



## Testimony

Before the Subcommittee on Strategic Forces, Committee on Armed Forces, U.S. Senate

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# DEPARTMENT OF ENERGY

## Continued Actions Needed to Address Management Challenges

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Accessible Version

# GAO Highlights

Highlights of [GAO-18-438T](#), a testimony before the Subcommittee on Strategic Forces, Committee on Armed Services, U.S. Senate

## Why GAO Did This Study

DOE's NNSA is responsible for managing the nuclear weapons stockpile and supporting nuclear nonproliferation efforts. DOE's Office of Environmental Management works to decontaminate and decommission facilities contaminated from decades of nuclear weapons production.

Over the last few years, GAO has reported on a wide range of challenges facing DOE and NNSA. These challenges contribute to GAO's continuing inclusion of DOE's management of major contracts and projects on the list of agencies and program areas that are at high risk of fraud, waste, abuse, and mismanagement. GAO also recently added the U.S. government's environmental liabilities to this list.

This statement is based on 18 GAO reports issued from October 2014 through February 2018 and discusses (1) challenges related to the affordability of NNSA's nuclear modernization plans; (2) challenges related to DOE's environmental liabilities; (3) the status of DOE's efforts to improve its management of contracts, projects, and programs; and (4) challenges facing NNSA's nonproliferation program. With NNSA documents, GAO updated its prior work on the affordability of NNSA's modernization plans.

## What GAO Recommends

GAO is not making any new recommendations. GAO has suggested that Congress consider taking certain actions and that DOE continue to act on the numerous recommendations GAO has made to address these challenges.

View [GAO-18-438T](#). For more information, contact David Trimble at (202) 512-3841 or [trimbled@gao.gov](mailto:trimbled@gao.gov).

March 14, 2018

## DEPARTMENT OF ENERGY

### Continued Actions Needed to Address Management Challenges

## What GAO Found

The Department of Energy's (DOE) National Nuclear Security Administration (NNSA) faces challenges related to the affordability of its nuclear modernization programs. In April 2017, GAO found a misalignment between NNSA's modernization plans and the estimated budgetary resources needed to carry out those plans. Specifically, GAO found that NNSA's estimates of funding needed for its modernization plans sometimes exceeded the budgetary projections included in the President's planned near-term (fiscal years 2018 through 2021) and long-term (fiscal years 2022 through 2026) modernization budgets. GAO also found that the costs of some major modernization programs—such as for nuclear weapon refurbishments—may also increase and further strain future modernization budgets. GAO recommended in April 2017 that NNSA include an assessment of the affordability of its modernization programs in future versions of its annual plan on stockpile stewardship; NNSA neither agreed nor disagreed with that recommendation.

DOE also faces challenges with addressing its environmental liabilities—the total cost of its cleanup responsibilities. According to the *Fiscal Year 2017 Financial Report of the United States Government*, DOE is responsible for \$383.8 billion—about 83 percent—of the federal government's \$464.5 billion total reported environmental liability. GAO and other organizations have reported that DOE has not consistently taken a risk-informed approach to decision making for environmental cleanup, which could reduce costs while also reducing environmental risks more quickly. For example, in May 2017, we found that DOE may be able to save tens of billions of dollars and accelerate its waste treatment mission by reconsidering its approach for treating a portion of tank waste at DOE's Hanford Site in Washington State. Since 1994, GAO has made at least 30 recommendations to DOE and other federal agencies, which could reduce long-term costs and environmental risks more quickly. Of these, 15 remain unimplemented.

DOE has taken several important steps that demonstrate its commitment to improving contract and project management, but challenges persist. Specifically, DOE's revised project management order, issued in May 2016, made several changes in response to recommendations GAO made in prior years, such as recommending that projects develop cost estimates and analyses of alternatives according to GAO's best practices. However, DOE's recent efforts do not address several areas, such as acquisition planning for major contracts and aspects of program and project management with which the department continues to struggle. GAO has made several recommendations related to these areas, and DOE has generally agreed with most of them.

Finally, NNSA faces challenges in implementing its nonproliferation programs. For example, in September 2017, GAO found that selected programs in NNSA's Office of Defense Nuclear Nonproliferation (DNN) did not measure performance against schedule and cost baselines, as recommended by program management leading practices because DNN's program management policy did not require programs to measure performance in this way. GAO recommended that DNN revise its policy to require programs to measure performance against cost and schedule baselines. NNSA indicated it plans to take action to revise its policy.

Chairman Fischer, Ranking Member Donnelly, and Members of the Subcommittee:

Thank you for the opportunity to discuss our recent work on some of the pressing management challenges facing the Department of Energy's (DOE) National Nuclear Security Administration (NNSA) and Office of Environmental Management (EM).<sup>1</sup> NNSA is responsible for managing the nation's three nuclear security missions: ensuring a safe, secure, and reliable nuclear deterrent; achieving designated reductions in the nuclear weapons stockpile; and supporting the nation's nuclear nonproliferation efforts. In support of these missions, in November 2017, NNSA issued its *Stockpile Stewardship and Management Plan*, which included about \$10 billion for weapons activities for fiscal year 2018. More recently, NNSA's February 2019 budget justification for the Weapons Activities appropriations account requested about \$61 billion for fiscal years 2019 through 2023 to carry out its mission, including its weapons modernization plans.

In support of its missions, NNSA implements a range of nonproliferation programs under its Office of Defense Nuclear Nonproliferation.<sup>2</sup> These programs include efforts to secure, consolidate, and dispose of weapons-usable nuclear materials and radiological sources;<sup>3</sup> reduce the risks of nuclear smuggling; enhance international export controls and International Atomic Energy Agency nuclear safeguards;<sup>4</sup> and support research and development of new nonproliferation technologies.

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<sup>1</sup>NNSA is a separately organized agency within DOE. It was created under Title 32 of the National Defense Authorization Act for Fiscal Year 2000, Pub. L. No. 106-65, §§ 3201-3299, 113 Stat. 512, 953-971 (1999) (codified as amended at 50 U.S.C. §§ 2401-2484 (2017)).

<sup>2</sup>DOE defines a program as an organized set of activities directed toward a common purpose or goal in support of an assigned mission area.

<sup>3</sup>Weapons-usable nuclear materials are highly enriched uranium, uranium-233, and any plutonium containing less than 80 percent of the isotope plutonium-238. Such materials are also often referred to as fissile materials or strategic special nuclear materials.

<sup>4</sup>The International Atomic Energy Agency is an independent international organization based in Vienna, Austria, that is affiliated with the United Nations and has the dual mission of promoting the peaceful uses of nuclear energy and verifying that nuclear material subject to safeguards is not diverted to weapons development efforts or other proscribed purposes. Safeguards allow the agency to independently verify that nuclear material and other specified items are not diverted by, among other things, inspecting all facilities and locations containing nuclear material declared by countries to verify its peaceful use.

EM is responsible for decontaminating and decommissioning nuclear facilities and sites that are contaminated from decades of nuclear weapons production and nuclear energy research. In February 2017, we reported that since its inception in 1989, EM has spent more than \$164 billion on cleanup efforts, which include retrieving, treating, and disposing of nuclear waste.<sup>5</sup>

Both NNSA and EM face critical challenges in fulfilling their missions. Since the end of the Cold War, key portions of the nuclear security enterprise's weapons production infrastructure have become outdated, prompting congressional and executive branch decision makers to call on DOE to develop plans to modernize this infrastructure.<sup>6</sup> Most recently, in January 2017, the President directed the Secretary of Defense to initiate a new *Nuclear Posture Review* to ensure that the U.S. nuclear deterrent is modern, robust, flexible, resilient, ready, and appropriately tailored to deter 21st-century threats and reassure our allies. This review was released in February 2018.<sup>7</sup> Previously, the 2010 *Nuclear Posture Review* had identified long-term modernization goals and requirements, including sustaining a safe, secure, and effective nuclear arsenal through increasing investments to rebuild and modernize the nation's nuclear infrastructure, some of which dates back to the 1940s.<sup>8</sup>

As NNSA works to modernize the nuclear security enterprise, EM must address the legacy of 70 years of nuclear weapons production and energy research by DOE and its predecessor agencies. These activities generated large amounts of radioactive waste, spent nuclear fuel, excess plutonium and uranium, and contaminated soil and groundwater. They also contaminated thousands of sites and facilities, including land, buildings, other structures, and systems and equipment. Various federal laws, agreements with states, and court decisions require the federal

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<sup>5</sup>GAO, *High-Risk Series: Progress on Many High-Risk Areas, While Substantial Efforts Needed on Others*, [GAO-17-317](#) (Washington, D.C.: Feb. 15, 2017).

<sup>6</sup>The end of the Cold War caused a dramatic shift in how the United States approaches nuclear weapons. Instead of designing, testing, and producing new nuclear weapons, U.S. strategy shifted to maintaining the existing nuclear weapons stockpile indefinitely.

<sup>7</sup>Department of Defense, *Nuclear Posture Review* (Washington, D.C.: Feb. 2018). The Nuclear Posture Review establishes the nation's nuclear weapons requirements and policy.

<sup>8</sup>Department of Defense, *Nuclear Posture Review Report* (Washington, D.C.: Apr. 6, 2010).

government to clean up environmental hazards at federal sites and facilities, such as nuclear weapons production facilities. DOE's approach to addressing these environmental liabilities is often influenced by numerous site-specific factors, stakeholder agreements, and legal provisions. For years, we and others have reported on shortcomings in DOE's approach to addressing its environmental responsibilities, including incomplete data on the extent of cleanup needed.

DOE relies primarily on contractors to carry out its programs, and it is the largest civilian contracting agency in the federal government. In fiscal year 2017, it spent approximately 90 percent of its \$32 billion in annual funding on contracts and major capital asset projects.<sup>9</sup> We designated DOE's contract management—which has included both contract administration and project management—as a high-risk area in 1990 because DOE's record of inadequate management and oversight of contractors had left it vulnerable to fraud, waste, abuse, and mismanagement. In our 2017 High Risk List update, we reported that NNSA and EM continued to demonstrate a strong commitment and top leadership support to improve contract and project management—a key criterion for removing agencies and program areas from our High Risk List.<sup>10</sup> However, we also found that DOE still needed to make progress on the other four criteria for removal: organizational capacity, corrective action planning, monitoring effectiveness, and demonstrating progress.

Further, in our 2017 High Risk List update, we added the federal government's environmental liabilities to our High Risk List. DOE is responsible for more than 80 percent of reported federal environmental liabilities.<sup>11</sup> In our 2017 High Risk List update, we reported that because of incomplete information and often inconsistent approaches to making cleanup decisions, DOE does not always approach environmental cleanup using a risk-informed approach to reduce health and safety risks in a cost-effective manner.

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<sup>9</sup>Major capital asset projects are projects estimated to cost \$750 million or more. DOE defines a capital asset project as a project with defined start and end points required in the acquisition of capital assets.

<sup>10</sup>[GAO-17-317](#). GAO's high-risk program identifies government operations with greater vulnerabilities to fraud, waste, abuse, and mismanagement or the need for transformation to address economy, efficiency, or effectiveness challenges.

<sup>11</sup>[GAO-17-317](#).

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My testimony today discusses (1) challenges related to the affordability of NNSA's nuclear weapons modernization plans; (2) challenges in addressing DOE's environmental liabilities; (3) the status of DOE's efforts to improve its management of contracts, projects, and programs; and (4) challenges facing NNSA's nonproliferation program. My statement is based primarily on our work from 18 GAO reports issued from October 2014 through February 2018—including 7 reports issued since I testified on this issue in May 2017 (see the end of this testimony for a list of related reports).<sup>12</sup> Detailed information about the scope and methodology we used to conduct our prior work can be found in each of our issued reports. With information from the *Fiscal Year 2018 Stockpile Stewardship Management Plan* and the *2018 Nuclear Posture Review*, we updated our prior work on the affordability of NNSA's modernization plans. We provided new information to NNSA for review and incorporated one technical comment. The work upon which this testimony is based was conducted 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.

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<sup>12</sup>GAO, *Department of Energy: Continued Actions Needed to Address Management Challenges*, [GAO-17-651T](#) (Washington, D.C.: May 24, 2017).

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## Misalignment between NNSA's Modernization Budget Estimates and Plans Presents Challenges Raised by Affordability Concerns

Based on our prior work, NNSA faces challenges in the face of affordability concerns. In our past reports on NNSA's 25-year plans to modernize the nation's nuclear weapons stockpile and its supporting infrastructure, we have identified concerns regarding the alignment of NNSA's plans with budget estimates as presented in NNSA's annual Stockpile Stewardship and Management plans.<sup>13</sup> For example, in April 2017, we issued our most recent report on the *Fiscal Year 2017 Stockpile Stewardship and Management Plan*, in which we identified two areas of misalignment between NNSA's modernization plans and the estimated budgetary resources needed to carry out those plans, which could result in challenges to NNSA's ability to afford its planned portfolio of modernization programs.<sup>14</sup> First, we found that NNSA's estimates of the funding needed for its modernization plans sometimes exceeded the budgetary projections included in the President's planned near- and long-term modernization budgets. In the near-term (fiscal years 2018 through 2021), we found that NNSA may have to defer certain modernization work beyond that time period to execute its program within the planned budget, which could increase modernization costs and schedule risks. This is a pattern we have previously identified as a "bow wave"—an increase in future years' estimated budget needs that occurs when agencies are undertaking more programs than their resources can support. In the long-term (fiscal years 2022 through 2026), we found that NNSA's modernization program budget estimates sometimes exceeded the projected budgetary resources planned for inclusion in the President's budget, raising additional questions about whether NNSA will be able to afford the scope of its modernization program. Second, we found that the costs of some major modernization programs—such as for nuclear weapon refurbishments—may also increase and further strain future modernization budgets.

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<sup>13</sup>The Stockpile Stewardship and Management Plan is updated annually and is NNSA's formal means of communicating to Congress information on modernization and operations plans and budget estimates over the next 25 years.

<sup>14</sup>GAO, *National Nuclear Security Administration: Action Needed to Address Affordability of Nuclear Modernization Programs*, [GAO-17-341](#) (Washington, D.C.: Apr. 26, 2017).

To help NNSA put forth more credible modernization plans, we recommended in our April 2017 report that the NNSA Administrator include an assessment of the affordability of NNSA's portfolio of modernization programs in future versions of the *Stockpile Stewardship and Management Plan*, such as by presenting options (e.g., potentially deferring the start of or canceling specific modernization programs) that NNSA could consider taking to bring its estimates of modernization funding needs into alignment with potential future budgets. In commenting on our report, NNSA neither agreed nor disagreed with our recommendation.

It does not appear that NNSA has taken steps to address our recommendation or address questions regarding the affordability of its modernization plans. Notably, the *Fiscal Year 2018 Stockpile Stewardship Management Plan* was released in November 2017, but NNSA did not assess the affordability of the plan, and the fiscal year 2018 plan did not include the long-term projections of the President's budget for modernization, which help provide insights on the affordability of the plans. The *Fiscal Year 2018 Stockpile Stewardship Management Plan* stated that no policy decision had been made on the topline budget totals for NNSA's modernization efforts beyond fiscal year 2018. However, the plan indicated that these totals would be refined for the fiscal year 2019 budget in accordance with the National Security Strategy, National Defense Strategy, and the *Nuclear Posture Review*, which were under development at the time of the fiscal year 2018 plan's release.

In February 2018, the Department of Defense released the *Nuclear Posture Review*, which proposed a range of nuclear policy proposals, including initiatives to support NNSA's nuclear weapon infrastructure and workforce, accelerating one warhead replacement program, and developing two new nuclear weapon capabilities, including modifying a small number of existing warheads on submarine launched ballistic missiles to provide a low-yield option and pursuing a nuclear-armed sea-launched cruise missile. NNSA's fiscal year 2019 budget request for the Weapons Activities appropriations account proposes a 19 percent increase for nuclear modernization programs from the fiscal year 2017 enacted budget and states that the budget is consistent with the *Nuclear Posture Review*. However, the budget request notes that the *Nuclear Posture Review's* policy initiatives need to be translated into requirements and that the options for meeting some *Nuclear Posture Review* goals—such as the low-yield submarine launched ballistic missile warhead—have not yet been developed. As a result, it is not clear whether the fiscal year 2019 budget estimates for NNSA's modernization programs are



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aligned with a changing set of modernization requirements. We are currently reviewing NNSA's *Fiscal Year 2018 Stockpile Stewardship and Management Plan*, and we expect to conduct a review of the *Fiscal Year 2019 Stockpile Stewardship and Management Plan* after it is released.<sup>15</sup>

In its November 2014 report, the Augustine-Mies Panel observed that NNSA's Stockpile Stewardship Management Plans, which are intended to communicate long-range plans and cost estimates, have varied from year to year in the costs and schedules for the delivery of several major life extension programs and nuclear facilities.<sup>16</sup> The panel concluded that the lack of a stable, executable plan for modernization is a fundamental weakness for NNSA. As NNSA considers new modernization plans and programs as the 2018 *Nuclear Posture Review's* policy initiatives are translated into requirements and options, aligning its modernization needs with potential future budgets will continue to be important.

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## DOE Annually Spends Billions on Cleanup, but the Cost of Its Environmental Liabilities Continues to Increase

DOE also faces challenges with addressing its environmental liabilities and its cleanup mission. In February 2017, we added the federal government's environmental liabilities to our High Risk List.<sup>17</sup> Specifically, we found that the federal government's environmental liabilities have been growing for the past 20 years and are likely to continue to increase. According to the *Fiscal Year 2017 Financial Report of the United States*

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<sup>15</sup>The National Defense Authorization Act for Fiscal Year 2013 includes a provision that we annually review a joint DOE-DOD report that addresses, among other things, the plan for the nuclear weapons stockpile and its delivery systems.

<sup>16</sup>Mr. Norman R. Augustine and Admiral Richard W. Mies served as the Co-Chairmen of the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise (known as the "Augustine-Mies Panel"). Section 3166 of the National Defense Authorization Act for Fiscal Year 2013 established the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise and tasked the advisory panel with offering a recommendation "with respect to the most appropriate governance structure, mission, and management of the nuclear security enterprise." The panel's November 2014 report summarizes the panel's findings on the current health of the enterprise, examines the root causes of its governance challenges, and offers its recommendations to address the identified problems.

<sup>17</sup>[GAO-17-317](#).

*Government*, DOE's environmental liabilities estimate had increased to \$383.8 billion—which is about 83 percent of the \$464.5 billion of the federal government's total reported environmental liability. Notably, these estimates do not reflect all of the future cleanup responsibilities that DOE may face.<sup>18</sup> In addition, as discussed below, DOE has not consistently taken a risk-informed approach to decision making for environmental cleanup, and DOE may therefore be missing opportunities to reduce costs while also reducing environmental risks more quickly. Our recent work in this area has also identified opportunities where DOE may be able to save tens of billions of dollars.

As we have previously reported, DOE's total reported environmental liabilities have generally increased over time.<sup>19</sup> Since 1989, EM has spent more than \$164 billion to retrieve, treat, and dispose of nuclear and hazardous waste and, as of 2017, it had completed cleanup at 91 of 107 sites across the country (the 91 sites were generally viewed by DOE as the smallest and least contaminated sites to address). Even with billions spent on environmental cleanup, DOE's estimated environmental liability has roughly doubled from \$176 billion in fiscal year 1997 to \$383.8 billion in fiscal year 2017.<sup>20</sup> From 2011 through 2016, EM spent \$35 billion, primarily to treat and dispose of nuclear and hazardous waste and construct capital asset projects to treat the waste (see fig. 1 for EM's annual spending and growing environmental liability). According to documents related to DOE's fiscal year 2016 financial statements, half of DOE's environmental liability resides at two cleanup sites: the Hanford Site in Washington State and the Savannah River Site in South Carolina.

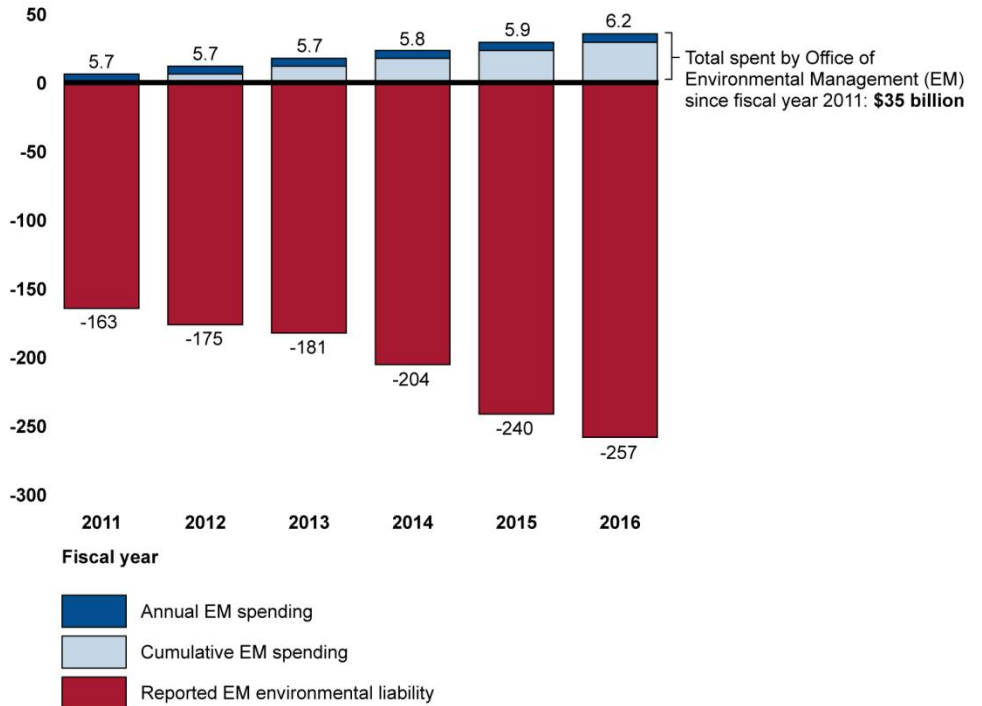
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<sup>18</sup>Federal accounting standards require agencies responsible for cleaning up contamination to estimate future cleanup and waste disposal costs and to report such costs in their annual financial statements as environmental liabilities. Per federal accounting standards, federal agencies' environmental liability estimates are to include probable and reasonably estimable costs of cleanup work.

<sup>19</sup>[GAO-17-317](#).

<sup>20</sup>We did not adjust environmental liability estimates for inflation because information about the amount of the liability applicable to each future fiscal year was not available.

**Figure 1: Department of Energy’s Office of Environmental Management’s Annual Spending and Growing Environmental Liability**  
Dollars (in billions)



Source: GAO analysis of Department of Energy budget data. | GAO-18-438T

**Data Table for Figure 1: Department of Energy’s Office of Environmental Management’s Annual Spending and Growing Environmental Liability**

| Fiscal year | Annual EM spending | Cumulative EM spending | Cumulative annual minus annual | Reported EM environmental liability |
|-------------|--------------------|------------------------|--------------------------------|-------------------------------------|
| 2011        | \$5.7              | 5.7                    | 0                              | -163                                |
| 2012        | \$5.7              | 11.4                   | 5.7                            | -175                                |
| 2013        | \$5.7              | 17.1                   | 11.4                           | -181                                |
| 2014        | \$5.8              | 22.9                   | 17.1                           | -204                                |
| 2015        | \$5.9              | 28.8                   | 22.9                           | -240                                |
| 2016        | \$6.2              | 35                     | 28.8                           | -257                                |

Notes: EM is the organization within the Department of Energy responsible for managing environmental cleanup and is responsible for cleaning up 107 sites across the country. To date, EM has completed cleanup at 91 of these sites. EM spending includes money to treat and dispose of nuclear and hazardous waste and to construct capital asset projects to treat the waste. We did not adjust environmental liability estimates for inflation because information about the amount of the liability applicable to each future fiscal year was not available.

In its fiscal year 2016 financial statement, DOE attributed recent environmental liability increases to (1) inflation adjustments for the current year; (2) improved and updated estimates for the same scope of work, including changes resulting from deferral or acceleration of work; (3) revisions in technical approach or scope for cleanup activities; and (4) regulatory and legal changes. Notably, in recent annual financial reports, DOE has cited other significant causes for increases in its liability. Other causes have included the lack of a disposal path for high-level radioactive waste—because of the termination of the Yucca Mountain repository program—and delays and scope changes for major construction projects at the Hanford and Savannah River sites.

We also reported in February 2017 that DOE’s estimated liability does not include billions in expected costs.<sup>21</sup> According to federal accounting standards, environmental liability estimates should include costs that are probable and reasonably estimable, meaning that costs that cannot yet be reasonably estimated should not be included in total environmental liability.<sup>22</sup> Examples of costs we reported on that DOE could not yet estimate include the following:

- DOE 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 DOE’s fiscal year 2015 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. According to DOE’s financial statement, since DOE is not yet required to establish a plan to clean up the site, the costs for this work are excluded from DOE’s annually reported environmental liability.
- DOE’s reported environmental liability includes an estimate for the cost of a permanent nuclear waste repository, but this estimate is highly uncertain. In 2010, DOE terminated its efforts to license a repository at Yucca Mountain near Las Vegas, Nevada. In 2013, DOE proposed a repository at a different location and in 2015 proposed separate repositories for defense and commercial waste. We reported

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<sup>21</sup>[GAO-17-317](#).

<sup>22</sup>Federal Accounting Standards Advisory Board, *FASAB Handbook of Federal Accounting Standards and Other Pronouncements, as Amended* (Washington, D.C.: June 30, 2016).

in October 2014 that estimated future costs for any repository become more uncertain with each year of delay.<sup>23</sup> We also reported in January 2017 that DOE's cost estimates for its 2015 proposal were uncertain and excluded billions of dollars in estimated costs.<sup>24</sup> In April 2017, we reported that using a comprehensive assessment of the benefits, costs, and schedules to inform DOE's waste disposal plan may show that tens of billions of dollars could be saved if DOE reverted to its original plan to have a single repository for defense and commercial nuclear waste.<sup>25</sup> In June 2017, a bill to renew efforts to open the Yucca Mountain repository was introduced in the House of Representatives.<sup>26</sup> Further, the President's budget requests for fiscal years 2018 and 2019 proposed resuming the license application process for the repository at Yucca Mountain, but Congress has not yet funded these DOE activities.

In addition, according to the DOE Inspector General, DOE may have insufficient controls in place to accurately account for its environmental liabilities. In November 2016, the DOE Inspector General reported a significant deficiency in internal controls related to the reconciliation of environmental liabilities.<sup>27</sup>

Moreover, DOE has not consistently taken a risk-informed decision-making approach to its environmental cleanup mission to more efficiently use resources. As our reports and those by other organizations issued over the last 2 decades have found, DOE's environmental cleanup decisions have not been risk-based, and there have been inconsistencies in the regulatory approaches followed at different sites. As we discuss below, we and others have pointed out that DOE needs to take a

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<sup>23</sup>GAO, *Spent Nuclear Fuel Management: Outreach Needed to Help Gain Public Acceptance for Federal Activities That Address Liability*, [GAO-15-141](#) (Washington, D.C.: Oct. 9, 2014).

<sup>24</sup>GAO, *Nuclear Waste: Benefits and Costs Should Be Better Understood Before DOE Commits to a Separate Repository for Defense Waste*, [GAO-17-174](#) (Washington, D.C.: Jan. 31, 2017).

<sup>25</sup>GAO, *2017 Annual Report: Additional Opportunities to Reduce Fragmentation, Overlap, and Duplication and Achieve Other Financial Benefits*, [GAO-17-491SP](#) (Washington, D.C.: Apr. 26, 2017).

<sup>26</sup>Nuclear Waste Policy Amendments Act of 2017, H.R. 3053, 115th Cong. (2017).

<sup>27</sup>U.S. Department of Energy, Office of the Inspector General, *The Department of Energy's Fiscal Year 2016 Consolidated Financial Statements*, OAI-FS-17-02 (Washington, D.C.: Nov. 15, 2016).

nationwide, risk-based approach to cleaning up these sites, which could reduce costs while also reducing environmental risks more quickly.

- In May 2017, we reported on DOE’s efforts to treat a significant portion of the waste in underground tanks at the Hanford Site.<sup>28</sup> We found that DOE chose different approaches to treat the less radioactive portion of its tank waste—which DOE refers to as “low-activity waste” (LAW)—at the Hanford and Savannah River sites.<sup>29</sup> We found that the best available information indicates that DOE’s estimated costs to grout LAW at the Savannah River Site are substantially lower than its estimated costs to vitrify LAW at Hanford, and DOE may be able to save tens of billions of dollars by reconsidering its waste treatment approach for a portion of the LAW at Hanford. Moreover, according to experts who attended a meeting we convened with the National Academies of Sciences, Engineering, and Medicine, both vitrification and grout could effectively treat Hanford’s LAW. Experts at our meeting also stated that developing updated information on the effectiveness of treating a portion of Hanford’s waste, called supplemental LAW, with other methods, such as grout, may enable DOE to consider waste treatment approaches that would accelerate DOE’s tank waste treatment mission, thereby potentially reducing certain risks and lifecycle treatment costs. We recommended that DOE (1) develop updated information on the performance of treating supplemental LAW with alternate methods, such as grout, before it selects an approach for treating supplemental LAW; and (2) have an independent entity develop updated information on the lifecycle costs of treating Hanford’s supplemental LAW with alternate methods.<sup>30</sup> DOE agreed with both recommendations.<sup>31</sup>

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<sup>28</sup>Our report focused on “low-activity waste,” which is DOE’s term for the portion of tank waste with low levels of radioactivity. DOE estimates that low-activity waste contains less than 10 percent of the radioactivity of the tank waste but more than 90 percent of the tank waste by volume. See 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).

<sup>29</sup>At the Savannah River Site, DOE has grouted about 4 million gallons of LAW since 2007. DOE plans to treat a portion of the Hanford Site’s LAW with vitrification, but it has not yet treated any of Hanford’s LAW and faces significant unresolved technical challenges in doing so. Grout immobilizes waste in a concrete-like mixture. Vitrification immobilizes waste in glass.

<sup>30</sup>We are currently in the process of completing a report on DOE’s Waste Treatment and Immobilization Plant quality assurance program.

- In 2015, a review organized by the Consortium for Risk Evaluation with Stakeholder Participation reported that DOE was not optimally using available resources to reduce risk.<sup>32</sup> According to the report, factors such as inconsistent regulatory approaches and certain requirements in federal facility agreements caused disproportionate resources to be directed at lower-priority risks. The report called for a more systematic effort to assess and rank risks within and among sites, including through headquarters guidance to sites, and to allocate federal taxpayer monies to remedy the highest priority risks through the most efficient means.
- In 2006, the National Research Council reported that the nation's approach to cleaning up nuclear waste—primarily carried out by DOE—was complex, inconsistent, and not systematically risk-based.<sup>33</sup> For example, the National Research Council noted that the current regulatory structure for LAW is based primarily on the waste's origins rather than on its actual radiological risks. The National Research Council concluded that by working with regulators, public authorities, and local citizens to implement risk-informed practices, waste cleanup efforts can be done more cost-effectively. The report also suggested that statutory changes were likely needed.

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<sup>31</sup>The National Defense Authorization Act for Fiscal Year 2017, section 3134, requires the Secretary of Energy to enter into an arrangement with a federally funded research and development center to conduct an analysis of approaches for treating Hanford's supplemental LAW, as well as concurrently enter into an arrangement with the National Academies of Sciences, Engineering, and Medicine to conduct a review of the analysis conducted by the federally funded research and development center. The National Academies is currently reviewing an analysis being carried out by a federally funded research and development center on approaches for treating supplemental LAW at the Hanford Site. Specifically, the National Academies plans to evaluate the technical quality and completeness of the analysis, such as the methods used to conduct risk, cost-benefit, schedule, and regulatory compliance assessments and the results of the assessments. The National Academies is also currently conducting a second assessment of EM's technology development efforts, including technologies and/or alternative approaches that could reduce EM's long-term costs, accelerate schedules, or mitigate risks.

<sup>32</sup>The Consortium for Risk Evaluation with Stakeholder Participation is a multi-university consortium organized in 1995 that provides several types of independent, multi-disciplinary reviews of DOE documents, projects, and reports. Omnibus Risk Review Committee, *A Review of the Use of Risk-Informed Management in the Cleanup Program for Former Defense Nuclear Sites* (August 2015).

<sup>33</sup>National Research Council of the National Academies, *Improving the Regulation and Management of Low-Activity Radioactive Wastes* (Washington, D.C.: National Academies Press, 2006).

Since 1994, we have made at least 30 recommendations related to addressing the federal government's environmental liability to DOE and others and 4 suggestions to Congress to consider changes to the laws governing cleanup activities. Of these, 15 recommendations remain unimplemented. If implemented, these recommendations would improve the completeness and reliability of the estimated costs of future federal cleanup responsibilities and lead to more risk-based management of the cleanup work.<sup>34</sup> We believe these recommendations are as relevant, if not more so, today.

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## DOE Has Taken Steps to Improve Management of Contracts, Projects, and Programs, but Challenges Remain

The Secretary of Energy has taken several important steps that demonstrate DOE's commitment to improving the management of contracts, projects, and programs. However, our recent work indicates that, even with these efforts, NNSA and EM continue to face long-standing challenges in several areas.

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### DOE Has Made Progress in Managing Contracts and Projects

As we noted in our 2017 High Risk List update, DOE has made progress in its contract and project management. DOE continued to meet the criterion for demonstrating a strong commitment and top leadership support for improving project management.<sup>35</sup> The Secretary of Energy issued two memorandums, in December 2014 and June 2015, that lay out a series of changes to policies and procedures to improve project management. These changes were included in DOE's revised project management order, DOE Order 413.3B, issued in May 2016. As noted in the memorandums, some of these changes are in response to

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<sup>34</sup>We have ongoing work examining the consistency of DOE's compliance agreements, looking specifically at the extent to which milestones within select compliance agreements are tailored to the environmental and human health risks that DOE is faced with addressing and the extent to which DOE's cleanup remedies are based on up-to-date assessments of conditions at sites and of DOE's technical capabilities.

<sup>35</sup>[GAO-17-317](#).



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recommendations we made in prior years, such as recommending that projects develop cost estimates and analyses of alternatives according to our best practices.

DOE also made significant efforts to improve its performance in monitoring and independently validating the effectiveness and sustainability of corrective measures and now partially meets our monitoring criterion for removing agencies and program areas from our High Risk List. For example, the Secretary improved the department's senior-level monitoring capability and strengthened the Energy Systems Acquisition Advisory Board by changing it from an ad hoc body to an institutionalized board responsible for reviewing all capital asset projects with a total project cost of \$100 million or more. The Secretary also created the Project Management Risk Committee, which includes senior DOE officials and is chaired by a new departmental position—the Chief Risk Officer. The committee is chartered to assess the risks of projects across DOE and advise DOE senior leaders on cost, schedule, and technical issues for projects.<sup>36</sup>

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## Challenges Persist in Several Areas

We have previously reported that DOE's recent efforts do not address several areas where it continues to have challenges, including (1) acquisition planning for its major contracts, (2) the quality of enterprise-wide cost information available to DOE managers and key stakeholders, (3) program and project management, and (4) major legacy projects.

### Acquisition Planning for Major Contracts

As we have previously reported, during the acquisition planning phase for contracts, DOE makes critical decisions that have significant implications for the cost and overall success of an acquisition. The size and duration

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<sup>36</sup>As we stated in our 2017 High Risk List update, additional time is needed for us to assess how effectively these recent monitoring improvements will validate the sustainability of corrective measures. We have not yet evaluated the operations of the newly created Project Management Risk Committee. In addition, DOE's new oversight and monitoring efforts are not comprehensive, as certain activities within EM are not subject to review by the committee, even though together they cost billions of dollars and last for numerous years. Finally, the effectiveness of DOE's monitoring of its contracts, projects, and programs depends on the availability of reliable enterprise-wide cost information on which to base oversight activities. See [GAO-17-317](#).

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of DOE's management and operating (M&O) contracts<sup>37</sup>—22 M&O contracts with an average potential duration of 17 years, representing almost three-quarters of DOE's spending in fiscal year 2015—underscore the importance of planning for every M&O acquisition. In August 2016, we examined DOE's use of M&O contracts.<sup>38</sup> According to DOE officials we interviewed at that time, one of the primary reasons DOE uses M&O contracts is because they are easier to manage with fewer DOE personnel because they are less frequently competed and have broadly written scopes of work, among other attributes. We found that DOE did not consider acquisition alternatives beyond continuing its long-standing M&O contract approach for 16 of its 22 M&O contracts. We concluded that without considering broader alternatives in the acquisition planning phase, DOE cannot ensure that it is selecting the most effective scope and form of contract, raising risks for both contract cost and performance. We recommended in our August 2016 report that DOE establish a process to analyze and apply its experience with contracting alternatives. DOE generally concurred with our recommendation and in November 2016 issued updated guidance that acquisition planning documents are to contain a thorough discussion of alternatives beyond simply extending or competing M&O contracts.<sup>39</sup>

### Quality of Enterprise-Wide Cost Information

We have previously reported that the effectiveness of DOE's monitoring of its contracts, projects, and programs depends on the availability of reliable enterprise-wide cost information on which to base oversight activities. For example, reliable enterprise-wide cost information is needed to identify the cost of activities, ensure the validity of cost estimates, and provide information to Congress to make budgetary decisions. However, we have found that meaningful cost analyses across

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<sup>37</sup>M&O contracts are agreements under which the government contracts for the operation, maintenance, or support, on its behalf, of a government-owned or government-controlled research, development, special production, or testing establishment wholly or principally devoted to one or more of the major programs of the contracting federal agency. 48 C.F.R. § 17.601 (2018).

<sup>38</sup>GAO, *Department of Energy: Actions Needed to Strengthen Acquisition Planning for Management and Operating Contracts*, [GAO-16-529](#) (Washington, D.C.: Aug. 9, 2016).

<sup>39</sup>We currently have four ongoing reviews related to contract management, including (1) performance management of DOE's management and operating contracts, (2) DOE and NNSA's subcontractor management, (3) NNSA's contract document management, and (4) NNSA's support service contracts.

programs, contractors, and sites are not usually possible because NNSA's contractors use different methods of accounting for and tracking costs. NNSA developed a plan to improve and integrate its cost reporting structures; however, we found in January 2017 that this plan did not provide a useful road map for guiding NNSA's efforts.<sup>40</sup> For example, we found that NNSA did not define strategies and identify resources needed to achieve its goals, which is a leading practice for strategic planning. NNSA's plan contained few details on the elements it must include, such as its feasibility assessment, estimated costs, expected results, and an implementation timeline. We concluded that until a plan is in place that incorporates leading strategic planning practices, NNSA cannot be assured that its efforts will result in a cost collection tool that produces reliable enterprise-wide cost information that satisfies the information needs of Congress and program managers. We recommended that NNSA develop a plan for producing cost information that fully incorporates leading planning practices. NNSA agreed with our recommendation. We are monitoring implementation of this recommendation.<sup>41</sup>

In addition, as we have previously noted, DOE needs quality data to manage its risk of fraud. The Fraud Reduction and Data Analytics Act of 2015 establishes requirements aimed at improving federal agencies' controls and procedures for assessing and mitigating fraud risks through the use of data analytics.<sup>42</sup> In a March 2017 report, however, we found that because DOE does not require its contractors to maintain sufficiently detailed transaction-level cost data that are reconcilable with amounts charged to DOE, it is not well positioned to employ data analytics as a fraud detection tool.<sup>43</sup> We found that the data were not suitable either because they were not for a complete universe of transactions that was reconcilable with amounts billed to DOE or because they were not

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<sup>40</sup>GAO, *National Nuclear Security Administration: A Plan Incorporating Leading Practices Is Needed to Guide Cost Reporting Improvement Effort*, [GAO-17-141](#) (Washington, D.C.: Jan. 19, 2017).

<sup>41</sup>Senate Report 115-125, accompanying S. 1519, the National Defense Authorization Act for 2018, includes a provision for us to examine NNSA's financial integration efforts, and we have initiated this work.

<sup>42</sup>Data analytics enable an organization to analyze transactional data to obtain insights into the operating effectiveness of internal controls and to identify improper cost charges, potential indicators of fraud, or actual fraudulent payments or activities.

<sup>43</sup>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).

sufficiently detailed to determine the nature of costs charged to DOE. We concluded that without requiring contractors to maintain such data, DOE will not be well positioned to meet the requirements of the Fraud Reduction and Data Analytics Act of 2015 and manage its risk of fraud and other improper payments. We recommended that DOE require contractors to maintain sufficiently detailed transaction-level cost data that are reconcilable with amounts charged to the government.

DOE did not concur with our recommendation. According to DOE, the recommendation establishes agency-specific requirements for DOE contractors that are more prescriptive than current federal requirements, and its M&O contractors, not DOE, are responsible for performing data analytics and determining what data are needed to do so. DOE's response to our recommendation is concerning because it demonstrates that DOE does not fully appreciate its responsibility for overseeing contractor costs. We believe that the use of data-analytic techniques by DOE employees could help mitigate some of the challenges that limit the effectiveness of DOE's approach for overseeing M&O contractor costs. However, effectively applying data analytics depends on the availability of complete and sufficiently detailed contractor data. Therefore, by implementing our recommendation, DOE could take the important steps necessary to require that contractors maintain sufficiently detailed transaction-level cost data that are reconcilable with amounts charged to the government.

### Program and Project Management

Although, as mentioned previously, DOE has taken some steps to improve program and project management, our recent work has shown that DOE continues to face several challenges in these areas, including the following:

- In February 2018,<sup>44</sup> we found that NNSA's preliminary plan for analyzing options to supply unobligated low-enriched uranium (LEU) for various missions, including certain national security needs, is inconsistent with DOE directives for program and project management that state that mission need should be independent of and not defined

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<sup>44</sup>GAO, *Nuclear Weapons: NNSA Should Clarify Long-Term Uranium Enrichment Mission Needs and Improve Technology Cost Estimates*, [GAO-18-126](#) (Washington, D.C.: Feb. 16, 2018).

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by a particular solution.<sup>45</sup> For example, NNSA's analysis of alternatives showed preference toward a particular solution—building a new uranium enrichment capability—and the agency has not included other technology options for analysis. Moreover, NNSA has prepared preliminary cost estimates for two uranium enrichment technology options—large and small centrifuges—that the agency considers to be the most feasible. However, these estimates are limited in scope and do not fully meet best practices for reliable cost estimates. We recommended that NNSA revise its mission need statement and adjust the range of options it considers in the analysis of alternatives process and that NNSA ensure its cost estimates are consistent with best practices. NNSA neither agreed nor disagreed with our recommendations and stated that it will take future actions consistent with these recommendations.

- In a January 2018 report, we found management challenges associated with NNSA's life extension programs (LEP).<sup>46</sup> For example, we found that NNSA had begun implementing requirements for using earned value management (EVM)<sup>47</sup>—a tool used across industry and government for conducting cost and schedule performance analysis—in three LEPs, but it had not adopted a key best practice that could help the agency better manage risk for LEPs. Specifically, we found that NNSA does not require an independent team to validate the EVM systems used by NNSA's contractors for LEPs against the national EVM standard. We concluded that without requiring validation of EVM systems, NNSA may not have assurance that its LEPs are obtaining reliable EVM data for managing their programs and reporting their status. We recommended that NNSA require an independent team to validate contractor EVM systems used for LEPs. NNSA agreed with our recommendation but stated that it already relies on a DOE project management office to

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<sup>45</sup>NNSA has several mission needs for enriched uranium, including providing LEU to fuel a nuclear reactor that produces tritium—a key isotope used in nuclear weapons. NNSA has a pressing defense need for unobligated LEU to fuel this reactor, meaning the uranium, technology and equipment used to produce the LEU, must be U.S. in origin. Because the United States lost its only source of unobligated LEU production in 2013, the supply is finite.

<sup>46</sup>GAO, *Nuclear Weapons: NNSA Should Adopt Additional Best Practices to Better Manage Risk for Life Extension Programs*, [GAO-18-129](#) (Washington, D.C.: Jan. 30, 2018).

<sup>47</sup>EVM measures the value of work accomplished in a given period and compares it with the planned value of work scheduled for that period and the actual cost of work accomplished.

independently validate contractor EVM systems. However, as we reported, DOE has not independently validated contractor EVM systems at six of the seven contractor sites that are responsible for conducting LEP activities.

- In November 2017, we found that NNSA had established program management requirements, such as developing cost and schedule estimates for its uranium, plutonium, tritium, and lithium programs and had established managers' roles and responsibilities for these programs.<sup>48</sup> However, officials told us that the programs had not fully met these requirements primarily because of staff shortages. We recommended that NNSA determine the critical staff skills it will need for these programs and use that information to address staffing shortages. NNSA agreed with our recommendation.
- In our September 2017 report on NNSA's Plutonium Disposition Program, we found that DOE does not have sufficient space at the Waste Isolation Pilot Plant (WIPP) to dispose of all defense transuranic waste.<sup>49</sup> Moreover, DOE officials recognize that expansion of WIPP's disposal space may be necessary in the future, but they had not analyzed or planned for the facility's expansion because their focus has been on resuming operations at WIPP, which had been suspended in 2014 after two separate accidents at the facility. Without developing a plan for WIPP that includes an integrated schedule for completing a regulatory approval process and constructing new space before WIPP's existing space is full, DOE does not have reasonable assurance that it will be able to expand the repository in a timely manner. We made four recommendations, including that DOE develop a plan for expanding WIPP's disposal space that includes a schedule for completing the expansion before existing space is full. DOE concurred with our recommendations.
- In September 2017, we found that DOE's program to re-establish the production of a plutonium isotope used to provide electrical power for National Aeronautics and Space Administration missions had made progress but faced a number of challenges to meeting production

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<sup>48</sup>GAO, *Nuclear Weapons: NNSA Needs to Determine Critical Skills and Competencies for Its Strategic Materials Programs*, [GAO-18-99](#) (Washington, D.C.: Nov. 14, 2017).

<sup>49</sup>GAO, *Plutonium Disposition: Proposed Dilute and Dispose Approach Highlights Need for More Work at the Waste Isolation Pilot Plant*, [GAO-17-390](#) (Washington, D.C.: Sept. 5, 2017). WIPP is an underground repository for the disposal of transuranic nuclear waste, which is waste contaminated by nuclear elements heavier than uranium, such as diluted plutonium.

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goals.<sup>50</sup> Specifically, we found that DOE had not developed an implementation plan that identifies milestones and interim steps that can be used to demonstrate progress in meeting production goals. Our prior work has shown that plans that include milestones and interim steps help an agency to set priorities, use resources efficiently, and monitor progress in achieving agency goals. In our September 2017 report, we made three recommendations, including that DOE develop such a plan for its plutonium isotope production approach and that DOE assess the long-term effects of known production challenges and communicate these effects to the National Aeronautics and Space Administration. DOE concurred with our recommendations.

- In a September 2017 report on NNSA's uranium program, we found that NNSA had not developed a complete scope of work, a life-cycle cost estimate, or an integrated master schedule for the overall uranium program—all of which are considered leading practices—and that it had no time frame for doing so.<sup>51</sup> We reported that NNSA plans to do so for the specific Uranium Processing Facility project,<sup>52</sup> as required by DOE's project management order. However, NNSA had not developed a complete scope of work for key program requirements, including important and potentially costly repairs and upgrades to existing buildings in which NNSA intends to house some uranium processing capabilities. We concluded that because NNSA had not developed a complete scope of work for the overall uranium program, it did not have the basis to develop a life-cycle cost estimate

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<sup>50</sup>GAO, *Space Exploration: DOE Could Improve Planning and Communication Related to Plutonium-238 and Radioisotope Power Systems Production Challenges*, [GAO-17-673](#) (Washington, D.C.: Sept. 8, 2017).

<sup>51</sup>GAO, *Modernizing the Nuclear Security Enterprise: A Complete Scope of Work Is Needed to Develop Timely Cost and Schedule Information for the Uranium Program*, [GAO-17-577](#) (Washington, D.C.: Sept. 8, 2017). The scope of work reflects all activities as defined in the program's work breakdown structure, which defines in detail the work necessary to accomplish a project's objectives. A life-cycle cost estimate provides an exhaustive and structured accounting of all resources and associated cost elements required to develop, produce, deploy, and sustain a particular program. An integrated master schedule is a document that integrates the planned work, the resources necessary to accomplish that work, and the associated budget for a program, as called for in best practices.

<sup>52</sup>In 2004, NNSA initiated plans for the construction of a new Uranium Processing Facility, a facility that would consolidate some of its existing uranium processing facilities—which are located at the Y-12 National Security Complex in Oak Ridge, Tennessee, were built in the 1940s and 1950s, and are outdated and deteriorating—into a single, more modern facility.

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or an integrated master schedule for the entire uranium program, which runs counter to best practices identified in GAO's cost estimating and scheduling guides. We recommended that NNSA set a time frame for completing the scope of work, life-cycle cost estimate, and integrated master schedule for the overall uranium program. NNSA generally agreed with this recommendation and stated that it has ongoing efforts to complete these actions.<sup>53</sup>

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## NNSA's Nonproliferation Program Faces Performance Measurement and Program Management Challenges

Our previous work has found that NNSA also faces challenges implementing its nonproliferation programs under its Office of Defense Nuclear Nonproliferation (DNN), which implements nuclear nonproliferation programs worldwide. In recently completed reviews of DNN programs, we have identified several challenges NNSA faces in how it measures performance and conducts program management of these efforts. Specifically,

- In September 2017, we found that four DNN programs did not have schedule and cost estimates covering their planned life cycles and did not measure performance against schedule and cost baselines as is recommended by program management leading practices.<sup>54</sup> NNSA officials explained that this is due in part to high levels of uncertainty in planning the selected programs' work scope or schedules, particularly in working with partner countries. However, we noted that uncertainty should not prevent these programs from establishing more complete or longer-term estimates to account for the time and resources they need to achieve their goals and track their

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<sup>53</sup>Senate Report 112-26 accompanying S. 1253, a bill for the National Defense Authorization Act for Fiscal Year 2012, includes a provision for us to review independent cost estimates of the Chemical and Metallurgical Research Replacement Nuclear Facility and the Uranium Processing Facility conducted by NNSA to ensure the accuracy of the cost estimates and that all cost savings measures have been considered. According to DOE's February 2018 monthly project portfolio status report, NNSA plans to release its final independent cost estimate report in late February 2018.

<sup>54</sup>GAO, *Nuclear Nonproliferation: NNSA Needs to Improve Its Program Management Policy and Practices*, [GAO-17-773](#) (Washington, D.C.: Sept. 28, 2017). We reviewed four selected DNN programs: Nuclear Material Removal, Highly Enriched Uranium Reactor Conversion, Radiological Security, and International Nuclear Security.



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performance. In addition, we observed that DOE's cost estimating guide, which applies to NNSA programs, describes approaches for programs to incorporate risk and uncertainty in estimates. But we found that DNN's program management policy, which was updated in February 2017, did not outline requirements for programs to establish life-cycle estimates or measure performance against schedule and cost baselines. We recommended that DNN revise its program management policy to require DNN programs to follow life-cycle program management leading practices, such as requiring life-cycle estimates and measuring against baselines. Updating the DNN policy to include requirements and guidance on cost estimating and tracking performance against schedule and cost baselines could help ensure that NNSA managers and Congress have better information on (1) how much DNN programs may cost, (2) the time they may need to achieve their goals, and (3) how effectively they are being executed compared to plans. Although NNSA neither agreed nor disagreed with the recommendation, it indicated that it plans to take action to revise its policy to address the recommendation.

- In February 2017, we found that NNSA was unable to demonstrate the full results of its research and development technology for preventing nuclear proliferation.<sup>55</sup> Specifically, we reported that DNN's Research and Development program did not consistently track and document projects that result in technologies being transitioned or deployed. Furthermore, we found that DNN's Research and Development project performance was difficult to interpret because the program's performance measures did not define criteria or provide context justifying how the program determined that it met its targets. We concluded that this, in turn, could hinder users' ability to determine the program's progress. NNSA officials said that final project reports did not document their assessment of performance against baseline targets and that there was no common template for final project reports. We noted that documenting assessments that compare final project performance results against baseline targets for scope of work and completion date could enhance NNSA's ability to manage its programs in accordance with these standards. We also concluded that more consistently tracking and documenting the transitioned and

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<sup>55</sup>GAO, *Nuclear Nonproliferation: Better Information Needed on Results of National Nuclear Security Administration's Research and Technology Development Projects*, [GAO-17-210](#) (Washington, D.C.: Feb. 3, 2017). A transitioned technology is provided to users outside of the project team for further development or deployment. A deployed technology is one that is being actively used in the field by a federal agency or foreign partner.

deployed technologies that result from DNN's projects could facilitate knowledge sharing within DNN. This would also provide a means by which to present valuable information to Congress and other decision makers about the programs' results and overall value. We recommended that NNSA consistently track and document results of DNN Research and Development projects and document assessments of final project results against baseline performance targets. NNSA agreed to take actions in response to both recommendations.

- In June 2016, we found that the Nuclear Smuggling Detection and Deterrence (NSDD) program had developed a program plan but that the plan did not include measurable goals and performance measures aligned to the goals.<sup>56</sup> As a result, we concluded that the NSDD program may not be able to determine when it has fully accomplished its mission, and it risked continuing to deploy equipment past the point of diminishing returns. We recommended that NSDD develop a more detailed program plan that articulates when and how it will achieve its goals, including completing key activities, such as the deployment of radiation detection equipment to partner countries. NNSA agreed with this recommendation, and in February 2017, NSDD issued a revised program plan. As a result of NNSA's implementation of this recommendation, Congress and NNSA decision makers will have additional information to assess the status, benefits, and performance of the NSDD program.

Chairman Fischer, Ranking Member Donnelly, and Members of the Subcommittee, this completes my prepared statement. I would be pleased to respond to any questions you may have at this time.

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## GAO Contact and Staff Acknowledgements

If you or your staff members have any questions about this testimony, please contact me at (202) 512-3841 or [trimbled@gao.gov](mailto:trimbled@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. GAO staff who made key contributions to this testimony are Jonathan Gill, Assistant Director; Antoinette Capaccio; Ricki Gaber; William Hoehn; and Amanda Kolling.

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<sup>56</sup>GAO, *Combating Nuclear Smuggling: NNSA's Detection and Deterrence Program Is Addressing Challenges but Should Improve Its Program Plan*, [GAO-16-460](#) (Washington, D.C.: June 17, 2016).

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## Related GAO Products

The following is a selection of GAO's recent work assessing the Department of Energy's management efforts, including at the National Nuclear Security Administration and at the Office of Environmental Management:

*Nuclear Weapons: NNSA Should Clarify Long-Term Uranium Enrichment Mission Needs and Improve Technology Cost Estimates.* [GAO-18-126](#). Washington, D.C.: February 16, 2018.

*Nuclear Weapons: NNSA Should Adopt Additional Best Practices to Better Manage Risk for Life Extension Programs.* [GAO-18-129](#). Washington, D.C.: January 30, 2018.

*Nuclear Weapons: NNSA Needs to Determine Critical Skills and Competencies for Its Strategic Materials Programs.* [GAO-18-99](#). Washington, D.C.: November 14, 2017.

*Nuclear Nonproliferation: NNSA Needs to Improve Its Program Management Policy and Practices.* [GAO-17-773](#). Washington, D.C.: September 28, 2017.

*Modernizing the Nuclear Security Enterprise: A Complete Scope of Work Is Needed to Develop Timely Cost and Schedule Information for the Uranium Program.* [GAO-17-577](#). Washington, D.C.: September 8, 2017.

*Space Exploration: DOE Could Improve Planning and Communication Related to Plutonium-238 and Radioisotope Power Systems Production Challenges.* [GAO-17-673](#). Washington, D.C.: September 8, 2017.

*Plutonium Disposition: Proposed Dilute and Dispose Approach Highlights Need for More Work at the Waste Isolation Pilot Plant,* [GAO-17-390](#). Washington, D.C.: September 5, 2017.

*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.

*2017 Annual Report: Additional Opportunities to Reduce Fragmentation, Overlap, and Duplication and Achieve Other Financial Benefits.* [GAO-17-491SP](#). Washington, D.C.: April 26, 2017.

*National Nuclear Security Administration: Action Needed to Address Affordability of Nuclear Modernization Programs.* [GAO-17-341](#). Washington, D.C.: April 26, 2017.

*Department of Energy: Use of Leading Practices Could Help Manage the Risk of Fraud and Other Improper Payments.* [GAO-17-235](#). Washington, D.C.: March 30, 2017.

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

*Nuclear Nonproliferation: Better Information Needed on Results of National Nuclear Security Administration's Research and Technology Development Projects.* [GAO-17-210](#). Washington, D.C.: February 3, 2017.

*Nuclear Waste: Benefits and Costs Should Be Better Understood Before DOE Commits to a Separate Repository for Defense Waste.* [GAO-17-174](#). Washington, D.C.: January 31, 2017.

*National Nuclear Security Administration: A Plan Incorporating Leading Practices Is Needed to Guide Cost Reporting Improvement Effort.* [GAO-17-141](#). Washington, D.C.: January 19, 2017.

*Department of Energy: Actions Needed to Strengthen Acquisition Planning for Management and Operating Contracts.* [GAO-16-529](#). Washington, D.C.: August 9, 2016.

*Combating Nuclear Smuggling: NNSA's Detection and Deterrence Program Is Addressing Challenges but Should Improve Its Program Plan.* [GAO-16-460](#). Washington, D.C.: June 17, 2016.

*Spent Nuclear Fuel Management: Outreach Needed to Help Gain Public Acceptance for Federal Activities That Address Liability.* [GAO-15-141](#). Washington, D.C.: October 9, 2014.

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