

GAO

Report to the Subcommittee on Energy  
and Water Development, Committee on  
Appropriations, U.S. Senate

October 2009

# NUCLEAR WEAPONS

## National Nuclear Security Administration Needs to Better Manage Risks Associated with Modernization of Its Kansas City Plant



GAO

Accountability \* Integrity \* Reliability



Highlights of [GAO-10-115](#), a report to the Subcommittee on Energy and Water Development, Committee on Appropriations, U.S. Senate

## Why GAO Did This Study

Built in 1943, the Kansas City Plant (KCP)—the National Nuclear Security Administration’s (NNSA) primary production plant for manufacturing nonnuclear components of nuclear warheads and bombs—is to be modernized because of its age and the high cost of maintenance and operation. Among other changes, NNSA plans to relocate KCP to a new facility and increase components obtained from external suppliers from about 54 to 70 percent. KCP’s continued supply of these components is essential for maintaining a reliable nuclear weapons stockpile.

GAO was asked to determine (1) how KCP developed plans for modernization, (2) actions KCP has taken to ensure uninterrupted production of components, and (3) actions KCP has taken to address the risks of outsourcing. GAO reviewed planning documents and met with officials from NNSA, KCP, and Sandia National Laboratories, which designs many of the components produced at KCP.

## What GAO Recommends

GAO is recommending, among other things, that NNSA ensure that future cost analyses consider the full useful life of the facility, revise the KCP relocation schedule to be consistent with Department of Energy (DOE) guidance and GAO-identified best practices, and develop a risk-based approach for managing technologies that could advance adversaries’ nuclear capabilities. In commenting on a draft of this report, NNSA generally agreed with our recommendations.

View [GAO-10-115](#) or [key components](#). For more information, contact Gene Aloise at (202) 512-3841 or [aloise@gao.gov](mailto:aloise@gao.gov).

## NUCLEAR WEAPONS

### National Nuclear Security Administration Needs to Better Manage Risks Associated with Modernization of Its Kansas City Plant

#### What GAO Found

KCP evaluated several alternatives on behalf of NNSA to modernize its facility based on whether the alternative (1) was consistent with NNSA’s goals for maintaining a smaller facility for producing nuclear weapons and one that could quickly adapt to change, (2) met NNSA’s commitments to Congress to operate a new facility by 2012, and (3) minimized costs and implementation risks. Based on KCP’s analyses of alternatives, NNSA chose to have a private developer build a new building in Kansas City 8 miles from the current facility, which NNSA would then lease through the General Services Administration (GSA) for a period of 20 years. However, in evaluating a financing method, KCP compared alternatives using cost estimates limited to 20 years. Twenty years is far shorter than the useful life of a production facility that is properly maintained; the current facility has operated for more than 60 years. NNSA and KCP officials acknowledge that while leasing a facility through GSA under a 20-year scenario is less costly than purchasing, it can be more costly over the longer term. Because KCP’s analysis did not consider costs beyond 20 years, NNSA cannot be certain if other alternatives, such as purchasing the facility, might have offered lower costs over the longer term.

KCP officials developed extensive plans to ensure that the production of components is not interrupted because of the transition to the new facility. However, its schedule—which is critical to ensuring that the move does not disrupt production—does not fully adhere to best practices GAO identified for schedule development and related DOE scheduling guidance. In February 2009, GAO assessed KCP’s schedule and found that, among other things, KCP had not adequately sequenced all activities in its schedule in the order in which they are to be carried out. GAO followed up in July 2009 and found that although KCP officials have made progress in addressing several of these problems, the schedule still has some shortcomings.

KCP has taken steps to mitigate some risks of increased outsourcing, but NNSA has not provided adequate oversight or clear and up-to-date export control guidance tailored for NNSA production and laboratory sites to effectively manage associated nuclear weapons proliferation risks. As such, KCP has not implemented a formal, risk-based approach to identify specific components and technologies that may be used by potential adversaries to develop or advance their nuclear capabilities. Lacking effective NNSA-specific guidance and a risk-based approach, KCP instead treats all components as if they pose equal proliferation risks. As such, items such as a common, commercially available screw are considered to be at the same level of proliferation risk as a complex mechanism designed to arm nuclear weapons. Further, KCP’s primary means of addressing this issue rests on its suppliers’ self-enforced compliance with a contract clause that outlines the suppliers’ responsibility to abide by applicable export control laws. Under this broadly applied approach to managing export control—where all components are treated as equal risks—NNSA may be missing opportunities at KCP to systematically identify and more effectively mitigate those risks that pose the greatest threats.

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## **Abbreviations**

DOD Department of Defense  
DOE Department of Energy  
DOJ Department of Justice  
GSA General Services Administration  
KCP Kansas City Plant  
NNSA National Nuclear Security Administration

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United States Government Accountability Office  
Washington, DC 20548

October 23, 2009

The Honorable Byron L. Dorgan  
Chairman  
The Honorable Robert Bennett  
Ranking Member  
Subcommittee on Energy and Water Development  
Committee on Appropriations  
United States Senate

Built in 1943, the Kansas City Plant (KCP)—the National Nuclear Security Administration’s (NNSA) primary production plant for manufacturing nonnuclear components of nuclear warheads and bombs—is being modernized because of its age and the high cost of maintenance and operation. KCP produces or procures more than 100,000 parts annually—ranging from nuts and bolts to complex radars—comprising about 85 percent of the components that go into a typical nuclear weapon. NNSA, a separately organized agency within the Department of Energy (DOE), owns the building, equipment, and components produced at KCP, and NNSA’s Kansas City Site Office provides local oversight of all activity. Honeywell Federal Manufacturing and Technologies (Honeywell) manages and operates the KCP facility for NNSA. In response to a July 2005 report of the Secretary of Energy Advisory Board’s infrastructure task force,<sup>1</sup> and NNSA’s 2006 strategic plan on infrastructure,<sup>2</sup> which proposed ways to transform the nuclear weapons complex, NNSA directed KCP to develop plans for modernizing its production facilities based on its goals of developing a smaller, more responsive production infrastructure—one that will ultimately support a smaller nuclear weapons stockpile—while continuing to maintain and refurbish the weapons currently in the stockpile. KCP outlined three key avenues for achieving NNSA’s goals, including (1) purchasing more components from external suppliers; (2) implementing a more commercial-like business process; and

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<sup>1</sup>Secretary of Energy Advisory Board, *Report of the Nuclear Weapons Complex Infrastructure Task Force: Recommendations for the Nuclear Weapons Complex of the Future* (Washington, D.C., July 13, 2005). Although not formally part of the nuclear weapons complex transformation, KCP aligned its modernization goals with NNSA’s overall transformation goals for the nuclear weapons complex.

<sup>2</sup>National Nuclear Security Administration, *Complex 2030: An Infrastructure Planning Scenario for a Nuclear Weapons Complex Able to Meet the Threats of the 21st Century* (Washington, D.C., Oct. 23, 2006).

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(3) building a smaller, modern, state-of-the-art, and more flexible manufacturing facility by 2012. KCP's current plans are expected to result in an 18-month relocation to a new facility, an increase in outsourcing of components from 54 to 70 percent, and a reduction in KCP's manufacturing footprint from about 3 million to 1 million square feet. KCP estimates that these measures will save about \$100 million annually.

Because KCP produces or procures components that are used to maintain the nation's nuclear weapons stockpile, any disruptions in production at KCP could negatively affect the nuclear weapons stockpile. Another important consideration—particularly as KCP increases purchases of components from external suppliers, or outsourcing—is ensuring that NNSA protects components and technologies, including weapons-related design drawings, unique production processes, and information that, although mostly unclassified, could be used by potential adversaries to develop or advance their nuclear capabilities. Recent GAO testimonies and a grand jury indictment have described events where foreign entities sought dual-use items—items that can be used for both commercial and military applications. In fact, we covertly purchased two such items—a triggered spark gap and an accelerometer—and shipped dummy copies overseas to demonstrate the ease with which real, illegal shipments could be affected.<sup>3</sup> These events also demonstrate potential nuclear proliferation risks and gaps in the nation's system for controlling the export of these items.<sup>4</sup> KCP regularly outsources the production of these types of dual-use items—which may have been designed at the nuclear weapons laboratories with unique weapons design characteristics, such as very high tolerances to extreme environments—raising questions as to whether these items may be more vulnerable to export.

In this context, you asked us to determine (1) how KCP developed plans for modernizing the facility, (2) actions KCP has taken to ensure uninterrupted production of components needed to support the weapons stockpile during and after the transition to the new facility, and (3) actions

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<sup>3</sup>Triggered spark gaps are versatile high-voltage switches used for medical applications that can also be used as nuclear weapons detonators. Accelerometers are sensors and instruments used for measuring, displaying, and analyzing acceleration and vibration.

<sup>4</sup>GAO, *Export Controls: Fundamental Reexamination of System Is Needed to Help Protect Critical Technologies*, [GAO-09-767T](#) (Washington, D.C.: June 4, 2009), and *Military and Dual-Use Technology: Covert Testing Shows Continuing Vulnerabilities of Domestic Sales for Illegal Export*, [GAO-09-725T](#) (Washington, D.C.: June 4, 2009).

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KCP has taken to address the risks and potential consequences of increased outsourcing of nonnuclear components.

To determine how KCP developed plans for modernizing the current facility, we reviewed NNSA and Honeywell documents describing the project's goals, approach, and rationale for key decisions on what actions to take, where to locate the facility, and how to finance it. We also interviewed officials at NNSA's Kansas City Site Office, Honeywell, and relevant subcontractors. Under our long-standing policy of not addressing issues in ongoing litigation, we did not evaluate KCP's analysis of location alternatives because a lawsuit was filed in October 2008 that among other things challenged the extent and adequacy of DOE's consideration of alternatives to its plans for replacing the KCP facility.<sup>5</sup> To determine the actions KCP has taken to ensure uninterrupted production of components, we reviewed agency and contractor documents describing transition plans and talked to officials at Sandia National Laboratories (Sandia) in New Mexico, which designs many of the nonnuclear components that are produced at KCP. We also evaluated the reliability of KCP's relocation schedule using GAO-identified best practices for effective scheduling,<sup>6</sup> many of which are also identified by DOE in its guidance on establishing performance baselines.<sup>7</sup> To determine the actions KCP has taken to address the risks associated with outsourcing, we reviewed agency and contractor documents, including KCP's outsourcing strategy and export control process and relevant export control laws and regulations, and interviewed key KCP, Sandia, and NNSA officials responsible for overseeing nuclear nonproliferation activities.

We conducted this performance audit from November 2008 through October 2009 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings

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<sup>5</sup>*Natural Resources Defense Council v. Samuel W. Bodman*, No. 1:08-cv-01709 (D. D.C. filed Oct. 8, 2008).

<sup>6</sup>GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, [GAO-09-3SP](#) (Washington, D.C.: March 2009).

<sup>7</sup>Department of Energy, *Performance Baseline Guide*, G 413.3-5 (Washington, D.C., Sept. 12, 2008).

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and conclusions based on our audit objectives. Appendix I contains a detailed description of our scope and methodology.

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## Background and Overview of Plans for Modernizing NNSA's KCP Facility

The KCP facility, NNSA's primary site for producing or procuring nonnuclear components, is the first site within the nuclear weapons complex scheduled for significant modernization. KCP does not possess weapons-grade nuclear materials, but it supplies approximately 85 percent of the nonnuclear components that compose a typical nuclear weapon—ranging from simple items like nuts and bolts to more complex components, such as radars, arming and firing mechanisms, and critical nuclear safety devices meant to prevent accidental detonation. The facility has a footprint of nearly 3 million square feet and costs about \$400 million per year to operate. Currently, about 127,000 square feet of this space is devoted to stored inventory, including production equipment, tooling, gauges, and testers.

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## Modernizing the KCP Facility

The production infrastructure of the nuclear weapons complex is aging and becoming increasingly outdated. A 2001 Department of Defense (DOD) review of the nation's nuclear policy found that the nuclear weapons production infrastructure needed to be repaired and made more flexible so that it could adapt to the changing needs of the nuclear weapons stockpile.<sup>8</sup> Subsequently, NNSA developed the strategic Complex Transformation Plan, which seeks to develop a smaller, more responsive production infrastructure—one that will ultimately support a smaller nuclear weapons stockpile—while continuing to maintain and refurbish the weapons currently in the stockpile.

As part of its Complex Transformation Plan, in 2006 NNSA directed KCP to develop plans for modernizing its production facilities. In its plans, KCP identified three key avenues for achieving NNSA's goals:

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<sup>8</sup>Department of Defense, *Nuclear Posture Review* (Washington, D.C., Dec. 31, 2001). This review was required by the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001, Pub. L. No. 106-398, § 1041, 114 Stat. 1654, 1654A-262 (2000), which directed 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 result of this review was DOD's proposal for the New Triad, which significantly expanded the range of strategic capabilities. A new *Nuclear Posture Review* is currently in progress—as required by the National Defense Authorization Act for Fiscal Year 2008, Pub. L. No. 110-181 § 1070, 122 Stat. 3, 327 (2008)—and a report on the results of this review is required to be submitted to Congress in 2009.



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*Increasing outsourcing.* KCP is increasing the percentage of nonnuclear components purchased from external suppliers from about 54 to 70 percent. At the same time, it is consolidating and reducing its external suppliers from about 412 in May 2008 to 320 in September 2009 to reduce the costs of working with and certifying multiple suppliers. As more components are acquired from external suppliers, KCP expects the equipment and infrastructure necessary for the production of many of those components to be eliminated, reducing the need for the large size and associated operating costs of the facility. KCP currently uses domestic-based suppliers, with the exception of those components that are acquired from Malaysia and Mexico. Nearly all of the components and processes that KCP outsources are unclassified; KCP officials told us that they have only certified one supplier that is approved for classified processing, production, and storage.

*Transforming its business processes.* Honeywell, the contractor that manages KCP, is implementing more commercial-like business practices. In particular, KCP officials note that they have recently been granted relief from some DOE and NNSA oversight, such as NNSA nuclear security orders, because it does not possess weapons-grade nuclear material and because commercial standards are being used. KCP officials believe that these changes will lead to more streamlined business processes with lower administrative costs. According to KCP officials, an independent review estimated that these lower costs will amount to \$37 million each year—more than one-third of the \$100 million annual cost savings KCP projects will result from its modernization plans.

*Building a modern, more flexible facility.* NNSA plans to have a new KCP facility built on an undeveloped site in Kansas City, Missouri. KCP's new facility is designed to be smaller and more adaptable than the current facility, allowing quick and economical changes to the capability and capacity of the facility, such as using more open manufacturing space and modular utility systems so that it can be quickly and inexpensively reconfigured to adapt to changing production needs. NNSA committed to Congress that the new KCP facility would be operating by 2012 but now expects a delay of about 1 year.

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## Financing the New Facility

To construct this new facility, NNSA identified three financing options. The traditional approach for financing construction projects is to request funding from Congress using a budget line item in the President's annual request for appropriations. If the requested funds are appropriated, a federal manager directly controls the scope, cost, and schedule of the

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design and construction of the facility. These projects usually require significant funding up front when the facility is being designed and constructed. However, as we have reported, large amounts of funding have become more difficult to obtain, and agencies are increasingly interested in financing alternatives that distribute costs over longer periods of time.<sup>9</sup> One alternative is to acquire facilities using the General Services Administration's (GSA) leasing authority, which allows GSA to lease space from a private developer on behalf of many government agencies. For a lease on privately owned land, the process culminates with a lease agreement of up to 20 years.<sup>10</sup> Another alternative, according to KCP officials, allows NNSA to secure financing directly through private developers for the construction of facilities, but this alternative allows only for a maximum 5-year lease term.<sup>11</sup>

We have considered federal leasing, in general, to be a challenge for almost 20 years. In January 2003 we designated federal real property as a high-risk area, citing the government's overreliance on costly, long-term leasing as one of the major reasons.<sup>12</sup> Our work has also shown that building ownership often costs less than operating leases, especially for long-term space needs.<sup>13</sup> Based on this work, we made recommendations in 2008 that agencies develop strategies to reduce reliance on leased space for long-term needs when ownership would be less costly.<sup>14</sup>

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<sup>9</sup>GAO, *Federal Real Property: Strategy Needed to Address Agencies' Long-standing Reliance on Costly Leasing*, [GAO-08-197](#) (Washington, D.C.: Jan. 24, 2008).

<sup>10</sup>The lease term may be for up to 30 years if the government owns the underlying land.

<sup>11</sup>Current NNSA policy permits potentially three additional 5-year options under this financing alternative—a total of 20 years.

<sup>12</sup>GAO, *High-Risk Series: An Update*, [GAO-03-119](#) (Washington, D.C.: January 2003).

<sup>13</sup>An operating lease is a lease that meets six criteria listed in the scorekeeping guidelines in OMB Circular A-11, app. A. Specifically, (1) ownership of the asset remains with the lessor during the term of the lease and is not transferred to the government at or shortly after the end of the lease term; (2) the lease does not contain a bargain-price purchase option; (3) the lease term does not exceed 75 percent of the estimated economic life of the asset; (4) the asset is a general purpose asset, it is not for a special purpose of the government, and it is not built to the unique specifications of the government lessee; (5) there is a private sector market for the asset; and (6) the present value of the minimum lease payments over the life of the lease does not exceed 90 percent of the fair market value of the asset at the beginning of the lease term.

<sup>14</sup>[GAO-08-197](#).

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## Avoiding Interruptions in the Supply of Components

Another important consideration in KCP's modernization plans is avoiding interruptions in the supply of components it produces. Such interruptions could negatively affect the nuclear weapons stockpile and weaken national security. For example, as nuclear weapons components age, they may need to be replaced to avoid undermining the reliability and performance of the weapon that they occupy. KCP produces or procures these replacement components. Much of KCP's current workload supports the life extension program for the W76 warhead—carried on the Navy's Trident II submarine-launched ballistic missile—which is a significant part of the U.S. nuclear weapons stockpile. Life extensions lengthen weapons' operational life for an additional 20 to 30 years and allow NNSA to certify that the weapons continue to meet military performance requirements without underground nuclear testing. In addition, KCP currently produces or procures nonnuclear components needed to maintain the W88 submarine-launched ballistic missile warheads, the W78 and W87 intercontinental ballistic missile warheads, the W80 cruise missile warhead, and the B61 and B83 nuclear bombs.

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## Managing Outsourced Technologies

Another important consideration in KCP's modernization plans, particularly as it begins to increase outsourcing, is that KCP manages components and technologies that might be attractive to terrorists or other potential adversaries. Passing components and technologies to external suppliers may put them at greater risk of being obtained and used by potential adversaries to develop or advance their own nuclear capabilities. Recently, the Department of Justice (DOJ) reported that on a daily basis, foreign states as well as criminal and terrorist groups seek arms, technology, and other material to advance their technological capacity, and the United States is a primary target because it produces advanced technologies. For fiscal year 2008, DOJ reported that more than 145 defendants faced criminal charges for attempting to illegally transfer these items and technologies, with roughly 43 percent of these defendants charged with attempting to transfer them to Iran or China.

Some of the components KCP produces or procures, as well as technologies that can be developed from obtaining weapons-related design drawings and unique production processes, among other things, may be subject to laws and regulations controlling their export. Export control is primarily managed by the Departments of Commerce and State. The Department of Commerce, through the Export Administration Regulations, controls exports of most dual-use items and technologies. The Department of Commerce maintains the Commerce Control List, which describes the characteristics and capabilities of dual-use items that

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may require export licenses. The list is divided into 10 general categories of controlled technologies, such as sensors or electronics, which could include components that KCP produces or outsources. The Department of State, under the authority of the Arms Export Control Act and the International Traffic in Arms Regulations, controls exports of munitions items and technologies—those designed, developed, configured, adapted, or modified solely for military applications. These items are identified on the U.S. Munitions List, requiring most to be licensed for export. While these two departments are responsible for limiting the possibility of export-controlled items and technologies falling into the wrong hands, NNSA asserts that it is also generally responsible for the management and security of the nation’s nuclear weapons, including ensuring that nuclear weapons components or related information about these technologies are not used to advance the nuclear capabilities of potential adversaries.

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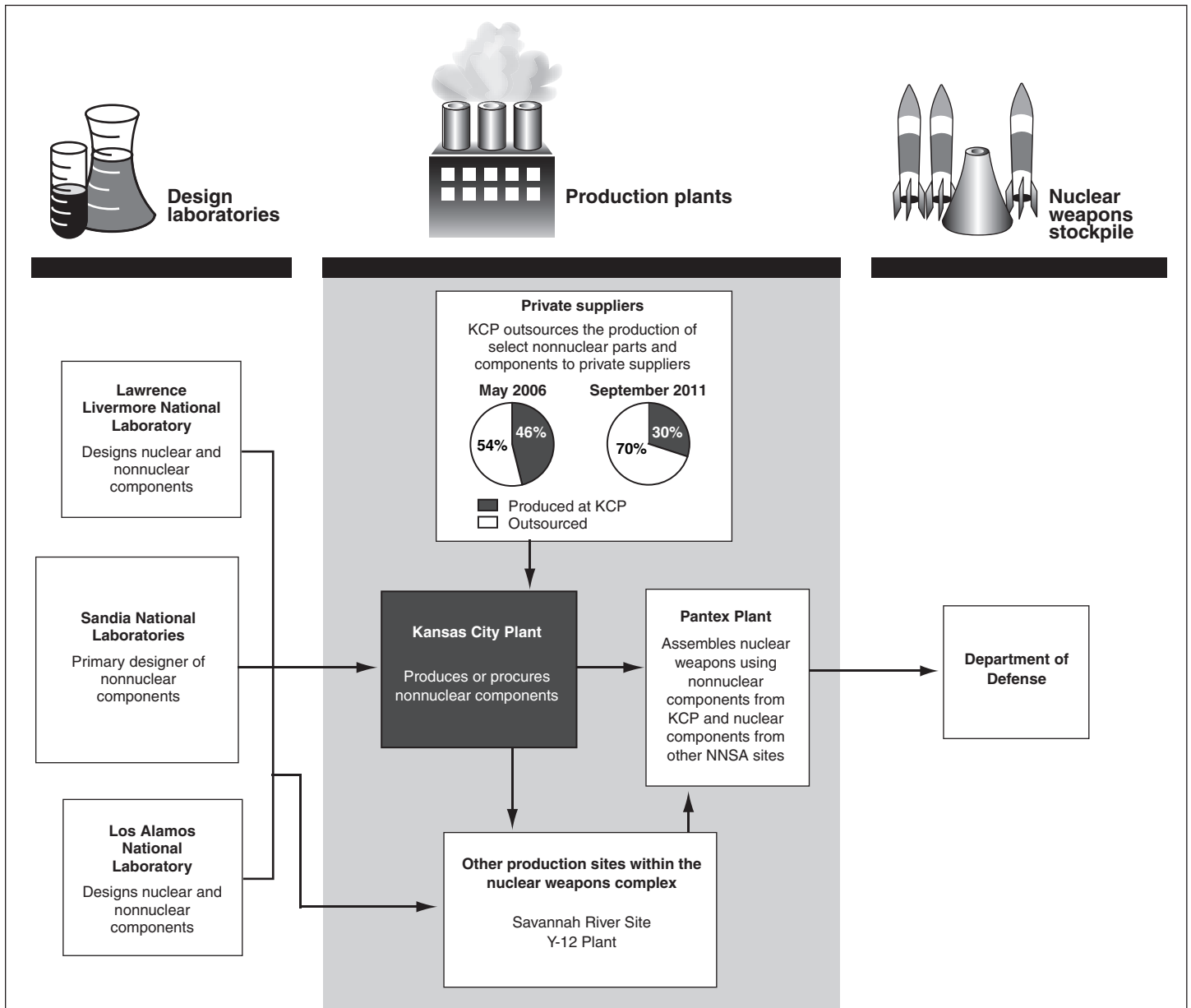
## Collaborating with NNSA’s National Laboratories

Many of the actions needed to successfully relocate the KCP facility require the ongoing cooperation of and collaboration with other NNSA laboratory sites. Design engineers at Lawrence Livermore, Los Alamos, and Sandia National Laboratories design the nonnuclear components produced or procured by KCP and determine whether the designs are classified, among other things. KCP produces or procures the components according to laboratory design specifications, but quality and production engineers from KCP continue to periodically collaborate with laboratory design engineers to oversee production, mitigate production risks, and integrate competing priorities, such as cost, schedule, design requirements, and quality. Before KCP begins full procurement or production of some components, laboratory design engineers must formulate a plan to qualify the component and assist in executing the qualification plan, which involves testing a sample of components to ensure that they meet quality, safety, and security standards. Such tests may include visual, environmental, mechanical, and electric tests, among others. In addition, if KCP decides to make major production changes or move the production process, components may have to be requalified to ensure that they still meet quality, safety, and security standards. Requalification can take from 1 month to more than 1 year, depending on the significance or complexity of the part and the extent of the planned production change. Requalification may also be required when a product is outsourced or moved from one supplier to another. As such, many components will have to be requalified before they can be produced at KCP’s new facility or by an external supplier. KCP is NNSA’s primary site within the nuclear weapons complex for producing nonnuclear components of nuclear warheads and bombs. Figure 1 illustrates how sites

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in the nuclear weapons complex interact with each other to design, produce, procure, and assemble nonnuclear components.

**Figure 1: Production of Nonnuclear Components in the U.S. Nuclear Weapons Complex**



Source: GAO analysis of NNSA and KCP data.

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## KCP Evaluated Several Alternatives for Modernizing Its Facility but Did Not Fully Analyze the Long-Term Impact of Some Financing Options

KCP officials told us that they evaluated several locations and financing alternatives based on their potential for satisfying NNSA's key goals outlined in its strategic plans for modernizing the overall infrastructure of the nuclear weapons complex. Based on analyses conducted by KCP, NNSA chose to lease a new facility for 20 years. However, KCP compared financing alternatives using cost estimates limited to 20 years rather than the full expected life of the proposed facility; therefore, NNSA cannot be certain whether other financing alternatives might have offered lower costs over the longer term.

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## KCP Evaluated Several Alternatives for Modernizing the Facility

KCP evaluated several alternatives on behalf of NNSA for modernizing its facility based on each alternative's potential to satisfy key goals outlined in NNSA's strategic plans for modernizing the nuclear weapons complex, among other things.<sup>15</sup> Specifically, KCP officials told us that they sought an option that (1) was consistent with NNSA's goals for maintaining a smaller facility for producing nuclear weapons and that could quickly adapt to change; (2) met schedule commitments to Congress; (3) minimized costs of constructing and annually operating and maintaining the facility; and, (4) maximized chances of completing the relocation within the established scope, cost, and schedule. Although KCP conducted the analyses of alternatives for modernizing its facility under the direction of NNSA, NNSA ultimately made its final decisions on how best to proceed using these analyses.

To determine how to proceed with the modernization of its facility, KCP officials stated that they considered (1) taking no action—essentially continuing operations at the current KCP location; (2) renovating adjacent GSA facilities; (3) purchasing or leasing other facilities that were already available in the Kansas City area; or (4) building a new facility on the existing KCP site, on other vacant land within Kansas City, or at another location. KCP officials explained that several of these options proved undesirable for a variety of reasons.

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<sup>15</sup>A lawsuit was filed in October 2008 that, among other things, challenged the extent and adequacy of DOE's consideration of alternatives to its plans for replacing the KCP facility. *Natural Resources Defense Council v. Samuel W. Bodman*, No. 1:08-cv-01709 (D. D. C. filed Oct. 8, 2008). Pursuant to its long-standing policy of not addressing issues in ongoing litigation, GAO has not evaluated DOE's consideration of these alternatives.

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- *Taking no action.* KCP determined that taking no action did not align with NNSA's overall Complex Transformation goals or commitments that NNSA's Deputy Administrator made to Congress to modernize the facility. According to KCP officials, taking no action would also result in annual operating costs that are about \$100 million higher than necessary beyond fiscal year 2013, over half of which would be related to facility maintenance.
  - *Renovating adjacent GSA facilities.* KCP determined that renovating adjacent GSA facilities was feasible and the least costly alternative in terms of construction costs, but it posed several problems. For example, renovating the 70-year-old facility would require extensive modification of electrical, heating, and cooling systems, which would require moving, penetrating, or bypassing concrete walls, floors, and ceilings. KCP officials stated that this would be difficult and time-consuming, and the considerable expense would be of questionable worth for such an old facility. Also, the adjacent facility is located in an area susceptible to flooding. Further, KCP officials stated that this option presented schedule risks. For example, multiple tenants in the GSA facility would need to relocate, and any delays in their relocations could cascade to the renovation process.
  - *Purchasing or leasing other available facilities in the Kansas City area.* KCP officials stated that they could not identify any other facilities in the region that were adequate for the KCP mission.

In light of these constraints, NNSA officials determined that building a new facility was the best option.

To identify a specific location for the new facility, KCP officials also told us that they considered nearby sites as well as sites outside of the Kansas City area. In particular, NNSA's Office of Transformation asked Science Applications International Corporation—a support contractor—to prepare an independent assessment of moving the nonnuclear production facilities from KCP to another site in the nuclear weapons complex.<sup>16</sup> In examining seven other active NNSA sites in the nuclear weapons complex, the study determined that Albuquerque, New Mexico, presented the highest potential for cost savings because Sandia—the primary design laboratory

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<sup>16</sup>Science Applications International Corporation, *Relocation of Non-Nuclear Production to an Alternate Location Business Case*, prepared for the National Nuclear Security Administration (Washington, D.C., Apr. 25, 2008).



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for nonnuclear components—has a location there. However, the study concluded that constructing the new facility in Albuquerque would not allow NNSA to recover the cost of moving the operation—reaching a “break even” point—by the end of the period considered in the study—about 20 years. The study also determined that relocating operations away from Kansas City would be expensive because staff would have to relocate, new staff would have to be trained, and critical expertise would be lost. Ultimately, based on KCP’s analysis, NNSA decided to build its new facility on an available site in Kansas City about 8 miles from the existing facility that is not on a flood plain.

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### KCP’s Cost Evaluation Did Not Consider the Full Life Cycle Costs of the Proposed Facility

To determine how to finance the construction of the new facility, KCP analyzed options to determine which best met NNSA’s goals and presented acceptably low risks. According to KCP officials, these options included (1) using congressional line item capital project funding, which is DOE’s traditional approach; (2) using a DOE lease process, which secures financing directly through private developers for the construction of facilities, but allows for a maximum 5-year lease term; and (3) using GSA’s leasing process. According to KCP officials, GSA’s leasing process was the best available financing alternative because it was the only financing option that could meet the NNSA Administrator’s commitment to Congress to operate the facility by 2012. GSA’s leasing process also led to the lowest overall total cost over a 20-year period and eliminated the need for large up-front capital outlays that Office of Management and Budget officials said would likely not be available for modernizing KCP. According to KCP officials, a 20-year lease through GSA would cost less annually than a lease undertaken through DOE’s lease process, which allows only a maximum 5-year lease.

The GSA lease process defines, among other things, (1) facility requirements; (2) how the facility should be built, such as security during construction; and (3) developer responsibilities for providing facility maintenance services over the life of the lease. For a lease on privately owned land, the process results in an operating lease agreement of up to 20 years—a legal and binding contract between GSA and a developer, with ownership remaining with the developer. KCP estimated that the GSA lease option would cost about \$4.762 billion, which includes estimated annual operating costs, onetime relocation costs, capital equipment, and annual lease payments of about \$43 million beginning in fiscal year 2011 and continuing through fiscal year 2030. In contrast, KCP’s total estimated cost for constructing the facility using congressional line item capital project funding is about \$4.875 billion, which includes the same types of

costs plus construction costs, but excludes annual lease payments because NNSA would own the facility.<sup>17</sup> KCP determined that DOE third-party financing was not viable because the process was new and unproven and offered only a short-term lease of 5 years, which KCP officials believed would likely result in higher annual lease costs because potential developers would have difficulty obtaining financing for such a short-term lease at a reasonable cost. As a result, KCP did not develop a total estimated cost based on a 5-year lease using DOE's process of obtaining third-party financing. Table 1 shows KCP's comparison of the two KCP options it determined would pose the lowest risk to implement—the GSA lease and DOE line-item project—revealing that the GSA lease is less costly than line-item funding by over \$100 million.

**Table 1: KCP's Comparison of Financing Options**

Dollars in billions			
Financing option	Meets NNSA's complex transformation goals	Meets NNSA's schedule commitments to Congress	Total estimated cost <sup>a</sup>
GSA lease	Yes	Yes	\$4.762
Congressional line item capital project funding	Yes	No	4.875

Source: GAO analysis of KCP data.

<sup>a</sup>KCP's total estimated cost is presented as the net present value in fiscal year 2006 dollars, with GSA lease payments beginning in fiscal year 2011 and ending in fiscal year 2030—a 20-year period. KCP's estimate also includes costs for the 5 years preceding commencement of the lease payments.

However, KCP did not compare alternatives using the total costs over the expected life of the proposed KCP facility—the full life cycle costs; therefore, NNSA cannot be certain whether other alternatives might result in lower longer-term costs. KCP limited its analysis of future costs to 20 years after lease payments begin, consistent with the longest lease term allowed under the GSA option and the longest period for which NNSA was willing to commit to under its current KCP relocation approach. However, 20 years is far shorter than the useful life of a production facility that is properly maintained; the current KCP facility has operated for more than 60 years. In addition, although requirements may change in the future, current nuclear weapons production requirements justify the need for KCP

<sup>17</sup>The congressional line item capital project costs were adjusted to account for the estimated residual value of the facility after 20 years—about \$130 million.

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manufacturing capabilities for at least another 32 years. Although leasing a facility for 20 years through GSA is less costly than leasing over shorter-term periods, leasing is usually more costly over the long term than constructing and owning a facility. NNSA and KCP officials acknowledged that while leasing a facility through GSA under a 20-year scenario is less costly than a line item project, it can be more costly over a longer-term scenario—possibly even beginning at about 22 years into the lease.

In early 2009, DOE's Office of Cost Analysis reviewed KCP's relocation project. Although ultimately supporting NNSA's decision to lease a new facility, DOE's review found KCP's cost analysis to be biased toward the leasing option. DOE's review noted that while leasing is more affordable up front, it is more costly over time, particularly since the government tends to occupy facilities for long periods of time and must pay relocation costs when the lease terms expire or negotiate new leases and continue making lease payments. KCP's cost analysis, being limited to 20 years, precludes including either of these costs, whereas a full life cycle cost analysis would have included both relocation and continuing lease costs.

KCP officials stated that limiting their analyses to 20 years is appropriate and is consistent with NNSA's overall approach for KCP's transformation. As part of its goals to develop a more adaptable nuclear infrastructure, NNSA determined that 20 years is the longest period for which it would be willing to commit under the current KCP relocation approach. NNSA officials stated that it is conceivable that the nation's entire nuclear stockpile, its nuclear strategy, or both could be obsolete by 2030 and a new strategy would apply. However, NNSA's weapons program manager for the W76 and W88 told us that current nuclear weapons production requirements for these two warhead types justify the need for KCP manufacturing capabilities until at least 2042. He added that since some threat to the United States will always exist, a new project will likely replace the W76 and W88 if they are ever taken out of service, thus justifying the need for KCP's manufacturing capabilities even beyond 2042.

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## KCP Is Taking Steps to Ensure Uninterrupted Production, Including Efforts to Address Scheduling Problems We Identified

KCP is initiating several key actions to help ensure that components are produced without delay or interruption, such as producing components before the move to compensate for periods of time when production will be halted and coordinating with design laboratories that will help to requalify equipment after the move. However, KCP's relocation schedule—which is critical to ensuring that the move does not disrupt production—did not initially adhere to all of GAO's best practices for schedule development. While KCP officials have taken steps to address some of these problems, the schedule still has some shortcomings.

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## KCP Is Initiating Several Key Actions to Help Ensure That Components Are Produced without Delay or Interruption

In preparation for KCP's 18-month move to its new facility, KCP officials have developed plans to ensure that it can continue to provide components for the nuclear weapons stockpile as scheduled. In 2007, KCP hired a professional moving company to develop a high-level strategy to minimize the duration, costs, and disruptions associated with the move. This strategy included major milestones and estimated time frames for moving each department within KCP. Based on these estimates, KCP has begun to produce components that it will store or deliver before and during the move to ensure that it can meet delivery requirements when production is halted to move, set up, and requalify equipment at the new facility. KCP officials conducted long-range planning to determine the demand for components through 2016, which helped officials estimate the number of components to produce in advance. As of June 2009, KCP officials stated that they are largely on schedule for producing these additional components.

Moreover, KCP has established a formal program to capture and preserve information about certain production processes and ensure that production capabilities are not lost. While KCP does not plan to record information about all processes, officials developed more than 60 step-by-step videos, overview videos, and notes from subject matter experts. This knowledge preservation program focuses on processes that are difficult to develop or involve key personnel who are retiring or otherwise leaving through other forms of attrition, as well as processes that KCP uses infrequently or plans to outsource. These efforts are designed to allow KCP to transfer knowledge and resume internal production of outsourced components, if necessary. Our March 2009 report on NNSA's stockpile life extension program illustrates the importance of maintaining such

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information.<sup>18</sup> Specifically, at another NNSA site, we found that officials no longer knew how to manufacture a key material needed to refurbish the W76 warhead because the site had kept few records of the process when the material was made in the 1980s, and almost all staff with expertise on its production had retired or left the agency. NNSA's efforts to address this information gap resulted in \$69 million in cost overruns and a schedule delay of at least 1 year that presented significant logistical challenges for the Navy. KCP's knowledge preservation program should help avoid similar problems.

In addition, KCP has developed a strategy to estimate the cost and time needed to requalify production and testing equipment after the move, which will help to ensure that the equipment continues to produce components of the same quality as before the move. In particular, KCP officials have identified all equipment that they believe will need to be requalified and determined how the move will affect this equipment, which in turn will affect how extensive requalification efforts will need to be. For example, officials assessed how the production process will change as a result of KCP purchasing new equipment or outsourcing production. Changes in environment, such as temperature and humidity levels, could also affect equipment and production. KCP officials also estimated how long requalification will likely take, based on previous requalification efforts, and have been meeting with design laboratories since July 2006 to plan and budget requalification efforts and to communicate overall plans for KCP's transition.

However, officials at Sandia stated that they are concerned that they may not have sufficient funds to assist with requalification activities within KCP's scheduled time frames. KCP officials estimate that requalification activities will cost KCP about \$20 million, while Sandia estimates that their support of requalification activities will cost Sandia an additional \$40 million for fiscal years 2008 through 2013.<sup>19</sup> In fiscal year 2009, the design laboratories' budgets did not include funding for requalification at KCP; the laboratories have requested funding for fiscal year 2010. KCP officials acknowledge that if funding is not available, requalification

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<sup>18</sup>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).

<sup>19</sup>Lawrence Livermore and Los Alamos National Laboratories will also conduct requalification activities; however, Sandia maintains a primary role in conducting these activities.

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efforts will be delayed, which will significantly delay its production schedule. Nevertheless, KCP believes that NNSA is committed to the KCP transition and will provide adequate funding to the design laboratories to support requalification. Accordingly, KCP is continuing to coordinate with the laboratories to estimate requalification needs.

KCP officials have also made plans to provide additional capability and capacity at the new facility to produce components that implement new technology or to reestablish the production of outsourced components if necessary. Specifically, KCP designed the facility so that it can add second and third work shifts, which may allow it to increase production of some components if needed. KCP has also dedicated about 10 percent of the facility's total square footage—about 100,000 square feet out of the facility's 1 million total square feet—to unused space that can be quickly and cost effectively converted for new capabilities or expansion of existing ones. KCP officials stated that they designed the new facility with a more open manufacturing space and modular utility systems so that it can be quickly and inexpensively reconfigured to adapt to changing production needs. In contrast, reconfiguring KCP's current facility would require extensive modification of electrical, heating, and cooling systems, including moving, penetrating, or bypassing concrete walls, floors, and ceilings. KCP has also retained the capability to produce certain components that it currently outsources, which will allow it to reverse the decision to outsource those components and more quickly resume production internally if necessary. For other components, however, KCP officials have determined that there are many private suppliers with similar production capabilities. As a result, KCP will not retain the ability to produce these components or execute such processes.

KCP plans to reduce the size of its available stored inventory space from nearly 300,000 square feet to 60,000 square feet—a total reduction of about 240,000 square feet, or about 80 percent. This will be accomplished by higher-density storage and disposition of obsolete and surplus inventory. KCP officials are currently in the process of identifying surplus inventory, which they define as items that have not been used in the last 2 years or have no demand anticipated in the next 10 years. As of February 2009, KCP had identified from 8,000 to 9,000 parts as surplus inventory. Sandia design engineers are concerned that KCP may discard critical equipment that could be expensive and difficult to re-create if it were needed again in the future. However, according to KCP officials, most equipment stored at KCP is so outdated that it would cost more to repair the equipment than the equipment is worth. Moreover, KCP officials said that they have consulted periodically with design engineers as part of the review process

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and that before disposal of items is authorized, NNSA will distribute a list of excess items to all nuclear weapons complex sites to confirm that KCP does not need to retain these items. KCP officials said that they plan to continue to coordinate with the design laboratories as they reduce inventory.

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## KCP Has Begun Taking Steps to Address Some Scheduling Problems We Identified

As part of KCP's plans to ensure a smooth transition to its new facility, KCP officials are working to develop a comprehensive project schedule that details when relocation activities will occur, how long they will take, and how they are interrelated. The schedule provides a road map for the move and a means for gauging progress and identifying potential problems. KCP officials stated that they have not established a formal baseline of the schedule because the construction portion of the schedule is not firm.<sup>20</sup> We assessed KCP's initial schedule in February 2009 and found that KCP did not fully adhere to GAO-identified best practices for schedule development. We assessed its revised schedule in July 2009 and found that KCP officials have taken steps to address some of the problems identified in our initial review, but that the schedule still has some shortcomings.

We assessed KCP's relocation schedule based on the nine best practices we have identified for effective schedule estimating: (1) capturing key activities, (2) sequencing key activities, (3) assigning resources to key activities, (4) establishing the duration of key activities, (5) integrating key activities horizontally and vertically, (6) establishing the critical path for key activities, (7) identifying "float time"—the time that activities can slip before the delay affects the completion date, (8) performing a risk analysis of the schedule, and (9) updating the schedule using logic and durations to determine dates.<sup>21</sup> Most of these practices are also identified by DOE in recent guidance on establishing performance baselines.<sup>22</sup> Appendix II

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<sup>20</sup>KCP officials initially expected to establish a formal baseline for the schedule in April 2009, in conjunction with the lease award, which did not occur at that time. Subsequently, KCP officials have delayed establishing the schedule baseline and currently expect to have one established by fall 2009.

<sup>21</sup>GAO-09-3SP.

<sup>22</sup>Department of Energy, *Performance Baseline Guide*. Although there is not a one-to-one correlation, many of the GAO-identified best practices, are also suggested schedule development practices in DOE's *Performance Baseline Guide*.

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contains more details on GAO's best practices for scheduling and a description of our assessments.

Our assessment of KCP's February 2009 schedule revealed that KCP did not meet three of these best practices and only partially met five.<sup>23</sup> For example, we found that KCP's schedule did not reflect resources—such as labor, material, or overhead—required to complete each activity, which is important to determine the feasibility of the schedule based on available resources. Further, KCP officials told us that they did not intend to conduct a risk analysis of the schedule, which, according to best practices, is important to predict the level of confidence in meeting a program's completion date and to identify high-priority risks. In addition, our assessment revealed that KCP established excessively long time frames for some very broad activities—275 activities had time frames of over 200 days in length. According to best practices, activity durations should be as short as possible.

In April 2009, we provided KCP and NNSA officials with our assessment of the February schedule. Although KCP officials provided additional context about their particular schedule situation, they acknowledged that the pre-baselined schedule was not yet complete and expressed an intention to work toward ensuring that the relocation schedule better conforms to GAO-identified best scheduling practices. For example, KCP officials acknowledged that they did not assign resources to activities in the schedule as suggested by GAO best practices, but explained that they planned to assign resources to certain activities in the schedule as well as track resources using other management systems as they complete a more detailed relocation plan in fiscal year 2011. KCP officials also explained that scheduling is time-intensive, and that the schedule is updated and improved daily. For example, KCP officials told us that they are in the process of reducing the number of activities with excessively long durations by, among other things, splitting longer duration activities into more detailed and shorter tasks as more information becomes available. KCP officials further explained that most of the activities with long durations are well into the future and cannot be accurately broken into smaller segments until some near-term activities are completed. In addition, KCP officials explained that although they have not performed a

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<sup>23</sup>In our February 2009 review, we had not completed our assessment of whether KCP's schedule had captured all key activities because we were missing key information and needed additional clarification. KCP supplied additional information and clarification for our July 2009 review.



formal risk analysis on the schedule, they use alternative methods to identify and reduce scheduling risks. For example, KCP officials told us that scheduling officials consult subject matter experts to provide estimates for the duration of activities, which they believe will be successfully executed within those time frames. Further, KCP officials asserted that they are monitoring schedule risks at the project and program levels through a separate database.

In our review of KCP's revised schedule in July, we found that KCP had taken steps to address some of the problems we identified; however, the schedule still does not fully adhere to GAO's best practices. Specifically, KCP improved the schedule in several areas. For example, KCP's February schedule did not fully resolve some key activities on the critical path—the path of work that must be completed as planned if the projected completion date is to be met. To correct this, KCP's July schedule included additional information on the lease award and other activities in the critical path that more realistically depicts KCP's overall expected completion date for relocation—October 2013, about a 1-year delay from NNSA's original commitment to Congress. However, a few practices that KCP's initial schedule either did not meet or only partially met did not significantly improve. For example, although KCP officials monitor schedule risks in a separate database, they do not plan to conduct a risk analysis using statistical analysis techniques as suggested by GAO-identified best practices. Table 2 summarizes the progress KCP made from February through July 2009.

**Table 2: KCP's Progress in Meeting GAO-Identified Best Practices for Scheduling**

Criterion	February 2009	July 2009
Capturing all activities	<sup>a</sup>	Partially meets
Sequencing all activities	Does not meet	Partially meets
Assigning resources to all activities	Does not meet	Does not meet
Establishing the duration of all activities	Partially meets	Mostly meets
Integrating schedule activities horizontally and vertically	Partially meets	Mostly meets
Establishing the critical path for all activities	Partially meets	Mostly meets
Identifying float between activities	Partially meets	Partially meets
Conducting a schedule risk analysis	Does not meet	Does not meet
Updating the schedule using logic and durations to determine the dates	Partially meets	Mostly meets

Source: GAO assessment of KCP's relocation schedule plan as of February and July 2009.

<sup>a</sup>We did not assess this best practice in February 2009 because we needed KCP to first clarify details on the data we received. We obtained additional data and clarification for the July 2009 assessment.

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The timely implementation of KCP's relocation schedule is critical to ensure that the relocation occurs on time and does not risk disruption of component production. In particular, the relocation is scheduled to occur during a large production run for the W76 life extension program, which began 2 years ago and is scheduled to last at least 10 more years. An NNSA W76 program manager stated that the relocation was planned without substantial input from him and that KCP may have missed opportunities to reduce risks associated with the relocation. For example, if officials had delayed the relocation by 2 years as he would have recommended, KCP could have reduced potential disruptions to the life extension program for the W76 nuclear warhead. Moreover, the program manager stated that any schedule delays during the relocation will likely cascade to an already tight production and delivery schedule.

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## KCP Has Begun Taking Steps to Mitigate Some Outsourcing Risks but Could Better Safeguard Technologies That Pose Nuclear Proliferation Risks

KCP has begun taking steps to address outsourcing risks, such as potential interruptions to supply sources; unanticipated price increases; and quality assurance problems, including counterfeiting and sabotage. However, KCP lacks a formal, risk-based approach to identifying and mitigating risks posed by components and technologies, including weapons-related design drawings; unique production processes; and information that although mostly unclassified, could be used by adversaries to develop or advance their nuclear capabilities.

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## KCP Has Begun Taking Steps to Mitigate Many Risks of Outsourcing

Sandia design engineers that we interviewed identified several general risks of outsourcing that could jeopardize the quality or safety of nuclear weapons or affect KCP's schedule or costs, and KCP has begun taking steps that seek to mitigate many of those risks. Specifically:

- *Loss of a supplier.* Sandia officials stated that relying on one supplier to produce a particular component can be risky because if a supplier can no longer produce components for KCP because of business failures, loss of interest in working with KCP, a natural disaster, or other reasons, production may be delayed while KCP identifies an alternative supplier or reestablishes production capabilities on-site. To mitigate this risk, KCP is developing a pool of capable suppliers for outsourced components so that

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it can quickly move production to another qualified supplier, if necessary. For example, when KCP officials decided to outsource a plating process—the process of coating electrical and mechanical products to improve their mechanical properties and protect against corrosion—they identified 1 primary supplier and 4 backup suppliers out of a potential pool of more than 2,000 suppliers that could be called upon if the primary supplier could no longer meet KCP’s needs. KCP officials told us that they also review potential suppliers’ financial stability and eliminate those companies with financial concerns from consideration.

- *Price increases.* According to Sandia officials, suppliers could increase their prices, which could cause an unanticipated increase in KCP’s manufacturing costs. To mitigate this risk, KCP officials told us that they include cost thresholds in their long-term purchase agreements and validate the reasonableness of the component price by comparing it with those of direct competition.
- *Quality assurance problems—including counterfeiting and sabotage.* Sandia officials stated that KCP is likely to have less direct control over outsourced production processes, which could lead to quality assurance problems, including an increased risk of counterfeiting and sabotage. KCP has, on occasion, experienced poor quality results from suppliers, which has required rework or changes in suppliers. Sandia officials also stated that they are increasingly concerned about the potential for KCP to unintentionally purchase counterfeit parts. For example, an expansive black market exists for some microelectronics, particularly in Southeast Asia. Sandia officials stated that counterfeit parts are becoming increasingly more sophisticated, thereby requiring more expertise to detect. Sandia officials also stated that suppliers may sabotage a component to undermine the reliability of a nuclear weapon. To mitigate these risks, KCP officials, sometimes accompanied by design engineers, have conducted periodic quality reviews, including scheduled and unannounced visits to some suppliers’ production sites. According to KCP officials, the frequency and type of these reviews depends on, among other things, the components’ degree of customization and the ease of inspection—in some cases, components must be destroyed while undergoing inspection, which is known as destructive testing. KCP officials have reportedly observed some suppliers’ production processes and overall quality of operations to verify that suppliers adhere to industry standards and follow proper production techniques, such as using appropriate levels of electrical voltage when manufacturing certain components. KCP officials also have tested components for problems with quality, including counterfeiting and sabotage. However, Sandia officials stated that testing might not always effectively reveal counterfeit parts or

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attempted sabotage. Although KCP officials said they do not outsource components that have the potential for sabotage that their tests cannot detect, KCP's efforts to restrict outsourcing of these components is not infallible. Although KCP's outsourcing process considers the security of a component and there is no evidence that sabotage has occurred in any components KCP has procured, KCP's outsourcing process lacks criteria and steps for determining and mitigating the risk of a component being counterfeited or sabotaged—a crucial feature of an effective risk-based approach. KCP officials have previously outsourced highly customized and preassembled components that cannot be easily inspected, potentially increasing the chance of counterfeited or sabotaged components going undetected.

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**KCP Has Not Conducted a Systematic Review to Identify Outsourced Technologies That Pose Nuclear Proliferation Risks**

KCP has not implemented a systematic review process to identify specific components, technologies, and information that although not considered to be classified national security information, are subject to export controls and could be used to advance the nuclear capabilities of adversaries. Although DOE guidance states that KCP should conduct a review to identify the components, technology, and information that could potentially advance the nuclear capabilities of potential adversaries, KCP and NNSA's site office have not conducted such a review. KCP and NNSA officials stated that they have not conducted such a review because NNSA's current interpretation of export control regulations is that all components used in nuclear weapons should be considered subject to the regulations. If this were not the case, the officials stated that it would be both difficult and time-consuming to make individual export control determinations for each of the many components produced or outsourced at KCP given the officials' perception of the lack of clarity in the regulations and would add little value to their current approach. Specifically, DOE issued guidance in 1999 to help DOE and its contractors to implement a consistent policy regarding transfers of unclassified equipment, materials, and technology that could adversely affect U.S. security or lead to the proliferation of weapons of mass destruction. This guidance specifies the need for an export control review to identify such equipment, materials, and technology, among other things, that could pose proliferation risks.<sup>24</sup> NNSA officials stated that although these guidelines are not requirements, they would be appropriate for KCP to use in its

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<sup>24</sup>Department of Energy, Office of Nonproliferation and National Security, Office of Arms Control and Nonproliferation, Nuclear Transfer and Supplier Policy Division, *Guidelines on Export Control and Nonproliferation*, July 1999.

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outsourcing decisions. Furthermore, the DOE guidance states that the NNSA site office manager at KCP is responsible for ensuring that KCP performs export control reviews.

As outsourcing increases and additional individuals gain access to nuclear weapons design and production information, potential adversaries could gain access to information that could be used to advance their own nuclear capabilities. KCP officials estimate that about 10 percent of the components KCP produces or procures would likely be considered high risk if a program of review existed, and acknowledged that they have not conducted a review to systematically evaluate the level of risk for each component. Instead, KCP officials stated that they treat each component and the associated design information as if they pose equal proliferation risks and are subject to International Traffic in Arms Regulations—the regulations controlling the exports of munitions items and technologies.<sup>25</sup> As such, items that pose little apparent risk of contributing to potential adversaries' development of nuclear weapons, such as a commercially available screw, are considered to be the same level of risk as complex components, such as a mechanism designed to arm nuclear weapons.

As a precautionary measure, KCP officials stated that they produce and assemble most of the more complex and higher-level components in-house, reserving outsourcing for components that are more commercially available, less complex, and at lower stages of assembly. Nevertheless, we observed that KCP officials currently outsource the production and assembly of several components that they determined to be of higher complexity and assumed the components were subject to export control requirements but did not conduct a systematic assessment of the components' actual proliferation risk. Without a systematic review process to identify which components and technologies—including weapons-related design drawings, unique production processes, and other information—pose greater threats, KCP may be missing opportunities to restrict certain outsourcing activities and mitigate the risk associated with sharing critical information that could be used to develop or enhance an adversary's nuclear weapon capabilities.

Furthermore, KCP's primary export control measure rests on its suppliers' compliance with a contract clause outlining their responsibility to abide by export control laws and safeguard nuclear weapon component production

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<sup>25</sup>The International Traffic in Arms Regulations appear at 22 C.F.R. §§ 120-130 (2009).

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and design information. The contract clause informs external suppliers of the potential applicability of export regulations and notifies suppliers that they must report any information that may require an export license or other forms of approval. For example, KCP outlines expectations for its suppliers, including to (1) disclose their intent to export a component or hire foreign nationals that might be exposed to the component or its design-related information and (2) fully comply with all export control laws and regulations. In some instances, self-reporting has allowed KCP to identify and mitigate a risk. For example, when one of KCP's domestic suppliers moved its operations to Mexico, KCP officials were faced with the decision whether to switch suppliers or retain the now foreign-based supplier. To mitigate concerns about working with a foreign-based company, KCP officials told us that they reevaluated the design of the component and decided to continue purchasing less-sensitive parts of the component—such as a type of connector—from that supplier, but found another domestic-based supplier to produce other more sensitive parts of the component—such as a particular type of cable. KCP officials told us that they took these actions after the supplier reported its relocation plans to KCP, as required in its contract. However, according to Sandia officials, supplier self-reporting has not always been a reliable approach. In another recent case, Sandia learned that a supplier was foreign owned only after it had already procured parts from that supplier, which led to additional costs, schedule delays, and other problems that eventually forced Sandia to produce the component in-house.

DOE and NNSA lack clear and up-to-date export control guidance. As a result, NNSA has not clearly communicated to KCP its expectations of what a systematic and consistent export control review process should include, or ensured that the specific components, technologies, and information that could be used to advance the nuclear capabilities of potential adversaries are identified. For example, NNSA officials that we spoke with noted that DOE's 1999 export control guidance is outdated. In 2005, NNSA officials determined that DOE's guidance needed to be updated, but the guidance revision was never completed. In addition, because the export control guidance is not tailored for NNSA production and laboratory sites, NNSA lacks firm criteria for conducting oversight of export control activities. KCP officials further explained that DOE's guidance is not helpful in interpreting the Commerce Control List, which is made up of broad categories that are not always specific to nuclear weapons technologies. For example, the Commerce Control List identifies sensors as a controlled technology; however, according to KCP officials, several items may fit that category, including items that could be used by potential adversaries to advance their own nuclear weapon capabilities as

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well as those that would not pose such a threat, such as a simple thermometer or rain gauge. Further, KCP officials stated that DOE's guidance does not clearly define laboratories' and production sites' responsibilities or provide a clear determination of who is responsible for identifying the components that are subject to export control. In particular, both KCP officials and design engineers told us that it is unclear whether KCP or the laboratories should determine the level of risk and how that risk should be communicated, such as how each design drawing should be labeled. KCP officials suggested that if design engineers identified the portions of the design drawing that may require more careful export control consideration, it would help them determine effective export risk mitigation steps. One KCP official stated that there is also considerable risk in asserting that a component is not subject to International Traffic in Arms Regulations, especially given the sensitivity and risk-averse nature of the nuclear weapons community. As a result, KCP has defaulted to treating all components as being of equal risk and subject to these regulations and has taken no specific actions to identify and mitigate the greatest risks.

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## Conclusions

KCP has made substantial progress toward achieving NNSA's overall goals to modernize its nonnuclear production facility and ensure continued production of quality components essential to maintaining the U.S. nuclear weapons stockpile. However, shortcomings in NNSA's oversight of KCP's relocation may offer lessons for future modernization efforts at its nuclear weapons facilities. In particular, NNSA allowed KCP 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, and did not require that KCP consider the full useful life of the facility in its analysis. As a result, NNSA's financing decisions were not as fully informed and transparent as they could have been. If KCP had quantified potential cost savings to be realized over the longer useful life of the facility, NNSA may have made a different decision. Further, because NNSA has not ensured that KCP's relocation schedule fully complies with DOE schedule development guidance and GAO-identified scheduling best practices, there is a potential for delays. A delay in KCP's relocation could affect the timely delivery of replacement components needed to maintain a reliable nuclear weapons stockpile, which, in turn, could have a detrimental effect on national security. Moreover, DOE and NNSA lack clear and up-to-date export control guidance that articulates NNSA's expectations of what a systematic and consistent export control review process should include. Because of this, KCP is not required to take—and therefore has not

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taken—proactive steps to identify specific components, technologies, and information that could be used to advance the nuclear capabilities of potential adversaries. Furthermore, without export control requirements that are designed specifically to meet NNSA production and nuclear weapons design laboratory needs, and an effective mechanism for ensuring enforcement of these requirements within NNSA, NNSA site offices are less able to

- (1) mitigate the risks associated with outsourcing components and
- (2) exercise effective oversight.

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## Recommendations for Executive Action

We recommend that the Secretary of Energy take the following five actions to strengthen NNSA's oversight practices and current and future facility modernization efforts.

To improve the transparency and usefulness of cost analyses prepared for future NNSA nuclear facilities modernization projects, we recommend that the Secretary of Energy direct the Administrator of NNSA to ensure that life cycle cost analyses include a thorough and balanced evaluation of short- and long-term construction and financing alternatives. Such analyses should consider the full useful life of the facility rather than the 20-year requirement for GSA leases or any predetermined length of time that might produce results that favor one option over another.

To better manage the KCP relocation schedule, we recommend that the Secretary of Energy direct the Administrator of NNSA to ensure that KCP's operating contractor revise the KCP relocation schedule so that it is consistent with DOE schedule development guidance and GAO-identified scheduling best practices, as outlined in appendix II.

Because of the importance of mitigating the risks of outsourcing nuclear weapons components and other information that if exported, might allow potential adversaries to develop or advance their nuclear capabilities, we also recommend that the Secretary of Energy direct the Administrator of NNSA to take immediate action to:

- Assess the effectiveness of NNSA's oversight of KCP's current export control and nonproliferation practices and, if appropriate, initiate corrective actions to strengthen that oversight.
- In collaboration with the Departments of State and Commerce, replace or supplement DOE's July 1999 Guidelines on Export Control and Nonproliferation with guidelines, or another form of directive as deemed



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appropriate by the agencies, that (1) clarify expectations for export control reviews to specifically meet NNSA production and nuclear weapon design laboratory needs and (2) contain an effective mechanism for ensuring enforcement of these export control guidelines within NNSA.

- Direct the KCP operating contractor to develop and implement a formal risk-based review process in cooperation with the nuclear weapons design laboratories that (1) identifies specific components, technologies, production processes, and related information that if exported, might allow potential adversaries to develop or advance their nuclear capabilities and (2) includes steps for mitigating these risks, particularly for considering whether or how to outsource these items.

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## Agency Comments and Our Evaluation

We provided NNSA with a draft of this report for its review and comment. In its written comments, NNSA states that our review was thorough and that we appropriately recognized NNSA's progress toward achieving the overall goals to modernize its production facility. NNSA also provided additional information on its overall approach for modernizing the KCP facility. NNSA generally agreed with our five recommendations and outlined some initial actions that it expects to take to address each of them.

NNSA provided its most substantive comments on our findings and recommendations concerning export control. Specifically, although agreeing with our three export control recommendations, NNSA stated that it will delay action on them until an export control working group that it created in July 2009 completes its analysis of export licensing and other related issues. While we believe NNSA's formation of a working group to study these export control issues is a positive first step toward improving its export control practices, it is important that NNSA not unduly delay taking action to mitigate nuclear proliferation risks associated with outsourcing nuclear weapons components and information.

Regarding our finding that KCP lacks a formal, risk-based approach to safeguard components and technology that could be used by potential adversaries, NNSA commented that KCP officials do not feel that additional outsourcing increases risk or that a more rigorous review would necessarily lead to different outsourcing decisions. However, as our draft report noted, without knowing which components pose the greatest risks, NNSA cannot be certain that it is focusing its efforts to safeguard the highest-risk components and technologies in the most effective manner.

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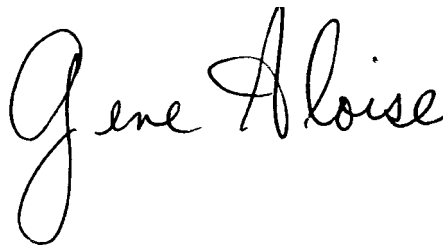
With regard to our recommendation that NNSA assess the effectiveness of its oversight of KCP's current export control and nonproliferation practices, NNSA responded that the correct export control requirements are being applied through its management and operating contract for KCP. Specifically, the management and operating contractor (Honeywell) uses standard export compliance clauses in supplier purchasing agreements to put suppliers on notice as to the requirements applicable to them. However, in our view, simply relying on the use of such clauses is not oversight. Because NNSA has the primary responsibility of preventing the proliferation of nuclear weapons, it is important that NNSA consider adopting a risk-based approach that could enhance existing export control requirements.

NNSA's comments are reprinted in appendix III.

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As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to the appropriate congressional committees; the Secretaries of Energy, State, and Commerce; the Administrator of NNSA; and the Director, Office of Management and Budget. The report also will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staffs have any questions about this report, 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 report. GAO staff who made major contributions to this report are listed in appendix IV.

A handwritten signature in black ink that reads "Gene Aloise". The signature is written in a cursive style with a large, looped initial "G".

Gene Aloise  
Director, Natural Resources and Environment

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# Appendix I: Objectives, Scope, and Methodology

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Our objectives were to determine (1) how the Kansas City Plant (KCP) developed plans for modernizing its facility, (2) actions KCP has taken to ensure uninterrupted production of components needed to support the nuclear weapons stockpile during and after the transition to the new facility, and (3) actions KCP has taken to address the risks and potential consequences of increased outsourcing of nonnuclear components.

To determine how KCP developed plans for modernizing the facility, we reviewed documents from the National Nuclear Security Administration (NNSA) and Honeywell Federal Manufacturing and Technologies (Honeywell), which manages and operates the KCP facility for NNSA, that describe the project's goals, approach, and rationale for key decisions on relocating and outsourcing the production of nonnuclear components. We also interviewed officials at NNSA's Kansas City Site Office, Honeywell, relevant subcontractors, and component design laboratories about KCP's relocation plans, approach, and time frames, including how the relocation might affect continued production of high-quality components and the risks posed by the current approach. Under our long-standing policy of not addressing issues in ongoing litigation, we did not evaluate KCP's analysis of relocation alternatives because a lawsuit was filed in October 2008 that, among other things, challenged the extent and adequacy of the Department of Energy's (DOE) consideration of alternatives to its plans for replacing the KCP facility.<sup>1</sup>

To determine the actions KCP has taken to ensure uninterrupted production of components needed to support the nuclear weapons stockpile during and after the transition to the new facility, we reviewed agency and contractor documents describing transition plans. We talked to officials at Sandia National Laboratories (Sandia) in New Mexico—which designs the nonnuclear components that are produced at KCP—about the impact of KCP's plans on the quality, reliability, and future support of the nuclear weapons stockpile. We evaluated the reliability of KCP's relocation schedule to determine the extent to which it captures key activities, is correctly sequenced, establishes the duration of key activities, is integrated, and has an established reliable critical path, among other things. We conducted an initial assessment in February 2009, and conducted a second assessment in July 2009 to evaluate the extent to

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<sup>1</sup>*Natural Resources Defense Council v. Samuel W. Bodman*, No. 1:08-cv-01709 (D. D.C. filed Oct. 8, 2008).

which the schedule improved over time. We based our assessment on GAO-identified best practices associated with effective schedule estimating,<sup>2</sup> many of which are also identified by DOE in its guidance on establishing performance baselines.<sup>3</sup> To assess KCP's schedule, we consulted with a scheduling expert and interviewed key program officials responsible for developing this schedule.

To determine the actions KCP has taken to address the risks and potential consequences of increased outsourcing of nonnuclear components, we reviewed agency and contractor documents, including KCP's outsourcing strategy and export control process. We also reviewed DOE's Export Control and Nonproliferation Guidelines, as well as relevant export control laws and regulations. In addition, we interviewed key KCP and Sandia officials to understand potential risks associated with outsourcing and KCP's approach for mitigating these risks, including nuclear proliferation risks. We met with NNSA site office officials responsible for overseeing KCP nuclear nonproliferation activities, and headquarters officials that provide guidance and nonproliferation expertise to site offices across NNSA.

We conducted this performance audit from November 2008 through October 2009 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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<sup>2</sup>[GAO-09-3SP](#).

<sup>3</sup>Department of Energy, *Performance Baseline Guide*.

# Appendix II: GAO Assessment of KCP's Relocation Schedule

Criterion	Explanation	GAO analysis – February 2009	GAO follow-up analysis – July 2009
Capturing all activities	The schedule should reflect all activities as defined in the program's work breakdown structure, to include activities to be performed by both the government and its contractors.	<b>Criteria not evaluated:</b> The schedule appears to contain most necessary activities; however, we were unable to verify whether all activities were included because of incomplete data and the need to clarify details on the data we received.	<b>Criteria partially met:</b> The schedule appears to contain most necessary activities; however, a supplemental dictionary that defines activities did not include sufficient detail for us to conclude that the schedule includes all the activities to be performed. The July schedule has a total of 5,592 activities.
Sequencing all activities	The schedule should be planned so that it can meet critical program dates. To meet this objective, key activities need to be logically sequenced in the order that they are to be carried out. In particular, activities that must finish before the start of other activities (i.e., predecessor activities) as well as activities that cannot begin until other activities are completed (i.e., successor activities) should be identified. By doing so, interdependencies among activities that collectively lead to the accomplishment of events or milestones can be established and used as a basis for guiding work and Sequencing all activities measuring progress.	<p><b>Criteria not met:</b> The schedule has an excessive amount of incomplete logic—where successor activities start before predecessor activities have completed—and an excessive amount of constrained tasks—which are tasks that have a specific start to finish date. According to best scheduling practices, the schedule should use logic and durations to reflect realistic start and completion dates for program activities. Specifically, we found</p> <ul style="list-style-type: none"> <li>• 212 tasks with early start constraints—that is, a “start no earlier than” date;</li> <li>• 2,121 activities with no successor activities;</li> <li>• 352 activities with no predecessor activities;</li> <li>• 102 lags—which are the duration between activities that delay successor activities; and</li> <li>• 850 negative lags—which allow the start or finish of a successor activity to occur earlier than the start or finish of a predecessor activity.</li> </ul>	<p><b>Criteria partially met:</b> KCP's use of constrained tasks has been reduced but not eliminated. Specifically, we found that since February 2009 KCP reduced the extent to which the following tasks were constrained:</p> <ul style="list-style-type: none"> <li>• the number of tasks with early start constraints was reduced from 212 in February to 144 in the July schedule;</li> <li>• the number of tasks with no successors was reduced from 2,121 in February to 200;</li> <li>• the number of tasks with no predecessor activities was reduced from 352 in February to 21;</li> <li>• the number of lags was reduced from 102 in February to 21, although some lags are still excessively long—from 240 to 422 days; and</li> <li>• the number of tasks with negative lags was reduced from 850 in February to 20.</li> </ul>

**Appendix II: GAO Assessment of KCP's  
Relocation Schedule**

<b>Criterion</b>	<b>Explanation</b>	<b>GAO analysis – February 2009</b>	<b>GAO follow-up analysis – July 2009</b>
Assigning resources to all activities	The schedule should reflect what resources (i.e., labor, material, and overhead) are needed to do the work, whether all required resources will be available when they are needed, and whether any funding or time constraints exist.	<b>Criteria not met:</b> The schedule did not include resources; therefore, it is not clear that this schedule is feasible.	<b>Criteria not met:</b> KCP's July schedule still does not include resources. Although the agency asserted that it has other systems to track resource use and to determine future resource needs, according to scheduling best practices, resources should be included in the schedule.
Establishing the duration of all activities	The schedule should realistically reflect how long each activity will take to execute. In determining the duration of each activity, the same rationale, data, and assumptions used for cost estimating should be used. Further, these durations should be as short as possible and they should have specific start and end dates. Excessively long periods needed to execute an activity should prompt further decomposition of the activity so that shorter execution durations will result.	<b>Criteria partially met:</b> The schedule included 138 activities with over 260 days' duration, which is approximately 1 year given a 5-day calendar. In addition, we found that KCP included 275 activities over 200 days in length. It is difficult to manage activities of this length and to know if these are realistic durations or how they were determined. According to best scheduling practices, durations should be as short as possible.	<b>Criteria mostly met:</b> Activity durations have been reduced, although some still remain long. For example, KCP has since reduced the number of activities with over 260 days duration from 138 in February to 57 activities in its July schedule. In addition, KCP has reduced the number of activities over 200 days in length from 275 in February to 204 in its July schedule. According to KCP officials, most of the long duration activities are well into the future and cannot be accurately decomposed until some near-term planning activities are completed.
Integrating schedule activities horizontally and vertically	The schedule should be horizontally integrated, meaning that it should link the products and outcomes associated with already sequenced activities. These links are commonly referred to as handoffs and serve to verify that activities are arranged in the right order to achieve aggregated products or outcomes. The schedule should also be vertically integrated, meaning that traceability exists among varying levels of activities and supporting tasks and subtasks. Such mapping or alignment among levels enables different groups to work to the same master schedule.	<b>Criteria partially met:</b> The schedule is not horizontally integrated. There are excessive instances of incomplete logic where activities have no successors. In addition, there is no evidence that the schedule is vertically traceable to other levels of activities, supporting tasks, or subtasks.	<b>Criteria mostly met:</b> KCP has made significant progress; however, because of the continued use of constraints, lags, and incomplete logic, the schedule is still not fully horizontally integrated. KCP has demonstrated that the schedule is vertically integrated with supporting tasks and subtasks through an external document.

**Appendix II: GAO Assessment of KCP's  
Relocation Schedule**

<b>Criterion</b>	<b>Explanation</b>	<b>GAO analysis – February 2009</b>	<b>GAO follow-up analysis – July 2009</b>
Establishing the critical path for all activities	Using scheduling software, the critical path—the longest duration path through the sequenced list of key activities—should be identified. The establishment of a program's critical path is necessary for examining the effects of any activity slipping along this path. Potential problems that may occur on or near the critical path should also be identified and reflected in the scheduling of the time for high-risk activities.	<b>Criteria partially met:</b> The critical path appears to be logical; however, with all of the other incomplete logic, as well as a large float value—the time that a predecessor activity can slip before the delay affects successor activities—the critical path is not reliable. In addition, in the February schedule, the critical path extended to September 27, 2010, and the lease award task was not on the critical path.	<b>Criteria mostly met:</b> KCP has made progress on the critical path. In KCP's July schedule, the critical path was extended to October 5, 2013, and the lease award task was added, as appropriate. However, the continued incomplete logic and large float value continue to affect the validity of the critical path.
Identifying float between activities	The schedule should identify float, so that schedule flexibility can be determined. As a general rule, activities along the critical path typically have the least amount of float.	<b>Criteria partially met:</b> The schedule calculates total float values—the time that activities can slip before the delay affects the end date—automatically. However, there are more than 4,800 activities with total float over 200 days. In addition, in the February schedule, there were 390 activities with over 1,000 days of total float. These values do not seem reasonable for a project schedule and probably are due to the excessive use of constraints and incomplete logic.	<b>Criteria partially met:</b> Progress has been made on reducing total float values, although they remain higher than expected. For example, KCP reduced the number of activities with over 200 days of total float from 4,800 in February to 2,964 in the July schedule. In addition, KCP has since reduced the number of activities with over 1,000 days of total float from 390 to 147.
Conducting a schedule risk analysis	A schedule risk analysis should be performed using a good critical path method schedule and data about project schedule risks, as well as statistical analysis techniques (such as Monte Carlo) to predict the level of confidence in meeting a program's completion date. This analysis focuses not only on critical path activities but also on activities near the critical path, since they can potentially affect program status.	<b>Criteria not met:</b> KCP has not performed a schedule risk analysis using statistical techniques. KCP officials reported that they have no plans to address this issue.	<b>Criteria not met:</b> KCP's schedule has not been subjected to a statistical risk analysis. KCP's scheduling team also indicated that it does not have plans to conduct statistical analyses on the schedule. Although KCP officials stated that they have conducted an analysis on a separate spreadsheet, it does not provide sufficient confidence in meeting a program's completion date.

**Appendix II: GAO Assessment of KCP's  
Relocation Schedule**

<b>Criterion</b>	<b>Explanation</b>	<b>GAO analysis – February 2009</b>	<b>GAO follow-up analysis – July 2009</b>
Updating the schedule using logic and durations to determine the start and completion dates	The schedule should use logic and durations in order to reflect realistic start and completion dates for program activities. The schedule should be continually monitored to determine when forecasted completion dates differ from the planned dates, which can be used to determine whether schedule variances will affect downstream work. Maintaining the integrity of the schedule logic is not only necessary to reflect true status, but is also required before conducting a schedule risk analysis.	<b>Criteria partially met:</b> The schedule appears to have been updated recently; however, because of the incomplete logic and reliance on lags, the dates for future activities are not reliable. Because the dates are not all calculated automatically, the schedule cannot be used to monitor changes in forecasted completion. Therefore, we could not determine with confidence whether schedule variances will affect downstream work.	<b>Criteria mostly met:</b> There are still 14 instances of incomplete logic—where successor activities start before predecessor activities have been completed.

Source: GAO assessment of KCP's relocation schedule based on GAO-identified best scheduling practices.

Note: During our July 2009 assessment, we learned that the software used to conduct our February assessment had produced inaccurate statistics. To correct this, we obtained new statistics for both February's and July's assessments using a more reliable method. However, the statistics shown in the February analysis have not been verified with KCP officials. Nevertheless, KCP officials agree that the general conclusions of our February assessment are still considered to be valid.



# Appendix III: Comments from the National Nuclear Security Administration



Department of Energy  
National Nuclear Security Administration  
Washington, DC 20585



October 15, 2009

Mr. Gene Aloise  
Director, National Resources  
and Environment  
Governmental Accountability Office  
Washington, D.C. 20548

Dear Mr. Aloise:

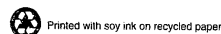
The National Nuclear Security Administration (NNSA) appreciates the opportunity to review the Government Accountability Office's (GAO) draft report, GAO-10-115, *NUCLEAR WEAPONS: National Nuclear Security Administration Needs to Better Manage Risks Associated with Modernization of Its Kansas City Plant*. We understand that this work was done at the request of the Senate's Subcommittee on Energy and Water Development, Committee on Appropriations. GAO was asked to determine (1) how the Kansas City Plant (KCP) developed plans for modernization; (2) the extent the plans ensure continuity of operations in support of the stockpile during and after transition to the new facility; (3) the extent the plans consider the consequences of increased outsourcing of the nonnuclear components (e.g., security, nonproliferation); and (4) the alternatives considered prior to deciding to replace the KCP facility.

NNSA appreciates GAO recognizing that substantial progress has been made toward achieving the overall goals to modernize its nonnuclear production facility and ensuring that continued production of quality components essential to maintaining the U.S. nuclear weapons stockpile. In addition, we appreciate the thorough investigative approach taken by GAO on this project and the professionalism of the GAO staff.

The transformation of the nonnuclear production infrastructure is a significant first step in NNSA's overall plan to transform the Cold War-era Nuclear Weapons Complex to a more cost effective, integrated and interdependent Nuclear Security Enterprise. The goals of the nonnuclear transformation are to reduce the operating footprint by more than half (from 3.1M to 1.4M ft<sup>2</sup>) and reduce NNSA's annual operating costs for KCP by about 25% (\$100M per year). NNSA directed and endorsed a plan with three major characteristics:

1. Strategic Sourcing and Sizing

While KCP was already outsourcing over half of the active components, additional outsourcing had the potential to enable reductions in footprint, capital expenditures, operating costs, and environmental hazards. It was appropriate to examine what additional technologies could be outsourced with acceptable risk. This analysis resulted in decisions to increase the total number of outsourced components by about 9% and suppliers by about 3%.



A much more significant impact on future plant size was enabled by the planned consolidation of major manufacturing processing areas. Through the elimination of excess capacity and redundancy of capabilities that are no longer necessary given the full range of future stockpile scenarios, the manufacturing footprint will be reduced from about 1.3M square feet to just over 0.6M square feet.

2. Business Process Transformation

NNSA recognized the unique nonnuclear production mission of KCP in 2005 and implemented a new oversight model for the facility in early 2007. This new oversight model implemented industrial standards in lieu of the Department of Energy (DOE) and NNSA directives, revised government oversight, and established a new contractor relationship based on commercial practices. These changes enabled the Maintenance & Operations (M&O) contractor to begin aligning the indirect and fixed costs of site operation to a more commercial model.

After benchmarking comparable operations, KCP officials set future cost targets and implemented business process transformation plans for each division that will achieve a \$100M annual savings in operations – predominantly from indirect and support functions. The business transformation is already about halfway to this goal and will exceed the forecasted savings rate when the transformation to the new facility is completed in Fiscal Year (FY) 2014.

3. Smaller, Modern, Adaptable Facility

After analyzing multiple physical alternatives and funding options, and in conjunction with the National Environmental Policy Act (NEPA) process, NNSA selected a General Services Administration (GSA) lease as the most appropriate means to acquire a smaller, modern, adaptable facility to be built on an undeveloped site in south Kansas City. The facility is being designed to have an administrative to manufacturing space ratio equivalent to a commercial facility. It is also being designed to enable timely and cost effective reconfigurations as required capabilities and capacities change in the future. The facility will be environmentally sustainable with Leadership in Energy and Environmental Design (LEED) Gold certification and less than half the energy consumption of the legacy building.

The buildings on the new campus have also been designed to yield high commercial value if the future NNSA mission strategy no longer requires the site. The choice of the GSA lease gives NNSA a wide range of future mission options without delays, lost opportunity savings, and long-term financial commitment associated with line item capitalization.

GAO examined all major aspects of the nonnuclear production transformation, known as the Kansas City Responsive Infrastructure Manufacturing & Sourcing (KCRIMS) project. Included in the scope of the project is related work for other government agencies that is performed in the National Secure Manufacturing Center (NSMC). The GAO report credits KCP officials with developing extensive plans and initiating several key actions to help ensure that the delivery of nonnuclear components is not interrupted during the transition to the new facility.

**NNSA Response to GAO Observations:**

After extensive review, GAO had no significant criticisms of the nonnuclear transformation project itself, but did recommend three areas for improvement. In summary, they are as follows:

1. **Lease vs. Buy Life Cycle Cost Analysis:** *The GAO notes that the facility cost analysis for the lease/buy decision was limited to 20 years rather than the full life expectancy of a new manufacturing facility. A full life cycle analysis may have resulted in a decision for federal ownership.*

We acknowledge that leases can be more expensive than ownership at some point in the life-span of a robust facility. The DOE's Office of Cost Analysis (DOE/OCA) examined the same concern by performing an independent review of the decision earlier this year. As noted in the GAO report, DOE/OCA ultimately supported the lease decision. The lease strategy requires no upfront capital which would likely require 3-5 years to obtain through the conventional Congressional line item funding process. This delay would result in lost savings of \$300M to \$500M. It should also be noted that the project met all criteria under OMB A-11 and A-94 for a government operating lease.

Furthermore, NNSA does not want to commit to maintaining a nonnuclear production facility within the Nuclear Security Enterprise for a period beyond 20 years because the overall stockpile and enterprise strategy could change significantly during that period.

Finally, if a longer term commitment is deemed appropriate, the government retains the flexibility to purchase the facility at fair market value at any time in the future. During the first site visit to KCP, the GAO auditor even noted that using a professional developer to manage the construction schedule and cost risk for a fixed price and then buying the facility may be a superior business practice since the developer rather than the government assumes the construction risks. In summary, NNSA believes that a lease with a good financial return is preferable to a federal ownership model that cannot be executed in the short term, especially when federal ownership could still be enabled at a later date.

2. **Project Schedule Maturity:** *The GAO sponsored two assessments of the KCRIMS integrated project plan (IPP) and concludes that the project schedule does not fully comply with GAO and DOE best practices and guidance for schedule development.*

We acknowledge that the project schedule does not yet comply with all of the GAO/DOE best practices, but we expect full compliance by the time the schedule is actually baselined. The baseline will be set within 30 days of receipt of a firm construction schedule from the developer. For the record, the GAO and DOE guidelines are excellent criteria for assessing the integrity of a baselined schedule. However, such assessments should not imply an end state during the period when the schedule is being developed.

NNSA would like to highlight the improvement in the schedule maturity between the February and July assessments, as evidenced by Appendix II in the report, which shows that only a small percentage of tasks do not pass the recommended criteria. Many of these tasks are far into the future and still lack enough resolution to comprehensively meet the guideline criteria. As noted in the report, KCP officials are using different management

systems to allocate resources and manage risks and they will not be included in the schedule files. The best practice guidance does not preclude these attributes from being managed in other ways.

The Program Management Institute recognizes that scheduling is both an art and a science and the KCP scheduling team is following these professional best practices. The *Project Management Body of Knowledge (PMBOK)* states, “Good practice does not mean that the knowledge described should always be applied uniformly on all projects; the project management team is responsible for determining what is appropriate for any given project.” The KCP team believes that placing too much emphasis on a purely mathematical approach does not yield the most cost effective path to a viable schedule. Therefore, the team embraces the fundamental PMBOK concept of progressive elaboration to develop the schedule in systematic incremental steps leading to the baselined schedule.

3. **Export Control:** *DOE and NNSA lack clear and up-to-date export control guidance with expectations for a systematic and consistent export control review process. Without such, KCP may be taking additional risks in outsourcing additional products.*

NNSA contractors are required to comply with federal, state and local regulations as part of their prime contract agreements. The International Traffic in Arms Regulations (ITAR) and Export Administration Regulations (EAR) are included in the federal regulation compliance requirement. The ITAR and the EAR contain the regulatory requirements associated with export activities related to nuclear weapons production. The DOE Guidelines on Export Control and Nonproliferation were developed to serve as complementary compliance “guidelines” in support of these regulations.

In order to comply with ITAR and EAR regulatory requirements, KCP M&O contractor utilizes export compliance clauses in supplier purchasing agreements, which place the suppliers on notice as to the ITAR and EAR regulatory requirements. The ITAR and EAR regulations currently do not require that NNSA M&O contractors go beyond the export compliance contract clause to transfer technical data to a domestic supplier (qualifying as a U.S. person). This clause, included in all product-related lower-tier KCP subcontracts, requires suppliers to notify KCP for concurrence prior to applying for an export license if the supplier deems one necessary. The KCP M&O contractor receives two to three such requests per year.

The ITAR regulations require companies to obtain an export license when sharing technical data with a foreign supplier or a domestic supplier allowing foreign national access. The KCP M&O contractor submits ITAR export license applications to the Directorate Defense Trade Controls when an export license is required to transfer technical data. The NNSA’s Office of International Regimes & Agreements organization has visibility to these license applications as part of the governments interagency review process.

The export control concerns are consistent with the national theme of recent GAO audits. The KCP M&O contractor does review security issues prior to outsourcing decisions, of which export control is one subset. Based on the current interpretation of State Department regulations, all production items outsourced by KCP are considered export controlled and treated as high risk. KCP officials do not feel that the additional outsourcing under KCRIMS

(a 9% increase in components outsourced and a 3% increase in suppliers) adds significantly to the Nation's risk profile and also does not believe that a more rigorous review would lead to different sourcing decisions.

The NNSA Nuclear Security Enterprise Senior Management Team created an Export Control Working Group in July 2009 to address export licensing and due diligence factors, e.g. marking technical data, registration, supplier contract language, supplier control plan and training. Recommendations from the Export Control Working Group will be shared with the GAO upon completion.

**NNSA Response to GAO Recommendations:** NNSA generally agrees with the recommendations and will take the following action:

**Recommendation 1:** Ensure that life cycle cost analyses include a thorough and balanced evaluation of short and long term construction and financing alternatives.

**Response:** Future NNSA projects will have the opportunity to take advantage of the DOE/OCA to perform reviews on major facility acquisition projects.

**Recommendation 2:** Ensure that KCP's operating contractor revises the KCP relocation schedule so that it is consistent with DOE schedule development guidance and GAO-identified scheduling best practices.

**Response:** NNSA concurs with the recommendation and will execute its existing plan for the initial baselined schedule to incorporate recognized best practices.

**Recommendation 3:** Assess the effectiveness of NNSA's oversight of KCP's current export control and nonproliferation practices.

**Response:** NNSA asserts that the correct export control requirements are being applied through the M&O contract. The recommendation will be taken under advisement for potential future action following recommendation 4 consideration.

**Recommendation 4:** Replace or supplement DOE's July 1999 Guidelines on Export Control and Nonproliferation to clarify expectations for export control reviews and develop an effective mechanism for ensuring enforcement.

**Response:** NNSA will take this recommendation under advisement. The NNSA ECWG (formed July 2009) is currently examining different aspects of export control. Their conclusions and recommendations will impact NNSA's actions concerning this GAO recommendation.

**Recommendation 5:** Direct the KCP operating contractor to develop and implement a formal risk-based review process to assess nuclear proliferation risks and mitigate these risks relative to component outsourcing decisions.

**Response:** NNSA will take this recommendation under advisement awaiting the analysis of the ECWG team referenced in our actions to recommendation 4.

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**Appendix III: Comments from the National  
Nuclear Security Administration**

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Again, NNSA appreciates the opportunity to provide these comments to the GAO's draft report. Should you have any questions about this response, please contact JoAnne Parker, Acting Director, Policy and Internal Controls Management, at 202-586-1913.

Sincerely,



Michael C. Kane  
Associate Administrator  
for Management and Administration

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# Appendix IV: GAO Contact and Staff Acknowledgments

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## GAO Contact

Gene Aloise, (202) 512-3841 or [aloisee@gao.gov](mailto:aloisee@gao.gov)

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## Acknowledgments

In addition to the contact named above, Ryan T. Coles, Assistant Director; Antoinette Capaccio; Tisha Derricotte; Terry Dorn; David T. Hulett; Sandra Kerr; Amanda Krause; Alison O'Neill; Christopher Pacheco; Tim Persons; Jeff Phillips; and John Smale made key contributions to this report.

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## GAO's Mission

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