



Testimony

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NATIONAL NUCLEAR SECURITY ADMINISTRATION

Observations on Management Challenges and Steps Taken to Address Them

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

Accessible Version

GAO Highlights

Highlights of [GAO-15-532T](#), a testimony before the Subcommittee on Strategic Forces, Committee on Armed Services, U. S. Senate

Why GAO Did This Study

NNSA is responsible for managing the nation's nuclear security missions, which include ensuring a safe, secure, and reliable nuclear deterrent; achieving reductions in the nuclear weapons stockpile; and supporting nuclear nonproliferation efforts (known as DNN programs). NNSA executes its missions at eight sites that make up the nuclear security enterprise.

GAO's reports have highlighted challenges NNSA has faced for several years. These challenges contribute to GAO's continuing inclusion of NNSA's management of contracts and major projects on GAO's list of agencies and program areas that are high risk due to their vulnerabilities to fraud, waste, abuse, and mismanagement, or are in most need of transformation. A recent series of commissions on NNSA's management, governance, and structure—such as the Augustine-Mies Panel—highlights the importance of NNSA's mission.

This testimony is based on eight prior GAO products issued from December 2010 through February 2015 and discusses NNSA's (1) plans to modernize the nuclear security enterprise, (2) understanding of the causes of contract and project management problems and the extent to which it has implemented GAO's related recommendations, (3) DNN programs' status in securing vulnerable nuclear materials, and (4) challenges in its governance of the nuclear security enterprise.

GAO is not making new recommendations in this statement.

View [GAO-15-532T](#). For more information, contact David C. Trimble at (202) 512-3841 or trimbled@gao.gov.

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NATIONAL NUCLEAR SECURITY ADMINISTRATION

Observations on Management Challenges and Steps Taken to Address Them

What GAO Found

The National Nuclear Security Administration (NNSA) faces challenges implementing its plans to modernize the nuclear security enterprise. In its November 2014 report, the Augustine-Mies Panel observed that NNSA's Stockpile Stewardship Management Plan, which is intended to communicate long-range plans and cost estimates, has varied from year to year in the costs and schedules for the delivery of several major life extension programs and nuclear facilities. The panel concluded that the lack of a stable, executable plan for modernization is a fundamental weakness for NNSA. Similarly, GAO found in 2013 that the Stockpile Stewardship Management Plan has shown changes in long-term budget and schedule estimates from year to year—for example, NNSA's stockpile budget estimates for 2014 through 2031 increased by about \$27 billion compared with the 2012 stockpile budget estimates for the same time period. GAO recommended that NNSA include in future plans a range of estimates that reflects projects that the agency knows are needed. NNSA agreed and appears to be implementing this recommendation.

As noted in GAO's 2015 high risk report, NNSA has a long history of identifying corrective actions and declaring them successfully resolved, only to follow with the identification of additional actions. As GAO has reported, this suggests that NNSA does not have a full understanding of the root causes of its contract and project management challenges. In its prior reports, GAO has made numerous recommendations to correct NNSA's project management problems. While NNSA has initiated some actions and made some progress, the agency has not taken action on many of these recommendations, including improving cost estimating capabilities and employing a rigorous analysis of alternatives to ensure that key capital asset and program decisions will both meet mission needs and be cost-effective. This suggests a lack of urgency or commitment on DOE's part to address identified challenges.

NNSA's Defense Nuclear Nonproliferation (DNN) programs have made progress securing vulnerable nuclear materials, but significant challenges remain. For example, GAO found in 2011 that NNSA faced challenges accounting for and ensuring the security of U.S. weapons-usable nuclear materials. GAO recommended that NNSA improve its process for securing these materials. Although NNSA disagreed, it has since taken some steps to prioritize its efforts. In addition, prior GAO work has raised concerns about the effectiveness of DNN program management and implementation, particularly with regard to execution of its plutonium disposition program, performance measures, and sustainability.

NNSA faces challenges in its governance of the nuclear security enterprise. The Augustine-Mies Panel highlighted such challenges in its report. The report addresses issues and concerns that GAO has also previously described in its work. For example, consistent with GAO's 2015 update to its high risk list, the Panel noted that NNSA major projects have been a continuing source of program schedule delays and cost overruns and that, as a result, NNSA needs to strengthen its cost estimating capabilities. The report also recommended that NNSA leadership employ a rigorous analysis of alternatives early in the decision process as the basis for assessing and validating program requirements, which is consistent with past GAO recommendations.

Chairman Sessions, 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 the National Nuclear Security Administration (NNSA) is facing.¹ NNSA is responsible for managing the nation's nuclear security missions. These 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—are largely executed at eight sites that comprise the nuclear security enterprise. NNSA sites include laboratories, production plants, and a test site, which are owned by the U.S. government but managed and operated by contractors. According to NNSA documents, NNSA's funding has increased steadily from \$9.6 billion in fiscal year 2009 to \$11.4 billion in fiscal year 2015—approximately 42 percent of the Department of Energy's (DOE) total fiscal year 2015 budget—to support its mission and related activities.²

Since the end of the cold war, key portions of the nuclear security enterprise's weapons production infrastructure have aged and become outdated, prompting congressional and executive branch decision makers to call on DOE to develop plans to modernize the infrastructure.³ The 2010 *Nuclear Posture Review* (NPR) 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, among other things.⁴ Building on the

¹NNSA is a separately organized agency within the Department of Energy. It was created under Title 32 of the National Defense Authorization Act for Fiscal Year 2000, Pub. L. No. 106-65, § 3201 et seq.

²NNSA's budget did not increase in fiscal year 2013 compared with the previous year due to sequestration, which decreased NNSA's fiscal year 2013 budget by \$917 million.

³The end of the cold war caused a dramatic shift in how the nation maintains nuclear weapons. Instead of designing, testing, and producing new nuclear weapons, the strategy shifted to maintaining the existing nuclear weapons stockpile indefinitely. Life extension programs extend, through refurbishment, the operational lives of weapons in the nuclear stockpile by 20 to 30 years and certify these weapons' military performance requirements without underground nuclear testing.

⁴Department of Defense, *Nuclear Posture Review Report* (Washington, D.C.: Apr. 6, 2010). The 2010 NPR establishes the nation's nuclear weapons requirements and policy. The president is required to submit a national security strategy annually to the Congress. 50 U.S.C. § 3043 (2015).

2010 NPR, the 2015 National Security Strategy states that the United States must invest the resources necessary to maintain a safe, secure, and effective nuclear deterrent as long as nuclear weapons exist. To meet these goals, NNSA refurbishes weapons in the stockpile to extend their operational lives; replaces or renovates research, development, and production facilities that date back to the 1940s and 1950s; and performs simulations and laboratory experiments to ensure existing nuclear weapons remain safe and reliable. In fiscal year 2011, the administration pledged over \$88 billion to NNSA over 10 years for operations and modernization, including the refurbishment of weapons in the current stockpile and construction of facilities to support these refurbishments.

Building from the policy priorities communicated in the *Nuclear Posture Review*, NNSA's *Stockpile Stewardship and Management Plan (SSMP)*, which is updated annually, provides information on modernization and operations plans and budget estimates over the next 25 years. The SSMP is NNSA's formal means for communicating to the Congress the status of certain activities and its long-range plans and budget estimates for sustaining the stockpile and modernizing the nuclear security enterprise. The SSMP also discusses the current and projected composition and condition of the nuclear weapons stockpile.

In addition to its defense programs, NNSA implements a range of nonproliferation programs under its Office of Defense Nuclear Nonproliferation (DNN). These programs include efforts to secure, consolidate, and dispose of weapons-usable nuclear materials and radiological sources;⁵ reduce the risks of nuclear smuggling; enhance international export controls and International Atomic Energy Agency (IAEA) nuclear safeguards; and support research and development of new nonproliferation technologies.⁶

⁵Weapons-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.

⁶IAEA 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 IAEA to independently verify that nuclear material and other specified items are not diverted from peaceful nuclear uses by, among other things, inspecting all facilities and locations containing nuclear material declared by countries to verify its peaceful use.

Our past testimonies in September 2012,⁷ March 2013,⁸ and July 2013,⁹ as well as reports we have issued over the past several years, have highlighted various challenges that NNSA faces in carrying out its mission-related responsibilities.¹⁰ These challenges contribute to our continuing inclusion of NNSA's management of contracts and major projects on our list of agencies and program areas that are at high risk due to their vulnerabilities to fraud, waste, abuse, and mismanagement, or are most in need of transformation. NNSA continues to demonstrate leadership commitment to address these challenges—a key criterion for removal from our high risk list. However, as we reported in our most recent update to the high risk list earlier this year, the agency has not made progress on the other four criteria for removal: organizational capacity, corrective action planning, monitoring effectiveness, and demonstrating progress.¹¹

A recent series of external commissions and reports on NNSA's management and structure also speaks to the importance of NNSA's mission and seriousness of these continuing challenges.¹² Notably, the Fiscal Year 2013 National Defense Authorization Act created the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise (Augustine-Mies Panel) to examine options and make recommendations for revising the governance structure, mission, and

⁷GAO, *Modernizing the Nuclear Security Enterprise: Observations on the National Nuclear Security Administration's Oversight of Safety, Security, and Project Management*, [GAO-12-912T](#) (Washington, D.C.: Sept. 12, 2012).

⁸GAO, *Modernizing the Nuclear Security Enterprise: Observations on DOE's and NNSA's Efforts to Enhance Oversight of Security, Safety, and Project and Contract Management*, [GAO-13-482T](#) (Washington, D.C.: Mar. 13, 2013).

⁹GAO, *Department of Energy: Observations on DOE's Management Challenges and Steps Taken to Address Them*, [GAO-13-767T](#) (Washington, D.C.: July 24, 2013).

¹⁰A list of recent GAO products assessing the Department of Energy's and NNSA's management challenges is included at the end of this statement.

¹¹GAO, *High Risk Series: An Update*, [GAO-15-290](#) (Washington, D.C.: Feb. 11, 2015).

¹²Recent commissions include the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise; National Research Council (NRC) Committee on Assessment of the Governance Structure of the NNSA National Security Laboratories; Commission to Review the Effectiveness of the National Energy Laboratories; and Secretary of Energy Advisory Board National Laboratory Task Force.

management of the nuclear security enterprise.¹³ This panel issued a report in November 2014.

My testimony today discusses (1) NNSA's plans to modernize the DOE's nuclear security enterprise, (2) NNSA's understanding of the causes of its contract and project management problems, and the extent to which it has implemented our related recommendations, (3) NNSA's DNN progress in securing vulnerable nuclear material and the remaining challenges, and (4) issues that NNSA faces in governance of the nuclear security enterprise. It summarizes key findings from eight reports issued from December 2010 to February 2015. Detailed information about the scope and methodology used to conduct this work can be found in each of our issued reports. The work upon which this statement is based was conducted in accordance with generally accepted government auditing standards.

NNSA Faces Challenges Implementing Its Plans to Modernize the Nuclear Security Enterprise

NNSA manages a complex, decades-long effort to modernize the nuclear security enterprise. In its recent report, the Augustine-Mies Panel observed that NNSA's SSMP, which is intended to communicate long-range plans and cost estimates, has varied from year to year in the costs and schedules for the delivery of several major life extension programs (LEP) and nuclear facilities, and the Panel concluded that the lack of a stable, executable plan for modernization is a fundamental weakness for NNSA. Our 2013 report similarly found that NNSA's SSMP has shown changes in plans and long-term budget estimates from year to year and that some assumptions on future spending estimates may not be realistic. For example, in 2013 we found that:

- The planned schedules for key weapons LEPs had changed. For example, key dates for the W78/88 LEP were pushed several years into the future. Specifically, this program shifted from a 2021 first-

¹³Mr. 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. Section 3166 of the Fiscal Year 2013 National Defense Authorization Act establishes the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise and tasks the advisory panel to offer recommendations "...with respect to the most appropriate governance structure, mission, and management of the nuclear security enterprise." The panel's 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.

production-unit and 2031 completion time frame in the fiscal year 2012 SSMP to a 2025 first-production-unit and 2036 completion time frame in the fiscal year 2014 SSMP.¹⁴ We have ongoing work looking at the fiscal year 2015 SSMP.

- NNSA's long-term budget estimates for the nuclear security enterprise have continued to change from year to year.¹⁵ For example, we found that NNSA's stockpile budget estimates from 2014 through 2031 increased by about \$27 billion compared with the 2012 stockpile budget estimates for the same time period.¹⁶ We noted that some of these changes were due to decisions made by the Nuclear Weapons Council.¹⁷ For example, according to the 2014 SSMP, the Nuclear Weapons Council directed changes to the planned schedules for some of the LEPs to accommodate the number and scope of all LEPs, which contributed to increases in the stockpile budget estimates.¹⁸

¹⁴The "first production unit" is the first complete warhead from a production line certified for deployment.

¹⁵GAO, *Modernizing the Nuclear Security Enterprise: NNSA's Budget Estimates Do Not Fully Align with Plans*, [GAO-14-45](#) (Washington, D.C.: Dec. 11, 2013). The National Defense Authorization Act for Fiscal Year 2011 mandated that GAO study and report annually on whether NNSA's nuclear security budget materials provide for funding that is sufficient to modernize and refurbish the nuclear security enterprise as well as recapitalize its infrastructure. Ike Skelton National Defense Authorization Act for Fiscal Year 2011, Pub. L. No. 111-383, § 3113, 124 Stat. 4137, 4509, *amended by* National Defense Authorization Act for Fiscal Year 2013, Pub. L. No. 112-239, § 3132(a)(2), 126 Stat. 1632, 2185.

¹⁶[GAO-14-45](#). These budget estimates include the SSMP, the Future-Years Nuclear Security Program (FYNSP), and NNSA's annual justification of the President's budget request, which typically includes the FYNSP.

¹⁷Nuclear Weapons Council is a joint organization composed of representatives from DOD and DOE that facilitates high-level coordination to secure, maintain, and sustain the nuclear weapons stockpile.

¹⁸LEPs extend, through refurbishment, the operational lives of weapons in the nuclear stockpile by 20 to 30 years and certify these weapons' military performance requirements without underground nuclear testing. In addition to LEPs, stockpile costs include those for other major weapons alterations and modifications; surveillance efforts to evaluate the condition, safety, and reliability of stockpiled weapons; maintenance efforts to perform certain minor weapons alterations or to replace components that have limited lifetimes; and core activities to support these efforts.

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- NNSA had not included estimated costs to construct both the Uranium Processing Facility (UPF) and the Chemistry Metallurgy Replacement Facility (CMRR). We recommended that NNSA include in its estimates at least a range of budget estimates for known future expenses for large capital projects even when a fully developed cost estimate had not been developed. NNSA agreed with this recommendation and the 2015 SSMP included estimates for these major large capital projects, which had previously been excluded. In addition, in the 2014 SSMP, NNSA also changed its methodology for developing budget estimates for LEPs. For example, NNSA officials said that the 2012 budget estimates for LEPs were based on an older LEP because there was not enough data at that time from recent and ongoing LEPs to develop cost models.¹⁹ In contrast, NNSA officials told us that they based their 2014 estimates on more reliable data from an ongoing LEP.

Our 2013 report also found that some assumptions in the SSMP may be unrealistic. NNSA's budget estimates to operate and maintain its existing facilities and infrastructure remain relatively flat through 2031 at about \$1.5 billion per year (in constant dollars). However, much of NNSA's existing facilities and infrastructure were constructed more than 50 years ago and are reaching the end of their useful lives. As a result, the agency is undertaking a number of improvement projects to modernize and maintain these facilities. We concluded that it may not be realistic for NNSA to assume that its annual budget estimates for operations and maintenance of facilities from 2014 to 2031 can remain relatively flat when its aging facilities will likely need additional resources to maintain them in the future.

¹⁹NNSA officials used data from the Reliable Replacement Warhead, a program that sought to develop a modern replacement warhead. This program was cancelled in 2009.

NNSA Does Not Fully Understand the Causes of Its Contract and Project Management Problems and Appears Resistant to Implementing GAO's Recommendations

In our February 2015 update to our high risk list, we expressed concern that DOE, including NNSA, may not have adequately identified the root causes of its contract and project management challenges. Our update also found that NNSA appeared resistant to implementing some of the recommendations we made in 2014 to correct these problems.

NNSA's Continued Corrective Actions Suggest It Does Not Understand the Causes of Its Contract and Project Management Problems

DOE has undertaken numerous efforts over the years to understand and address its contract and project management challenges. Our 2015 high risk update described a sequence of actions starting in 2008, when DOE issued a root cause analysis and a corrective action plan that identified what DOE considered to be the 10 most significant issues in managing its contracts and projects, and the actions needed to mitigate these issues. These issues included problems with front-end planning, project funding, accountability, cost estimating, contract and project management workforce, and project oversight.²⁰ DOE issued another report in 2011 that stated that the corrective actions it implemented from its 2008 plan had effectively mitigated most of the root causes of these issues.²¹ However, the department continued to identify additional root causes and corrective actions and recommendations to address its persistent contract and project management challenges. In 2010, DOE identified in a report six additional barriers to improving contract and project management and developed corrective actions to address these barriers.²² In 2012, DOE issued another report stating that it had completed or partially completed

²⁰U.S. Department of Energy, *Root Cause Analysis: Contract and Project Management* (Washington, D.C.: April 2008); U.S. Department of Energy, *Root Cause Analysis: Contract and Project Management Corrective Action Plan* (Washington, D.C.: July 2008).

²¹U.S. Department of Energy, *Root Cause Analysis and Corrective Action Plan Closure Report* (Washington, D.C.: February 2011).

²²U.S. Department of Energy, *U.S. Department of Energy: Contract and Project Management Improvement* (Washington, D.C.: April 2012).

the corrective actions necessary to address these barriers.²³ In November 2014, DOE issued another report on project management that identified four key factors that contribute to project management success or failure at DOE: front-end planning, project funding, accountability, and project oversight.²⁴ The report also included 21 recommendations to address continuing project management challenges. Notably, all four of these factors are among those discussed in DOE's 2008 root cause analyses and among those that DOE said in 2011 it had at least partially mitigated. As we noted in our February 2015 update to our high risk list,²⁵ DOE's long history of identifying additional corrective actions suggests that it has not always fully understood the causes of its contract and project management problems.

More importantly, DOE's December 2014 project management report included a description of actions to address the four key factors it had identified; however it did not discuss why the previous attempts to address these issues had either failed or why these problems had reemerged. For example, the 2008 corrective action plan found front-end planning as one of the top 10 issues contributing to the department's contract and project management problems. The corrective actions DOE identified in that report included developing a more detailed internal front-end planning process, such as identifying and defining specific assumptions for technical design and nuclear safety requirements. However, this is contrary to DOE's 2011 report that stated that the department had fully or partially completed all corrective measures from 2008, including those related to front-end planning. In addition, the 2008 report identified a number of areas where DOE had continuing challenges, including cost estimating and an inadequate number of federal contracting and project management personnel. For cost estimating, our November 2014 report also found that DOE and NNSA cost estimating requirements and guidance for projects and programs

²³U.S. Department of Energy, *U.S. Department of Energy: Contract and Project Management Improvement Closure Plan*. (Washington, D.C.: April 2012).

²⁴U.S. Department of Energy, *Improving Project Management: Report of the Contract and Project Management Working Group* (Washington, D.C.: November 2014).

²⁵[GAO-15-290](#).

generally did not reflect best practices for developing cost estimates.²⁶ For federal personnel, our February 2015 high risk report found that DOE did not meet the criteria for having the capacity (people and resources) to resolve contract and project management problems.²⁷ Our report cited a DOE workforce analysis from 2013 that concluded that DOE had an extremely low number of contract specialists. We also noted in our report that this workforce analysis did not include the other key staff members normally included in the description of the acquisition workforce, such as program and project managers and contracting officer representatives.²⁸ In contrast to these findings, DOE reported, in 2011, that it would complete its efforts to improve cost estimating later that year, and that had substantially completed its efforts to enhance the federal contract and project management workforce.

DOE Appears Resistant to Implementing Recommendations Intended to Improve DOE Project Management Problems

We have previously noted instances where DOE appeared resistant to implementing some of our recommendations to correct DOE's project management problems. For example, our February 2014 report included an evaluation of NNSA's mixed oxide (MOX) fuel fabrication facility, the estimated cost of which NNSA had increased by more than \$6.3 billion from NNSA's initial estimate in 1997 to about \$7.7 billion in 2014.²⁹ In that report, we recommended that DOE require a root cause analysis for projects that experience cost increases or schedule delays exceeding a certain threshold established by the department, including the MOX facility. We noted that such an analysis would help ensure that future

²⁶GAO, *Project and Program Management: DOE Needs to Revise Requirements and Guidance for Cost Estimating and Related Reviews*, [GAO-15-29](#) (Washington, D.C.: Nov. 25, 2014). We reported in 2014 on efforts by DOE, including NNSA, to improve its cost estimating efforts. For example, at that time, DOE had embarked on a Cost Estimating and Scheduling Initiative to systematically improve DOE's policies and guidance. In addition, in April 2013, NNSA created the Office of Program Review and Analysis. According to NNSA, this office is intended to improve NNSA's ability to plan and budget by providing senior leadership independent advice on resource allocations to ensure the best use of the agency's resources, including evaluating cost estimates of NNSA projects and programs.

²⁷[GAO-15-290](#)

²⁸[GAO-15-290](#)

²⁹GAO, *Plutonium Disposition Program: DOE Needs to Analyze the Root Causes of Cost Increases and Develop Better Cost Estimates*, [GAO-14-231](#) (Washington, D.C.: Feb. 13, 2014).

DOE projects benefit from lessons learned that reflect the causes of past projects' cost increases and schedule delays. DOE disagreed with our recommendation, stating that such an analysis should not be required, and that DOE program offices could decide on a case-by-case basis when to conduct such an analysis. However, DOE's requirements do not define how or when a root cause analysis should be conducted and it is not clear when or what would trigger a root cause analysis, which could result in analyses not being conducted consistently or not being conducted at all, hampering DOE's ability to apply lessons learned from past projects to ongoing or future projects. We continue to believe that a root cause analysis should be conducted for all projects that experience cost increases or schedule delays above a threshold established by the department. We also note that our recommendation is consistent with a requirement in the Weapon Systems Acquisition Reform Act of 2009, under which that the Department of Defense must perform a root cause analysis of a cost increase that exceeds a certain threshold.

Similarly, in 2014, we issued two reports with recommendations addressing key elements of the front-end planning process for large projects and programs. In both reports, DOE agreed with the recommendations, but it did not indicate whether it would implement them. In November 2014, we noted that DOE had a history of struggling to complete many of its major construction projects within initial cost and schedule estimates.³⁰ We found that DOE and NNSA cost estimating requirements and guidance for projects and programs generally do not reflect best practices for developing cost estimates. We also found in November 2014 that, because DOE and NNSA do not require reviews of program cost estimates, the extent of weaknesses in program cost estimates is largely unknown. DOE itself, in 2008, identified inadequate cost estimating capability as one of the top 10 most significant issues contributing to its contract and project management challenges. To address these issues, we recommended that DOE, among other things, revise its requirements and guidance for projects and programs to ensure DOE and NNSA and its contractors develop cost estimates in accordance with cost estimating best practices, and that independent reviews of programs are conducted periodically. DOE agreed with these recommendations. However, DOE did not specify a timeline for

³⁰[GAO-15-29](#).

implementing many of these recommendations, indicating to us DOE's lack of urgency or commitment in correcting these issues.

In the second report, issued in December 2014, we examined how DOE selects approaches for its projects to meet mission requirements.³¹ In this report, we found that several of DOE's major construction projects, including some of NNSA's, had incurred significant cost increases and schedule delays, and that DOE was in the process of reassessing the originally selected project alternative for each project. We found that neither DOE's requirements nor its guidance for analyzing alternatives conformed to best practices, and therefore DOE could not have confidence that applying its requirements and guidance would lead to a reliable analysis. A reliable analysis is critical to ensuring that key capital asset and program decisions will both meet mission needs and be cost-effective. To address these issues, we recommended that DOE incorporate all best practices into its analysis-of-alternatives requirements. DOE agreed with this recommendation, but again, it did not specify a timeline for implementing the recommendation, indicating to us a lack of urgency and commitment to correct the problem.

NNSA's DNN Programs Have Made Some Progress Securing Vulnerable Nuclear Material, but Significant Challenges Remain

Our reports have found that DNN has made some progress in securing vulnerable nuclear material. Specifically, we reported in December 2010 on NNSA's efforts to carry out the President's April 2009 initiative (also known as the Prague initiative) calling on the agency to secure all vulnerable nuclear material around the world within 4 years.³² In that report, we found that NNSA's Materials Protection, Control and Accounting Program had made considerable progress securing Russian nuclear warheads and materials at numerous Russian sites. The president's 2009 Prague initiative ended in December 2013, but DNN and the U.S. government's commitment to ensuring the security of worldwide nuclear materials endures, and we have ongoing work examining it.

³¹GAO, *DOE and NNSA Project Management: Analysis of Alternatives Could Be Improved by Incorporating Best Practices*, [GAO-15-37](#), (Washington, D.C.: Dec. 11, 2014).

³²GAO, *Nuclear Nonproliferation: Comprehensive U.S. Planning and Better Foreign Cooperation Needed to Secure Vulnerable Nuclear Materials Worldwide*, [GAO-11-227](#) (Washington, D.C.: Dec. 15, 2010).

However, our reports have also identified key challenges NNSA faces in its efforts to secure vulnerable nuclear materials. In our December 2010 report, we found that NNSA had estimated it would assist Russia in consolidating its HEU to fewer, more secure locations by removing material from five sites and 50 buildings completely by 2010; however, it had achieved removal of all highly enriched uranium (HEU) from only one site and 25 buildings. In addition, we found that NNSA had made little progress in converting research reactors in Russia from the use of HEU. At that time, NNSA planned to complete the conversion or verify the shutdown of 71 HEU-fueled research reactors and related facilities in Russia by 2020; however, Russia had not agreed to convert any of these facilities. Nonetheless, Russia verified to NNSA in February 2010 that it had shut down three of its research reactors, and NNSA achieved an agreement in principle to conduct conversion feasibility studies on six additional Russian research reactors.

In addition, in September 2011, we found that DNN and U.S. agencies faced significant challenges in accounting for and ensuring the security of U.S. weapons-usable nuclear materials as a result of foreign nuclear research and commercial power activities.³³ That report found that, of 55 visits by U.S. physical protection teams to overseas sites from 1994 through 2010, partner countries met international physical security guidelines about half the time.

Moreover, we identified weaknesses in DNN's and other U.S. agencies' management of this effort. Among other concerns, we found in September 2011 that DNN's and U.S. agencies' activities for prioritizing and coordinating physical protection visits and measuring performance did not meet GAO's best practices for agency performance or DOE's standards for internal control.³⁴ Specifically, we found that DNN and U.S. agencies had not systematically visited countries believed to be holding the highest proliferation risk quantities of U.S. nuclear material. DNN and U.S. agencies had not systematically revisited sites that did not meet physical security guidelines in a timely manner, and NNSA and U.S. agencies did not have a comprehensive, current inventory of U.S.

³³GAO, *Nuclear Nonproliferation: U.S. Agencies Have Limited Ability to Account for, Monitor, and Evaluate the Security of U.S. Nuclear Material Overseas*, [GAO-11-920](#) (Washington, D.C.: Sept. 8, 2011).

³⁴[GAO-11-920](#).

weapons usable nuclear materials overseas. We suggested that the Congress consider directing NNSA and the Nuclear Regulatory Commission to compile an inventory of U.S. HEU and separated plutonium overseas. We also recommended that NNSA develop a more systematic process for identifying and prioritizing future physical protection visits, and periodically review performance toward meeting goals for the U.S. physical protection program visits. NNSA disagreed with our recommendations. However, it has taken some actions to address them including compiling an initial inventory of U.S.-origin HEU overseas and developing a more systematic process for identifying and prioritizing future protection visits.

We have also identified challenges in another element of DNN's mission—improving the capabilities of other countries to detect, deter and interdict smuggled nuclear material. The Second Line of Defense program—including the Megaports Initiative, which was consolidated into Second Line of Defense in 2014—is essential to this effort.³⁵ In October 2012,³⁶ we issued a report examining the Megaports Initiative and found that the continuity and sustainability of the Megaports program could be a concern going forward. We found that NNSA had not finalized a long-term plan for ensuring the sustainability of the Megaports Initiative and recommended that NNSA finalize a sustainability plan for ensuring ongoing operations after NNSA transfers all equipment, maintenance, operations, and related financial responsibilities to partner countries. We also found that the initiative's performance measures did not provide sufficient information for decision making because they did not evaluate the program's impact and effectiveness. We recommended that NNSA develop and maintain useful and reliable measures to assess the performance of the initiative. NNSA agreed with our recommendations and, in fiscal year 2014, added a new metric that tracks the cumulative number of sites that are being maintained by the host country.

³⁵The Second Line of Defense—now called the Nuclear Smuggling Detection and Deterrence (NSDD) program— was designed to deter, detect, and interdict illicit trafficking of nuclear materials by installing radiation detection equipment at border crossings, airports, and seaports of partner countries. The Megaports Initiative funded the installation of radiation detection equipment at select seaports overseas and trained foreign personnel to use this equipment to scan shipping containers entering and leaving these seaports.

³⁶GAO, *Combating Nuclear Smuggling: Megaports Initiative Faces Funding and Sustainability Challenges*, [GAO-13-37](#) (Washington, D.C.: Oct. 31, 2012).

Finally, the effectiveness of NNSA's nuclear nonproliferation mission depends in part on the agency's plutonium disposition program, and we found in 2014 NNSA faces challenges in this regard.³⁷ The plutonium disposition program has represented a significant portion of the DNN budget over the past 5 years, ranging from approximately 18 percent of the DNN budget request in fiscal year 2015 to approximately 36 percent of the DNN budget request in fiscal year 2013. This program is a key element of the U.S. commitment to dispose of 34 metric tons of weapons grade surplus plutonium under the Plutonium Management and Disposition Agreement between the United States and Russia. The construction of the MOX facility at DOE's Savannah River Site in South Carolina has been the central focus in meeting this commitment. In February 2015, we reported on several challenges in this program, including a cost increase of approximately \$2.9 billion and a schedule delay of about 3 years, and DOE generally agreed with our recommendations to address these issues.³⁸ DOE is continuing to construct the MOX facility and is conducting additional analyses of the project, including independent cost and schedule estimates as well as an analysis of alternatives approaches for plutonium disposition.

NNSA recently reorganized its DNN programs into a new structure, and for several years has sustained an effort to assess "over the horizon" nuclear and radiological proliferation threats and trends—in other words, evolving threats over the next decade.³⁹ However, according to NNSA officials, the Russian government recently decided to cease joint cooperation with NNSA at most Russian weapons complex and civilian nuclear sites as of December 2014, which presents new challenges for NNSA and raises questions about the status of projects not yet completed and the sustainability of progress already made. We will continue to follow these issues and have ongoing work looking at NNSA's nonproliferation programs, including planning, management, and their effectiveness.

³⁷ [GAO-14-231](#).

³⁸ [GAO-15-290](#).

³⁹ DNN now manages the following programs: Material Management and Minimization, Global Material Security, Nonproliferation and Arms Control, Nonproliferation Construction, and Defense Nuclear Nonproliferation Research & Development.

NNSA Faces Challenges in Its Governance of the Nuclear Security Enterprise

The Augustine-Mies's Panel's report highlighted the challenges NNSA faces in its governance of the nuclear security enterprise.⁴⁰ The issues and concerns identified in this report appear to be consistent with those that we have previously described in our work.

Regarding NNSA's modernization efforts, the Augustine-Mies Panel observed that the 2015 SSMP assumes a budget that may not be achievable and that NNSA's nuclear modernization plans are significantly underfunded relative to identified needs. The panel further noted that the SSMP reflected significant delays in the delivery of several major LEPs and nuclear facilities, and that the lack of a stable, executable plan for modernization is a fundamental weakness for NNSA. As noted earlier, our work has found that NNSA's long-term budget estimates for the nuclear security enterprise have continued to change from year to year and that some assumptions in the SSMP may be unrealistic.

In addition, consistent with our 2015 high risk update, the Augustine-Mies Panel found that NNSA's capital projects have been a continuing source of cost overruns and schedule delays. The panel noted that these have significantly undermined the agency's credibility and recommended that DOE strengthen its efforts to develop independent cost and resource analysis capabilities and that leadership employ a rigorous analysis of alternatives early in the decision process as the basis for assessing and validating program requirements. The panel also recommended holding managers accountable for implementing the department's directive on project management (Order 413.3B). The panel noted that while adherence to DOE orders is mandatory, in practice, Order 413.3B has been viewed more as guidance that is not always followed, and that stricter enforcement is necessary. In addition, the Augustine-Mies Panel found specific shortfalls in critical skills for program management, cost estimation, and resource management and recommended that NNSA leadership analyze the level and skill mix of the workforce necessary to meet future needs and invest in the needed skills in the workforce. Our high risk update noted that DOE, including NNSA, did not have the capacity (people and resources) to resolve contract and project management problems. We reported that DOE, including NNSA, had taken some actions to address capacity issues, but these actions have

⁴⁰Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise, *A New Foundation for the Nuclear Security Enterprise*; November 2014.

not yet ensured that the department has the capacity to fully address its contract and project management challenges.

On implementation of corrective actions plans, the panel noted that there have been numerous previous studies with numerous valid recommendations, many of which recurred in the panel's assessment as well. The panel noted, however, that there was not a well-established process for reviewing these recommendations, performing root cause analysis of them, taking corrective action where appropriate, and then following up to ensure that the corrective actions are institutionalized. The panel recommended that nuclear security enterprise leadership develop a process to provide accountability and follow up on findings and recommendations from studies and reviews, both internal and external. In December 2014, the Secretary issued a memo stating that DOE would strengthen the role of the Energy Systems Acquisition Advisory Board and establish a project management risk committee to provide agency-wide project management risk assessment and expert advice. As we noted in our 2015 high risk update, this initiative demonstrates the continued commitment of top leadership to address its contract and project management challenges, but DOE's cycle of identifying root causes, recommendations and corrective actions—which DOE declares successful, only to later issue another set of root causes and corrective actions—raises concerns that DOE has not fully identified the root causes behind these problems.

The panel also examined NNSA's oversight of its management and operating (M&O) contractors and raised questions regarding the impact and effectiveness of contract requirements and performance metrics on mission execution. We have ongoing work examining NNSA's contract oversight policies and guidance that examines NNSA's approach to overseeing and evaluating its M&O contractors and how NNSA determines the extent to which it can use contractor assurance systems for deciding M&O contractor award fees.⁴¹ This report is expected to be completed in May 2015.

⁴¹ Contractor assurance systems are management systems and processes designed and used by NNSA's contractors to monitor their own performance and self-identify and correct potential problems. NNSA, which validates the systems, used the systems' data to monitor contractors' performance in safety, security, and other areas and to tailor the level of oversight.

Chairman Sessions, 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.

GAO Contact and Staff Acknowledgments

If you or your staff members have any questions about this testimony, please contact me at (202) 512-3841 or trimbled@gao.gov. Contact points for our Office 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 Nathan Anderson, Assistant Director; Allison Bawden; Alisa Beyninson; Antoinette Capaccio; Daniel Feehan; Jonathan Gill; Bridget Grimes; William Hoehn; Amanda Kolling; Michelle Munn; Alison O'Neill; and Rebecca Shea.

Selected Recent GAO Products Assessing the Department of Energy's and National Nuclear Security Administration's Management Efforts

The following is a selection of GAO's recent work assessing the Department of Energy's and National Nuclear Security Administration's management efforts:

High-Risk Series: An Update. [GAO-15-290](#). Washington, D.C.: February 11, 2015.

DOE and NNSA Project Management: Analysis of Alternatives Could Be Improved by Incorporating Best Practices [GAO-15-37](#). Washington, D.C.: December 11, 2014.

Project and Program Management: DOE Needs to Revise Requirements and Guidance for Cost Estimating and Related Reviews. [GAO-15-29](#). Washington, D.C.: November 25, 2014.

Nuclear Weapons: Some Actions Have Been Taken to Address Challenges with the Uranium Processing Facility Design. [GAO-15-126](#). Washington, D.C.: October 10, 2014.

Plutonium Disposition Program: DOE Needs to Analyze the Root Causes of Cost Increases and Develop Better Cost Estimate. [GAO-14-231](#). Washington, D.C.: February 13, 2014.

Modernizing the Nuclear Security Enterprise: NNSA's Budget Estimates Do Not Fully Align with Plans. [GAO-14-45](#). Washington, D.C.: December 11, 2013.

Modernizing the Nuclear Security Enterprise: Observations on NNSA's Options for Meeting Its Plutonium Research Needs. [GAO-13-533](#). Washington, D.C.: September 11, 2013.

Department of Energy: Observations on DOE's Management Challenges and Steps Taken to Address Them. [GAO-13-767T](#). Washington, D.C.: July 24, 2013.

National Nuclear Security Administration: Laboratories' Indirect Cost Management Has Improved, but Additional Opportunities Exist. [GAO-13-534](#). Washington, D.C.: June 28, 2013.

Nuclear Nonproliferation: IAEA Has Made Progress in Implementing Critical Programs but Continues to Face Challenges. [GAO-13-139](#). Washington, D.C.: May 16, 2013.

Department of Energy: Observations on Project and Program Cost Estimating in NNSA and the Office of Environmental Management. [GAO-13-510T](#). Washington, D.C.: May 8, 2013.

Modernizing the Nuclear Security Enterprise: Observations on DOE's and NNSA's Efforts to Enhance Oversight of Security, Safety, and Project and Contract Management. [GAO-13-482T](#). Washington, D.C.: March 13, 2013.

High-Risk Series: An Update. [GAO-13-283](#). Washington, D.C.: February 2013.

Department of Energy: Better Information Needed to Determine If Nonmajor Projects Meet Performance Targets. [GAO-13-129](#). Washington, D.C.: December 19, 2012.

Combating Nuclear Smuggling: Megaports Initiative Faces Funding and Sustainability Challenges. [GAO-13-37](#). Washington, D.C.: October 31, 2012.

Modernizing the Nuclear Security Enterprise: Observations on the National Nuclear Security Administration's Oversight of Safety, Security, and Project Management. [GAO-12-912T](#). Washington, D.C.: September 12, 2012.

Modernizing the Nuclear Security Enterprise: Observations on the Organization and Management of the National Nuclear Security Administration. [GAO-12-867T](#). Washington, D.C.: June 27, 2012.

Modernizing the Nuclear Security Enterprise: NNSA's Reviews of Budget Estimates and Decisions on Resource Trade-offs Need Strengthening. [GAO-12-806](#). Washington, D.C.: July 31, 2012.

Modernizing the Nuclear Security Enterprise: Strategies and Challenges in Sustaining Critical Skills in Federal and Contractor Workforces. [GAO-12-468](#). Washington, D.C.: April 26, 2012.

Modernizing the Nuclear Security Enterprise: New Plutonium Research Facility at Los Alamos May Not Meet All Mission Needs. [GAO-12-337](#). Washington, D.C.: March 26, 2012.

Nuclear Weapons: NNSA Needs to Improve Guidance on Weapon Limitations and Planning for Its Stockpile Surveillance Program. [GAO-12-188](#). Washington, D.C.: February 8, 2012.

Department of Energy: Additional Opportunities Exist to Streamline Support Functions at NNSA and Office of Science Sites. [GAO-12-255](#). Washington, D.C.: January 31, 2012.

Nuclear Nonproliferation: Action Needed to Address NNSA's Program Management and Coordination Challenges. [GAO-12-71](#). Washington, D.C.: December 14, 2011.

High-Risk Series: An Update. [GAO-11-278](#). Washington, D.C.: February 2011.

Nuclear Nonproliferation: U.S. Agencies Have Limited Ability to Account for, Monitor, and Evaluate the Security of U.S. Nuclear Material Overseas. [GAO-11-920](#). Washington, D.C.: September 8, 2011.

Nuclear Nonproliferation: Comprehensive U.S. Planning and Better Foreign Cooperation Needed to Secure Vulnerable Nuclear Materials Worldwide. [GAO-11-227](#). Washington, D.C.: December 15, 2010.

Nuclear Weapons: National Nuclear Security Administration's Plans for Its Uranium Processing Facility Should Better Reflect Funding Estimates and Technology Readiness. [GAO-11-103](#). Washington, D.C.: November 19, 2010.

Nuclear Nonproliferation: National Nuclear Security Administration Has Improved the Security of Reactors in its Global Research Reactor Program, but Action Is Needed to Address Remaining Concerns. [GAO-09-949](#). Washington, D.C.: September 17, 2009.

Nuclear Weapons: Actions Needed to Identify Total Costs of Weapons Complex Infrastructure and Research and Production Capabilities. [GAO-10-582](#). Washington, D.C.: June 21, 2010.

Nuclear Nonproliferation: DOE Needs to Address Uncertainties with and Strengthen Independent Safety Oversight of Its Plutonium Disposition Program. [GAO-10-378](#). Washington, D.C.: March 26, 2010.

Nuclear Security: Better Oversight Needed to Ensure That Security Improvements at Lawrence Livermore National Laboratory Are Fully

Implemented and Sustained. [GAO-09-321](#). Washington, D.C.: March 16, 2009.

Nuclear Weapons: NNSA and DOD Need to More Effectively Manage the Stockpile Life Extension Program. [GAO-09-385](#). Washington, D.C.: March 2, 2009.

Nuclear Nonproliferation: DOE's Program to Assist Weapons Scientists in Russia and Other Countries Needs to Be Reassessed. [GAO-08-189](#). Washington, D.C.: December 12, 2007.

Nuclear and Worker Safety: Actions Needed to Determine the Effectiveness of Safety Improvement Efforts at NNSA's Weapons Laboratories. [GAO-08-73](#). Washington, D.C.: October 31, 2007.

Securing U.S. Nuclear Material: DOE Has Made Little Progress Consolidating and Disposing of Special Nuclear Material. [GAO-08-72](#). Washington, D.C.: October 4, 2007.

Nuclear Nonproliferation: Progress Made in Improving Security at Russian Nuclear Sites, but the Long-term Sustainability of U.S.-Funded Security Upgrades Is Uncertain. [GAO-07-404](#). Washington, D.C.: February 28, 2007.

National Nuclear Security Administration: Additional Actions Needed to Improve Management of the Nation's Nuclear Programs. [GAO-07-36](#). Washington, D.C.: January 19, 2007.

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