

**GAO**

Testimony

Before the Subcommittee on Strategic  
Forces, Committee on Armed Services,  
House of Representatives

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For Release on Delivery  
Expected at 10:00 a.m. EDT  
Thursday, July 17, 2008

# NUCLEAR WEAPONS

## Views on NNSA's Proposal to Transform the Nuclear Weapons Complex

Statement of Gene Aloise, Director  
Natural Resources and Environment





Highlights of [GAO-08-1032T](#), a testimony before the Subcommittee on Strategic Forces, Committee on Armed Services, House of Representatives

## Why GAO Did This Study

Over the past several years, a serious effort has begun to comprehensively reevaluate how the United States maintains its nuclear deterrent and what the nation's approach should be for transforming its aging nuclear weapons complex. The National Nuclear Security Administration (NNSA), a separately organized agency within the Department of Energy (DOE), is responsible for overseeing this weapons complex, which comprises three nuclear weapons design laboratories, four production plants, and the Nevada Test Site.

In December 2007, NNSA issued a draft report on potential environmental impacts of alternative actions to transform the nuclear weapons complex, which NNSA refers to as Complex Transformation. NNSA's preferred action is to establish a number of "distributed centers of excellence" at sites within the existing nuclear weapons complex, including the Los Alamos National Laboratory for plutonium capabilities, the Y-12 Plant for uranium capabilities, and the Pantex Plant for weapons assembly, disassembly, and high explosives manufacturing. NNSA would continue to operate these facilities to maintain and refurbish the existing nuclear weapons stockpile as it makes the transition to a smaller, more responsive infrastructure.

GAO was asked to discuss NNSA's Complex Transformation proposal. This testimony is based on previous GAO work.

To view the full product, including the scope and methodology, click on [GAO-08-1032T](#). For more information, contact Gene Aloise at (202) 512-3841 or [aloisee@gao.gov](mailto:aloisee@gao.gov).

## NUCLEAR WEAPONS

### Views on NNSA's Proposal to Transform the Nuclear Weapons Complex

#### What GAO Found

Transforming the nuclear weapons complex will be a daunting task. In April 2006 testimony before the Subcommittee on Energy and Water Development, House Committee on Appropriations, GAO identified four actions that, in its view, were critical to successfully achieving the transformation of the complex. On the basis of completed and ongoing GAO work on NNSA's management of the nuclear weapons complex, GAO remains concerned about NNSA's and the Department of Defense's (DOD) ability to carefully and fully implement these four actions. For this reason, GAO believes that the Congress must remain vigilant in its oversight of Complex Transformation. Specifically:

- NNSA and DOD have not established clear, long-term requirements for the nuclear weapons stockpile. While NNSA and DOD have considered a variety of scenarios for the future composition of the nuclear weapons stockpile, no requirements have been issued. It is GAO's view that NNSA will not be able to develop accurate cost estimates or plans for Complex Transformation until stockpile requirements are known. Further, recent GAO work found that the absence of stockpile requirements is affecting NNSA's plans for manufacturing a critical nuclear weapon component.
- NNSA has had difficulty developing realistic cost estimates for large, complex projects. In September 2007, a contractor provided NNSA with a range of cost estimates for over 10 different Complex Transformation alternatives. However, the contractor stated that (1) its analysis was based on rough order-of-magnitude estimates and (2) NNSA should not use its cost estimates to predict budget-level project costs. In addition, in March 2007 GAO reported that 8 of 12 major construction projects being managed by DOE and NNSA had exceeded their initial cost estimates.
- NNSA will need to develop a transformation plan with clear, realistic milestones. GAO expects that once NNSA decides the path forward for Complex Transformation later this year, NNSA will put forward such a plan. However, GAO has repeatedly documented problems with NNSA's ability to implement its plans. For example, in February 2006 GAO reported problems with the planning documents that NNSA was using to manage the implementation of its new approach for assessing and certifying the safety and reliability of the nuclear stockpile.
- Successful transformation requires strong leadership. In 2006, NNSA created an Office of Transformation to oversee its Complex Transformation activities. However, GAO is concerned that the Office of Transformation may not have sufficient authority to set transformation priorities for all of NNSA, specifically as they affect nuclear nonproliferation programs.

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Madam Chairman and Members of the Subcommittee:

We are pleased to be here today to provide our observations on the National Nuclear Security Administration's (NNSA) proposal, known as Complex Transformation, to modernize the nuclear weapons complex. As you know, NNSA, a separately organized agency within the Department of Energy (DOE), is responsible for conducting nuclear weapon and nonproliferation-related national security activities in research and development laboratories, production plants, and other facilities.<sup>1</sup> With the moratorium on underground nuclear testing that began in 1992 and the subsequent creation of the Stockpile Stewardship Program, the mission of the nuclear weapons complex changed from "designing, building, and testing" successive generations of weapons to extending the life of the existing nuclear weapons stockpile through "scientific study, computer simulation, and refurbishment." To carry out its weapons activities, NNSA received about \$6.3 billion for fiscal year 2008 and has requested about \$6.6 billion for fiscal year 2009. Between fiscal years 2010 and 2013, NNSA is proposing to spend almost \$29 billion for these programs.

Over the past decade, NNSA has invested billions of dollars in sustaining the Cold War-era stockpile and upgrading the three nuclear weapons design laboratories with new, state-of-the-art experimental and computing facilities. In contrast, the production infrastructure of the nuclear weapons complex is aging and increasingly outdated. The 2001 Nuclear Posture Review found that the nuclear weapons manufacturing infrastructure had atrophied and needed to be repaired.<sup>2</sup> NNSA estimates that it will cost \$2.4 billion to reduce the backlog of deferred maintenance at these facilities to an appropriate level consistent with industry best practices. The 2001 Nuclear Posture Review also called for the development of a "responsive infrastructure" that would support a smaller nuclear deterrent. The United

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<sup>1</sup>Specifically, NNSA operates three national nuclear weapon design laboratories—Lawrence Livermore National Laboratory, California; Los Alamos National Laboratory, New Mexico; and the Sandia National Laboratories, New Mexico and California—four nuclear weapons production sites—the Pantex Plant, Texas; the Y-12 Plant, Tennessee; the Kansas City Plant, Missouri; and a portion of the Savannah River Site, South Carolina—and the Nevada Test Site.

<sup>2</sup>In section 1401 of the Floyd D. Spence Defense Authorization Act for Fiscal Year 2001 (Pub. L. No. 106-398), the Congress required the Secretary of Defense, in consultation with the Secretary of Energy, to "conduct a comprehensive review of the nuclear posture of the United States for the next 5 to 10 years." The 2001 Nuclear Posture Review was the second post-Cold War review of U.S. strategic nuclear forces. The first one was conducted in 1994.

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States subsequently committed to stockpile reductions in the Moscow Treaty with Russia, which was ratified in 2003.

NNSA's Complex Transformation effort seeks to address these issues by transforming to a smaller, more responsive infrastructure—one that will ultimately support a smaller nuclear weapons stockpile—while continuing to maintain and refurbish the existing nuclear weapons stockpile in the interim. In recent years, NNSA and the Department of Defense (DOD) have advocated replacing the existing stockpile with one composed of reliable replacement warheads (RRW), which could potentially be easier to manufacture, maintain, and certify without the need for underground nuclear tests. They believe the RRW program would help transform the complex. In addition, in January 2008 the Congress established the Congressional Commission on the Strategic Posture of the United States, which must conduct a review of nuclear weapons policies and requirements.<sup>3</sup> NNSA and DOD must cooperate with the Commission as it conducts its review.<sup>4</sup>

In December 2007, NNSA issued a draft report on the potential environmental impacts of alternative Complex Transformation actions.<sup>5</sup> NNSA's preferred action is to establish a number of "distributed centers of excellence" at sites within the existing nuclear weapons complex.<sup>6</sup> The individual centers of excellence proposed include the Los Alamos National Laboratory (LANL) for plutonium capabilities, the Y-12 Plant for uranium capabilities, and the Pantex Plant for weapons assembly and disassembly as well as for high explosives manufacturing. In addition, NNSA's preferred action includes the consolidation of significant quantities of special nuclear material. Implementation of the preferred action is supported by two major construction projects: (1) the Chemistry and Metallurgy Research Replacement Facility at LANL, which would provide

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<sup>3</sup>Commissioners include William Perry, James Schlesinger, John Foster, Lee Hamilton, Keith Payne, Ellen Williams, Harry Cartland, John Glenn, Fred Ikle, Morton Halperin, James Woolsey, and Bruce Tarter.

<sup>4</sup>National Defense Authorization Act for Fiscal Year 2008 (Pub. L. No. 110-181) §1062.

<sup>5</sup>NNSA, *Draft Complex Transformation Supplemental Programmatic Environmental Impact Statement* (Washington, D.C., Dec. 2007).

<sup>6</sup>According to NNSA, this preferred action is based on the consideration of environmental impacts, as well as consideration of other factors such as mission and infrastructure compatibility, economic analysis, safety, safeguards and security, and workforce training and retention.

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upgraded analytical chemistry capabilities to support manufacturing of “pits”—a key nuclear weapons component that contains plutonium; and (2) the Uranium Processing Facility at Y-12, which would provide upgraded capabilities to support manufacturing and processing of weapons components containing uranium. The total costs of these two projects are currently estimated to be as high as \$5.5 billion.

Our testimony discusses our concerns with NNSA’s Complex Transformation proposal and is based on completed and ongoing GAO work. To carry out our objective, we relied on previous GAO work, including our April 2006 testimony before the Subcommittee on Energy and Water Development, Committee on Appropriations, House of Representatives;<sup>7</sup> a May 2008 report on nuclear weapon pit manufacturing;<sup>8</sup> and our March 2007 report on DOE’s management of major construction projects.<sup>9</sup> 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 the audit to obtain sufficient, appropriate evidence to produce 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 statements today.

In summary:

Transforming the nuclear weapons complex will be a daunting task. The facilities that maintain and refurbish the legacy nuclear weapons stockpile must remain operational during the transition to a smaller, more responsive infrastructure while minimizing the potential safety, security, and environmental impacts of relocating and constructing this infrastructure. In our April 2006 testimony, we identified four actions that, in our view, are critical to successfully achieving the transformation of the

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<sup>7</sup>GAO, *Nuclear Weapons: Views on Proposals to Transform the Nuclear Weapons Complex*, [GAO-06-606T](#) (Washington, D.C.: April 26, 2006).

<sup>8</sup>GAO, *Nuclear Weapons: NNSA Needs to Establish a Cost and Schedule Baseline for Manufacturing a Critical Nuclear Weapon Component*, [GAO-08-593](#) (Washington, D.C.: May 23, 2008).

<sup>9</sup>GAO, *Department of Energy: Major Construction Projects Need a Consistent Approach for Assessing Technology Readiness to Help Avoid Cost Increases and Schedule Delays*, [GAO-07-336](#) (Washington, D.C.: Mar. 27, 2007).

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complex. We continue to believe these actions must be addressed. Specifically:

- NNSA and DOD will need to establish clear, long-term requirements for the stockpile by determining the types and quantities of nuclear weapons needed;
- After stockpile requirements are developed, NNSA will need to provide accurate estimates of the costs of transformation;
- NNSA will need to develop and implement a plan with clear milestones for measuring progress; and
- NNSA's Office of Transformation must have the authority to make and enforce its decisions on transformation and be held accountable by the Congress for achieving timely and cost-effective results.

On the basis of our review of recent and ongoing GAO work on NNSA's management of the nuclear weapons complex, we remain concerned about NNSA's and DOD's ability to carefully and fully implement these four actions. For this reason, we believe that the Congress must remain vigilant in its oversight of Complex Transformation.

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## NNSA and DOD Have Not Established Clear, Long-Term Requirements for the Nuclear Weapons Stockpile

The United States' nuclear weapons stockpile comprises nine nuclear weapons types, all of which were designed during the Cold War. Two of these systems—the B61 and the W76—are currently being refurbished to extend their useful lives for up to 30 years through NNSA's Life Extension Program.<sup>10</sup> In May 2008, we reported that, over the past few years, NNSA and DOD have considered a variety of scenarios for the future composition of the nuclear stockpile that would be based on different stockpile sizes and the degree to which the stockpile would incorporate new RRW designs.<sup>11</sup> For example, NNSA and DOD have considered how large the stockpile needs to be in order to maintain a sufficiently robust and responsive manufacturing infrastructure to respond to future global geopolitical events. In addition, NNSA and DOD have considered the number of warheads that will need to be either refurbished or replaced in the coming decades. However, NNSA and DOD have not issued requirements defining the size and composition of the future stockpile.<sup>12</sup>

We discussed one effect of this lack of clear stockpile requirements in our May 2008 report on plutonium pit manufacturing. Specifically, we found that in October 2006, NNSA proposed building a new, consolidated plutonium center at an existing DOE site that would be able to manufacture pits at a production capacity of 125 pits per year. However, by December 2007, NNSA stated that instead of building a new, consolidated plutonium center, its preferred action was to upgrade the existing pit production building at LANL to produce up to 80 pits per year.<sup>13</sup> Although DOD officials agreed to support NNSA's plan, these officials also stated that future changes to stockpile size, military

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<sup>10</sup>NNSA has already refurbished the W87. However, as we reported in December 2000—GAO, *Nuclear Weapons: Improved Management Needed to Implement Stockpile Stewardship Program Effectively*, [GAO-01-48](#) (Washington, D.C.: Dec. 14, 2000)—the W87 life extension experienced significant design and production problems that raised its costs by over \$300 million and caused schedule delays of about 2 years. We found that one of the main causes for these problems was an inadequate management structure and unclear leadership.

<sup>11</sup>[GAO-08-593](#).

<sup>12</sup>NNSA had planned to complete a detailed design definition and cost study of the RRW during 2008. However, the explanatory statement accompanying the fiscal year 2008 NNSA appropriation stated that the bill provided no funding for the RRW program.

<sup>13</sup>At LANL, pit manufacturing currently takes place within the Plutonium Facility-4 building, which was constructed in 1978 as a multiuse research and development facility. As of September 1, 2007, pit manufacturing and certification operations occupied about 35 percent of this building.

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requirements, and risk factors may ultimately lead to a revised, larger rate of production. This uncertainty has delayed NNSA in issuing final plans for its future pit manufacturing capability.

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## NNSA Has Had Difficulty Developing Realistic Cost Estimates for Large, Complex Projects

Once a decision is made about the size and composition of the stockpile, NNSA should develop accurate estimates of the costs of transforming the nuclear weapons complex. In September 2007, a contractor provided NNSA with a range of cost estimates for over 10 different Complex Transformation alternatives.<sup>14</sup> For example, the contractor estimated that the cost of NNSA's preferred action would be approximately \$79 billion over the period 2007 through 2060.<sup>15</sup> This option was also determined to be the least expensive. In contrast, the contractor's estimate for a consolidated nuclear production center—another alternative that would consolidate plutonium, uranium, and weapons assembly and disassembly at one site—totaled \$80 billion over the same period.<sup>16</sup> Although these estimates differ by only \$1 billion over 53 years, they are based on significantly different assumptions. Specifically, NNSA's preferred action assumes a manufacturing capacity of up to 80 pits per year, and the alternative for a consolidated nuclear production center assumes a capacity of 125 pits per year. In addition, the contractor cautioned that because its cost analysis was not based on any specific conceptual designs for facilities such as the consolidated nuclear production center, it had not developed cost estimates for specific projects. As a result, the contractor stated that its estimates should not be used to predict a budget-level project cost.

Historically, NNSA has had difficulty developing realistic, defensible cost estimates, especially for large, complex projects. For example, in March 2007,<sup>17</sup> we found that 8 of the 12 major construction projects that DOE and NNSA were managing had exceeded their initial cost estimates. One project, the Highly Enriched Uranium Materials Facility nearing

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<sup>14</sup>TechSource, Inc., LMI Government Consulting, *Independent Business Case Analysis of Consolidation Options for the Defense Programs SNM and Weapons Production Missions*, preliminary draft, September 2007.

<sup>15</sup>This cost estimate is reported using net present value, base year 2007.

<sup>16</sup>The contractor assumed this consolidated nuclear production center would be constructed at LANL.

<sup>17</sup>[GAO-07-336](#).



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completion at the Y-12 Plant, has exceeded its original cost estimate by over 100 percent, or almost \$300 million. We reported that the reasons for this cost increase included poor management and contractor oversight. In addition, NNSA's cost estimate for constructing the Chemistry and Metallurgy Research Replacement Facility has more than doubled—from \$838 million to over \$2 billion—since our April 2006 testimony. This revised cost estimate is so uncertain that NNSA did not include any annual cost estimates beyond fiscal year 2009 in its fiscal year 2009 budget request to the Congress. Finally, the preliminary results of our ongoing review of NNSA's Life Extension Program for this Subcommittee show that NNSA's cost estimate for refurbishing each B61 nuclear bomb has doubled since 2002.<sup>18</sup>

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## NNSA Will Need to Develop a Transformation Plan with Clear, Realistic Milestones

NNSA does not expect to issue a record of decision on Complex Transformation until later this year. As a result, we do not know the ultimate decision that NNSA will make—whether to modernize existing sites in the weapons complex or consolidate operations at new facilities. We expect that once NNSA makes this decision, NNSA will put forward a transformation plan with specific milestones to implement its decision. Without such a plan, NNSA will have no way to evaluate its progress, and the Congress will have no way to hold NNSA accountable.

However, over the past decade, we have repeatedly documented problems with NNSA's process for planning and managing its activities. For example, in a December 2000 report, we found that NNSA needed to improve its planning process so that there were linkages between individual plans across the Stockpile Stewardship Program and that the milestones contained in NNSA's plans were reflected in contractors' performance criteria and evaluations.<sup>19</sup> However, in February 2006, we reported similar problems with how NNSA is managing the implementation and reliability of the nuclear stockpile.<sup>20</sup> Specifically, we found that NNSA planning documents did not contain clear, consistent milestones or a comprehensive list of the scientific research being

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<sup>18</sup>NNSA is currently refurbishing two types of B61 nuclear bombs: the B61-7 and the B61-11.

<sup>19</sup>GAO, *Nuclear Weapons: Improved Management Needed to Implement Stockpile Stewardship Program Effectively*, [GAO-01-48](#) (Washington, D.C.: Dec. 14, 2000).

<sup>20</sup>GAO, *Nuclear Weapons: NNSA Needs to Refine and More Effectively Manage Its New Approach for Assessing and Certifying Nuclear Weapons*, [GAO-06-261](#) (Washington, D.C.: Feb. 3, 2006).

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conducted across the weapons complex in support of NNSA's Primary and Secondary Assessment Technologies programs. These programs are responsible for setting the requirements for the computer codes and experimental data needed to assess and certify the safety and reliability of nuclear warheads. We also found that NNSA had not established adequate performance measures to determine the progress of the weapons laboratories in developing and implementing this new methodology.

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## Successful Transformation Requires a Strong Office of Transformation

As we noted in July 2003, one of the key practices for successfully transforming an organization is to ensure that top leadership sets the direction, pace, and tone for the transformation.<sup>21</sup> One of the key problems that NNSA has experienced has been its inability to build an organization with clear lines of authority and responsibility. We also reported in January 2004 that NNSA, as a result of reorganizations, has shown that it can move from what was often called a "dysfunctional bureaucracy" to an organization with clearer lines of authority and responsibility.<sup>22</sup> In this regard, we stated in our April 2006 testimony that NNSA's proposed Office of Transformation needed to be vested with the necessary authority and resources to set priorities, make timely decisions, and move quickly to implement those decisions.<sup>23</sup> It was our view that the Office of Transformation should (1) report directly to the Administrator of NNSA; (2) be given sufficient authority to conduct its studies and implement its recommendations; and (3) be held accountable for creating real change within the weapons complex.

In 2006, NNSA created an Office of Transformation to oversee its Complex Transformation efforts. This office has been involved in overseeing early activities associated with Complex Transformation, such as the issuance of the December 2007 draft report on the potential environmental impacts of alternative Complex Transformation actions. However, the Office of Transformation does not report directly to the Administrator of NNSA. Rather, the Office reports to the head of NNSA's Office of Defense Programs. In this respect, we are concerned that the Office of

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<sup>21</sup>GAO, *Results-Oriented Cultures: Implementation Steps to Assist Mergers and Organizational Transformations*, [GAO-03-669](#) (Washington, D.C.: July 2, 2003).

<sup>22</sup>GAO, *National Nuclear Security Administration: Key Management Structure and Workforce Planning Issues Remain as NNSA Conducts Downsizing*, [GAO-04-545](#) (Washington, D.C.: June 25, 2004).

<sup>23</sup>[GAO-06-606T](#).

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Transformation may not have sufficient authority to set transformation priorities for all of NNSA, specifically as they affect nuclear nonproliferation programs. Because NNSA's ultimate decision on the path forward for Complex Transformation has not yet been made, it remains to be seen whether the office has sufficient authority to enforce transformation decisions or whether it will be held accountable within NNSA for these decisions.

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Madam Chairman, this concludes my prepared statement. I would be happy to respond to any questions that you or Members of the Subcommittee may have at this time.

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## GAO Contacts and Staff Acknowledgements

For further information on this testimony, please contact me at (202) 512-3841 or [aloisee@gao.gov](mailto:aloisee@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. Ryan T. Coles, Assistant Director; Allison Bawden; Jason Holliday; Leland Cogliani; Marc Castellano; and Carol Herrnstadt Shulman made key contributions to this testimony.

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