



Testimony

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Energy and Commerce, House of
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DEPARTMENT OF ENERGY

Environmental Liability Continues to Grow, and Significant Management Challenges Remain for Cleanup Efforts

Statement of David C. Trimble, Director
Natural Resources and the Environment

GAO Highlights

Highlights of [GAO-19-460T](#), a testimony before the Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives

Why GAO Did This Study

EM's cleanup responsibilities include remediating contaminated soil and groundwater, deactivating and decommissioning contaminated facilities, and treating millions of gallons of radioactive waste that resulted from nuclear weapons produced during World War II and the Cold War.

GAO has reported on a wide range of challenges facing EM, including management challenges and the office's increasing environmental liability. In 2017, GAO added the U.S. government's environmental liability to the list of program areas that are at high risk for fraud, waste, abuse, and mismanagement or in need of transformation. DOE is responsible for over 80 percent of the federal government's environmental liability. This testimony discusses (1) the status of DOE's environmental liability, (2) management challenges at EM, and (3) EM's reporting on its cleanup efforts. It is based on five GAO reports issued from January to March 2019, updated with information from DOE's recent *Fiscal Year 2018 Agency Financial Report* and 2020 budget request.

What GAO Recommends

Since January 2019, GAO has made 20 recommendations to DOE to address the growing environmental liability and management challenges and will continue to monitor DOE's implementation of these recommendations. DOE has generally agreed with all but one of these recommendations and has noted plans to implement many of the recommendations.

View [GAO-19-460T](#). For more information, contact David Trimble at (202) 512-3841 or trimbled@gao.gov.

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What GAO Found

In fiscal year 2018, the Department of Energy's (DOE) estimated environmental liability—that is, its estimated probable costs of future environmental cleanup—was \$494 billion. Of this amount, DOE's Office of Environmental Management (EM)—which is responsible for most of DOE's cleanup activities—accounted for \$377 billion. EM's portion of the liability reflects cleanup estimates for 16 sites across the United States. Two of these, the Hanford site in Washington and Savannah River site in South Carolina, have most of EM's nuclear waste stored in tanks, which is particularly costly and complicated to treat. EM's environmental liability grew by \$214 billion in fiscal years 2011 through 2018, even though EM spent over \$48 billion on cleanup. GAO found that this liability may continue to grow for several reasons:

- EM's environmental liability does not include the costs of all future cleanup responsibilities. For example, as of April 2018, DOE and its contractor had not negotiated a cost for completing a large waste treatment facility, called the Waste Treatment and Immobilization Plant, at the Hanford site.
- About 30 to 60 percent of EM's cleanup budget goes toward recurring activities necessary to maintain the sites—such as physical security and infrastructure maintenance—rather than toward reducing EM's environmental liability.
- EM officials have not analyzed the root causes of the cost growth.

GAO found that EM has not resolved long-standing management challenges. First, EM does not have a program-wide cleanup strategy and relies primarily on individual sites to locally negotiate cleanup activities and establish priorities, which does not always balance overall risks and costs. For example, the Hanford and Savannah River sites plan to treat similar radioactive tank waste differently, with Hanford's efforts possibly costing tens of billions more than Savannah River's. In addition, EM manages most of its cleanup work as operations activities, under less stringent requirements than other environmental remediation projects. For example, operations activities are not subject to independent oversight outside EM, and therefore DOE cannot hold EM accountable for its performance.

GAO also found that EM has not consistently reported to Congress on its cleanup efforts as required, and the information EM has reported has been incomplete or inaccurate. Under the National Defense Authorization Act for Fiscal Year 2011, EM must annually report estimated costs and detailed funding needs for future cleanup activities. EM's fiscal year 2017 submission to Congress was only the second one since fiscal year 2011, and it did not include a detailed list of upcoming activities or funding needed to meet those activities. Finally, GAO found that information provided in EM's fiscal year 2016 to 2018 budget requests did not reflect the funding some DOE officials said it needs to meet its milestones. Budget requests for those years were for at least \$1.5 billion less than the \$8 billion a senior EM official said EM anticipated was needed annually to meet milestones called for in legally enforceable agreements.

Chair DeGette, Ranking Member Guthrie, and Members of the Subcommittee:

I am pleased to be here today to discuss highlights of our recent work related to the Department of Energy's (DOE) cleanup mission. DOE has the difficult task of cleaning up hazardous and radioactive waste at sites across the country from energy research and nuclear weapons production dating back to World War II and the Cold War. DOE's cleanup mission includes remediating contaminated soil and groundwater; deactivating and decommissioning contaminated buildings; and designing, constructing, and operating facilities to treat millions of gallons of radioactive waste. DOE's Office of Environmental Management (EM) is responsible for most of the department's cleanup activities.¹ EM's estimate of the probable costs for the future cleanup of this waste is known as its environmental and disposal liability (or environmental liability).²

In February 2017, we added the federal government's environmental liabilities to our list of agencies and program areas that are at high risk for fraud, waste, abuse, and mismanagement or that are most in need of transformation.³ In our 2017 High-Risk Series, we noted that DOE's fiscal year 2016 environmental liability constituted the largest share—over 80 percent—of the federal government's total environmental liability and was likely to increase. Further, we noted that DOE did not have complete information about its cleanup responsibilities and that inconsistent approaches to making cleanup decisions prevented DOE from fully and cost-effectively addressing its environmental liability in ways that reduce the risks to human health and the environment. We stated that future progress in addressing the federal government's environmental liability depends on, among other things, how effectively DOE and other federal

¹In the fall of 1989, DOE established the Office of Environmental Restoration and Waste Management, which was later renamed the Office of Environmental Management.

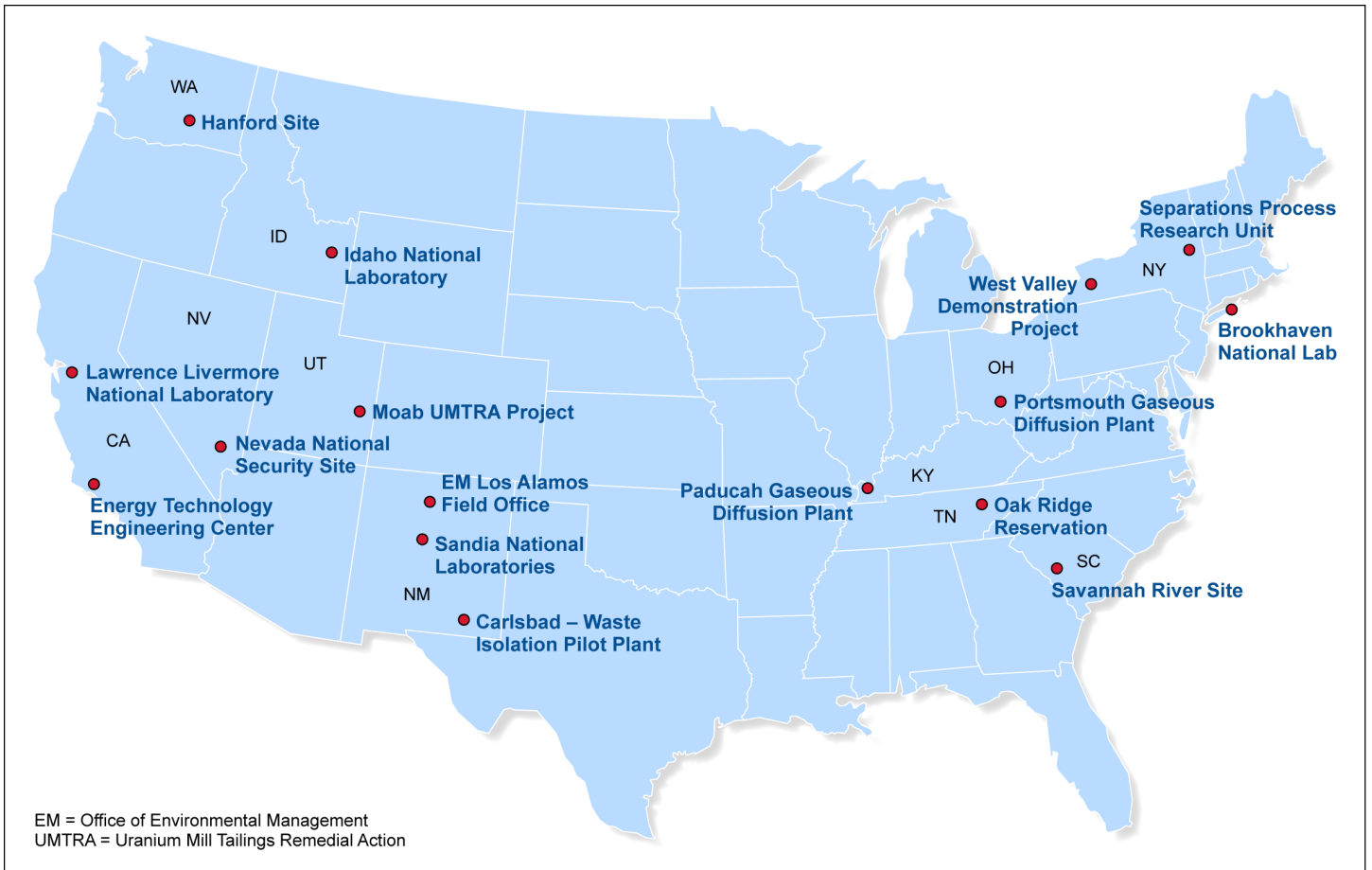
²The federal government is financially liable for cleaning up areas where federal activities have contaminated the environment. Various federal laws, agreements with states, and court decisions require the federal government to clean up environmental hazards at federal sites and facilities—such as nuclear weapons production facilities and military installations. Federal accounting standards require agencies responsible for cleaning up contamination to estimate future cleanup and waste disposal costs and to report such costs as environmental liabilities in their annual financial statements.

³GAO, *High-Risk Series: Progress on Many High-Risk Areas, While Substantial Efforts Needed on Others*, [GAO-17-317](#) (Washington, D.C.: Feb. 15, 2017).

departments and agencies set priorities under increasingly restrictive budgets to balance risks and costs when selecting cleanup remedies.

According to EM documents, the agency's cleanup responsibilities generally include (1) storing and treating radioactive and hazardous waste; (2) treating contaminated soil and groundwater; (3) preparing and disposing of spent nuclear fuel and highly enriched uranium materials; and (4) deactivating and decommissioning excess facilities, some of which are highly contaminated. EM has spent about \$177 billion on cleanup work since it began its cleanup program in 1989. It has completed cleanup at 91 DOE sites, but cleanup work remains at 16 sites (see fig. 1). Some of these remaining sites are the most challenging to address and involve designing, building, starting up, and operating complex nuclear facilities. These facilities include the Waste Treatment and Immobilization Plant (WTP) in Hanford, Washington; the Integrated Waste Treatment Unit at Idaho National Laboratory; and the Salt Waste Processing Facility at the Savannah River site in South Carolina—each of which is over budget and behind schedule.

Figure 1: Department of Energy Office of Environmental Management Sites Where Cleanup Work Remains



Sources: GAO analysis of Department of Energy information; Map Resources (map). | GAO-19-460T

This statement summarizes highlights of our recent work addressing (1) the status of DOE's environmental liability, (2) management challenges at EM, and (3) EM's reporting on its cleanup efforts.

My testimony is based on five reports issued from January to March 2019 related to EM's cleanup efforts.⁴ For this body of work, we reviewed agency financial, program, and policy documents; visited cleanup sites; and interviewed DOE and industry officials, among other things. Our reports each include a detailed description of our scope and methodology. In addition, we updated information on EM's annual spending and reported environmental liability with information from DOE's fiscal year 2018 financial statement, which was published in December 2018, and DOE's fiscal year 2020 congressional budget request.⁵ We provided a draft of the new information contained in this testimony to DOE for technical review and addressed its views in the body of our statement where appropriate. All work on which this testimony is based was performed 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.

⁴GAO, *Department of Energy Contracting: Actions Needed to Strengthen Subcontract Oversight*, [GAO-19-107](#) (Washington, D.C.: Mar. 12, 2019); *High-Risk Series: Substantial Efforts Needed to Achieve Greater Progress on High-Risk Areas*, [GAO-19-157SP](#) (Washington, D.C.: Mar. 6, 2019); *Nuclear Waste Cleanup: DOE Could Improve Program and Project Management by Better Classifying Work and Following Leading Practices*, [GAO-19-223](#) (Washington, D.C.: Feb. 19, 2019); *Nuclear Waste: DOE Should Take Actions to Improve Oversight of Cleanup Milestones*, [GAO-19-207](#) (Washington, D.C.: Feb. 14, 2019); and *Department of Energy: Program-Wide Strategy and Better Reporting Needed to Address Growing Environmental Cleanup Liability*, [GAO-19-28](#) (Washington, D.C.: Jan. 29, 2019).

⁵Department of Energy, *Fiscal Year 2018 Agency Financial Report*, DOE/CF-0149 (Washington, D.C.: Dec. 2018); *Department of Energy FY 2020 Congressional Budget Request, Environmental Management*, DOE/CF-0155 (Washington, D.C.: Mar. 2019).

DOE's Estimated Environmental Liability Was \$494 Billion in Fiscal Year 2018 and May Continue to Grow

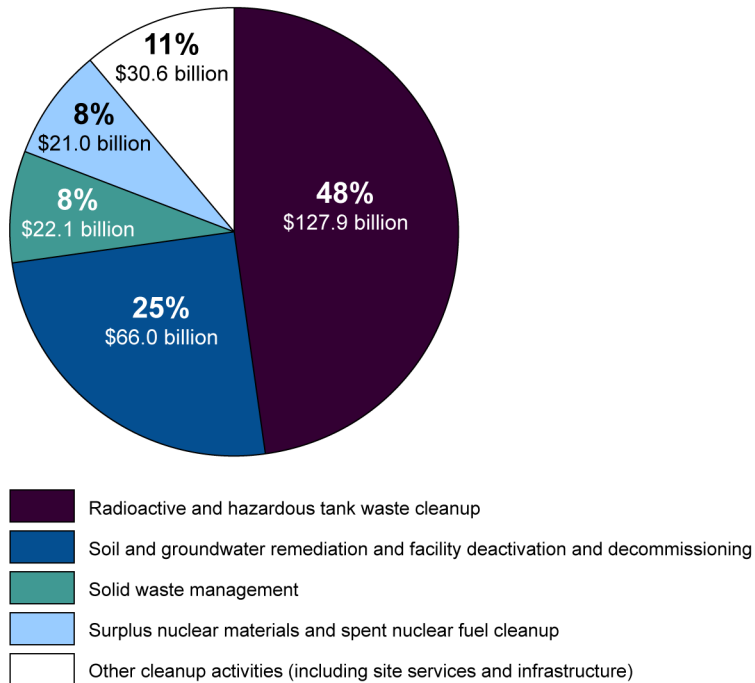
In its fiscal year 2018 financial statement, DOE reported an estimated environmental liability of \$494 billion. The majority of this liability was for cleanup work overseen by EM. We reported in January 2019 that in recent years, EM's environmental liability has grown annually at a level that has outpaced the department's annual spending on cleanup activities, and its liability may continue to grow.⁶

DOE Estimated Its Environmental Liability Was \$494 Billion in Fiscal Year 2018

In its fiscal year 2018 financial statement, DOE reported its estimated environmental liability at \$494 billion. In the financial statement, EM accounted for \$377 billion (over 75 percent) of DOE's total liability. In developing its environmental liability estimate, EM estimates the costs of storing, treating, or disposing of a variety of waste types. Storing and treating radioactive tank waste account for the largest portion of EM's costs. For example, in January 2019 we reported that, in fiscal year 2017 (the most recent year for which these data were available at the time of our review), EM's responsibilities to store and treat radioactive waste stored in underground tanks accounted for nearly half of EM's total environmental liability, and its responsibilities for addressing contaminated facilities and remediating soil and groundwater contamination accounted for about one-quarter. Figure 2 shows the percentage and dollar amount of EM's environmental liability by cleanup activity for fiscal year 2017.

⁶[GAO-19-28](#).

Figure 2: Office of Environmental Management’s Portion of the Department of Energy’s Fiscal Year 2017 Estimated Environmental Liability by Cleanup Activity



Source: GAO analysis of Department of Energy information. | GAO-19-460T

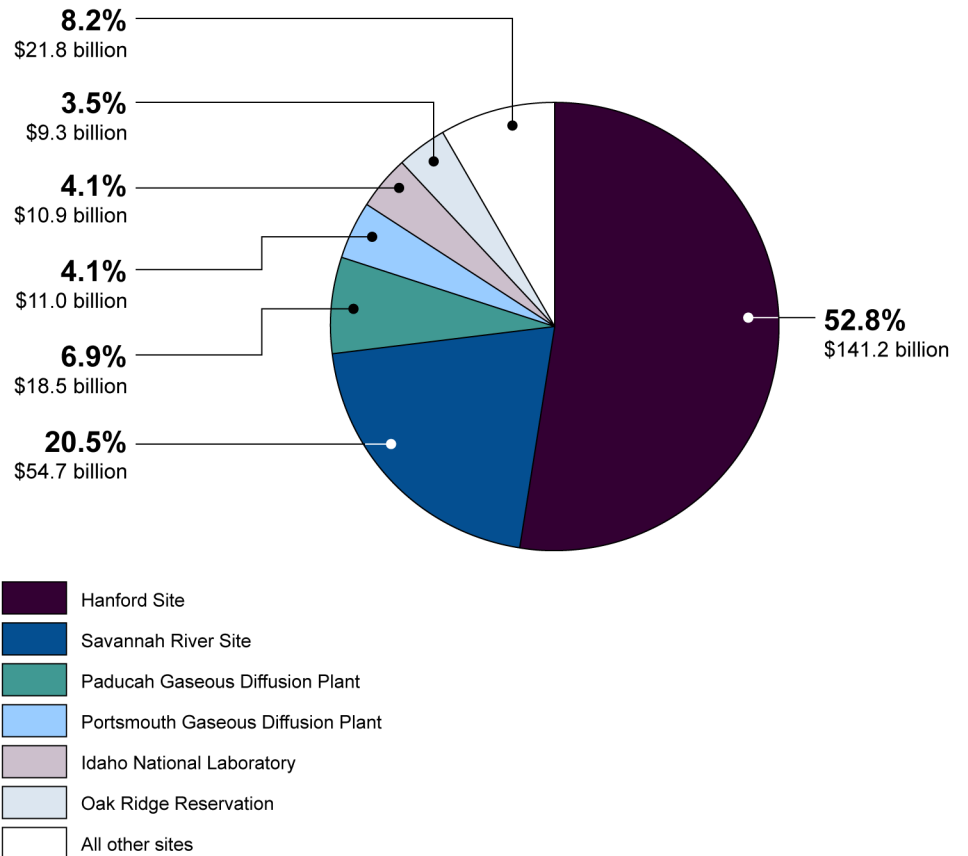
Note: Amounts are based on the Department of Energy’s (DOE) fiscal year 2017 financial statement. Because not all of DOE’s future cleanup costs are accounted for and because some of DOE’s current estimates for cleanup work are likely understated, this estimated liability is likely an underestimate.

In January 2019, we also found that, of the 16 sites across the United States at which EM has cleanup responsibilities, two sites accounted for more than 70 percent of EM’s environmental liability in fiscal year 2017: the Hanford site and the Savannah River site (see fig. 3).⁷ These sites also include the majority of EM’s radioactive tank waste and the majority of radioactive contamination, which is particularly costly and complicated to treat. The Hanford site has 177 tanks containing 55 million gallons of waste, and the Savannah River site has 43 tanks containing 36 million gallons of waste.⁸

⁷GAO-19-28.

⁸As we reported in January 2019, as of the end of 2017, the Savannah River site had treated about 7 million gallons of tank waste, and the Hanford site had treated 3 gallons under a demonstration project.

Figure 3: Department of Energy Office of Environmental Management’s Fiscal Year 2017 Estimated Environmental Liability, by Cleanup Site



Source: GAO analysis of Department of Energy information. | GAO-19-460T

Note: Amounts are based on the Department of Energy’s fiscal year 2017 financial statement.

EM’s Environmental Liability May Continue to Grow

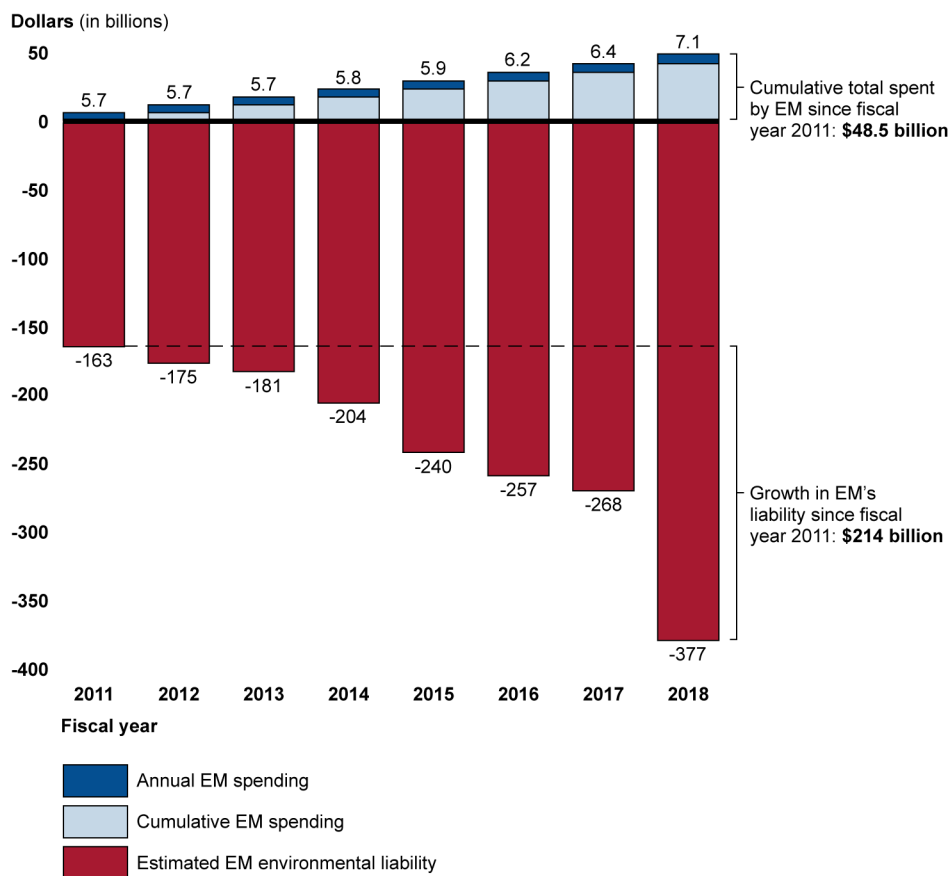
We reported in January 2019 that in recent years, EM’s environmental liability has grown annually at a level that has outpaced the department’s annual spending on cleanup activities.⁹ This growth has occurred at the same time as the number of contaminated sites has decreased.¹⁰ In fiscal years 2011 through 2018, EM spent over \$48 billion, primarily to address radioactive tank waste as well as treat and dispose of other nuclear and

⁹GAO-19-28.

¹⁰According to DOE, EM last closed a site in 2014, and prior to that it had last closed a site in 2011.

hazardous materials.¹¹ Nonetheless, since 2011, EM's environmental liability grew by \$214 billion, from \$163 billion to \$377 billion, according to our analysis of DOE financial data and documents (see fig. 4).

Figure 4: Department of Energy Office of Environmental Management's (EM) Annual Spending and Estimated Environmental Liability, Fiscal Years 2011 through 2018



Source: GAO analysis of Department of Energy financial and budget data. | GAO-19-460T

Note: We updated the amounts in [GAO-19-28](#) to include data from the Department of Energy's fiscal year 2018 financial statement. For this report, "spending" refers to appropriations.

¹¹This amount included construction of the WTP at the Hanford site, which DOE plans to use for treating Hanford's tank waste. The WTP includes several waste treatment facilities, including one to vitrify Hanford's high-level waste and a facility to vitrify its low-activity waste.

EM's environmental liability may continue to grow because its currently estimated environmental liability does not include the costs of all cleanup activities for which the agency will likely be responsible in the future and because the cost of addressing some of EM's largest projects is still underestimated. First, not all of the cleanup activities EM must undertake are captured in the current liability because, according to federal accounting standards, only work that is probable and reasonably estimable is required to be reported in an agency's liability.¹² For example, EM has not yet developed a cleanup plan or cost estimate for the Nevada National Security site and, as a result, the cost of future cleanup of this site was not included in EM's reported environmental liability. The nearly 1,400-square-mile site has been used for hundreds of nuclear weapons tests since 1951. These activities have resulted in more than 45 million cubic feet of radioactive waste at the site, but the costs for the cleanup of this waste are excluded from EM's annually reported environmental liability. Second, the current cost associated with some of EM's cleanup efforts may be underestimated. For example, as of April 2018, EM and its contractor had still not negotiated a cost for completing the WTP—DOE's largest and most complex construction project.

Further, although EM typically spends about \$6 billion per year on cleanup activities, a large amount of its cleanup budget does not support actual cleanup activities. Instead, this funding goes toward recurring activities necessary to maintain the sites rather than toward reducing the environmental liability. EM refers to these activities as "minimum safety" work. According to EM officials, examples of such work include physical security, health and radiation protection, or critical facility and infrastructure maintenance for safe conditions. These officials said that minimum safety work constitutes 30 to 60 percent of individual sites' budgets, for a total of at least \$2.7 billion of EM's fiscal year 2018 budget, as we reported in February 2019.¹³ The Assistant Secretary for EM noted in September 2018 that much of DOE's environmental liability is

¹²According to the Financial Accounting Standards Board, where the federal government is not legally responsible for environmental cleanup but acknowledges that it will assume financial responsibility for the cleanup, a liability is recorded for unpaid amounts due, not necessarily the full cost of cleanup. Also, where the government is legally responsible for environmental cleanup but there is no known technology to clean up a particular site, then known costs for which the entity is responsible, such as a remedial investigation, feasibility studies, and costs to contain the contamination, are recorded as a liability. Further, federal agencies' environmental liability estimates do not include cost estimates for work for which reasonable estimates cannot currently be generated.

¹³[GAO-19-223](#).

associated with managing minimum safety work and that significant potential cost savings could result from reducing minimum safety work. Accordingly, she stated that EM planned an initiative in fiscal year 2019 to examine how EM can reduce this work.

EM has undertaken several ad hoc studies and initiatives to address the growing costs in its cleanup program. However, EM has not conducted a formal root cause analysis to identify the causes for the growth in its environmental liabilities. Specifically, EM headquarters officials we interviewed said they were aware of the increases to the environmental liability from year to year, as well as the areas in which the liability changed; however, they said they had not done a detailed analysis of the root causes of the growth. A leading practice for program management is monitoring and controlling the program, which includes conducting root cause analyses and developing corrective action plans. However, in February 2019, we found that EM's cleanup policy does not follow this leading practice because it does not include any such requirements.¹⁴ We recommended that EM review and revise its policy to include program management leading practices in its requirements, including for monitoring and controlling the program. DOE agreed with our recommendation and stated that it plans to revise its policy.

EM Has Not Resolved Management Challenges in Its Cleanup Program

EM has not resolved long standing management challenges that affect its cleanup program and contracts. In March 2019, we issued our 2019 High-Risk Series, which included updates related to DOE's environmental liability and its contract management.¹⁵ While officials at EM have taken some steps toward management improvements aimed at reducing its environmental liabilities, we found that EM has not demonstrated progress toward resolving these challenges. We have identified several unresolved issues including the following:

- EM does not have a program-wide cleanup strategy. We reported in January 2019 that EM relies primarily on individual sites to locally negotiate cleanup activities and establish priorities.¹⁶ Our analysis of DOE documents identified instances of decisions involving billions of dollars where such an approach did not always balance overall risks

¹⁴[GAO-19-223](#).

¹⁵[GAO-19-157SP](#).

¹⁶[GAO-19-28](#).

and costs. For example, we reiterated what we found in May 2017 that two EM sites had plans to treat similar radioactive tank waste differently, and the estimated costs for treating the waste at one site—Hanford—may be tens of billions more than those at the other site—Savannah River.¹⁷ In addition, EM sites generally do not consider other sites' risks and priorities when making cleanup decisions. We reported in January 2019 that this approach is not consistent with recommendations we and others have made over the last 2 decades that EM develop national priorities to balance risks and costs across and within its sites.¹⁸ Moreover, EM has not developed a program-wide strategy that sets such priorities and describes how EM will address its greatest risks. Instead, according to agency officials, it continues to prioritize and fund cleanup activities by individual site. We recommended in January 2019 that EM develop a program-wide strategy that outlines how EM will direct available resources to address human health and environmental risks across and within sites. DOE agreed with our recommendation and has since said it is working toward this goal.

- EM manages most of its cleanup work as operations activities, under less stringent requirements than capital asset projects.¹⁹ In February 2019, we reported that EM manages its cleanup work under different requirements, depending on whether it classifies the work as a capital asset project or an operations activity.²⁰ EM currently manages most of its work as operations activities. In its fiscal year 2019 budget, operations activities accounted for 77 percent of EM's budget (about

¹⁷GAO, *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).

¹⁸[GAO-19-28](#).

¹⁹EM divides its cleanup work into capital asset projects and operations activities. According to DOE's order governing the management of capital asset projects—DOE Order 413.3B—a capital asset project is a project with defined start and end points required in the acquisition of capital assets; capital asset projects can also include the environmental remediation of land to make it useful. Capital asset projects—which involve the acquisition of land and other assets, including through environmental remediation—must undergo a series of reviews by independent experts and DOE's senior leadership. Operations activities are reoccurring facility or environmental operations as well as activities that are project-like, with defined start and end dates, according to EM policy. According to EM officials, EM manages its operations activities based on requirements listed in a cleanup policy that it issued in July 2017, and they are not reviewed outside of EM.

²⁰[GAO-19-223](#).

\$5.5 billion), and capital asset projects accounted for 18 percent (about \$1.3 billion). Operations activities have less stringent requirements. For example, unlike capital asset projects, operations activities are not required to go through a thorough upfront planning process to determine the scope of work to be completed. In addition, under EM cleanup requirements, operations activities are not subject to independent oversight by entities outside EM. As a result, DOE management does not have information on how EM manages operations activities and cannot hold EM accountable for cost-effective and timely completion of this cleanup work. Since 2015, experts in DOE's Office of Project Management have raised concerns that some operations activities, such as cleanup of radioactive tank waste, should be classified as capital asset projects. In February 2019, we recommended that EM work with DOE's Office of Project Management—which is responsible for providing DOE-wide leadership and assistance pertaining to project management—to establish requirements for classifying cleanup work as capital asset projects or operations activities and then work together to assess EM's ongoing operations activities to determine if they should be reclassified as capital asset projects based on the newly established requirements.²¹ DOE generally agreed with our recommendations and committed to review and revise its requirements as appropriate.

- EM's cleanup policy does not follow program and project management leading practices. In February 2019, we also found that EM's 2017 cleanup policy, which outlines procedures that govern the EM program and its operations activities, does not follow most selected leading practices for program and project management.²² Specifically, we found that EM's 2017 cleanup policy does not follow any of 9 selected program management leading practices related to scope, cost, schedule performance, and independent reviews. For example, the policy does not require the program management

²¹[GAO-19-223](#).

²²See [GAO-19-223](#). We identified nine program management leading practices based on Project Management Institute's (PMI) standards related to a program's management of scope, cost, schedule performance, and to independent review of performance. The Program Management Institute, Inc., is a not-for-profit association that provides global standards for, among other things, project and program management. In addition, we identified 12 project management leading practices by first identifying leading practices listed in DOE's project management order—DOE's Order 413.3B—related to management of scope, cost, schedule performance, and to independent review of performance for projects, and then comparing these practices with PMI's standards for project management.

leading practice of monitoring and controlling the program, including conducting root cause analyses and developing corrective action plans. Further, EM's 2017 cleanup policy follows only 3 of 12 selected project management leading practices related to these areas. For example, EM's 2017 cleanup policy does not require any independent reviews of its operations activities by anybody outside of EM. We recommended that DOE review and revise EM's cleanup policy to include program and project management leading practices related to scope, cost, schedule performance, and independent reviews. DOE agreed with our recommendations.

In addition, broader DOE management challenges affect EM and have implications for EM's ability to effectively manage its cleanup work and begin reducing its environmental liability. EM, like DOE, executes its program activities primarily through the use of contracts. We have reported that about 90 percent of DOE's budget is spent on contractors that manage the laboratories and carry out DOE's programs. DOE's contract management, however, is one of the areas we have identified as posing a high risk of fraud, waste, abuse, and mismanagement because of DOE's record of inadequate management and oversight of contractors. As a result, DOE's contract and project management has been on our High Risk List since 1990. Most recently, we found in March 2019 that DOE did not always ensure that contractors audited subcontractors' incurred costs as required in their contracts.²³ We identified more than \$3.4 billion in subcontract costs incurred over a 10-year period that had not been audited as required, and some subcontracts remained unaudited or unassessed for more than 6 years. Completing audits in a timely manner is important because of a 6-year statute of limitations to recover unallowable costs that could be identified through such audits. We recommended that DOE develop procedures that require local offices to monitor contractors to ensure timely completion of required subcontract audits. DOE partially concurred with this recommendation and stated that it plans to review existing requirements and guidance and to consider the extent to which it requires monitoring of contractors' progress in

²³See [GAO-19-107](#). We looked at DOE's 24 largest prime contracts, which totaled \$23.6 billion of DOE's fiscal year 2016 obligations, including contractors from the Office of Environmental Management. We also found in March 2017 that DOE did not have a department-wide invoice review policy or well-documented invoice review procedures at sites we examined. Consequently, DOE had no assurance that control activities at these sites were operating as intended. We recommended that DOE establish invoice review policies and procedures, and DOE generally agreed with this recommendation. See also GAO, *Department of Energy: Use of Leading Practices Could Help Manage the Risk of Fraud and Other Improper Payments*, [GAO-17-235](#) (Washington, D.C.: Mar. 30, 2017).

completing required subcontract audits. As we noted in the March 2019 report, we believe that DOE's plans to further examine the issues raised in our report is a positive step toward resolving the issues; however, we continue to believe that the actions called for in our recommendations remain valid and that DOE could more efficiently resolve the issues by proceeding to implement those actions.

EM Has Not Reported Required Information about the Status of Its Cleanup

Accurate and reliable information on the status and progress in a program is essential for effective management and to ensure key stakeholders are provided the information they need to fulfill their oversight, advisory, and other essential roles. However, EM's performance measures for operations activities do not provide a clear picture of overall performance, and EM has not followed best practices in implementing its performance reporting systems. In addition, EM has historically not provided all of the statutorily required information about the status of its cleanup effort, and the information EM has reported has been incomplete or inaccurate. Finally, in its recent budget materials, EM did not include the funding it says it needs to meet its schedule cleanup milestones.

EM's Cleanup Performance Measures Do Not Provide a Clear Picture of Overall Performance

In February 2019, we found that EM's performance measures for operations activities—which constitute most of its cleanup activities—do not provide a clear picture of overall performance.²⁴ According to EM documentation and officials, EM uses three tools to measure the overall performance of operations activities: earned value management (EVM),²⁵ performance metrics,²⁶ and cleanup milestones.²⁷ We found problems with EM's use of each of these tools. Figure 5 summarizes our findings on these three performance measures and how they affect EM's ability to effectively manage the cleanup effort.







²⁴[GAO-19-223](#).

²⁵EVM is an industry standard and is considered a best practice for conducting cost and schedule performance analysis for projects. It measures the value of work accomplished in a given period and compares it with the planned value of work scheduled for the period and with the actual cost of the work accomplished.

²⁶EM developed 17 program-wide performance metrics for its cleanup work. The goal of these metrics is to measure progress toward completing the scope of work for the contract and the entire life of an operations activity. EM headquarters collects information from the sites monthly to measure how each activity has performed against a goal set at the beginning of each year. Examples of EM's performance metrics include (1) the cubic meters of transuranic waste being disposed of; (2) the number of containers of high-level waste packaged for final disposition, and (3) the number of closed radioactive liquid waste tanks.

²⁷Cleanup milestones represent deadlines for various cleanup-related activities derived from agreements DOE enters into with its regulators, including the Environmental Protection Agency and states. EM also uses its commitment to meet site milestones as justification to request annual cleanup funding from Congress.

Figure 5: Summary of Findings on EM's Three Performance Measures

Performance measure	Findings	Accurately measures EM's performance
Earned value management (EVM) systems 	<ul style="list-style-type: none"> X EVM systems used by contractors covering operations activities are not comprehensive X EVM systems do not provide reliable data on performance X EVM systems do not support decision making by senior EM headquarters management X Much of the cleanup work is categorized in a way that limits the usefulness of the EVM data 	 Not clear
Program-wide performance metrics 	<ul style="list-style-type: none"> X Not connected to cost so difficult to determine whether EM received good value from the contractor 	 Not clear
Cleanup milestones 	<ul style="list-style-type: none"> X Milestones regularly re-negotiated and changes not tracked X Reasons for changes to milestones are not recorded 	 Not clear

EM = Department of Energy's Office of Environmental Management

Source: GAO analysis of Department of Energy information. | GAO-19-460T

First, we found in February 2019 that EM does not always ensure that its EVM data are comprehensive or reliable.²⁸ EVM measures the value of work accomplished in a given period and compares it with the planned value of work scheduled for the period and with the actual cost of the work accomplished. EM relies primarily on EVM data to measure the overall performance of its operations activities. EM relies on contractors' EVM systems to measure the performance of its contractors' operations activities. We reviewed all 20 EM contracts covering operations activities

²⁸GAO-19-223.

and found that EM requires its contractors to maintain EVM systems for 17 of all 20 contracts. We also found that EM paid its contractors to maintain these systems and provide EVM reports to EM. However, we found that EM has not followed best practices to ensure that these systems are (1) comprehensive, (2) provide reliable data, and (3) are used by EM leadership for decision-making—which are the three characteristics of a reliable EVM system. For example, only about half of the EVM systems met the best practices for conducting integrated baseline reviews and performing ongoing surveillance. Among those, many of the reviews were not rigorous enough to ensure that the performance measurement baseline captured all of the work. We found that EM officials were not performing thorough surveillance reviews to ensure that EVM systems were in alignment with EVM guidelines and that the data being reported by the EVM systems were reliable. In addition, the EVM data for contracts covering operations activities contained numerous, unexplained anomalies in all the months we reviewed, including missing or negative values for some of the completed work to date.²⁹ Even though EM requires most of its contractors for operations activities to maintain EVM systems and pays them for doing so, EM's 2017 cleanup policy generally does not require that EVM systems be maintained and used in a way that follow EVM best practices. The use of EVM as a management tool is considered an industry standard and a best practice for conducting cost and schedule performance analysis for projects. EVM data can alert project managers to potential problems sooner than expenditures alone can. Because EM does not follow best practices in administering its EVM systems, EM leadership may not have access to reliable performance data to make informed decisions in managing billions of dollars' worth of cleanup work every year and to provide to Congress and other stakeholders. We recommended that EM update its cleanup policy to require that EVM systems be maintained and used in a way that follows EVM best practices. DOE agreed with this recommendation, and said it would implement it.

Second, we found that EM's performance metrics do not link performance to cost. EM collects performance metrics from the sites monthly to measure progress toward completing the scope of work for the contract and against a goal set at the beginning of each year. We found in February 2019 that EM's performance metrics do not link that work to the

²⁹We analyzed EM headquarters' EVM data on operations activities from October 2016 through September 2017 (the most recent data available at the time of our review).

cost of completing it.³⁰ For example, EM reported that it eliminated 72,000 gallons of radioactive liquid waste out of a target of 342,000 gallons for fiscal year 2017 at the Savannah River site and disposed of 1,734 cubic meters of low-level waste out of a target of 360 cubic meters at the Idaho site. However, in neither case did EM indicate how much that work cost to accomplish, such as whether those costs were above or below what had been planned. Because EM's metrics do not link performance to cost, the performance information EM has provided to Congress does not indicate whether EM received good value from the contractor since it does not show how much that work cost to accomplish. We recommended that EM integrate EVM data into EM's performance metrics for operations activities. DOE agreed with this recommendation and said it would implement it.

Finally, we found in February 2019 that sites regularly renegotiate cleanup milestones they are at risk of missing, and EM does not track data on the history of postponed milestones or the reasons why milestones were postponed.³¹ As a result, milestones have limited value as a means of tracking cleanup progress since EM does not track the original (or any previously revised) milestone dates, which could provide some data to measure the progress of cleanup activities. We recommended that EM track and report original milestones dates as well as changes to its cleanup milestones. DOE agreed with our recommendation and said it is already tracking this information at the site level. In response, we reiterated the importance of tracking these changes and reporting that information at the headquarters level to help inform Congress.

EM Has Inconsistently Reported on Cleanup Status and Its Information May Be Misleading

We reported in January 2019 that EM has not submitted congressionally mandated reports on its cleanup program and the information EM has reported has been incomplete or inaccurate.³² These reports are intended to provide Congress with information on the progress, challenges, and expected future costs of the EM cleanup program. Under the fiscal year 2011 National Defense Authorization Act, EM must annually develop and report to Congress a Future-Years Defense Environmental Management

³⁰[GAO-19-223](#).

³¹[GAO-19-207](#).

³²[GAO-19-28](#).

Plan that reflects estimated expenditures and proposed appropriations included in the DOE budget for defense environmental cleanup activities.³³ It must do so at or about the same time that it submits its budget request. The plan is to cover the fiscal year for which the budget is submitted and at least the 4 succeeding fiscal years. The plan is required to describe the cleanup activities to be carried out during the period specified by the plan, estimated expenditures and proposed appropriations necessary to support them, and each milestone in an enforceable agreement governing the cleanup activity. For each milestone, EM is to identify whether the milestone will be met and, if not, explain why not and provide the date by which EM expects to meet it.

EM submitted the required plan in fiscal year 2012 but did not submit plans from fiscal year 2013 through fiscal year 2016, as we found in January 2019, or in fiscal year 2018.³⁴ EM's most recent Future-Years Defense Environmental Management Plan, which DOE submitted to Congress in August 2017, included little of the information required by the fiscal year 2011 National Defense Authorization Act.³⁵ Table 1 shows our assessment of the information EM provided in its 2017 Future-Years Defense Environmental Management Plan against the reporting requirements.

³³50 U.S.C. § 2582a.

³⁴DOE submitted its first plan in September 2012, but according to EM officials, did not submit another plan until 2017. EM officials told us that they provided oral briefings to Congress for fiscal years 2013 through 2016 to fulfill this requirement. See [GAO-19-28](#).

³⁵Department of Energy, *Future-Years Defense Environmental Management Plan, FY2018 to FY2070* (Washington, D.C.: August 2017).

Table 1: GAO Analysis of Office of Environmental Management’s (EM) Fiscal Year 2017 Future-Years Defense Environmental Management Plan

Reporting requirement	Extent to which the plan met requirement	Summary of GAO analysis
Timeliness: Submit annually at or around President’s budget submission	Did not meet	The plan was first mandated in 2011, but EM submitted it only twice since then—once in 2012 and most recently in August 2017, 3 months after the fiscal year 2018 budget was submitted.
Expenditures/estimated future costs: Estimated expenditures and proposed appropriations in budget year and at least 4 succeeding fiscal years.	Did not meet	Plan provides general life-cycle cost estimates that are lower than the costs reflected in EM’s environmental liability estimate, rather than specifying estimated expenditures and proposed appropriations for the budget year plus 4 succeeding fiscal years.
List of cleanup activities and projects: Provide a detailed list of activities planned for the budget year and 4 succeeding fiscal years	Partially met	Budget year activities are explained at a high level in a “highlights” section for each site. Although activities for fiscal year 2018 are discussed, activities for fiscal years 2019 through 2021 are outlined at a high level but not detailed.
Milestones: List all milestones for budget submission year and 4 succeeding years, due date, and statement of whether milestones will be met and, if not, why not.	Partially met	Plan shows milestones by site. However, out of 154 milestones listed, the plan shows only one milestone that may be missed; yet the Department of Energy has noted publicly that there is a high risk of missing another milestone (at Hanford).

Source: GAO analysis of the Department of Energy’s Office of Environmental Management’s (EM) 2017 Future-Years Defense Environmental Management Plan. | GAO-19-460T

Note: Reporting requirements are from the National Defense Authorization Act for Fiscal Year 2011.

We also found in February 2019 that the forecast completion dates for milestones listed in the 2012 and 2017 plans may not present an accurate picture of the status of the milestones and EM’s cleanup efforts.³⁶ For example, in the 2012 plan, DOE reported that only four out of 218 milestones were at risk of missing their planned completion date, while the rest were on schedule. When comparing these milestones to the 2017 plan, we found that at least 14 of them had been postponed. Similarly, the 2017 plan listed only one milestone out of 154 as forecast to miss its due date. However, because EM does not have a historical record of the changes made to the milestones, it is unclear how many of these milestones were recently revised or actually represented their original due dates because the report does not include this information.

Because DOE is not consistently and comprehensively submitting complete information about the status of its cleanup, Congress and other stakeholders may not have access to reliable information to make

³⁶GAO-19-207.

informed decisions about billions of dollars of cleanup work. We recommended that DOE submit in EM's annually required Future-Years Defense Environmental Management Plan all mandated requirements, as well as information on annual growth in environmental liability estimates by site, the key factors causing that growth, and an explanation of significant differences between environmental liability estimates and life cycle cost estimates.³⁷ DOE agreed with our recommendation and has since said it is working toward this goal.

EM's Recent Budget Materials Have Not Reflected the Funding EM Anticipates Is Needed to Meet Its Future Cleanup Responsibilities

In addition to the Future-Years Defense Environmental Management Plan, DOE is to submit a budget request each fiscal year to Congress along with an explanation of what EM cleanup activities the funding will accomplish. However, in January 2019 we found that the information EM provided to Congress in its fiscal years 2016, 2017, and 2018 budget requests did not reflect the funding some senior DOE officials said EM needs to meet its scheduled cleanup milestones.³⁸ We reported that in a 2015 presentation on cleanup priorities, EM's Deputy Assistant Secretary noted that EM's anticipated long-term funding needs for the full costs of cleanup far exceeded the office's annual budget requests and noted that in fiscal years 2016, 2017, and 2018, EM anticipated that it needed nearly \$8 billion annually to meet scheduled milestones called for in compliance agreements. However, DOE's budget requests for those fiscal years were \$5.8 billion, \$6.1 billion, and \$6.5 billion, respectively—a shortfall of at least \$1.5 billion per year.³⁹ The Deputy Assistant Secretary also noted that if EM continued to receive about \$6 billion per year in the coming 2 decades, it would face a funding shortfall of about \$28 billion. He also said that the time frame for EM's cleanup mission would likely be extended for years, thereby increasing cleanup costs and raising the environmental liability. Similarly, we reported that in a 2017 site cleanup meeting, EM's Associate Principle Deputy Assistant Secretary for Field Operations said that in order for EM to meet all of the cleanup requirements reflected in agreements with federal and state regulators, EM would need a much larger budget than was requested in fiscal year 2018. For example, this official said that EM's Hanford site, which

³⁷[GAO-19-28](#).

³⁸[GAO-19-28](#).

³⁹According to DOE's fiscal year 2017 budget justification, EM's fiscal year 2016 enacted appropriation was \$6.2 billion. DOE's fiscal year 2018 budget justification noted that EM's fiscal year 2017 appropriation, under a continuing resolution, was \$6.3 billion.

received about \$2.5 billion in fiscal year 2018, needed more than \$4 billion per year to meet scheduled milestones to construct and operate the WTP—one of many cleanup activities at the site—for the duration of its planned mission. The official added that EM’s annual budget will not cover all needs, particularly because infrastructure maintenance, repair, and replacement needs are growing and extending the completion of cleanup further into the future. We recommended that DOE disclose the funding EM needs to meet all of its scheduled milestones. DOE agreed with this recommendation and said it plans to request the funding needed to meet its cleanup agreements.

Chair DeGette, Ranking Member Guthrie, and Members of the Subcommittee, this concludes my prepared remarks. I would be happy to respond to any questions that you may have at this time.

GAO Contact and Staff Acknowledgments

If you or your staff have any questions about this testimony, please contact David C. Trimble, Director, Natural Resources and Environment, at (202) 512-3841 or trimbled@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this testimony. GAO staff who made key contributions to this testimony are Amanda Kolling (Assistant Director), Chad Clady, Kelly Friedman, Cristian Ion, Jeff Larson, Cynthia Norris, Dan Royer, and Kiki Theodoropoulos.

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Nuclear Waste Cleanup: DOE Could Improve Program and Project Management by Better Classifying Work and Following Leading Practices. [GAO-19-223](#). Washington, D.C.: February 19, 2019.

Nuclear Waste: DOE Should Take Actions to Improve Oversight of Cleanup Milestones. [GAO-19-207](#). Washington, D.C.: February 14, 2019.

Department of Energy: Program-Wide Strategy and Better Reporting Needed to Address Growing Environmental Cleanup Liability. [GAO-19-28](#). Washington, D.C.: January 29, 2019.

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