low-activity waste = 29 million gallons
    c) Supplemental low-activity waste for treatment = 52 million gallons
        i) Water and other materials added to prepare the waste for treatment
    d) Grouted-supplemental low activity waste = 81 million gallons / 11 million cubic feed)
        i) Cement and other materials added to grout the waste for disposal

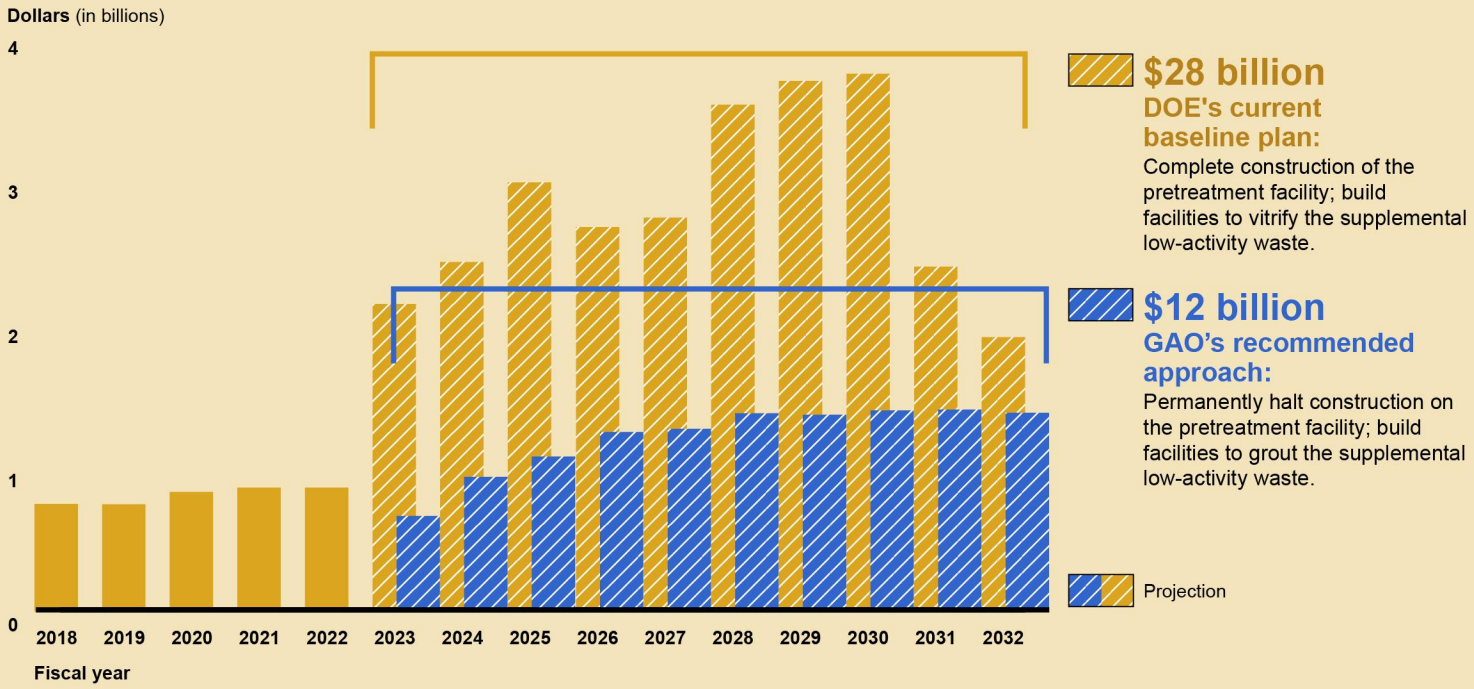
In 2012, technical challenges led DOE to halt construction on a key facility within the WTP that was intended to pretreat waste for vitrification by separating it into different components. In 2013 and 2015, we recommended that DOE not resume construction of the pretreatment and high-level waste facilities until all technical challenges had been resolved (see Related GAO Recommendations).

DOE is exploring alternative approaches to pretreat the waste (such as tank-side technologies to remove some highly radioactive constituents so that the HLW can be sent directly to the HLW vitrification facility) and may not need to spend additional funds on the stalled pretreatment facility.

In 2017, DOE completed the first phase of a project, called the Test Bed Initiative, to demonstrate the feasibility of grouting LAW for off-site disposal. Congress appropriated $7 million in the fiscal year 2022 budget for DOE to conduct a second phase of this initiative, which DOE now refers to as the Low-Level Waste Offsite Disposal Project.

If DOE were to permanently suspend construction of the pretreatment facility and opt to grout, rather than vitrify, the supplemental LAW, it could save tens of billions of dollars (see fig. 6). Separately, the National Academies and a Federally Funded Research and Development Center Technical Team reached a similar conclusion.

Figure 6: Estimated Appropriations for Waste Treatment Scenarios, by Fiscal Year



Source: GAO analysis of Department of Energy data. | GAO-22-105809

Note: These cost projections include the following key assumptions: (1) for DOE's approach, a second low-activity waste vitrification facility will be built and operated with the same technical assumptions as the first one; (2) facilities currently under construction will be completed and operated as planned (including the Direct-Feed Low-activity Waste Project; the high-level waste facility; and, for DOE's approach, the pretreatment facility); (3) the underground tanks will remain fully operational for the duration of the waste treatment mission; (4) the final disposal alternative for treated high-level waste will be at a yet-to-be-determined off-site national repository; and (5) the treated low-activity waste will be permanently disposed of on-site at Hanford. There are also substantial uncertainties associated with these cost projections, including the availability of key treatment facilities, the ability of the facilities to operate at planned rates, and the future condition of the aging waste tanks. To attempt to account for these uncertainties, DOE adds a contingency amount (about 4 percent) to its annual cost projections. All costs and cost estimates in this table are presented in 2020 dollars.

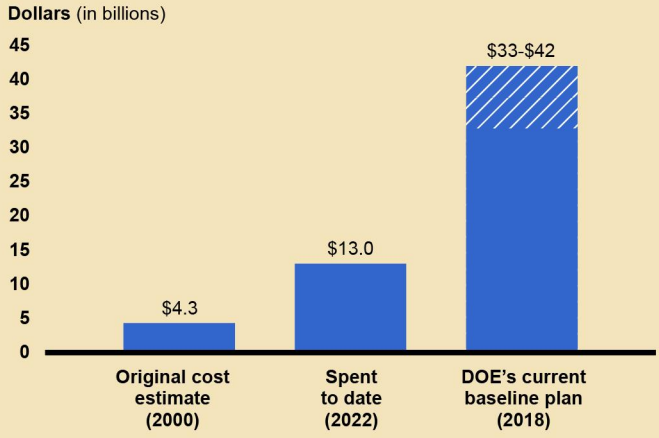
Data table for Figure 6: Estimated Appropriations for Waste Treatment Scenarios, by Fiscal Year (dollars in billions)

Year	Current baseline appropriation	Baseline under GAO'2 recommended approach
2018	0.748	0.000
2019	0.745	0.000
2020	0.831	0.000
2021	0.861	0.000
2022	0.861	0.000
2023	2.134 projected	0.664 projected
2024	2.425 projected	0.935 projected
2025	2.978 projected	1.077 projected
2026	2.662 projected	1.240 projected
2027	2.727 projected	1.263 projected
2028	3.510 projected	1.371 projected
2029	3.675 projected	1.361 projected
2030	3.725 projected	1.390 projected
2031	2.387 projected	1.396 projected
2032	1.898 projected	1.374 projected

The estimated cost to complete construction of the WTP as currently planned has increased substantially since DOE's contractor started construction in 2000, when it was $4.3 billion. As of June 2022, DOE has spent $13 billion on the construction of the WTP (see fig. 7).

DOE does not currently have an approved baseline cost estimate to complete the project, since the two largest facilities (for pretreatment of the waste and for treatment of the HLW) are on hold while DOE prioritizes other activities. However, in 2018, the Army Corps of Engineers estimated that completing the WTP as planned would cost $21 billion to $30 billion in addition to the nearly $12 billion that DOE had spent at that time, for a total cost of $33 billion-$42 billion.[8]

Figure 7: Estimated Appropriations to Complete the Waste Treatment Plant



Sources: Department of Energy (DOE) and U.S. Army Corps of Engineers data. | GAO-22-105809

Related GAO Recommendations

GAO has recommended that Congress consider clarifying, in a manner that does not impair the regulatory authorities of the Environmental Protection Agency and any state, DOE's authority to determine, in consultation with the Nuclear Regulatory Commission, (1) whether portions of the tank waste can be managed as a waste type other than HLW and can be disposed of outside the state of Washington (see GAO-22-104365) and (2) that residual tank waste can be managed as a waste type other than HLW (see GAO-21-73). As of June 2022, Congress has not yet addressed these matters.

GAO has also made a number of recommendations to DOE related to the Hanford waste treatment mission. Some key recommendations include

- DOE should expand future analyses of potential supplemental LAW disposal options to include all federal and commercial facilities that could potentially receive grouted LAW from Hanford (see GAO-22-104365). DOE agreed with but has not yet fully implemented this recommendation;
- DOE should follow the steps outlined in GAO's risk-informed decision-making framework as it makes decisions about the future of the pretreatment mission (see GAO-20-363). DOE agreed with but has not yet fully implemented this recommendation; and
- DOE should not resume construction on the WTP's pretreatment and high-level waste facilities until critical technologies are tested and verified as effective, the facilities' design has been completed to the level established by nuclear industry guidelines, and the contractor's preliminary documented safety analysis complies with DOE nuclear safety regulations (see GAO-13-38 and GAO-15-354). DOE agreed with this recommendation and has not yet restarted construction on these facilities.

[8]U.S. Army Corps of Engineers, *Parametric Evaluations of the Waste Treatment and Immobilization Plant* (Washington, D.C.: July 10, 2018).

Source: Department of Energy. | GAO-22-105809

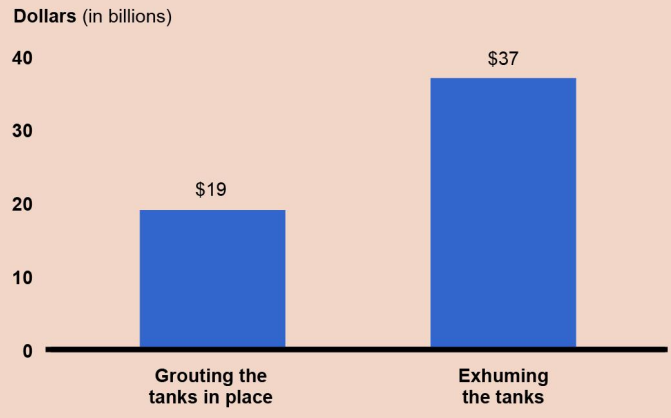
Waste Management

The Hanford waste tanks are aging, and many are decades past their intended design life. DOE estimates that about 68 of its 177 underground tanks may have collectively leaked over 1 million gallons of waste into the ground. Still, DOE plans to use some of the aging double-shell tanks for temporarily holding the waste as it is treated. However, according to an internal DOE risk assessment, it is extremely likely that the site will run out of tank space for this purpose. DOE also estimates that building additional tanks would cost $1.5 billion (for 4 million gallons of additional capacity).

Ultimately, DOE plans to retrieve the waste from the tanks and close them. In fiscal years 1997 through 2019, DOE spent over $10 billion to monitor, maintain, and retrieve waste from Hanford's tanks. DOE expects to spend at least $69 billion more on activities to retrieve tank waste and close the tanks, according to a January 2019 DOE report.

We reported in January 2021 (see GAO-21-73) that DOE could save up to $18 billion by filling the closed tanks with grout and leaving them in place, rather than exhuming them for disposal elsewhere, as the state of Washington may require (see fig. 8). We also reported that DOE should seek stakeholders' buy-in to the decision-making process. However, DOE faces challenges in engaging stakeholders, including local, regional, and national entities, as well as tribal governments.

Figure 8: Estimated Appropriations to Close the Tanks



Source: Department of Energy. | GAO-22-105809

Related GAO Recommendations

GAO has made a number of recommendations related to DOE's Hanford tank management mission. Some key recommendations include

- DOE should assess the extent to which the double-shell tanks might be susceptible to leaking (see GAO-15-40). DOE agreed with this recommendation but has not yet fully implemented this recommendation; and
- DOE should assess its efforts to involve stakeholders—such as local and regional entities—in the Hanford tank closure process to ensure that DOE engages them in the decision-making process (see GAO-21-73). DOE agreed with but has not yet fully implemented this recommendation.

Glossary

Environmental liability: Estimate of the probable costs for the future cleanup activities.

Grout (verb): A process in which the liquid waste is combined with a concrete-like or grout mixture, which then hardens to immobilize the waste.

High-level waste (HLW): As defined in the Atomic Energy Act of 1954, as amended, and the Nuclear Waste Policy Act of 1982, as amended, HLW is (1) 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 (2) other highly radioactive material that the Nuclear Regulatory Commission, consistent with existing law, determines by rule requires permanent isolation. 42 U.S.C. §§ 2014(dd), 10101(12).

Low-activity waste (LAW): Primarily the liquid portion of the Hanford tank waste that remains after as much radioactive material as is technically and economically practical has been removed. DOE uses the term LAW to mean the waste that, when solidified and properly classified as low-level radioactive waste, may be disposed of as low-level radioactive waste in a near-surface facility.

Supplemental LAW: The portion of the LAW (about 40 percent) for which DOE has not yet selected a treatment approach.

Vitrification: A treatment process in which the waste is immobilized in glass.

Waste Treatment and Immobilization Plant (WTP): DOE's current planned approach to treating Hanford's tank waste. The WTP includes several waste treatment facilities, including a facility to prepare the waste for treatment, one to vitrify Hanford's HLW, and a facility to vitrify its LAW.

Enclosure II: Related GAO Products

Hanford Cleanup: DOE Has Opportunities to Better Ensure Effective Startup and Sustained Low-Activity Waste Operations. GAO-22-104772. Washington, D.C.: June 14, 2022.

Environmental Cleanup: Status of Major DOE Projects and Operations. GAO-22-104662. Washington, D.C.: May 4, 2022.

Nuclear Waste Disposal: Actions Needed to Enable DOE Decision That Could Save Tens of Billions of Dollars. GAO-22-104365. Washington, D.C.: December 9, 2021.

Department of Energy: Environmental Liability Continues to Grow, but Opportunities May Exist to Reduce Costs and Risks. GAO-21-585R. Washington, D.C.: June 8, 2021.

High-Risk Series: Dedicated Leadership Needed to Address Limited Progress in Most High-Risk Areas. GAO-21-119SP. Washington, D.C.: March 2, 2021.

Hanford Cleanup: DOE's Efforts to Close Tank Farms Would Benefit from Clearer Legal Authorities and Communication. GAO-21-73. Washington, D.C.: January 7, 2021.

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