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MODERNIZING THE NUCLEAR SECURITY ENTERPRISE

Observations on the National Nuclear Security Administration's Oversight of Safety, Security, and Project Management

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Highlights

Highlights of GAO-12-912T, a testimony before the Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives.

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Why GAO Did This Study

The National Nuclear Security Administration (NNSA), a separately organized agency within the Department of Energy (DOE), is responsible for managing nuclear weapon- and nonproliferation-related national security activities in laboratories and other facilities, collectively known as the nuclear security enterprise. Major portions of NNSA's mission are largely carried out by contractors at each site within the enterprise. GAO has designated contract management at NNSA as an area at high risk for fraud, waste, and abuse. Progress has been made, but GAO continues to identify problems such as inadequate oversight of safety and security as well as cost and schedule overruns on major projects. With NNSA proposing to spend tens of billions of dollars to modernize the nuclear security enterprise, it is important to ensure scarce resources are spent in an effective and efficient manner.

This testimony addresses (1) DOE's and NNSA's safety and security oversight and (2) NNSA's project and contract management. It is based on prior GAO reports issued from August 2000 to April 2012.

DOE and NNSA continue to act on the numerous recommendations GAO has made to improve NNSA's management of the nuclear security enterprise. GAO will continue to monitor DOE's and NNSA's implementation of these recommendations.

View GAO-12-912T. For more information, contact Gene Aloise at (202) 512-3841 or aloisee@gao.gov

What GAO Found

NNSA has successfully ensured that the nuclear weapons stockpile remains safe and reliable and has accomplished this complicated task by using state-of-the-art facilities as well as the skills of top scientists. Nevertheless, DOE's and NNSA's ineffective oversight of its contractors has contributed to many safety and security problems across the nuclear security enterprise. As work carried out at NNSA's sites involves dangerous nuclear materials such as plutonium and highly enriched uranium, stringent safety procedures and security requirements must be observed. In response to numerous serious safety incidents over several decades, DOE has taken steps to improve safety oversight. Recently, laboratory and other officials have raised concerns, however, that federal oversight has become excessive and overly burdensome. To address these concerns, DOE completed a safety and security reform effort to streamline or eliminate many DOE directives. However, GAO reported in April 2012 that the benefits of this reform effort are unclear because DOE did not determine if the original directives were, in fact, burdensome. In addition, the reform effort did not fully address safety concerns GAO and others identified in the areas of quality assurance, safety culture, and federal oversight. For example, the reform effort gives the NNSA site offices, rather than DOE's Office of Independent Oversight staff, increased responsibility for correcting problems identified in independent assessments. Site office determinations of what issues require more formal contractor responses may be influenced by the fact that the site offices also have responsibility for keeping costs under control and work on schedule. NNSA has also experienced security deficiencies, including numerous incidents involving the compromise or potential compromise of classified information that pose the most serious threat to U.S. national security. NNSA has made significant progress addressing these deficiencies—including the establishment of an effective headquarters security organization—but more effective oversight is needed to ensure that safety and security improvements are fully implemented and sustained.

NNSA continues to experience significant cost and schedule overruns on its major projects. For example, NNSA's estimated cost to construct a modern Uranium Processing Facility at NNSA's Y-12 National Security Complex experienced a nearly seven-fold cost increase from between $600 million and $1.1 billion in 2004 to between $4.2 billion and $6.5 billion in 2011. In addition, NNSA's estimated cost to construct a new plutonium research facility at Los Alamos National Laboratory experienced a nearly six-fold increase from between $745 million and $975 million in 2005 to between $3.7 billion and $5.8 billion in 2010. The project has also been delayed between 8 to 12 years from NNSA's original plans. DOE has recently taken a number of actions to improve management of major projects, including those overseen by NNSA. For example, DOE has updated program and project management policies and guidance in an effort to improve the reliability of project cost estimates, better assess project risks, and better ensure project reviews are timely, useful and identify problems early. However, in GAO's view, DOE and NNSA need to (1) commit sufficient people and resources to resolve contract management problems, and (2) demonstrate, on a sustained basis, the ability to complete major projects on time and on budget.

Chairman Stearns, Ranking Member DeGette, and Members of the Subcommittee:

Thank you for the opportunity to discuss our work on safety, security, and project management issues related to the nation's nuclear security enterprise. As you know, the National Nuclear Security Administration (NNSA), a separately organized agency within the Department of Energy (DOE), is responsible for managing nuclear weapon- and nonproliferation-related missions in research and development laboratories, production plants, and other facilities—known collectively as the nuclear security enterprise.[1] NNSA manages these national security missions, but work activities are largely carried out by management and operating (M&O) contractors at each site within the nuclear security enterprise. Working under M&O contracts, NNSA contractors apply their scientific, technical, and management expertise at NNSA's government-owned, contractor operated sites.[2]

Questions have been raised about DOE's and NNSA's management of the nuclear security enterprise. For example, we first designated DOE's management of its contracts as an area at high risk of fraud, waste, abuse, and mismanagement in 1990 because of the department's record of inadequate management and oversight of its contractors. During the late 1990's, DOE experienced security problems at the nation's nuclear weapons laboratories and significant cost overruns on major projects. According to a June 1999 report by the President's Foreign Intelligence Advisory Board, DOE's management of the nuclear weapons laboratories, while representing "science at its best," also embodied "security at its worst" because of "organizational disarray, managerial neglect, and...a culture of arrogance." The advisory board urged

[1] Specifically, NNSA manages three national nuclear weapon design laboratories—Lawrence Livermore National Laboratory in California, Los Alamos National Laboratory in New Mexico, and Sandia National Laboratories in New Mexico and California. It also manages four nuclear weapons production plants—the Pantex Plant in Texas, the Y-12 National Security Complex in Tennessee, the Kansas City Plant in Missouri, and the Tritium Extraction Facility at DOE's Savannah River Site in South Carolina. NNSA also manages the Nevada National Security Site, formerly known as the Nevada Test Site.

[2] M&O contracts are agreements under which the government contracts for the operation, maintenance, or support, on its behalf, of a government-owned or -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. Federal Acquisition Regulation, 48 C.F.R. § 17.601.

Congress to create a new organization that, whether established as an independent agency or a semiautonomous agency within DOE, would have a clear mission, streamlined bureaucracy, and drastically simplified lines of authority and accountability. Responding to the board's recommendations, Congress created NNSA under Title 32 of the National Defense Authorization Act for Fiscal Year 2000—the NNSA Act.[3] The NNSA Act established NNSA as a "separately organized agency" within DOE. The act established the position of DOE Under Secretary for Nuclear Security, who was also designated as the Administrator of NNSA. The Secretary of Energy and the Deputy Secretary of Energy were allowed to establish policy for NNSA and to give direction to NNSA through the Administrator; however, other DOE employees were prohibited from directing the activities of individual NNSA employees. DOE directives remain the primary means to establish, communicate, and institutionalize policies, requirements, responsibilities, and procedures for multiple departmental elements, including NNSA, but the act gives the NNSA Administrator the authority to establish NNSA-specific policies, unless disapproved by the Secretary of Energy. NNSA does this through the issuance of Policy Letters.[4]

NNSA's creation, however, has not yet had the desired effect of fully resolving these long-standing management problems. For example, security incidents, as well as safety issues, contributed to the temporary shut-down of facilities at both Los Alamos and Livermore in 2004 and 2005.[5] However, concerns have been raised recently by national laboratory and other officials that DOE's and NNSA's oversight of the laboratories' activities has become excessive and that the safety and security requirements the laboratories are subject to are overly prescriptive and burdensome, which has resulted in a negative effect on the quality of science performed at these laboratories. Regarding major projects, contract management at NNSA and DOE's Office of

[3] Pub. L. No. 106-65, 113 Stat. 512, 953 (1999).

[4] NNSA, *Policy Letters: NNSA Policies, Supplemental Directives, and Business Operating Procedures,* NA SD 251.1 (Washington, D.C.: July 5, 2011).

[5] For additional information on the 2004 temporary shutdown of facilities at Los Alamos, see GAO, *Stand-Down of Los Alamos National Laboratory: Total Costs Uncertain; Almost All Mission-Critical Programs Were Affected but Have Recovered,* GAO-06-83 (Washington, D.C.: Nov. 18, 2005).

Environmental Management remain on our high-risk list.[6] In this context, there have been calls in Congress and other organizations to enhance NNSA's ability to operate independently of DOE. For example, the Defense Science Board proposed in 2006 that a completely independent nuclear weapons agency be created.[7] In January 2007, we reported[8] that former senior DOE and NNSA officials with whom we spoke generally did not favor removing NNSA from DOE; we concluded that such drastic change was unnecessary to produce an effective organization and we continue to hold this view.[9]

My testimony today discusses DOE's and NNSA's management of the nuclear security enterprise. It focuses on our reports issued from August 2000 to April 2012 on (1) oversight of safety and security performance in the nuclear security enterprise and (2) project and contract management. Detailed information about scope and methodology can be found in our issued reports. We conducted the performance audit work that supports this statement in accordance with generally accepted government auditing standards. Those standards require that we plan and perform audits 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.

Background

DOE is responsible for a diverse set of missions, including nuclear security, energy research, and environmental clean-up. These missions are managed by various organizations within DOE and largely carried out by M&O contractors at DOE sites. According to federal budget data, NNSA is one of the largest organizations in DOE, overseeing nuclear

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

[7] The Defense Science Board provides the Department of Defense with independent advice and recommendations on matters relating to the department's scientific and technical enterprise. See Defense Science Board Task Force, *Nuclear Capabilities* (Washington, D.C.: December 2006).

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

[9] GAO, *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).

weapons, nuclear nonproliferation, and naval reactors missions at its sites. With a $10.5 billion budget in fiscal year 2011—nearly 40 percent of DOE's total budget—NNSA is responsible for providing the United States with safe, secure, and reliable nuclear weapons in the absence of underground nuclear testing and maintaining core competencies in nuclear weapons science, technology, and engineering. Ensuring a safe and reliable nuclear weapons stockpile is an extraordinarily complicated task and requires state-of-the-art experimental and computing facilities as well as the skills of top scientists in the field. To its credit, NNSA consistently accomplishes this task, as evidenced by the successful assessment of the safety, reliability, and performance of each weapon type in the nuclear stockpile since its creation. In 2011, the administration announced plans to request $88 billion from Congress over the next decade to operate and modernize the nuclear security enterprise.

As discussed above, work activities to support NNSA's national security missions are largely carried out by M&O contractors. This arrangement has historical roots. Since the Manhattan Project produced the first atomic bomb during World War II, NNSA, DOE, and predecessor agencies have depended on the expertise of private firms, universities, and others to carry out research and development work and efficiently operate the facilities necessary for the nation's nuclear defense. Currently, DOE spends 90 percent of its annual budget on M&O contracts, making it the largest non-Department of Defense contracting agency in the government.

DOE generally regulates the safety of its own nuclear facilities and operations at its sites. In contrast, the Nuclear Regulatory Commission (NRC) generally regulates commercial nuclear facilities, and the Occupational Safety and Health Administration (OSHA) generally regulates worker safety at commercial industrial facilities.[10] However, because of the dangerous nature of work conducted at many sites within the national security enterprise—handling nuclear material such as plutonium, manufacturing high explosives, and various industrial operations that use hazardous chemicals—oversight of the nuclear security enterprise is multifaceted. First, DOE policy states that its contractors are expected to develop and implement an assurance

[10] DOE regulates the safety of most of its own sites with nuclear operations; NRC regulates several DOE nuclear facilities, and OSHA regulates occupational safety at DOE sites that have no nuclear function.

system, or system of management controls that help ensure the department's program mission and activities are executed in an effective, efficient, and safe manner.[11] Through these assurance systems, contractors are required to perform self-assessments as well as identify and correct negative performance trends. Second, NNSA site offices, which are collocated with NNSA sites, oversee the performance of M&O contractors. Site office oversight includes communicating performance expectations to the contractor, reviewing the contractor's assurance system, and conducting contractor performance evaluations. Third, DOE's Office of Health, Safety, and Security—especially its Office of Independent Oversight—conducts periodic appraisals to determine if NNSA officials and contractors are complying with safety and security requirements.[12] Fourth, NNSA receives safety assessments and recommendations from other organizations, most prominently the Defense Nuclear Facilities Safety Board (Safety Board)—an independent executive branch agency created by Congress to assess safety conditions and operations at DOE's defense nuclear facilities.[13] To address public health and safety issues, the Safety Board is authorized to make recommendations to the Secretary of Energy, who may then accept or reject, in whole or in part, the recommendations. If the Secretary of Energy accepts the recommendations, the Secretary must prepare an implementation plan. Other organizations that provide assessments and recommendations to NNSA on the management of its sites include DOE's Office of Inspector General, the National Academy of Sciences, and GAO.

[11] DOE, *Department of Energy Oversight Policy*, DOE P 226.1B (Washington, D.C.: Apr. 25, 2011). Contractor assurance systems are to cover the following operational aspects: (1) environment, safety, and health; (2) safeguards and security; (3) emergency management; and (4) cyber security.

[12] DOE reorganized offices within the Office of Health, Safety, and Security. The Office of Independent Oversight merged with the Office of Enforcement and was renamed the Office of Enforcement and Oversight. For the purposes of this report, we refer to it as the Office of Independent Oversight.

[13] The Safety Board provides oversight for all NNSA sites except the Kansas City Plant, which manufactures non-nuclear components.

Ineffective DOE and NNSA Contractor Oversight Has Contributed to Safety and Security Problems Across the Nuclear Security Enterprise

Work carried out at NNSA's sites may involve plutonium and highly enriched uranium, which are extremely hazardous. For example, exposure to small quantities of plutonium is dangerous to human health, so that even inhaling a few micrograms creates a long-term risk of lung, liver, and bone cancer, and inhaling larger doses can cause immediate lung injuries and death. Also, if not safely contained and managed, plutonium can be unstable and spontaneously ignite under certain conditions. NNSA's sites also conduct a wide range of other activities, including construction and routine maintenance and operation of equipment and facilities that also run the risk of accidents, such as those involving heavy machinery or electrical mishaps. The consequences of such accidents could be less severe than those involving nuclear materials but could also lead to long-term illnesses, injuries, or even deaths among workers or the public.

Long-standing DOE and NNSA management weaknesses have contributed to persistent safety problems at NNSA's national laboratories. In October 2007, we reported that there had been nearly 60 serious accidents or near misses at NNSA's national laboratories since 2000.[14] These incidents included worker exposure to radiation, inhalation of toxic vapors, and electrical shocks. Although no one was killed, many of the accidents caused serious harm to workers or damage to facilities. For example, at Los Alamos in July 2004, an undergraduate student who was not wearing required eye protection was partially blinded in a laser accident. Our review of nearly 100 reports issued since 2000 found that the contributing factors to these safety problems generally fell into three key categories: (1) relatively lax laboratory attitudes toward safety procedures, (2) laboratory inadequacies in identifying and addressing safety problems with appropriate corrective actions, and (3) inadequate oversight by NNSA site offices. DOE's Office of Inspector General has also raised concerns about safety oversight by NNSA's site offices. Specifically, the Inspector General reported in June 2011 that NNSA's Livermore Site Office was not sufficiently overseeing the contractor to ensure that corrective actions were fully and effectively implemented for a

[14] GAO, *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.: Oct. 31, 2007).

program designed to limit worker exposure to beryllium, a hazardous metal essential for nuclear operations.[15]

In a March 2010 memorandum, the Deputy Secretary of Energy announced a reform effort to revise DOE's safety and security directives and modify the department's oversight approach to "provide contractors with the flexibility to tailor and implement safety and security programs without excessive federal oversight or overly prescriptive departmental requirements." In the memorandum announcing this effort, the Deputy Secretary noted that burdensome safety requirements were affecting the productivity of work at DOE's sites and that reducing this burden on contractors would lead to measurable productivity improvement. As we reported to this committee in April 2012, this reform effort reduced the number of safety related directives from 80 to 42 by eliminating or combining requirements the department determined were unclear, duplicative, or too prescriptive and by encouraging the use of industry standards.[16] However, the benefits of this reform effort are not clear because DOE did not (1) determine how the original requirements impaired productivity or added costs, (2) assess whether the cost to implement the revised directives would exceed the benefits, or (3) develop performance measures in order to assess how the reform effort will lead to improved productivity or lower costs. Furthermore, DOE's safety reform effort did not fully address safety concerns we and others identified in the areas of quality assurance, safety culture, and federal oversight. In fact, some of the revisions DOE made to its safety-related directives may actually result in weakened independent oversight. For example, while DOE policy notes that independent oversight is integral to help ensure the effectiveness of safety performance, DOE's Office of Independent Oversight staff must now coordinate its assessment activities with NNSA site office management to maximize the use of resources. This arrangement potentially raises concerns about whether Office of Independent Oversight staff will be sufficiently independent from site office management. In addition, the reform effort gives the NNSA site office, rather than Office of Independent Oversight staff, increased responsibility for managing actions to correct problems identified in

[15] DOE Office of Inspector General, *Implementation of Beryllium Controls at Lawrence Livermore National Laboratory,* DOE/IG-0851 (Washington, D.C.: June 17, 2011).

[16] GAO, *Nuclear Safety: DOE Needs to Determine the Costs and Benefits of Its Safety Reform Effort*, GAO-12-347 (Washington, D.C.: Apr. 20, 2012).

independent assessments. Site office determinations of what issues require more formal contractor responses may be influenced by the fact that the site offices also have responsibility for keeping costs under control and work on schedule.

Similar to, but independent of DOE's safety and security reform effort, in February 2011, NNSA initiated its "governance transformation" project, which involved revising the agency's business model to, among other things, place more reliance on contractors' self-oversight through contractor assurance systems to ensure such things as effective safety and security performance. NNSA's Kansas City Plant has completed implementation of this new business model, and other NNSA sites—such as the Nevada National Security Site and the Y-12 National Security Complex—are currently making changes to implement it as well. In response to the new business model, the Safety Board and the DOE Office of Inspector General have raised concerns about contractor assurance systems. For example, in an April 2011 congressional testimony, the chairman of the Safety Board stated that contractor assurance systems at defense nuclear facilities have not achieved a degree of effectiveness that would warrant a reduction in federal safety oversight and that they are not expected to achieve this effectiveness in the foreseeable future. In May 2012, the DOE Office of Inspector General reported on weaknesses with Sandia National Laboratories' Integrated Safety Management contractor assurance system.[17] Specifically, the report stated, among other things, that (1) contractor self-assessments often failed to identify weaknesses that were subsequently identified by independent assessments and (2) the NNSA site office had not always included goals in the contractor's performance evaluation plans for correcting known weaknesses.

NNSA's work with nuclear materials such as plutonium and highly enriched uranium, nuclear weapons and their components, and large amounts of classified data requires extremely high security. However, we have documented cases of poor security performance within the nuclear security enterprise. For example, in January 2008, we reported that Los Alamos experienced 57 reported security incidents involving the compromise or potential compromise of classified information from

[17] DOE Office of Inspector General, *Integrated Safety Management at Sandia National Laboratories*, DOE/IG-0866 (Washington, D.C.: May 2012).

October 1, 2002, through June 30, 2007, according to DOE records.[18] Thirty-seven (or 65 percent) of these reported incidents posed the most serious threat to U.S. national security interests. Of the remaining 20 incidents, 9 involved the confirmed or suspected unauthorized disclosure of secret information, which posed a significant threat to U.S. national security interests. The remaining 11 reported security incidents involved the confirmed or suspected unauthorized disclosure of confidential information, which posed a threat to DOE security interests. Since that time, NNSA has made progress resolving some security issues. In our January 2007 report, we made 21 recommendations to the Secretary of Energy and the Administrator of NNSA that were intended to correct deficiencies in five areas, including security.[19] Our security-related recommendations included having NNSA implement a professional development program for security staff to ensure the completion of needed training, develop a framework to evaluate results from security reviews and guide security improvements, and establish formal mechanisms for sharing and implementing lessons learned across the nuclear security enterprise. DOE and NNSA have taken important steps to address most of these recommendations. Specifically, NNSA's establishment of an effective headquarters security organization has made significant progress implementing these recommendations by performing security reviews, developing security performance measures, and instituting a security lessons-learned center.

Nevertheless, NNSA has struggled to sustain security improvements while continuing to experience security deficiencies. In June 2008, we reported that significant security problems at Los Alamos had received insufficient attention.[20] The laboratory had over two dozen initiatives under way that were principally aimed at reducing, consolidating, and better protecting classified resources. However, the laboratory had not implemented complete security solutions to address either classified parts storage in unapproved storage containers or weaknesses in its process for ensuring that actions taken to correct security deficiencies were

[18] GAO, *Los Alamos National Laboratory: Information on Security of Classified Data, Nuclear Material Controls, Nuclear and Worker Safety, and Project Management Weaknesses*, GAO-08-173R (Washington, D.C.: Jan. 10, 2008).

[19] GAO-07-36

[20] GAO, *Los Alamos National Laboratory: Long-Term Strategies Needed to Improve Security and Management Oversight*, GAO-08-694 (Washington, D.C.: June 13, 2008).

completed. Furthermore, Los Alamos had implemented initiatives that addressed a number of previously identified security concerns but had not developed the long-term strategic framework necessary to ensure that its fixes would be sustained over time. In March 2009, we reported on numerous and wide-ranging security deficiencies at Livermore, particularly in the ability of Livermore's protective forces to ensure the protection of special nuclear material and the laboratory's protection and control of classified matter.[21] Livermore's physical security systems, such as alarms and sensors, and its security program planning and assurance activities were also identified as areas needing improvement. Weaknesses in Livermore's contractor self-assessment program and the Livermore Site Office's oversight of the contractor contributed to these security deficiencies at the laboratory. According to one DOE official, both programs were "broken" and missed even the "low-hanging fruit." The laboratory took corrective action to address these deficiencies, but we noted that better oversight was needed to ensure that security improvements were fully implemented and sustained.

NNSA Needs to Make Further Improvements to Its Management of Major Projects and Contracts

A basic tenet of effective management is the ability to complete projects on time and within budget. However, for more than a decade and in numerous reports, we have found that NNSA has continued to experience significant cost and schedule overruns on its major projects, principally because of ineffective oversight and poor contractor management. Specifically:

- In August 2000, we reported that poor management and oversight of the National Ignition Facility construction project at Lawrence Livermore National Laboratory had increased the facility's cost by $1 billion and delayed its scheduled completion date by 6 years.[22] Among the many causes for the cost overruns or schedule delays, DOE and Livermore officials responsible for managing or overseeing the stadium-sized laser facility's construction did not plan for the technically complex assembly and installation of the facility's 192 laser

[21] GAO, *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.: Mar. 16, 2009).

[22] GAO, *National Ignition Facility: Management and Oversight Failures Caused Major Cost Overruns and Schedule Delays*, GAO/RCED-00-271 (Washington, D.C.: Aug. 8, 2000).

beams. They also did not use independent review committees effectively to help identify and correct issues before they turned into costly problems. Similarly, in April 2010, we reported that weak management by DOE and NNSA had allowed the cost, schedule, and scope of ignition-related activities at the National Ignition Facility to increase substantially.[23] Since 2005, ignition-related costs have increased by around 25 percent—from $1.6 billion in 2005 to over $2 billion in 2010—and the planned completion date for these activities has slipped from the end of fiscal year 2011 to the end of fiscal year 2012 or beyond.

- We have issued several reports on the technical issues, cost increases, and schedule delays associated with NNSA's efforts to extend, through refurbishment, the operational lives of nuclear weapons in the stockpile. For example, in December 2000, we reported that refurbishment of the W87 strategic warhead had experienced significant design and production problems that increased its refurbishment costs by over $300 million and caused schedule delays of about 2 years.[24] Similarly, in March 2009, we reported that NNSA and the Department of Defense had not effectively managed cost, schedule, and technical risks for the B61 nuclear bomb and the W76 nuclear warhead refurbishments.[25] For the B61 life extension program, NNSA was only able to stay on schedule by significantly reducing the number of weapons undergoing refurbishment and abandoning some refurbishment objectives. In the case of the W76 nuclear warhead, NNSA experienced a 1-year delay and an unexpected cost increase of nearly $70 million as a result of its ineffective management of one of the highest risks of the program—manufacturing a key material known as Fogbank, which NNSA needed to refurbish the warhead but did not have the knowledge, expertise, or facilities to manufacture.

[23] Ignition-related activities consist of the efforts separate from the facility's construction that have been undertaken to prepare for the first attempt at ignition—the extremely intense pressures and temperatures that simulate on a small scale the thermonuclear conditions created in nuclear explosions. See GAO, *Nuclear Weapons: Actions Needed to Address Scientific and Technical Challenges and Management Weaknesses at the National Ignition Facility*, GAO-10-488 (Washington, D.C.: Apr. 8, 2010).

[24] GAO, *Nuclear Weapons: Improved Management Needed to Implement Stockpile Stewardship Program Effectively*, GAO-01-48, (Washington, D.C.: Dec. 14, 2000).

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

- In October 2009, we reported on shortcomings in NNSA's oversight of the planned relocation of its Kansas City Plant to a new, more modern facility.[26] Rather than construct a new facility itself, NNSA chose to have a private developer build it. NNSA would then lease the building through the General Services Administration for a period of 20 years. However, when choosing to lease rather than construct a new facility itself, NNSA allowed the Kansas City Plant to limit its cost analysis to a 20-year life cycle that has no relationship with known requirements of the nuclear weapons stockpile or the useful life of a production facility that is properly maintained. As a result, NNSA's financing decisions were not as fully informed and transparent as they could have been. If the Kansas City Plant had quantified potential cost savings to be realized over the longer useful life of the facility, NNSA might have made a different decision as to whether to lease or construct a new facility itself.

- We reported in March 2010 that NNSA's plutonium disposition program was behind schedule in establishing a capability to produce the plutonium feedstock necessary to operate its Mixed-Oxide Fuel Fabrication Facility currently being constructed at DOE's Savannah River Site in South Carolina.[27] In addition, NNSA had not sufficiently assessed alternatives to producing plutonium feedstock and had only identified one potential customer for the mixed-oxide fuel the facility would produce. In its fiscal year 2012 budget justification to Congress, NNSA reported that it did not have a construction cost baseline for the facility needed to produce the plutonium feedstock for the mixed-oxide fuel, even though Congress had already appropriated over $270 million through fiscal year 2009 and additional appropriation requests totaling almost $2 billion were planned through fiscal year 2016. NNSA stated in its budget justification that it was considering options for producing necessary plutonium feedstock without constructing a new facility.

[26] GAO, *Nuclear Weapons: National Nuclear Security Administration Needs to Better Manage Risks Associated with Modernization of Its Kansas City Plant*, GAO-10-115 (Washington, D.C.: Oct. 23, 2009).

[27] GAO, *Nuclear Nonproliferation: DOE Needs to Address Uncertainties with and Strengthen Independent Safety Oversight of Its Plutonium Disposition Program*, GAO-10-378 (Washington, D.C.: Mar. 26, 2010). Mixed-oxide fuel contains plutonium blended with natural uranium, reprocessed uranium, or depleted uranium.

- In November 2010, we reported that NNSA's plans to construct a modern Uranium Processing Facility (UPF) at its Y-12 National Security Complex in Oak Ridge, Tennessee, had experienced significant cost increases.[28] Originally estimated in 2004 to cost from $600 million to $1.1 billion, NNSA revised its cost estimate in 2007, more than doubling the estimated cost to construct the facility to between $1.4 billion and $3.5 billion. Costs have continued to rise since we issued our report. As of September 2011, NNSA estimated that the facility would cost from $4.2 billion to $6.5 billion to construct—a nearly seven-fold cost increase from the original estimate.

- We reported in March 2012 on NNSA's plans to construct the Chemistry and Metallurgy Research Replacement Nuclear Facility (CMRR) at Los Alamos, which is intended to modernize the laboratory's capability to analyze and store plutonium.[29] Specifically, we found that in 2005, when DOE developed initial plans for CMRR, it estimated that the project would cost from $745 million to $975 million and would be completed between 2013 and 2017. In April 2010, NNSA estimated that CMRR will cost between $3.7 and $5.8 billion—a nearly six-fold increase from the initial estimate—and that construction will be complete by 2020—a 3- to 7-year delay. In February 2012, after we had provided NNSA with a draft of our report for its comments, NNSA announced that it had decided to defer CMRR construction by at least an additional 5 years, bringing the total delay from NNSA's original plans to 8 to 12 years. Furthermore, even though CMRR as designed may be large enough to meet nuclear weapon stockpile requirements, it is unclear if the facility will be large enough to accommodate DOE's nonweapons activities that involve plutonium—such as nonproliferation, nuclear forensics, and nuclear counterterrorism programs—because the department has not comprehensively studied their long-term research and storage needs.

[28] GAO, *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.: Nov. 19, 2010).

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

As discussed above, NNSA remains on our high-risk list as vulnerable to fraud, waste, abuse, and mismanagement. DOE has recently taken a number of actions to improve management of major projects, including those overseen by NNSA. For example, DOE has updated program and project management policies and guidance in an effort to improve the reliability of project cost estimates, better assess project risks, and better ensure project reviews that are timely and useful and identify problems early. These are positive steps, and we will continue to monitor and evaluate DOE's and NNSA's implementation of these actions. However, DOE needs to ensure that NNSA has the capacity—that is, the people and other resources—to resolve its project management difficulties so that its major projects do not continue to experience major cost overruns and schedule delays.

In conclusion, the critical nature of the work NNSA performs and the high-hazard operations it conducts—often involving extremely hazardous materials, such as plutonium and highly enriched uranium, that must be stored under high security to protect them from theft—requires careful oversight and stringent safety and security requirements. With regard to the concerns that DOE's and NNSA's oversight of the laboratories' activities has become excessive and that safety and security requirements are overly prescriptive and burdensome, we agree that excessive oversight and micromanagement of contractors' activities is not an efficient use of scarce federal resources. Nevertheless, in our view, the problems we continue to identify in the nuclear security enterprise are not caused by excessive oversight, but instead result from ineffective oversight. NNSA has made significant progress—including the establishment of an effective headquarters security organization—resolving many of the safety and security weaknesses we have identified, but more effective oversight is needed to ensure that these improvements are fully implemented and sustained.

Regarding management of major projects and contracts, NNSA has, to its credit, successfully ensured that the nuclear weapons stockpile remains safe and reliable in the absence of underground nuclear testing, accomplishing this complicated task by using state-of-the-art facilities, as well as the skills of top scientists. NNSA faces a complex task in planning, budgeting, and ensuring the execution of interconnected activities across the nuclear security enterprise. Among other things, maintaining government-owned facilities that were constructed more than 50 years ago and ensuring M&O contractors are sustaining critical human capital skills that are highly technical in nature are difficult undertakings. Over the past decade, we have made numerous recommendations to DOE and

NNSA to improve their management practices. DOE and NNSA have acted on many of these recommendations and have made considerable progress. Nevertheless, enough significant management problems remain that prompt some to call for removing NNSA from DOE and either moving it to another department or establishing it as a separate agency. However, we do not believe that such drastic changes are necessary. Importantly, we are uncertain whether such significant organizational changes to increase NNSA's independence would produce the desired effect of creating a modern, responsive, effective, and efficient nuclear security enterprise. Nevertheless, DOE and NNSA must continue their efforts to (1) commit sufficient people and resources to resolve project and contract management problems and (2) demonstrate, on a sustained basis, the ability to complete major projects on time and on budget. As NNSA is proposing to spend decades and tens of billions of dollars to modernize the nuclear security enterprise, Congress and the American taxpayer have the right to know whether investments made in the nuclear security enterprise are worth the cost.

Chairman Stearns, Ranking Member DeGette, 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 Acknowledgements

If you or your staff have any questions about this testimony, please contact me at (202) 512-3841 or aloisee@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 Allison Bawden, Ryan T. Coles, and Jonathan Gill, Assistant Directors; and Patrick Bernard, Senior Analyst.

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