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# NUCLEAR WEAPONS

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

Statement of Gene Aloise, Director
Natural Resources and Environment

July 17, 2008

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Highlights

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

### Why GAO Did This Study

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

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

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

To view the full product, including the scope and methodology, click on the link above. For more information, contact Gene Aloise at (202) 512-3841 or aloisee@gao.gov.

### What GAO Found

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

- NNSA and DOD have not established clear, long-term requirements for the nuclear weapons stockpile. While NNSA and DOD have considered a variety of scenarios for the future composition of the nuclear weapons stockpile, no requirements have been issued. It is GAO's view that NNSA will not be able to develop accurate cost estimates or plans for Complex Transformation until stockpile requirements are known. Further, recent GAO work found that the absence of stockpile requirements is affecting NNSA's plans for manufacturing a critical nuclear weapon component.

- NNSA has had difficulty developing realistic cost estimates for large, complex projects. In September 2007, a contractor provided NNSA with a range of cost estimates for over 10 different Complex Transformation alternatives. However, the contractor stated that (1) its analysis was based on rough order-of-magnitude estimates and (2) NNSA should not use its cost estimates to predict budget-level project costs. In addition, in March 2007 GAO reported that 8 of 12 major construction projects being managed by DOE and NNSA had exceeded their initial cost estimates.

- NNSA will need to develop a transformation plan with clear, realistic milestones. GAO expects that once NNSA decides the path forward for Complex Transformation later this year, NNSA will put forward such a plan. However, GAO has repeatedly documented problems with NNSA's ability to implement its plans. For example, in February 2006 GAO reported problems with the planning documents that NNSA was using to manage the implementation of its new approach for assessing and certifying the safety and reliability of the nuclear stockpile.

- Successful transformation requires strong leadership. In 2006, NNSA created an Office of Transformation to oversee its Complex Transformation activities. However, GAO is concerned that the Office of Transformation may not have sufficient authority to set transformation priorities for all of NNSA, specifically as they affect nuclear nonproliferation programs.

Madam Chairman and Members of the Subcommittee:

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

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

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

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

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

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

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

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

[4]National Defense Authorization Act for Fiscal Year 2008 (Pub. L. No. 110-181) §1062.

[5]NNSA, *Draft Complex Transformation Supplemental Programmatic Environmental Impact Statement* (Washington, D.C., Dec. 2007).

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

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

Our testimony discusses our concerns with NNSA's Complex Transformation proposal and is based on completed and ongoing GAO work. To carry out our objective, we relied on previous GAO work, including our April 2006 testimony before the Subcommittee on Energy and Water Development, Committee on Appropriations, House of Representatives;[7] a May 2008 report on nuclear weapon pit manufacturing;[8] and our March 2007 report on DOE's management of major construction projects.[9] We conducted the performance audit work that supports this statement in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to produce a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our statements today.

In summary:

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

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

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

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

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

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

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

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

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

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

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

[11]GAO-08-593.

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

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

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

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

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

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

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

[15]This cost estimate is reported using net present value, base year 2007.

[16]The contractor assumed this consolidated nuclear production center would be constructed at LANL.

[17]GAO-07-336.

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

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

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

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

[18]NNSA is currently refurbishing two types of B61 nuclear bombs: the B61-7 and the B61-11.

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

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

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

## Successful Transformation Requires a Strong Office of Transformation

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

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

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

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

[23]GAO-06-606T.

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

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

## GAO Contacts and Staff Acknowledgements

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

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**Testimony of Dr. Michael R. Anastasio**

**Laboratory Director**
**Los Alamos National Laboratory**

**before the**
**Committee on Armed Services**
**Subcommittee on Strategic Forces**
**U.S. House of Representatives**

**Hearing on**
**"Nuclear Weapons Complex Modernization"**

**July 17, 2008**

## Introduction

Chairman Tauscher, Ranking Member Everett, and Members of the Subcommittee, thank you for the opportunity to appear before you today to discuss the Transformation of the Nuclear Weapons Complex. I am Dr. Michael Anastasio, the director of the National Nuclear Security Administration's Los Alamos National Laboratory, and it is a pleasure to be before you again this year. Our earlier February briefing on the status of our nuclear weapons stockpile presented to you the issues that we face as NNSA laboratory directors working to assess the stockpile, and that briefing serves as an effective backdrop for today's topic of how best to transform the Complex.

The entire weapons enterprise must transform itself into a more efficient operation that can continue to maintain the nation's strategic deterrent while minimizing the need to return to underground nuclear testing.

This morning, I will briefly describe my view of transformation, focusing first on the overall Complex and then discussing its effects on Los Alamos. Second, building on our briefing from February, I will discuss the challenges that we face in our annual assessment of the nuclear stockpile, because this process helps determine the requirements for transformation. And, last, I will highlight what I see as the major challenge for the enterprise in the future: sustaining the science of the Complex as a whole, and of Los Alamos.

## Part I: The Need to Transform the Complex

I fully support NNSA's vision to transform the Nuclear Weapons Complex into a smaller, safer, more secure, more modern, more agile, and less expensive complex that leverages the scientific, technical, testing, and production capabilities of its workforce. By achieving this vision and, for example, demonstrating that the enterprise can respond rapidly to stockpile problems, the United States can potentially further reduce the number of reserves in the nuclear weapon stockpile.

To implement this vision, it is important to understand that the Complex is largely a fixed-cost enterprise. This means that no matter the size of the nuclear weapons stockpile, whether it is a few weapons, or thousands of weapons, the nation needs to support an overall capability to ensure the safety, security, and reliability of the stockpile. And as long as we have a legacy Cold War stockpile we must retain the full Cold War production capabilities. From this standpoint, we really don't have a choice but to seek ways to reduce costs by avoiding duplication and operating more efficiently within a shrinking budget. The NNSA plan for Complex Transformation will take important steps to do just this.

At LANL, we are providing significant leadership in NNSA's effort to achieve integration across the Complex, e.g., encouraging NNSA-wide business processes for increased efficiency. Internally, we have spent the past two years working toward consolidation and high efficiency. We face considerable challenges with our infrastructure in that we maintain more than 9 million square feet of facilities, with over one-third of that space more than 40 years old. We are working to reduce our physical footprint by roughly 2 million square feet (more than one-quarter of the reduction has been completed in the last year and a half). We are consolidating the number of high-explosive firing sites across the Laboratory. We have internally absorbed the higher

operating costs associated with the new contract structure. We will continue these efforts and more as part of Complex Transformation.

The Laboratory has also had to make tough decisions and significant reductions in staffing levels. Since the beginning of fiscal year 2006, the overall Laboratory workforce has been reduced—through attrition, limited hiring, and a voluntary reduction program—by more than 2,100 individuals, 46 percent of whom were part of the technical workforce.

From the national perspective, the NNSA preferred alternative selection confirms that Los Alamos is first and foremost a national security science R&D laboratory. Specifically, NNSA's preferred alternative calls for LANL to continue its role, along with Lawrence Livermore, as the country's nuclear weapons design and engineering laboratory, and as a center of excellence in supercomputing. Additionally, the plan calls for LANL to serve as the nation's center of excellence for plutonium research, development, and manufacturing.

NNSA's preferred alternative also will reduce Complex-wide the workforce supported by weapons activities funding by 20-30 percent over the course of a decade or so. At Los Alamos, we have already seen our nuclear weapons program personnel reduced by nearly 15 percent since Los Alamos National Security, or LANS, LLC started operations in June 2006.

Los Alamos is committed to carrying out our role in the preferred alternative. Critical to establishing LANL as the nation's plutonium R&D center is the nuclear infrastructure required for this mission, namely maintaining the Laboratory's ability to conduct plutonium chemistry and metallurgy R&D, which is currently done at our aging Chemistry and Metallurgy Research facility (CMR). As laboratory director, one of my most critical infrastructure priorities is to replace the CMR building. The CMR building was completed in the early 1950s to support scientific research of plutonium and other actinide elements. Work in this facility supports not only the nation's nuclear deterrent but also space exploration, energy research, nuclear nonproliferation, and nuclear counterterrorism.

Our work in the CMR is safe and secure, and our Laboratory staff has done a remarkable job further reducing risks by closing several wings in a short time. However, this will become ever-more challenging as we must meet the increasing safety and security expectations. Congress and the NNSA have authorized and appropriated funds to begin construction of the new CMR Replacement, known as CMR-R, which, when complete, will be more than 100,000 square feet smaller than the existing facility.

I should highlight that the new CMR-R is <u>not</u> planned to be used as a pit production facility. It will allow for the consolidation of category I and II special nuclear materials from Lawrence Livermore National Laboratory. CMRR will also enable the nation to continue to train IAEA inspectors, provide power sources for U.S. satellites, research and build next-generation nuclear detection equipment, and train various United States personnel on how to prevent and deal with the potential for nuclear terrorism.

Another infrastructure priority for the future of Los Alamos, as called out in NNSA's Complex Transformation plans, is the refurbishment of our linear accelerator, the Los Alamos Neutron Science Center, or LANSCE. We rely heavily on the capabilities that are available only from LANSCE, including proton radiography, fundamental cross-sections, and properties of classified

subsystem materials under extreme conditions. LANSCE also enables us to carry out a broad range of basic science that supports everything from biology to nuclear forensics and attribution. The refurbishment of LANSCE, known as LANSCE-R, will allow the facility to continue to support the nation for another 20–30 years, as well as form the foundation for a new science facility to attract and retain the next generation of scientists.

Part of the future that we see for LANL in experimental science is focused on materials science and test capability, MaRIE (Matter-Radiation Interaction in Extremes). MaRIE will be designed to create and exploit extreme radiation fluxes and probe matter to tackle the toughest materials challenges, ranging from weapons aging to improved solar cells to longer-lasting nuclear fuel rods. When coupled with modern facilities and equipment and our role as a high-performance computing center (our Roadrunner supercomputer is the latest example), this facility would help ensure our access to the best scientific talent well into the future.

**Part II: Maintaining the Legacy Stockpile**

Transforming the Complex now is critical because facilities are aging and in need of recapitalization, while the overall budget is shrinking. To make matters more challenging, the nuclear weapons laboratories have determined that the aging stockpile needs increasing attention in the future to ensure its safety, security, and reliability.

As the NNSA laboratory directors discussed back in February, it is increasingly difficult to sustain the legacy stockpile, which is characterized by high yield-to-weight systems with relatively low-tolerance margins and exotic materials. Exact remanufacture of warheads cannot be done for a variety of reasons ranging from today's environmental constraints and changed production processes to loss of specialized knowledge. In fact, many of the processes and technologies used originally to manufacture the warheads no longer exist. As we introduce small changes into the warheads, we move further away from the "as-tested design," adding additional risks and challenges to our understanding of warhead safety and performance.

The approach of Stockpile Stewardship, begun in 1995 as an ambitious effort to sustain the nuclear weapons stockpile while minimizing the need for nuclear testing, relies on developing and validating through interlaboratory peer review a more fundamental scientific and engineering understanding of the performance, safety, and security of weapon operations. This fundamental approach is based on a much more extensive range of nonnuclear aboveground testing and a vastly improved simulation capability. Ultimately, expert judgment and rigorous peer review assure that critical conclusions are drawn from the best available data, appropriate high-resolution simulation, and a suite of evolving testing capabilities. Sound science is the core of our confidence.

I remain confident in the United States nuclear deterrent and believe that the tools envisioned for the Stockpile Stewardship Program have so far provided the data needed to assess the state of the U.S. stockpile. The programmatic successes have been a major factor in allowing the United States to reduce overall the size of the nuclear stockpile by roughly 75 percent from its peak to a level below that during the Eisenhower administration.

These increasing risks for the future to confidence in the legacy stockpile require sustained efforts to utilize and advance our basic scientific and engineering understanding. Yet with the needs to recapitalize the infrastructure and the growing operational costs from the ever-increasing safety, security, and environmental standards, it is extremely difficult to maintain, use, or enhance the Stockpile Stewardship tools so necessary to preserve our deterrent.

Compounding my concerns is the decline in the number of technical staff at Los Alamos, and within the complex, especially for those who have significant experience in weapon design, manufacture, and production. Our capability ultimately resides in the experience, knowledge, and skills of our scientists and engineers. The ability to maintain a pipeline of the best scientific and technical staff through robust programs and facilities is essential.

**Part III: Health of Science**

In Part I, I discussed the infrastructure issues that Los Alamos faces and the similar issues across the Complex. Coupling those with the increasing effort that must be devoted to the legacy stockpile creates the biggest challenge for Complex Transformation and for the future of the Complex. In addition to CMRR, NNSA must address how to fund several other major nuclear facilities including the Uranium Production Facility (UPF), the Pit Disassembly and Conversion Facility (PDCF), and the Mixed Oxide Fabrication Facility (MOX). All of these requirements are hitting at the same time that the available budget will be shrinking.

My concern is that we will continue to see funding for nuclear weapons science, and hence science in general, squeezed at the national laboratories. This is the same science infrastructure that enables our success in helping address other national security and emerging energy security challenges. This concern applies both at Los Alamos and nationally.

When we started Stockpile Stewardship, it was clear that in order to reduce the likelihood of having to return to testing, we would need to do more science, not less. Now, we see that many of the investments of Stewardship are coming to fruition, notably the Dual-Axis Radiographic Hydrotest Facility (DARHT) at Los Alamos, NIF at Livermore, and the MESA facility at Sandia. Just as the nation needs to reap the benefits of these investments, we are not able to fully utilize those tools to solve the latest challenges of Stewardship.

From a Los Alamos perspective, I am concerned about the future of science. And, it's essential to understand the very tight linkage between nuclear weapons funding and our ability to carry out a broader set of scientific research and development efforts to meet other national needs. Approximately 55 percent of our funding comes from NNSA's Office of Defense Programs, but it is virtually the only source of infrastructure investment. So the weapons program builds facilities and capabilities critical for nuclear weapons work, which can also be used to meet other needs of the country. A current example is our new Roadrunner supercomputer, which will be applied in its first six months to unclassified problems ranging from climate change to better understanding disease.

Let me emphasize again that the squeeze on science funding jeopardizes the future of the Laboratory because it is this strong science base that enables us to attract and retain the best and brightest scientists. I want to highlight just a few of our recent scientific accomplishments at Los Alamos:

- Working with the Air Force, we developed and fielded a wide-area persistent surveillance capacity called Angel Fire for the U.S Marine Corps. The system provides warfighters with real-time situational awareness.
- We demonstrated the potential for increases in solar energy efficiency using nano-scale semiconductors through an effect called carrier multiplication.
- We rapidly and effectively supported the national response to the North Korean nuclear test. We provided the sole technical support from the Department of Energy at the Six-Party Talks in Beijing on implementation of the North Korean denuclearization commitments.
- We recovered more than 1,750 U.S.-origin radiological sources in fiscal year 2007, including the first-ever disposal of radium-226 sealed sources.
- We won more than a hundred major science awards from major organizations.
- We developed the first high-resolution climate model for ocean circulation, which allows us to better understand such climate effects as El Niño and La Niña.
- We completed the one-hundredth genetic sequence for DOE's Joint Genome Institute.
- We've received 107 R&D 100 awards over the past 30 years. The two that we earned this year were for developing the 3-D tracking microscope that can follow the motion of nanometer-sized objects process and for the Laser-Weave to synthesize high-strength inorganic fibers.

When I talk about science being squeezed at the laboratories, I am concerned about our primary nuclear weapons mission but also about other areas where we have capabilities to serve the nation. Because of our ability to address complex scientific problems, LANL is poised to assist the nation further with larger concerns such as global climate change and energy security. I see Los Alamos taking a leading role in understanding global climate change through detailed modeling and validation, developing the next generation of energy storage technology, and studying ways to verify carbon emissions worldwide. These are areas where we already do work, but I believe we can do more to meet the nation's needs.

**Conclusion**

In conclusion, I want to reiterate my support for the vision of NNSA's Complex Transformation plan, and I believe that Los Alamos can serve the nation well as a national security science laboratory, focused on nuclear weapons design and engineering, supercomputing, and plutonium R&D and manufacture.

I am very proud of the role and accomplishments of Los Alamos National Laboratory in protecting the national security interests of this country. I remain concerned, however, that science is being squeezed out, which increases future risks to our confidence in the stockpile and our ability to support other national missions.

I look forward to further engaging with Congress and the national policymakers as a new path is charted for the Nuclear Weapons Complex. I believe that the backbone of our capability as a nation is the science and technology base embodied in the national laboratories. Los Alamos stands ready to continue to provide the science that underpins our strategic deterrent, as well as the science that can be applied to the many challenges the nation now faces in energy, climate, nonproliferation, defense, and intelligence.

**Statement of Thomas P. D'Agostino**

**Under Secretary for Nuclear Security and Administrator**

**National Nuclear Security Administration**

**U.S. Department of Energy**

**On**
**Complex Transformation**

**Before the**
**House Committee on Armed Services**
**Subcommittee on Strategic Forces**

**JULY 17, 2008**

Thank you for the opportunity to discuss U.S. nuclear weapons policies and programs. My remarks focus on our efforts to transform the nuclear weapons complex into a 21st century national security enterprise. I will highlight our efforts to assure the safety, security and reliability of the U.S. nuclear weapons stockpile while at the same time transforming the stockpile and the current "Complex" that supports it.

Before I begin, I want to remind you of the tremendous progress made over the past few years in reducing the size of our nuclear weapons stockpile. As you recall, in 2002, President Bush and President Putin signed the Moscow Treaty, which will reduce the number of our operationally deployed strategic nuclear warheads to 1,700 to 2,200 by 2012. In 2004, the President issued a directive to cut the entire U.S. nuclear stockpile—both deployed and reserve warheads—in half by 2012. But this goal was later accelerated and achieved 5 years ahead of schedule in 2007. As of the end of 2007, the total stockpile was almost 50 percent below what it was in 2001, when the President took office.

On December 18, 2007, the White House announced the President's decision to reduce the nuclear weapons stockpile by another fifteen percent by 2012. This means the U.S. nuclear stockpile will be less than one-quarter its size at the end of the Cold War—the smallest stockpile in more than 50 years.

In the eighth year of this Administration, with the support of Congress, NNSA has achieved a level of stability that is required for accomplishing our long-term missions. Our fundamental national security missions for the United States--in addition to assuring the safety, security and reliability of the U.S. nuclear weapons stockpile while at the same time transforming the stockpile and the nuclear weapons complex that supports it--also includes reducing the threats posed by nuclear proliferation, and providing safe and reliable nuclear reactor propulsion systems for the U.S. Navy.

Some individuals have questioned whether this Administration has articulated an underlying strategy for our strategic posture. In July 2007, the Secretary of Energy joined the Secretaries of Defense and State in sending to Congress the Bush Administration's nuclear weapons strategy entitled "National Security and Nuclear Weapons: Maintaining Deterrence in the 21st Century." This document not only describes the history of nuclear deterrence during the Cold War, but also reinforces how deterrence applies to present and future security threats, and what a nuclear stockpile of the 21st Century will need to look like in order to meet those threats.

As a follow-up, Secretaries Bodman and Gates provided Congress a far more detailed classified white paper in March 2008 entitled "National Security and Nuclear Weapons in the 21st Century." This document describes what type of deterrent strategy is needed in the 21st century; articulates the size and nature of a stockpile to correspond to that strategy given certain scenarios and potential technological improvements; and articulates the type of infrastructure needed to support this type of stockpile into the future. It is interesting to note, that while some claim we should not pursue an effort to modernize our nuclear enterprise, we are the only declared nuclear state that is in fact not currently modernizing its essential infrastructure or stockpile. We look forwarded to providing an unclassified redacted version in the very near future that will allow broader public discussion of these important issues.

In addition, over the past three years we have been on a very public course of analyzing, describing, and performing environmental studies associated with the type of infrastructure we believe we will need for the future, an effort integral to the future ability to sustain our deterrent called Complex Transformation. Just this year alone, we have conducted 20 public meetings on the Complex Transformation Supplemental Programmatic Environmental Impact Statement, and more than doubled the amount of time required by law to allow for public input into our plans. My intention is to make a decision this year on this three year effort, in order to move forward and ensure we are to continue on a viable path to support the nation's strategic deterrent.

**Where we are Today**

Before I describe our Complex Transformation vision, I want to review where we are today. Nuclear weapons remain the backbone of United States national security policy, providing the ultimate guarantor of our national defense. I am very proud of the accomplishments by people in the Complex who over the preceding decades enabled us to fulfill our vital stockpile mission. With the end of the Cold War and the dawn of the 21st Century, our national security investments in support of strategic deterrence must now advance to address an unpredictable international environment, persistent proliferation dangers, and emerging nuclear capabilities that could threaten vital American interests and international peace and security. In addition, our employees must have access to a responsive nuclear weapons complex that, in partnership with the Department of Defense (DoD), will ensure we have capabilities to address these future challenges.

The United States will continue to require nuclear forces for the foreseeable future, and the NNSA fundamental mission responsibility to *provide safe, secure, and reliable nuclear warheads in support of the nation's deterrent* remains and guides our future actions. To accomplish our mission, we must retain and exercise fundamental capabilities to design and certify nuclear warheads at world-class facilities that apply leading-edge computing, simulation, and other science-based competencies to unique challenges; to manufacture one-of-a-kind weapon parts, such as plutonium and uranium components, in responsive and less-costly production plants; and to safely and securely assemble, disassemble, and transport warheads as needed to support our surveillance, life-extension, and dismantlement objectives. We need to accelerate the fundamental transformation of our Complex over the next 10 years to sustain these capabilities and to assure a safe, secure and reliable nuclear deterrent -- one that does not require underground nuclear testing; that resolves current stockpile and production challenges; and preserves our deterrent with fewer weapons.

Regarding the timing of current actions, we are not embarking upon a new strategy in the final days of an Administration. Even though many talk about Complex Transformation as a new initiative, transformation of the Complex has been underway for some time. Past transformational activities include closing the Pinellas, Florida plant and consolidating non-nuclear operations at our Kansas City Plant; closing our pit production facility at Rocky Flats, Colorado; closing operations at Mound, Ohio; and ending special nuclear material production at Hanford, WA, Oak Ridge, TN, and Savannah River, SC. Also in the 1990s, we initiated development of major new research and development (R&D) facilities, such as the National Ignition Facility, required to support our Stockpile Stewardship Program without the historical tool of underground testing. These earlier actions significantly changed the face of our nuclear weapons complex. Today's nuclear weapons enterprise consists of eight geographically separated sites that comprise the R&D and production capabilities of the complex. Our production plants were reduced in number during the 1990s but many of the remaining facilities are old, too large, and very expensive to maintain. We propose to continue this transformation to better serve the American people in the post-Cold War and post-September 11$^{th}$ world. By all accounts transformation is an evolution. We are continuing to consolidate non-nuclear component manufacturing through our Kansas City Responsive Infrastructure Manufacturing and Sourcing initiative that, over the next 5 years, will reduce the costs, square footage, and number of personnel required for this essential function. Our new Tritium Extraction Facility at the Savannah River Site is operational and providing us with replacement tritium supplies for the first time in nearly twenty years. Soon, the Highly-Enriched Uranium Materials Facility under construction at our Y-12 Site in Oak Ridge will consolidate uranium storage while simultaneously improving security and lowering storage costs. These are just a few examples of the continuing transformation of the physical face of the Complex.

While addressing physical infrastructure needs, Complex Transformation also addresses our most important resources--our people. We are able to accomplish great tasks, solve complex problems, and improve on our national security capabilities because we have scientific and technical talent beyond comparison. The people at our national

laboratories and production plants are truly world leaders in the science and technology that sustain our nuclear deterrent that helps keep America safe from hostile threats. Enabled by our core weapons-related programs, these same individuals throughout the Complex are able to also harness their skills in other areas of national security importance, such as nonproliferation research and development, nuclear forensics, threat reduction technology, and analytical nuclear counterterrorism support to the intelligence community.

The recent dislocations and involuntary separations that have impacted the weapons complex have affected employee morale and the retention of younger staff members. This past December when I announced the release of the Complex Transformation Supplemental Programmatic Environmental Impact Statement, I took careful note to highlight that scientific and engineering expertise are essential for the 21st Century mission of our deterrent and nonproliferation missions. As resources and attention focus on production capability issues, we must be vigilant to ensure the robustness of our scientific, technical and engineering expertise and facilities. To further demonstrate our commitment, last month, the Secretary of Energy signed a "Lab Vision" paper[1] setting forth the strategic mission of NNSA's three laboratories and the test site to enable NNSA to respond to the evolving 21st Century global security threats, and bring our science, technology and engineering enterprise to bear on solving significant national security challenges. This document will allow me to further engage my interagency counterparts on national security diversification at our sites which will capitalize on the skills of our workforce into the future.

**The Good News**

Today, our national security laboratories and production plants ensure that American nuclear weapons are safe, secure and reliable. The Stockpile Stewardship Program that allows us to maintain a nuclear weapons stockpile continues to evolve and improve with experience we have gained over the past decade. To date, problems identified in the stockpile are being resolved by Stockpile Stewardship Program scientific tools without underground testing, and existing fixes have been incorporated into planned warhead Life Extension Programs (LEPs).

A tactical risk we took in the 1990s was transferring our plutonium production capability from the Rocky Flats Plant to the Los Alamos National Laboratory. After ten years of effort, we reconstituted a limited W88 pit manufacturing capability at Los Alamos and have successfully delivered newly-manufactured plutonium pits to the stockpile. This recent success has shown us the major challenges of rebuilding a capability after it has been lost.

We are also having great success in our nonproliferation commitments to reduce the size of the stockpile, as we exceeded our dismantlement goal for 2007 by nearly 150 percent. Combined with the reduction of the overall stockpile, this sends the right message to the rest of the world that the United States continues to lead in its commitment to Article VI of the Nuclear Non-Proliferation Treaty.

[1] The "Lab Vision" paper is provided.

**Complex at a Crossroads**

Today the Complex is at a crossroads. Although there may be debate on the size and role of our nuclear deterrent, one fact is clear—as long as other countries possess nuclear weapons the United States must maintain a reliable nuclear deterrent. Maintaining a viable deterrent means retaining an essential set of capabilities in the nuclear weapons complex to support the stockpile. While we are meeting safety, security, and basic DoD requirements today, the present Complex is too inefficient, too old, and too costly to sustain. Special nuclear materials (SNM) are present at more sites than we believe necessary. After September 11th, security has been enhanced and SNM is becoming more and more expensive to secure. Some facilities sized to support a large Cold War-era stockpile are no longer necessary or affordable. Without transformation, ever-increasing funds will be required to secure a greater perimeter than needed, maintain more square footage than is efficient, and sustain out-dated facilities well beyond their economic lifetime.

Our challenge is to *move from a nuclear complex designed for the Cold War to a 21st century national security enterprise that is at the forefront of science and technology and responsive to future national security requirements.* Several of the specific challenges we face are:

- Our uranium facilities date back to the Manhattan Project of the 1940s. Securing these facilities against terrorist threats is increasingly difficult and costly. Future warheads, whether refurbished through life-extension programs or through warhead replacement, will require a uranium component production or recycling capability. Our Y-12 uranium facilities in Oak Ridge, TN, are where our increased dismantlement work is also completed on warhead secondaries. Given the long lead times necessary to design and construct new facilities, decisions concerning uranium facilities must be made soon. In addition, the sooner that these existing, antiquated facilities are replaced, the sooner we will be able to reap the full security and cost benefits of consolidating of uranium activities into a smaller security and facility footprint.

- Restoring a limited production capability for W88 pits took ten years. Our pit manufacturing capability relies on Los Alamos nuclear facilities that were originally built to support R&D activities. The newest plutonium facility is thirty years old and one Los Alamos research building (Chemistry and Metallurgy Research) dates from the early 1950s and has served well beyond its economic lifetime. During the height of the Cold War the now-closed Rocky Flats pit manufacturing facility produced thousands of pits a year. Last year, an interim capability at Los Alamos produced 11 certifiable pits for the W88 warhead; this year 6 pits are slated to be produced. Sustaining this capability is both complex and technologically challenging. Furthermore, this cannot be done anywhere outside of the NNSA nuclear weapons complex. America needs a sustained level of pit production and plutonium capability for several reasons, listed below.

- First, maintaining the deterrent requires a capability to conduct advanced plutonium research and manufacture plutonium pits. This is a core competency that must be retained. Independent of the number of pits needed in the future, we need the Chemistry and Metallurgy Research Replacement – Nuclear Facility to maintain our plutonium capabilities at Los Alamos as we remove Category I/II quantities of plutonium from Lawrence Livermore National Laboratory's "Superblock," close the existing Chemistry and Metallurgy Research (CMR) facility, and consolidate weapons-related operations into one plutonium site. Moreover, if a major problem develops in the stockpile related to pits, we currently have an insufficient capacity to make replacement pits. During the Cold War, five major sites, now closed and dismantled, conducted plutonium research and manufacturing. Today, our plutonium research and pit manufacturing is consolidated at one site –Los Alamos—and we must ensure the safety and viability of that site.

- Second, maintaining a responsive infrastructure means maintaining the skills of the people who understand plutonium and plutonium manufacturing and analysis. In the end, we are best served by exercising the capability to conduct advanced plutonium research and to manufacture plutonium pits in facilities designed to meet 21st Century security, safety and health requirements.

- Our stockpile is aging, with some warheads designed and constructed over 40 years ago. We have increasing concerns about our ability in the long-term to certify the safety and reliability of these warheads without nuclear testing. That is the impetus for our consideration of a Reliable Replacement Warhead (RRW) approach which could introduce significant safety and security enhancements and allow the best opportunity for a smaller stockpile. Alternatively, and absent congressional support for RRW, we will rely on a life-extension approach of the legacy stockpile for an extended period. Neither approach would introduce new military capabilities to the stockpile, although an LEP approach because of the already beyond design life of our current stockpile, could prove too costly and may ultimately not be viable should we require our deterrent throughout this century. Some of the technologies and capabilities in our Complex, required for either the LEPs or RRWs, have atrophied or will atrophy and may have to be completely reconstituted if we do not take action now. We must ensure that we sustain essential nuclear capabilities.

- Security, both physical and cyber, will continue to require substantial resources. The current Complex, including some Manhattan Project facilities, is not optimized to provide both a robust and cost-effective security posture.

- Similarly, assuring nuclear safety of our Complex will become increasingly challenging and more costly until we improve our risk management practices and replace aging facilities with new ones built to modern standards with more

engineered safety features included. Thus, construction of new uranium and plutonium facilities is a key element of our long-term strategy to enhance nuclear safety and security at a sustainable cost.

In addition to the fundamental technical challenges of maintaining a nuclear deterrent, the costs simply to maintain the *current* infrastructure continue to rise; we cannot afford the status quo. We must transform the Complex to a smaller, more integrated and interdependent enterprise that accomplishes our existing and future national security missions at an affordable cost.

**Transformation Vision**

Our Complex Transformation vision for the future is a *smaller, safer, more secure and less expensive enterprise that leverages the scientific and technical capabilities of our workforce to meet all our national security requirements.*

Our future deterrent won't be based on the Cold War model of a large number of weapons. The Cold War model is not appropriate to address the 21st Century international security environment. We are reducing the size of our nuclear weapons stockpile. Instead, it will be based upon the *capability* and *flexibility* to respond to varying national security situations and produce those weapons if and when required. Complex Transformation is critical not only to accomplish our nuclear weapons mission in partnership with DoD, but also to better leverage our scientific and technical know-how needed to support other national security partners in the areas of non-proliferation, nuclear incident response, nuclear forensics, and support to the intelligence community.

Our approach to achieve Complex Transformation rests on four pillars:

- Transform the nuclear stockpile through the Stockpile Stewardship Program in partnership with the Department of Defense.
- Transform to a modernized, cost-effective nuclear weapons complex to support needed capabilities in our physical infrastructure.
- Create an integrated, interdependent enterprise that employs best business practices to maximize efficiency and minimize costs.
- Advance the science and technology base that is the cornerstone of our nuclear deterrence and remains essential for long-term national security.

**Why Transform Now – Why Not Wait?**

Complex Transformation must take place regardless of the size or composition of our future stockpile. Even with a smaller stockpile, maintaining required capabilities has a greater impact on the minimum size of our facilities than throughput capacity. Neither our workforce numbers nor facility square footage scale linearly with the size of the stockpile. In today's era of small stockpiles, the required square footage in a modern, well-designed facility to provide an essential capability frequently provides sufficient minimum capacity for our work. For example, the Uranium Processing Facility (UPF) is

being designed to function within various through-put ranges which are directly tied to any future stockpile projections. The UPF is being designed to fulfill the modest requirements of today. However, with minimal cost impact, it can be modified within the existing design floor space to accommodate additional national security requirements which may arise. This basic facility is instrumental in consolidating the current uranium missions for Naval Reactors fuel production, Defense Nuclear Nonproliferation's highly-enriched uranium blend-down, and work for others including medical isotope production. Thus, we are confident that many aspects of Complex Transformation can proceed while a more precise size and composition of our stockpile is defined in the coming years.

Complex Transformation must take place with or without RRW and the facilities we have proposed are required for either outcome. We will be hard pressed to meet our LEP commitments without successfully implementing Complex Transformation. If an RRW were authorized by the next Administration and Congress, its concepts could enhance the efficiency and responsiveness of the Complex compared to an LEP-only approach. The RRW concept increases intrinsic security in the weapons themselves, employs fewer exotic and hazardous (and more environmentally benign) materials, and could mean eventual lower lifecycle costs by eliminating some processes needed to support today's weapons, such as the need to machine and handle conventional high explosives. Additionally, if RRW meets the promise of allowing a smaller nuclear stockpile, additional savings could be achieved.

**Physical Infrastructure and the Complex Transformation Supplemental Programmatic Environmental Impact Statement (SPEIS)**

This period of change for the nuclear weapons complex began with the end of the Cold War and the initiation of the Stockpile Stewardship Program. The decisions related to the Stockpile Stewardship Program were announced in a 1996 record of decision that was based on analyses in the *Stockpile Stewardship and Management Programmatic Environmental Impact Statement (SSM-PEIS)* and other information. Since early 2002 when the Administration's Nuclear Posture Review was sent to Congress, NNSA has focused on establishing a responsive infrastructure to enable opportunities for stockpile reductions. A number of other reviews including Department of Defense assessments and Task Force reports in 2005 from both the Defense Science Board and Secretary of Energy Advisory Board subsequently identified shortcomings with the current Complex and emphasized a more urgent need to transform.

In 2006, NNSA proposed a planning scenario for the future Complex. Release of that planning scenario is part of NNSA's process of evaluating alternatives for transforming the Complex and identifying the environmental impacts, costs, risks and benefits of these alternatives. One of our primary objectives was to restructure facilities containing large quantities of Special Nuclear Material (SNM) that are costly to secure. Restructuring of major R&D facilities is also being evaluated in order to eliminate unnecessary redundancy across the Complex. To inform our decisions, we are preparing an environmental impact statement. Given that the current proposals would continue the transformation announced in the 1996 record of decision and analyzed in the SSM-PEIS, the current NEPA analysis is structured as a supplement to the SSM PEIS and is referred

to as the *Complex Transformation Supplemental Programmatic Environmental Impact Statement* or "SPEIS."[2]

I announced NNSA's intent to move forward on the SPEIS on December 18, 2007. The draft SPEIS evaluated alternatives for continuing transformation of the Complex. The document analyzed many different scenarios regarding how the Complex might be structured to best achieve our mission. It describes NNSA's "preferred alternative" for transforming the Complex that would rely on distributed centers of excellence focusing on core competencies, eliminating redundancies, and maximizing consolidation of SNM that requires high levels of security.

As set out in the preferred alternative, ***modern production "centers of excellence"*** for plutonium, uranium, tritium, and assembly/disassembly of weapons would be created to support the enduring stockpile. To preserve intellectual competition and robust, rigorous peer review, ***two independent design/certification "centers of excellence"*** would be maintained for nuclear weapons development and assessment. We would reduce the amount of space protected by high-security perimeters, the acreage of testing sites, and square footage of buildings in today's Complex. The facilities that provide our future warhead stewardship and production capabilities would be modern, agile, safe, and secure. The Complex of the future would have an integrated set of laboratories and manufacturing plants that apply leading-edge science and technology to maintain nuclear forces sufficient to deter future adversaries or to respond to foreign technological breakthroughs.

Over the next ten years, we would:

- Consolidate the SNM now at seven sites to five sites by 2012, with a significantly smaller high-security security perimeter footprint at those sites by 2018;
- Close or transfer from weapons activities funding about 600 buildings or structures, many by 2010;
- Reduce NNSA operational responsibilities and areas at two major testing sites supporting our laboratories by 2015;
- Reduce the square footage of facilities supporting weapons missions by more than 9 million square feet; and
- Reduce the workforce supported by weapons activities funding by 20-30% over the course of a decade or so. Our preference, with the support of Congress, is to achieve this workforce reduction through attrition, or by moving people from weapons work to other important and related national security work.

The Draft Complex Transformation SPEIS was published and posted online; and NNSA notified the public that it was available for review on January 11, 2008. A 90-day comment period was to close on April 10, 2008. However, in response to requests from

[2] A copy of the executive summary for the SPEIS is provided.

the Congress and the public, NNSA extended the comment period until April 30, 2008. More than 2000 people attended 20 public hearings across the United States. We received more than 600 oral comments during more than 80 hours of hearings, and more than 100,000 e-mail and written comments.

We are in the process of considering the comments we received and revising the SPEIS. We plan to release the final SPEIS this fall. NNSA would issue the first record of decision based on the final SPEIS no sooner than 30 days after the final SPEIS's Notice of Availability appears in the *Federal Register*.

**Science and Technology Base**

Maintaining the science and technology base provided by our national security laboratories and plants is essential. For more than a decade, a comprehensive science-based approach – the Stockpile Stewardship Program – has been the foundation for the continued viability of the stockpile. While focusing on this core weapons mission, our labs and plants have also provided many technological solutions to broader national security challenges. These solutions were derived from the capabilities developed as part of our weapons mission. The scientific capabilities resident in our highly-skilled workforce and infrastructure are a unique and very valuable resource for the nation.

Some have expressed concern that Complex Transformation may damage this essential science and technology base. There is a need for vigilance to prevent the unintended weakening of our scientific foundation. However, we believe that the greatest potential for long-term damage to our scientific capabilities arises from taking no action. Simply stated, the overhead costs of maintaining our existing infrastructure are just too large, and growing. Over time, this reduces the funds available for direct mission work including our science base. We must fund some near-term capital investments to solve this problem for the long-term. This requires a re-distribution of some funds within the Complex. Since the national security laboratories receive a majority share of NNSA weapons funding, this re-distribution must be done with great care to minimize impacts to science and technology activities.

Over the past two years, we have increased our science and engineering planning to ensure that we protect essential scientific capabilities during consolidation and change. As noted earlier, the Secretary of Energy, myself and the Directors of our National Laboratories recently announced a "Laboratory Vision for the Future" to address some of these concerns. I recently appointed a senior science advisor who reports directly to me. He is to focus on sustaining our science base. We are actively seeking strategic partnerships with other Department of Energy entities and federal agencies to better leverage and sustain critical competencies at our laboratories. While we share the concerns about adverse impacts to our science and technology base during Complex Transformation, we are aggressively taking action to avoid them.

With regards to the workforce restructuring which has occurred over the past year as a result of the FY08 appropriations, I feel it is important to emphasize to the Committee that I do not take these actions lightly and that we have applied great scrutiny and care to

ensure that we are taking these actions consistent with our future plans in terms of human capital and workforce expertise. It is important to remind ourselves that our Defense Programs activities are formulated based on national security requirements and meeting those deliverables to our partners in the Department of Defense.

**Going Forward**

The preferred alternative for Complex Transformation offers the lowest overall cost and risk. We propose to implement transformation within our FYNSP projections, assuming, of course, that savings from early transformation actions (e.g., supply chain management center, SNM consolidation, and non-nuclear production transformation) are available to be reinvested. Additionally, we would minimize the risk of production shortfalls for items that support the existing stockpile during the transition to a transformed complex.

We propose to pay for transformation through a combination of the following:

- Infrastructure savings through footprint reductions, replacement of buildings that are long past their economic lifetime, and updated cost-sharing models for work-for-others customers;
- Reduced overhead costs through contract reforms, improved risk management strategies, greater business practice uniformity, improvements in product assurance processes, and commodity purchase savings through a supply chain management center;
- Negotiations with DoD on alternative stockpile augmentation strategies;
- Reductions in staff supporting weapons activities through attrition and reassignment to other national security missions; and
- Optimization of federal staffing enabled by contract reform and improved line oversight of contractor assurance systems.

In short, Complex Transformation forces us to reform our current business practices and consolidate the nuclear weapons enterprise while we ensure that our most important resource – our people – are energized and challenged.

**What if we don't transform?**

What will happen if we do not transform and just maintain the status quo? The short answer is *we will reach the point where NNSA will be unable to maintain America's nuclear deterrent*. Every year the costs to maintain, operate and secure our physical infrastructure continue to rise. The JASONs, an independent group of scientists that advises the government, the Defense Nuclear Facilities Safety Board (DNSFB), the Defense Science Board and the Secretary of Energy Advisory Board have all issued reports or findings over the past several years highlighting the need for NNSA infrastructure improvements and modernization. Delay in beginning this phase of transformation will only increase the costs and risks of maintaining the nuclear deterrent.

We cannot continue to do 21st Century national security business with a 50-year-old Cold War infrastructure. The need for sustaining future plutonium and uranium capabilities are without question. One common thread among all these experts is the agreement that we will need these capabilities to maintain our nuclear deterrent. Take the 50-year-old Chemistry and Metallurgy Research (CMR) Facility at Los Alamos, for example. The DNSFB has clearly stated that the CMR has significant safety issues which cannot be addressed in the existing structure. Similar issues exist at Y-12 with regards to Building 9212 which currently houses many of our legacy uranium processing operations. The country can not afford to wait any longer.

**Conclusion**

As Administrator, I am responsible for sustaining our capabilities that support the Nation's commitment to maintain the lowest number of nuclear weapons consistent with U.S. national security requirements. In this role, I support adopting a flexible posture that allows "back up" to be provided by an infrastructure capable of confronting a threat rather than warheads held in reserve. A reduced stockpile and consolidated, efficient design and production capability, will be a more cost-effective means to maintain the U.S. nuclear deterrent. Since my first day as acting Deputy Administrator for Defense Programs, I have taken a long hard look at the nuclear weapons complex, and where we need to be. I am convinced that what I have outlined here is the best path. And I also feel that the need for change is urgent. We must act now to adapt for the future and stop pouring money into an old, Cold War weapons complex that is too big and too expensive.

This will not be easy, but the key to successfully meeting our mission and transforming the Complex is to ensure that we become a *smaller, safer, more secure, and less expensive enterprise that leverages the scientific and technical capabilities of our workforce to meet all our national security requirements.* We need buildings, methods and materials that are safer for our workers than those used during the Cold War.

Our dedicated workforce is the key to transformation and its success. They will be the agents of transformation and their insights, experience and proven dedication will be needed to carry it out. Their expertise constitutes a key element of our nation's national security.

Thank you, I'll be happy to take your questions.

Statement of Dennis Hayes

General Manager, Defense Programs

Washington Savannah River Company

Before the

Committee on Armed Services
Subcommittee on Strategic Forces

July 17, 2008

Thank you for the opportunity to provide this statement in support of today's hearing.

I am here representing the Washington Savannah River Company, which has served as the operating contractor at the Savannah River Site since 1989. Our company is pleased to have helped play a role in NNSA's national security mission, and grateful for all of the stakeholder support that has allowed the missions at SRS to succeed.

Today, the Savannah River Site is home to a complex of facilities that are designed and operated to process tritium, the radioactive form of hydrogen gas that is an essential component of a nuclear weapon. Our operations include reclamation of previously used tritium reservoirs; receipt, packaging and shipping of reservoirs; recycling, extraction and enrichment of tritium gas; and laboratory operations.

We are fully supportive of the Complex Transformation vision, as outlined by Mr. D'Agostino. At Savannah River, we are already adjusting to the changing workload associated with today's stockpile requirements; we also have been full participants in the process to date, helping to develop alternatives in the areas of tritium, plutonium and uranium.

The Savannah River Site tritium facilities have already gone through a transformation since the mid-1990s, and can be seen as one of the models for what can be achieved through transformation. From 1994 through 2007, SRS successfully executed three major line item projects – the Replacement Tritium Facility (1994), the Tritium Consolidation Project (2004) and the Tritium Extraction Facility (2007) – that now make up the core operation.

Through that transformation, which replaced all of the original SRS tritium gas processing capability, we have achieved the following:

-Implementation of state of the art technology.

-Substantial improvements in worker safety and reductions in environmental emissions.

-An overall enhancement to basic capabilities to support the complex and the stockpile, both today and for the foreseeable future.

In that same timeframe, we successfully executed the transfer of the Gas Transfer System Surveillance mission. The Savannah River Site's acceptance of that mission enabled DOE to cease operations at the Mound Site in Ohio, and helped enable the transfer of that site to the local community for reuse efforts.

All of the above efforts support the transformation goal of eliminating redundant capability where it makes sense and when the risks are acceptable.

As suggested in Mr. D'Agostino's testimony, the Savannah River tritium facilities would play a role in transformation as the preferred alternative for the tritium production center of excellence. That designation acknowledges the investment that has been made in the set of facilities described above; it also would allow for the consolidation of tritium research and development work at Savannah River, and the corresponding elimination of redundant capability and facility footprint. From the standpoint of our current operations, we are also implementing change that supports transformation goals. Our Tritium Extraction Facility personnel, for example, are working under a Responsive Operations plan, a plan that acknowledges and adapts to a changing workload, while making the best, most efficient use of a trained, mobile workforce. I would be happy to provide you with additional specific detail if you wish.

In summary, and on behalf of the Savannah River Site, we look forward to a continuing role in the transformed NNSA complex.

# Statement of Dr. Thomas O. Hunter
# President and Director
# Sandia National Laboratories

# United States House of Representatives
# Committee on Armed Services
# Subcommittee on Strategic Forces
# July 17, 2008

## Introduction

Madam Chairman and distinguished members of the Committee, thank you for the opportunity to testify. I am Tom Hunter, President and Director of Sandia National Laboratories. Sandia is a multiprogram national security laboratory owned by the United States Government and operated by Sandia Corporation for the National Nuclear Security Administration (NNSA).

My statement responds to the Committee's request to discuss three closely related issues: (1) the national security rationale for the Stockpile Stewardship Program and the complex that supports it; (2) the Preferred Alternative for Complex Transformation that NNSA has proposed; and (3) other alternatives for securing the continued effective execution of the Stockpile Stewardship Program.

## The National Security Rationale for the Stockpile Stewardship Program

Clearly, a vigorous national policy discussion concerning the future role of nuclear weapons is occurring today. This is a necessary and important discussion, and it demonstrates the vitality of our form of government. NNSA's job—and the job of its laboratory directors— will be to implement the nuclear weapon mission as determined by the nation's policy makers. The nuclear weapon stockpile will no doubt be different as we move forward. Its composition and size will likely be altered, and it will be increasingly older.

Regardless of how policy may change, the fact that nuclear weapons and a nuclear weapon knowledge base exists in the modern world creates important challenges that must be managed over the long term. The NNSA complex will continue to have principal mission responsibility for meeting those challenges.

Nuclear weapons continue as a key element of U.S. national defense policy. Consistent with existing policy, the NNSA laboratories are implementing the Stockpile Stewardship Program, which is the essential mechanism for maintaining the nuclear weapons stockpile. It is a challenging mission.

The NNSA laboratories serve several key purposes through the Stockpile Stewardship Program:

- First and foremost, the laboratories support the weapons currently in stockpile. We do this through stockpile evaluation and assurance activities, which permit the laboratories to inform the Secretaries of Energy and Defense about the safety, reliability, performance and military effectiveness of the stockpile every year. The law requires that this assessment be submitted to the President and the Congress without change.

- Issues inevitably arise as a consequence of aging or other factors. The laboratories resolve these issues when they occur, and upgrade aging subsystems as legacy technology becomes obsolete.
- The weapons science competencies that reside in the laboratories position the nation to evaluate and respond to unanticipated developments in the international environment or in the weapons technology of other nations. It is important that laboratories retain the capability to perform a warhead system development, if warranted by a future change in policy.
- The laboratories continually evaluate weapon surety systems and provide enhancements as necessary. Safety and security of warheads must be vigilantly maintained. Thus we constantly push the state of technology to reduce risk a far as practical.
- The laboratories maintain a deep foundation of scientific and engineering competencies, which is an essential component of our nation's deterrent—as well as a resource for national leadership in technology to address broad national security challenges.

The Stockpile Stewardship Program must continue to be structured in such a way that the laboratories can provide the flexibility that will be required to respond to changes in nuclear weapon policy. If Stockpile Stewardship focuses exclusively on the legacy stockpile of the Cold War, it may not have the flexibility to adapt efficiently to new policy requirements. Moreover, indefinitely maintaining legacy weapons may require a more costly nuclear weapons complex over the long term. We need to maintain a balance of investment in scientific and technical competencies for design and assessment with those needed for the production complex.

Leadership in science and engineering is important for ensuring an effective stockpile. The laboratories must attract and retain high-quality staff and maintain key scientific facilities. System engineering programs, technology development, and advanced scientific and engineering research are important for sustaining the quality of our technical talent.

The Committee should be aware that reductions proposed in the House markup for appropriations in Weapons Activities would have a significant impact on the NNSA laboratories' ability to perform their responsibilities in Directed Stockpile Work and the science, engineering, and computing campaigns that support stockpile assurance. Similarly, Laboratory-Directed Research and Development is marked for a reduction by half, which would impact the laboratories' capability for scientific and engineering innovation that benefits all of our national security missions.

In my opinion, an essential characteristic of the Cold War's resolution and a fundamental element of deterrence going forward is the strength and resiliency of the NNSA laboratories. Their scientific capabilities have deterred our adversaries, contributed mightily to the nation's technological leadership, and seen many significant applications in support of national security. It is essential to recognize the ongoing need for a vital scientific foundation to support the evolving national security policy.

## The Preferred Alternative For Complex Transformation

In January, NNSA released its draft Supplemental Programmatic Environmental Impact Statement (SPEIS) for transforming the nuclear weapons complex. Complex Transformation is a vision for a smaller, safer, more secure, and less expensive complex. The SPEIS outlines a

Preferred Alternative utilizing distributed centers of excellence, and it proposes to consolidate some missions and facilities within the existing NNSA sites.

We at Sandia recognize the need for changes in the nuclear weapons complex. We support NNSA in its effort to transform the complex into a modern enterprise for efficient and cost-effective stewardship of the nuclear deterrent.

We have long supported and see great benefit in the Preferred Alternative's proposal to consolidate Category I and II special nuclear materials (SNM). We are so committed to that concept, and to the improvements in security posture and the complex-wide cost savings associated with it, that in February we completed the removal of all discrete Category I and II SNM from Sandia sites.

Implementation of the Preferred Alternative must be carefully managed so that essential capabilities remain strong and can continue to support the core products for which we are responsible. Sandia's core products for the Stockpile Stewardship Program include engineered and integrated warhead systems; arming, fuzing, and firing systems; neutron generators; gas transfer systems; and surety systems.

The capabilities that we regard as essential for enabling our core products include major environmental testing, radiation effects science, computational simulation, microsystem technologies, materials science, and the engineering sciences. Many of these capabilities are synergistic with those in industry and at research universities; however, they do not exist in those sectors in the specialized forms required for stockpile stewardship nor as an integrated enterprise. These capabilities are also important to the nation's broader science and technology agenda.

Under the Preferred Alternative, Sandia would continue to be the center of excellence for science and engineering for warhead non-nuclear systems and components and for major non-nuclear environmental testing. Sandia would also develop a revised flight testing strategy for gravity weapons at the Tonopah Test Range and would have a different role in NNSA's high-performance computing program. Sandia's California laboratory would continue to perform the non-nuclear systems engineering for nuclear weapons designed with the Lawrence Livermore National Laboratory, and it would also transition to a multi-agency resource. We are developing a plan to guide the transition of our California site to that vision.

### *High-Performance Computing under the Preferred Alternative*

Under the Preferred Alternative for Complex Transformation, NNSA plans to consolidate operation of high-performance computing platforms at the Lawrence Livermore and Los Alamos sites. It is important to recognize that state-of-the-art capability computing is an essential foundation of all three laboratories. In fact, it was these laboratories, especially Sandia, that brought the nation to a leadership position in supercomputing—leadership in effective systems architectures, algorithms, and applications. High-performance computing is at the heart of the capability for all laboratory missions.

In order to remain a key participant in NNSA's high-performance computing program, Sandia negotiated a memorandum of understanding with Los Alamos National Laboratory that will bring together the two laboratories' computer science and operational capabilities for high-performance computing. Under this agreement, Sandia will lead in providing the architecture and engineering expertise for capability platforms, and Los Alamos will lead in deployment and operations. Teams will be formed from both laboratories to provide an unparalleled computa-

tional resource for future NNSA capability platforms.

This partnership is not without risk to both institutions. It is too soon to tell whether it will maintain the expertise that has provided the foundation for the nation's preeminent global position in computing. It will be essential for NNSA to execute a strategy that supports the Sandia/Los Alamos partnership with a platform procurement in fiscal year 2010 that meets the established requirements for maintaining and refurbishing the nuclear weapon stockpile.

In this regard, high-performance computing at NNSA is also challenged by a proposed reduction of $66 million in the Advanced Simulation and Computing Campaign in the House markup of the Energy and Water Appropriations bill for fiscal year 2009. A reduction of that magnitude will call into question the viability of the Sandia/Los Alamos partnership.

### *Sandia's California Laboratory Site under the Preferred Alternative*

Consistent with the Preferred Alternative for Complex Transformation, we are implementing an initiative at Sandia's California site in Livermore that is designed to sustain the core expertise for California-designed nuclear weapons while also applying those scientific and engineering assets to other national security, homeland security, energy security, and environmental challenges.

This transformation will exploit the utility of the California location, recognizing the role of the State of California in the nation's future energy, environmental, and national security needs. It also will take advantage of the other Department of Energy multiprogram laboratories in California (Lawrence Berkeley National Laboratory and Lawrence Livermore National Laboratory) and will serve as a pilot Energy Innovation Hub seeking to develop mechanisms for translating DOE-generated science into real-world applications. This approach creates an opportunity to work jointly with Lawrence Livermore National Laboratory to establish an open corridor accessible to industry and academia so that the expertise of both laboratories can be applied to unclassified issues of national importance.

This transformation pilot for Sandia's California laboratory may require a new management model within the Department of Energy that supports the mission activities of multiple program offices at a single site. The Department of Energy is working with us to define a model that recognizes the Department's overarching responsibility for a variety of national security missions while sharing institutional stewardship costs and governance responsibilities with other offices and agencies.

## Alternatives for Effective Execution of the Stockpile Stewardship Program

NNSA's Preferred Alternative is a workable and prudent approach for realizing efficiencies in the nuclear weapons complex. It represents a rational way to deal with the nuclear weapon stockpile and the complex that supports it. There is, though, another factor that I think should be addressed, which applies to all future complex alternatives. That factor is the way in which the complex is managed.

As I mentioned earlier, the vitality of the NNSA laboratories is an essential element in assuring a safe, secure nuclear deterrent. These laboratories must assure that a strong science and engineering capability exists to properly respond to evolving national policy and maintain an aging legacy stockpile. Yet there is, in my judgment, an equally important element which addresses the role and character of these institutions. The laboratories must—above all—be

committed to the nation's service. The singular responsibility to objectively evaluate and inform the nation's leaders about the state of health of our nuclear deterrent is just cause to rise above all other interests and incentives for these institutions. The leadership of these laboratories must always subordinate any personal, corporate, or financial-return concerns to serve first in the national interest. This must also be the prevailing ethos for all employees in the laboratories.

This essential value system in the laboratories has been long in development, yet it is increasingly fragile as it confronts the future. It is a commodity that cannot be bought at any price, but losing it could result in a cost that we would ultimately regret.

These institutions need to feel accountable for their important national roles and for superior performance in delivering results. The entirety of each institution must be managed in a way to be continually more effective, ever stronger in scientific and engineering capability, and increasingly cost-efficient. As the complex transforms, it is imperative that accountability—with the commensurate authority for action—be maintained in our laboratories and their leaders. Potential confusion around roles and responsibilities that move beyond "what" and more toward "how" could also serve to erode the character of national service at the laboratories. As we move forward in this necessary transformation of the complex, it is my earnest hope that this important—perhaps most important—element not be overlooked.

Another important concept to help guide the transformation of the complex is to encourage synergistic multiprogram, multi-agency activities under the integrated management of each laboratory. Today's national security challenges are more complex than they were during the Cold War. Challenges in cyber security, homeland security, energy security, and other emerging threats are formidable, and the agencies addressing those challenges need access to the multidisciplinary scientific and engineering resources that exists at NNSA laboratories.

The NNSA laboratories are uniquely positioned to contribute to the solutions of today's complex national security challenges. Moreover, the laboratories will increasingly depend on diverse national security programs to enhance their critical capabilities. It makes sense, therefore, for Complex Transformation to facilitate more intensive use of the NNSA laboratories by multiple sponsors. Sandia's California laboratory is a perfect setting for testing the viability of a multi-agency model for NNSA institutions as the nuclear weapons program approaches a reduced level of effort.

## Conclusion

Nuclear weapons remain a key element of U.S. national defense policy. The Stockpile Stewardship Program must continue to be structured in such a way that the NNSA laboratories can exercise the flexibility that will be required to respond to changes in nuclear weapon policy.

I support NNSA's plan for changes in the nuclear weapon complex. Implementation of the Preferred Alternative must be carefully managed so that essential capabilities remain strong and the laboratories can continue to support the core products for which they are responsible. I do have concerns about the implementation of Complex Transformation with respect to Sandia's interests in high-performance computing and our California laboratory. I am also concerned that proposed reductions in appropriations affecting the Stockpile Stewardship Program will impact our ability to perform the mission. However, if these concerns can be addressed, then I see no reason why the Preferred Alternative for Complex Transformation cannot succeed.

**Testimony of Marylia Kelley, Executive Director, Tri-Valley CAREs, before the House Armed Services Subcommittee on Strategic Forces, regarding modernization of the nuclear weapons complex, 7/17/08**

Thank you Madam Chairperson, Mr. Everett and subcommittee members for inviting me to testify before you today. I am Marylia Kelley, Executive Director of the Livermore, CA-based Tri-Valley CAREs, a non-profit organization founded in 1983 to monitor the U.S. nuclear weapons complex and its Lawrence Livermore National Laboratory. I represent the group's staff, board, technical advisors and 5,600 members who comprise a cross-section of our community including current and retired scientists and engineers.

My testimony will focus on three areas that are central to the subcommittee's interests and to this hearing: **(1)** The Dept. of Energy (DOE) National Nuclear Security Administration's (NNSA) preferred alternative for "Complex Transformation"; **(2)** A stockpile management alternative that will better assure the safety and reliability of the existing nuclear weapons arsenal at lower cost, reduced scientific risk and superior nonproliferation benefit; and **(3)** Specific alternatives for the future of nuclear materials and sites in the nuclear weapons complex.

## THE COMPLEX TRANSFORMATION PLAN IS FLAWED

The NNSA has stated that Complex Transformation is the agency's "vision for a smaller, safer, more secure and less expensive nuclear weapons complex…" Let's take a closer look.

First, the "vision." Beneath the rhetoric, Complex Transformation calls for a significant revitalization of the nuclear weapons complex. The weapons complex of today consists of 8 major sites. After Complex Transformation is fully implemented, the weapons complex of the future will consist of the same 8 sites. The plan's centerpieces include a new, larger plutonium complex at the Los Alamos Lab in NM, capable of producing 80 new plutonium bomb cores per year, and a new Uranium Processing Facility at Y-12 in TN. According to the 2008 draft PEIS, Complex Transformation is based on the 2001 Nuclear Posture Review. Yet, Congress has already mandated that the next administration prepare a new Nuclear Posture Review. Thus, NNSA's plan will be dead on arrival; based on yesterday's policy, not forward-looking vision.

The NNSA touts its plan as a "smaller" nuclear weapons complex. Here, NNSA takes credit for proposing to demolish old buildings that, in many cases, are already in the queue to be torn down and decontaminated. As those activities will happen independently, their removal is not an achievement of Complex Transformation. The NNSA says its plan will reduce the square footage of buildings and structures supporting nuclear weapons missions from 35 million square feet today to about 26 million square feet. My organization and others *reject* the notion that a 26 million square foot complex refurbished with new capabilities and facilities in order to more efficiently develop and produce new nuclear weapons represents the major change in direction that is so sorely needed for the weapons complex infrastructure – and for nuclear weapons policy.

The NNSA calls its Complex Transformation plan "more secure," but, as I will discuss in the Livermore Lab section that follows, this plan keeps thousands of pounds of plutonium and highly enriched uranium in a vulnerable, untenable situation at Livermore Lab until 2012. Then, NNSA proposes to move the plutonium twice in service of Complex Transformation. This is not a plan that appropriately prioritizes the security of nuclear materials. Finally, NNSA insists the plan will be "less expensive," but fails to provide cost estimates in its draft PEIS. In 2006, the Gov-

ernment Accountability Office offered an initial estimate of $150 billion over 20 years. Others suggest that Complex Transformation will exceed the $150 billion mark.

The NNSA promoted this plan in 2006 with vu-graphs stating that the Reliable Replacement Warhead (RRW) program "will be the 'enabler' for stockpile and infrastructure transformation." Since Congress has prudently cut the RRW budget since then, the NNSA has begun submerging the role of RRW in Complex Transformation. Make no mistake, however. The development of new and/or significantly modified nuclear weapons remains at the heart of the Complex Transformation approach, whether through RRW or a successor design program. The plan locks the nuclear weapons complex into a path that entrenches current nuclear weapons policy, preempts a full policy debate, and end runs both the commission that this subcommittee was instrumental in enabling through the National Defense Authorization Act of 2008 and the aforementioned new Nuclear Posture Review.

The NNSA has received between 115,000 and 120,000 verbal testimonies and written letters, cards, emails and petitions opposing the plan. Add the 33,000 who spoke or wrote in opposition during the initial "scoping" process, delete the duplicates, and the number approaches 150,000. This outpouring of comment represents a public referendum against the NNSA plan.

In sum, Complex Transformation is **wrong policy**, enabling new nuclear weapons programs that run counter to U.S. nonproliferation aims, **wrong direction,** building unneeded weapons facilities, **wrong priorities**, costing $150 billion or more and failing to quickly secure the nation's most vulnerable nuclear materials, and **wrong timing**, putting the "cart" of new bomb-building capabilities before the "horse" of the new policy and posture reviews. The public has roundly rejected the plan, the Congress has cut funds for some of its key elements, and the NNSA tells me it will release the final PEIS and execute a Record of Decision codifying the plan this Fall.

In so doing, the NNSA willfully ignores an alternative approach to managing the nuclear weapons stockpile that is technically, politically, environmentally and fiscally superior to the agency's "preferred alternative" outlined in the Complex Transformation PEIS.

## SUPERIOR ALTERNATIVES EXIST: THE CURATORSHIP APPROACH

"Curatorship" is a far superior approach to maintaining the full safety and reliability of the existing nuclear weapons stockpile. Curatorship focuses on careful surveillance, analysis and refurbishment of the actual weapons in the arsenal rather than on pushing the envelope of new research and development, as is the case with the present "Stockpile Stewardship" program and, to an even greater extent, the proposed RRW path.

The NNSA's Stockpile Stewardship approach "emphasizes development and application of greatly improved scientific and technical capabilities to assess the safety, security and reliability of existing nuclear warheads…." In contrast, Curatorship is an inherently more conservative, less scientifically risky approach to that job. Under Curatorship, only if NNSA's surveillance activities demonstrated compelling evidence that a component had degraded, or would soon degrade, and further analysis indicated that such degradation could cause a significant loss of safety or reliability, would NNSA replace the affected part. The replacement would be remanufactured as close to the original design as possible.

Compared to Stockpile Stewardship, changes to weapons would be minimized using the Curatorship approach. One significant outcome of Curatorship is that less uncertainty would be intro-

duced into the stockpile over time than is the case with the present program, which allows (and even encourages) major modifications. Likewise, Curatorship is a more certain approach to stockpile maintenance than the research, development, testing, engineering and production of what would be, in essential aspects, new warheads under the RRW program.

Instead of relying on a massive R & D enterprise geared more to the desires of a few individuals than to the needs of the weapons, Curatorship relies on the agency's extensive historical testing and certification activities, which have demonstrated that the existing stockpile is safe and secure. Under Curatorship, NNSA would need skilled engineers and physicists, with good judgement, to examine warheads and to determine when components must be replaced. The NNSA would continue to operate state-of-the-art testing and engineering facilities to examine components. It would retain sufficient capability to apply analytical models to questions of weapon safety and reliability. That said, NNSA would have no requirement for many of its Stockpile Stewardship facilities, which are primarily useful to design and certify new and/or significantly modified weapons and components.

The Curatorship approach will reduce the NNSA's environmental footprint and its operating costs. Under Curatorship, NNSA would close numerous facilities that use high explosives, tritium (radioactive hydrogen) and other hazardous materials beyond the NNSA's Complex Transformation plan. Moreover, under Curatorship, new facilities such as the Chemistry and Metallurgy Research buildings Replacement (CMRR) at Los Alamos Lab and the Uranium Processing Facility at Y-12 would not be built or operated, resulting in an environmental benefit. Curatorship would rein in costs. The NNSA currently spends about 50% of the Weapons Activities budget each year on nuclear weapons R & D. Under Curatorship, R & D would be directed primarily toward improving surveillance and testing, to understanding how materials in existing weapons age and to further validating codes and models to historical test results. Such R & D is estimated to amount to less than 20 % of the current budget.

Let me say a word here about Curatorship and nuclear disarmament, which my organization also advocates. Curatorship is not disarmament. Curatorship will fully maintain the safety and reliability of the existing U.S. nuclear weapons stockpile, which was extensively tested full-scale in Nevada, until such time as the weapons are dismantled. That said, the U.S. is committed to nuclear disarmament under Article VI of the Non-Proliferation Treaty (NPT), to which it is a signatory. Curatorship is more compatible with the NPT, and, more broadly, with U.S. nonproliferation aims, than either the present Stockpile Stewardship or the proposed RRW path.

Here is one example: The New Agenda Coalition, an influential group of signatory states to the NPT, has warned that any "plans or intentions to develop new types of weapons or rationalization for their use stand in marked contradiction to the NPT, and undermine the international community's efforts towards improving the security of all states." Curatorship avoids putting new military capabilities into the arsenal. By foregoing further "vertical proliferation," Curatorship will enhance the stature and effectiveness of the U.S. as we seek to work with our allies to address the rising pressures of the "horizontal proliferation" of nuclear weapons to new states. In so doing, Curatorship will reduce the nuclear dangers and make the U.S. and the world safer.

The Curatorship approach to managing the nuclear weapons stockpile builds on an impressive lineage. It stands on basic concepts advocated by Norris Bradbury, Los Alamos Lab director from 1945-1970, J. Carson Mark, former head of the Los Alamos's Theoretical Division, Richard Garwin, former nuclear weapon designer and current JASON, Ray Kidder, senior staff scien-

tist and former weapons designer at Livermore Lab and others. In 2000, Tri-Valley CAREs contracted with Robert Civiak, a physicist and Budget Examiner for DOE weapons programs at the Office of Management and Budget from 1988-1999. Dr. Civiak undertook the analysis necessary to put the flesh on the bones of the Curatorship option. Much appreciation is also due recent and present weapons scientists for their evaluation of the Curatorship approach; in particular, to Roger Logan, a recent nuclear weapon design and certification retiree from Livermore Lab, who had served as head of the Lab's Directed Stockpile Work.

Tri-Valley CAREs provides a detailed analysis of Curatorship - and a list of facilities that would be available for closure or remissioning under this alternative - in its 2008 comments on the draft Complex Transformation PEIS, which I ask be included in its entirety in the hearing record.

## SAMPLER OF ALTERNATIVE APPROACHES NEEDED AT THREE NNSA SITES

**Livermore Lab:** The main site sits on little more than one square mile with homes and apartments built up by its fence line. Suburban neighborhoods lie only about 800 yards from the Lab's "Superblock" and thousands of pounds of plutonium and highly enriched uranium. Tri-Valley CAREs has long-held concerns regarding the security of nuclear materials at Livermore Lab. This spring, DOE undertook a series of security drills, including a force-on-force test, in which a tactical security team played the role of an attacking force in order to see how the Lab's protective forces would respond. According to reports, the mock terrorist team's objective was to get to the nuclear material and hold the ground long enough to construct an Improvised Nuclear Device (capable of producing a nuclear explosion). A second scenario involved would be attackers stealing plutonium for use at a later date. While NNSA has yet to respond to Tri-Valley CAREs' Freedom of Information Act request for unclassified records regarding the security drill, the information we have gathered to date is that the mock terrorists succeeded in both of those objectives.

NNSA and Livermore Lab have attempted to downplay the significance of the security failures, claiming that the exercise was not realistic. However, the conditions favored the Lab's protective forces not the would-be attackers. The Lab was given extensive advance notice of the drill, which eliminated the element of surprise. The mock attack was conducted at night, when few of the Lab's thousands of employees were present. Further, because NNSA had given Livermore Lab a waiver from having to demonstrate compliance with the 2005 Design Basis Threat (DBT), the drill was conducted to the less rigorous specifications of the 2003 DBT. (The DBT is based on the Postulated Threat, which in turn is developed jointly by the DIA, FBI, CIA, DOE and DoD.)

Tri-Valley CAREs concludes the plutonium and highly enriched uranium at Livermore Lab is not secure, nor can it be made secure due to the compactness of the site, its 600 buildings cheek to jowl and the close proximity of densely populated neighborhoods, including my own. Tri-Valley CAREs is opposed to the NNSA proposal to leave these materials at Livermore Lab through 2012, as outlined in the draft Complex Transformation PEIS. I would also point to a 2007 GAO report, "DOE Has Made Little Progress Consolidating and Disposing of Special Nuclear Material." GAO stated that it will cost nearly half a billion dollars just to keep Livermore's plutonium in place for 7 years. GAO also noted the lack of any actual, detailed plan for its removal.

In addition to removing special nuclear material from the Lab, any forward-looking plan for the future of the complex would conclude that there is no "need" to maintain two full service nuclear weapon design labs. It is entirely feasible to transition Livermore Lab to new missions. Under this scenario, nuclear weapons design activities would cease. Nonproliferation, research on global climate change, non-polluting, renewable energy technologies and other science in the national interest would replace weapons R & D. Livermore Lab would maintain a small weapons footprint with about two dozen select staff supporting Curatorship and about the same number teamed to accomplish Certification tasks. The security costs at the site would plummet, a necessary step in making Livermore Lab competitive in attracting research projects. This idea, whose time has more than arrived, has a lineage that includes the late Rep. George Brown, former Chair of the Science Committee, and the recommendation of the DOE's "Galvin commission" among others.

**Los Alamos & Sandia Labs:** Many of the functions necessary for Curatorship would take place at Los Alamos. With the emphasis shifted from weapons design to maintenance, however, this could be accomplished without increasing the nuclear weapons footprint there. Tri-Valley CAREs opposes Complex Transformation's proposal to expand plutonium pit production at Los Alamos from its current 20 pits per year capacity to up to 80 bomb cores/year. In this regard, we note the proposed CMRR Nuclear Facility should not be built. We note also that under Tri-Valley CAREs' plan, Sandia, Albuquerque would retain the centrally important stockpile management program responsible for disassembling eleven warheads of each design each year to examine and test the components to determine if there are any "actionable" fixes to be carried out.

**The Kansas City Plant:** The NNSA is poised to privatize a key part of the nuclear weapons complex, which will circumvent the ability of Congress to authorize and appropriate funds. The plan is to build and operate a new Kansas City Plant eight miles from its present location under a lease back arrangement. This is occurring outside of the Complex Transformation PEIS or an Environmental Impact Statement. It is being pursued on the basis of a flimsy environmental assessment. Alternatives were given short shrift. NNSA and the General Services Administration have undertaken actions that appear to support a predetermined outcome, a violation of law. The plan violates Office of Management and Budget anti-deficiency guidelines. Tri-Valley CAREs advocates that Congress ask the GAO to investigate the lease arrangement and agency actions.

## CONCLUSION: EMERGING POLICY TRENDS AND NEXT STEPS

2008 began with George Shultz, William Perry, Henry Kissinger and Sam Nunn renewing their efforts "Toward a Nuclear-Free World." Amb. James Goodby published an essay calling for 1,000 or fewer U.S. nuclear weapons by 2012. This is a trend line long-coming and worthy of further Congressional consideration. Too, NGOs will continue to contribute analyses. For example, Tri-Valley CAREs, other groups at NNSA sites and two of our DC colleagues, Natural Resources Defense Council and Project on Government Oversight, are undertaking an analysis of the "right sized" complex to support a stockpile of 500 warheads. Networks, like the Alliance for Nuclear Accountability, will continue to share perspectives from communities around DOE sites. My list could go on; notable activities abound. ***My conclusion is: The NNSA plan is flawed, the reality is that U.S. nuclear policy is at a crossroad, Curatorship is a sensible path forward, nuclear materials must be secured, scientific talent and funds need to be freed to address pressing priorities, the NGO community has ideas to share, and Congress has a uniquely important role to play in delegitimizing nuclear weapons and making the U.S. and the world safer.***

Statement of Darrel P. Kohlhorst

President and General Manager
Babcock &Wilcox Technical Services Y-12, LLC

On
Modernization of the Nuclear Weapons Complex

Before the
Subcommittee on Strategic Forces
Committee on Armed Services
U.S. House of Representatives

July 17, 2008

Thank you for the opportunity to submit this statement regarding the National Nuclear Security Administration's (NNSA) plans for transforming the nuclear weapons complex and the role of the Y-12 National Security Complex (Y-12), located in Oak Ridge, Tennessee, in those plans.

Babcock &Wilcox Technical Services Y-12 (B&W Y-12) is the management and operating contractor for Y-12, a vital production component of today's nuclear weapons complex. Today, the Y-12 missions include manufacturing, dismantlement, and assessment of nuclear weapon secondaries, cases, and other weapons components; safely and securely storing and managing highly enriched uranium (HEU); supplying HEU for use in naval reactors; promoting international nuclear safety and nonproliferation; and reducing global dangers from weapons of mass destruction. We are committed to increased productivity while maintaining a focus on continued safety improvement and workforce restructuring.

B&W Y-12 fully supports NNSA's desire and approach to accelerate the fundamental transformation of the nuclear weapons complex over the next 10 years and, more specifically, endorses NNSA's preferred alternative contained in the *Draft Complex Transformation Supplemental Programmatic Environmental Impact Statement* (SPEIS) released in December 2007. That preferred alternative, the distributed centers of excellence, names Y-12 as the Uranium Center of Excellence with the continuation of our currently assigned missions. It also endorses completion of construction and operation of the Highly Enriched Uranium Materials Facility (HEUMF) and design of the Uranium Processing Facility (UPF). The relocation of the Y-12 mission to another site would require a major, upfront facility investment; the establishment and training of a new workforce; overlapping operations to ensure a proper transition and mission continuation; relocation of special nuclear material, fixtures, and tooling; and the initiation of a full shutdown, decommissioning, and demolition program for Y-12. Studies and analyses performed to date indicate that Y-12 represents the least cost, lowest risk approach for transforming NNSA's uranium mission.

I'd like to specifically address the need for transformation at Y-12. Most of the uranium facilities at Y-12 were constructed in the 1940s and 1950s and were not designed to meet today's nuclear safety and security standards. They are oversized to support the stockpile of today and the future. While Y-12 operates in a safe and compliant manner today, it requires ever-increasing operations and maintenance funding with increasing risk to the mission as the facilities continue to exceed normal operating lifetimes. Compliance with today's more stringent security requirements demands a manpower-intensive approach, because decades ago the facilities were not designed to address security concerns. From an overall transformation perspective, Y-12 has been referred to as the "poster child" for the aging nuclear weapons complex, but we have also been recognized for our aggressive approach to transformation. Y-12 has created a clear path to resolve these infrastructure issues and we are well on our way to the future.

The Y-12 transformation plan that is being implemented focuses on downsizing, consolidating, and rebuilding mission-critical facilities with a special emphasis on health, safety, environmental, and security solutions. Construction of HEUMF will be completed this summer, and the preliminary design of UPF is well under way. Completion of these two facilities, which will house all enriched uranium production and storage operations, will lead to a 90% reduction (from 150 acres to 15 acres) in the high security area and a 60% reduction in the nuclear facility footprint. In addition, it will lead to a reduction of approximately $200M per year in operations, maintenance and security costs. In light of the age and condition of our existing enriched uranium facilities and the opportunity for substantial savings in annual operating costs, it is imperative that we keep UPF on an aggressive schedule.

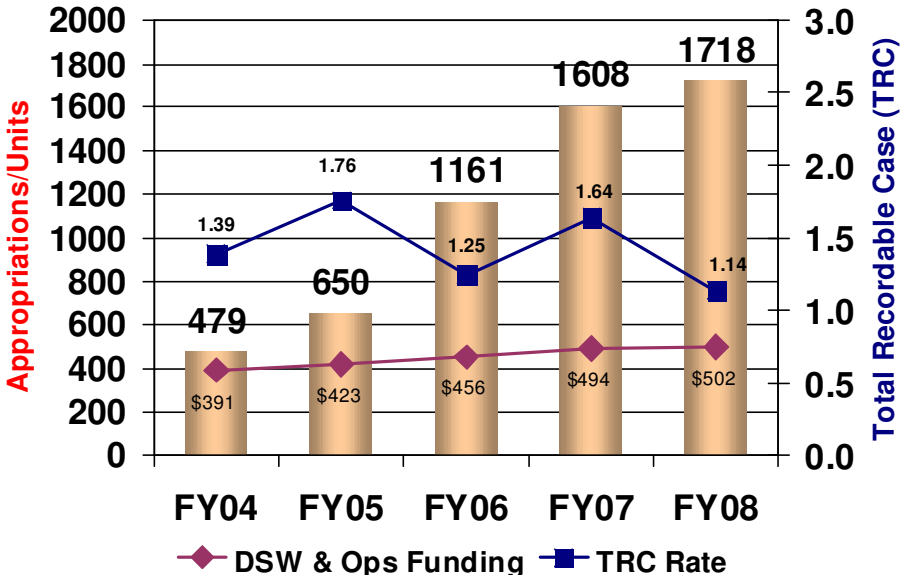
During the past 3 years we have consolidated our surveillance and depleted uranium metal cycle operations from four facilities to two, allowing us to cease operations in two 1940s production facilities encompassing approximately 900,000 sq ft. We have demolished more than 1 million sq ft of Cold War-era structures and consolidated technical and administrative functions into two new facilities eliminating the use of 35 Cold War-era facilities. One of our two new technical and administrative facilities is LEED (Leadership in Energy and Environmental Design) certified and is one of only eight such facilities in Tennessee. We are proactively addressing legacy facilities that have or will become excess to NNSA by teaming with Department of Energy-Oak Ridge Operations Environmental Management and Oak Ridge National Laboratory on an Integrated Facilities Disposition Project (IFDP) that will disposition 15 major facilities at Y-12, many of which are process contaminated, totaling approximately 3.8 million sq ft. The Critical Decision 0 (approval of mission need) for IFDP was approved in 2007, and Critical Decision 1 (approval to start preliminary design) was submitted for approval in June 2008.

Investments made through the Facilities and Infrastructure Recapitalization Program (FIRP), the Readiness Campaign, and the Plant Directed Research and Development (PDRD) programs are making a great contribution to transformation of the site. FIRP investments have enabled infrastructure upgrades, reduced the deferred maintenance backlog by more than $133M, and supported major renovation to our compressed air, potable water, and steam generation systems. Similarly, Campaigns and PDRD investments have supported replacement of key production equipment and the development and deployment of new technologies such as microwave casting, specialized infrared heating applications, and agile machining to more capably and efficiently

perform our mission. These upgrades will help bridge the gap to the new Y-12 and allow us to take advantage of new technologies contributing to cost reductions.

Y-12 is a recognized leader in its safeguards and security program and is providing innovative solutions for the timely and cost-effective compliance with increasing Design Basis Threat (DBT) requirements. We have been actively dismantling retired systems, consolidating special nuclear material into fewer locations, and implementing physical security improvements that allow us to meet the DBT policy without significant increases in our protective force staff. Our designed denial facility approach for HEUMF and UPF will support the most cost effective approach for the safe and secure management of the U.S. HEU stockpile.

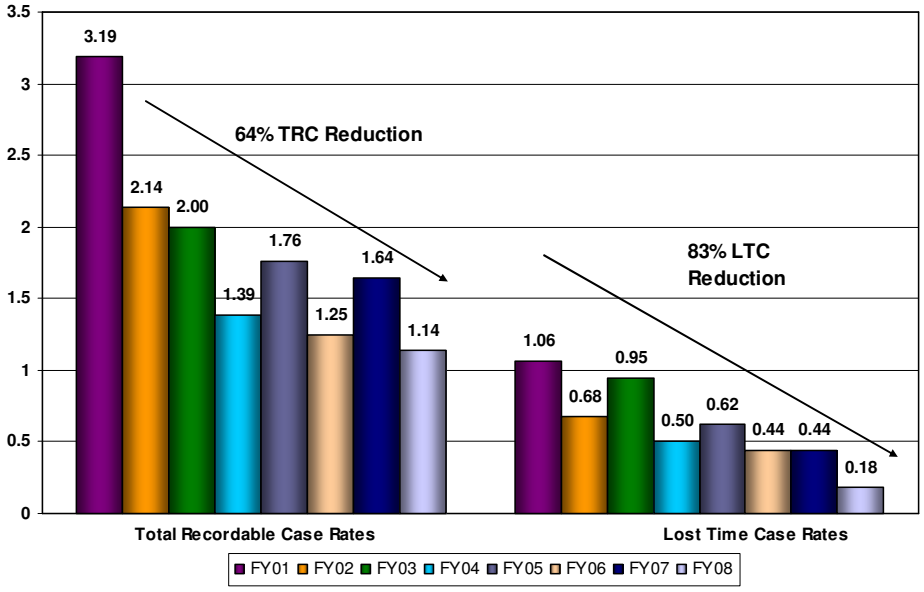
As you can see, we are already well on our way to transforming Y-12 to a smaller, modern, and more responsive complex. At the same time, it's important to note that Y-12 continues to provide and improve critical mission support for weapons refurbishment and dismantlement. We completed the W87 Life Extension Program in FY 2004. This year we will complete the B61 Alt 357 Program, reducing the average cost per unit by approximately 46% of the original estimate, and achieve first production unit and production ramp-up on the W76 Life Extension Program. In FY 2006 we more than tripled weapons dismantlement rates, and in FY 2007 and FY 2008 we sustained these accelerated rates. Savings achieved from these dismantlement efficiencies were used to provide funding for consolidation of our surveillance operations to ultimately achieve greater productivity and reduced cost. These achievements were realized while maintaining safety as our number one priority with modest increases to our annual operating funds.




**Y-12 safety, production performance, and funding.**

The federal budget profiles for FY 2009 and beyond compel us to accelerate and expand productivity and cost-reduction efforts at Y-12. We are engaging all Y-12 organizations to assess and improve the effectiveness and efficiency of how we create and deliver our products and services. As part of this initiative, I chartered an Indirect Review Board, accountable to me, to foster success in productivity improvement, to properly resource site-wide efforts, and to maximize the value for the U.S. taxpayer funding we receive. By becoming more efficient in every activity, cost savings will support improved site conditions and responsiveness. To achieve further costs savings, B&W Y-12 and B&W Pantex are working together to optimize mission, laboratory, and business operations through cooperative inter-site initiatives. These initiatives include sharing of best business practices and continuation of collaborative improvement programs like the Y-12 Throughput Improvement Plan and the Pantex Throughput Improvement Plan.

A major attribute of Y-12 today is our highly skilled workforce, which cannot be easily replaced. Y-12 is implementing an integrated human capital strategy to recruit, retain, and develop a highly skilled, flexible, and diverse workforce. In addition to expanding on-the-job training and training development, we are increasing our community outreach and manufacturing partnership and apprenticeship programs with labor unions and area schools to create the skilled crafts talent pool for future essential skills. Finally, we are expanding our Knowledge Preservation and Management activities to ensure we do not lose critical scientific, engineering, and manufacturing knowledge. As we downsize and modernize our operations and facilities over the next 10–15 years, we expect to see a 20–30% decrease in the workforce funded by NNSA Defense Programs. If allowed to be managed, most of that change can be achieved through attrition. B&W Y-12 has a strong safety culture which is supported by our workforce. We have seen a 64% improvement in our recordable injuries rate and an 83% improvement in our lost time case rate. Our goal is zero accidents and zero injuries.




**Y-12 total recordable case and lost time case rates.**

Much of my prior discussion has been associated with NNSA's stockpile stewardship efforts. Y-12 plays a vital role in the U.S. nuclear nonproliferation efforts by managing NNSA's Fissile Material Disposition Program. This program has dispositioned more than 113 metric tons of HEU (uranium enriched to contain 20% or more of the fissionable isotope U-235), down blended more than 97 metric tons to commercial nuclear fuel, and supplied 80% of the world's low enriched uranium research reactors with down blended HEU. Y-12 is also the supplier of HEU feedstock to the US Navy's Nuclear Fleet, supplying more than 18 metric tons of HEU for use by the Naval Reactors Program.

I believe it is important to note the overwhelming support Y-12 is receiving for its transformation efforts and future as the Uranium Center of Excellence from the State of Tennessee, the local community, and our local partners and collaborators. Y-12 is situated in a strong scientific and technical community and enjoys the benefit of working with the Oak Ridge National Laboratory, the Tennessee Valley Authority, the University of Tennessee, the Oak Ridge Associated Universities, and the Tennessee Valley Corridor. These relationships strengthen Y-12's ability to attract and retain a world-class workforce, to team on projects of national security importance, and to share production and technology solutions. Y-12 has long been and continues to be a strong corporate citizen, both giving to and receiving benefit from this thriving community. About one thousand people, mostly in support of transformation, attended the Complex Transformation SPEIS Public Hearings in Oak Ridge early this year.

In closing, I want to reiterate B&W Y-12's strong commitment to NNSA Complex Transformation, to the completion of the ongoing Y-12 transformation plans, and to the continuation of aggressive productivity improvement initiatives that are increasing efficiency and improving product quality. There are six major facilities included in Y-12's transformation plan. Two facilities (Jack Case Center and New Hope Center) are complete, HEUMF will complete construction this summer, UPF is in preliminary design, the Complex Command Center will request Critical Decision 1 this summer, and the Consolidated Manufacturing Complex is in pre-conceptual planning phase. In the meantime, we must manage wisely and invest appropriately in our aging infrastructure to ensure it supports our critical uranium mission until we complete our new facilities. You can see that Y-12 will be ready for the next century; we are up to the challenge and are making visible progress.

Thank you again for the opportunity to submit this statement.

Statement of J. Greg Meyer

President and General Manager
Babcock &Wilcox Technical Services Pantex, LLC

On
Nuclear Weapons Complex Modernization

Before the
Subcommittee on Strategic Forces
Committee on Armed Services
U.S. House of Representatives

JULY 17, 2008

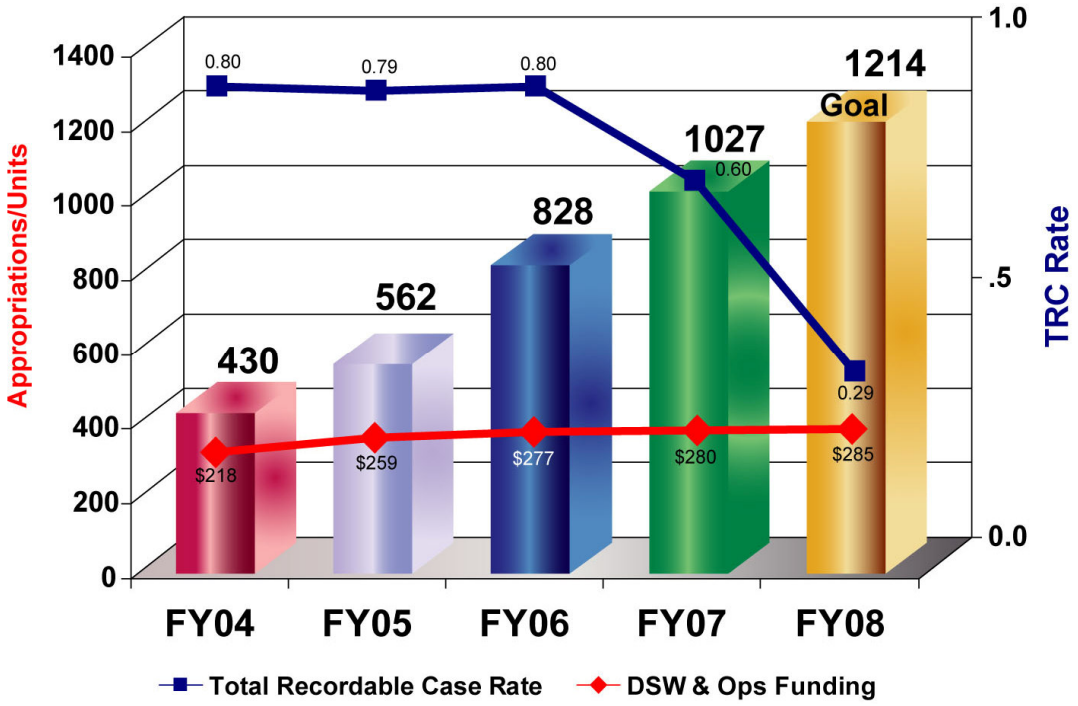
Thank you for the opportunity to speak about Pantex Plant's unique capabilities and how the site will play a strong role in the National Nuclear Security Administration's (NNSA) plan to transform the nuclear weapons complex.

Babcock &Wilcox Technical Services Pantex (B&W Pantex) is the management and operating contractor for the Pantex Plant located in Amarillo, Texas, and is responsible for the site's daily operations. In support of primary mission responsibilities, Pantex safely and securely fabricates chemical high explosives for nuclear weapons, assembles and performs maintenance and surveillance of nuclear weapons in the stockpile, disassembles nuclear weapons being retired from the stockpile, and provides interim storage of plutonium components from dismantled weapons.

B&W Pantex believes the NNSA's Complex Transformation plan will ensure the complex retains long-term viability as a responsive, flexible and cost-effective asset for national defense programs. Pantex Plant is prepared to support the roles outlined by the plan. We believe that continuing the work that we do currently and accepting the proposed activities would capitalize on the significant expertise, experience and infrastructure already funded, proven and available at the Pantex Plant.

The NNSA's Supplemental Programmatic Environmental Impact Statement (SPEIS) preferred alternative names Pantex Plant as the Center of Excellence for Assembly and Disassembly of Nuclear Weapons. Pantex is currently the only nuclear weapons site performing assembly and disassembly, and is the only viable option for this work. Over the last several years, our production output has steadily increased while manpower levels have remained essentially flat and budgets have remained fairly stable. Through efficiencies, using general industry methods such as Six Sigma and Kaizen Events in collaboration with both the national laboratories and other production plants, we have reduced the cost per unit by 54 percent since 2004. During the last fiscal year, B&W Pantex exceeded the production goal and demonstrated that the site has the

capability and capacity to complete between 1,000 and 1,200 deliverables on an annual basis. This capacity will vary depending on the workload mix but will meet all existing Production and Planning Directive (P&PD) scenarios for NNSA. We were able to accomplish this while achieving world-class safety levels that were recognized by the NNSA and private industry.




No other site in the complex has the facilities or work force needed to support the Nation's nuclear weapons production goals. The Pantex Plant is the only NNSA site ready to meet the FY05 Design Basis Threat this fiscal year. Building at another site to meet the needs of the Stockpile Stewardship Program would be cost prohibitive and increase the footprint of the Nuclear Weapons Complex (NWC). Maintaining the current mission, the infrastructure and workforce at Pantex is the best alternative for the Nation. Continued funding, specifically the Readiness of Technical Basis & Facilities (Operations of Facilities) and Safeguards and Security accounts, is required to maximize the efficiency of the site and provide the most value to the taxpayer.

The NNSA's preferred alternative also names Pantex Plant as the High Explosives (HE) Production and Machining Center of Excellence. Currently, Pantex has cradle to grave responsibility for high explosives production. The site synthesizes HE, formulates it for individual weapons programs, then presses and machines it for use in weapons. Pantex also tests high explosives in indoor and outdoor facilities and disposes of HE no longer needed in the stockpile. We are consolidating operations from World War II-era HE facilities to existing or new HE manufacturing facilities to provide more energy-efficient facilities, a safer working environment and more agile responses to mission requirements. A new High Explosive Pressing Facility, a currently authorized but not completely funded project, is a critical part of this consolidation. The demolition of the World War II facilities will result in footprint reductions.

Facility and equipment upgrades, coupled with continuous process improvements, will ensure that Pantex is positioned to support ongoing and projected nuclear weapons work. Pantex also will be able to provide HE to other government agencies, and to provide HE to non-government customers in "Work for Others" projects. These changes will improve our safety posture and will provide significant cost savings to the NNSA.

Other planned changes will consolidate the Pantex Plant infrastructure into a modern, efficient, smaller and less expensive site to operate and manage. Although B&W Pantex's stewardship has yielded a 98.5 percent facility utilization rate, we have developed strategies that will make the infrastructure even more responsive. These strategies include reducing the number of Firing Sites, consolidating administrative and technical operations into a new facility complex, and deactivating, decommissioning, and demolishing facilities that are no longer required. Also included is the consolidation of Special Nuclear Material (SNM) and weapons into an underground storage facility inside the main operations area where the actual work is performed. This will improve the efficiencies of operations. The current storage facility, which is in a different zone, would be closed. This would eliminate the need for a separate storage facility, and the associated security and on-site transport costs.

The Weapons Surveillance Facility (WSF) is one of several new buildings planned for the site. The WSF will increase existing capacities and provide new capabilities for the surveillance, evaluation, and re-acceptance of weapons and weapon components. B&W Pantex currently conducts a portion of the weapons surveillance activities; however, the weapons are transported to Los Alamos National Laboratory for further evaluation. The WSF will allow all evaluations to be performed at the Pantex site. The additional bays planned for the WSF and new enhanced Non-Destructive Evaluation (NDE) equipment will provide much needed capacity without reducing bays available for weapon operations. New capabilities will meet the increasing demands for higher diagnostic precision and analysis of weapons and components by employing current technology and modern equipment. In addition, the consolidation of weapons surveillance activities at Pantex will significantly reduce the need to move components between sites for evaluation and testing, thus reducing risks and costs associated with shipments.

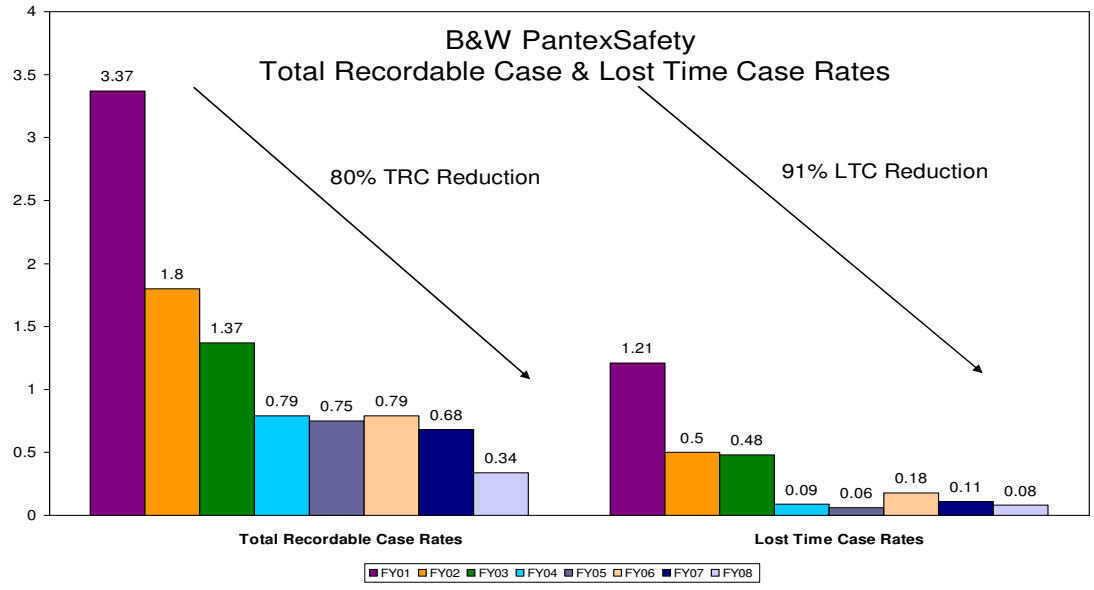
SNM activities are an integral part of weapons surveillance. B&W Pantex is conducting pit diagnostics, testing and refurbishment, which allow the pits to be reused. B&W Pantex has successfully processed pits through the Special Nuclear Material Component Requalification Facility (SNMCRF). B&W Pantex consolidated SNM activities into one division to capture the expertise needed to support and strengthen this program. This initiative provides the NNSA with the potential to realize a substantial cost savings.

Under the NNSA's leadership, B&W Pantex participated in a complex-wide initiative to improve weapons production. The Pantex Throughput Improvement Plan (PTIP) identified constraints to production throughput, and defined and implemented process changes that created significant improvements to production deliverables. In an effort to recognize further costs savings, B&W Pantex and B&W Y-12 are working together to optimize mission, laboratory and business operations through cooperative inter-site initiatives. Additionally, B&W Pantex continues to support and implement the NWC Supply Chain Center (SCC) and Information Resource Management (IRM) initiatives to consolidate, streamline and reduce business process costs. The

SCC initiative is already providing benefit to the Pantex Plant. B&W Pantex has utilized the NWC Supply Chain Center to acquire materials and services that represent 12 % of the sites procurement budget.

The company's focus on Integrated Safety Management (ISM) will continue to seamlessly integrate safety, security and quality into work processes. Of course, none of these accomplishments would be possible without a well-trained work force. Amarillo has a strong local job market, and we have created an alliance with local educational institutions for the training of production technicians and the availability of advanced degrees in Engineering and Business Administration. B&W Pantex has maintained critical skills including engineering, manufacturing, radiation safety, emergency response, nuclear safety and production. The company also has an established training and certification program that has been recognized by the Society for Training & Development (ASTD) in both 2007 and 2008.

The Pantex Plant has a strong safety culture that we have developed through well-designed and aggressive safety management techniques such as improved hazard recognition, hazard correction and employee involvement. Safe performance has been a primary focus of B&W Pantex since the company assumed the contract in February 2001. As a result, safety performance at the site has improved even as weapons maintenance and dismantlement activities have increased. We have seen an 80 percent improvement in our recordable injuries rate and a 91 percent improvement in lost time case rate. B&W Pantex was named one of America's Safest Companies by Occupational Hazards magazine in 2007. We have also received four awards from the National Safety Council in the past year and the Occupational Achievement award from the American Society of Safety Engineers (ASSE). We have posted more than 3 million continuous work hours without a lost time injury in both 2007 and 2008. Although we are very proud of our safety record, our goal is zero accidents and zero injuries.



I want to also recognize the strong relationship we have developed with the communities surrounding Pantex. The Plant has been involved in community activities since employees began the Christmas Card project more than 50 years ago. Today, B&W Pantex sponsors a wide variety of community and educational projects partnering with local businesses, schools and charitable organizations. Most of our senior managers sit on boards for community organizations such as the United Way, the Amarillo Area Center for Advanced Learning and the High Plains Food Bank. Our employees are encouraged to participate in community activities and several serve in elected city and county positions. We are proud that for the past few years our employees have provided 10 percent of the contributions for the local United Way organization. B&W Pantex also has a number of Memorandums of Understanding (MOUs) with surrounding communities and counties for the exchange of fire and emergency medical services. We work closely with our neighbors to keep them informed about Plant activities, and we have developed an on-going interaction with local interest groups such as Panhandle Area Neighbors and Landowners, STAND (Sustainability in Technologies, Agriculture, and Nature's Diversity) and the Peace Farm. Although we have differing opinions, we believe the relationships are amicable. Since assuming the Pantex contract in 2001 and as part of our ongoing efforts to protect public health and the environment and communicate those activities with the neighbors and community, we have informed them about our continued efforts to remediate the subsurface groundwater from legacy site activities and prevent contamination of the Ogallala Aquifer. The State of Texas Commission on Environmental Quality recently recognized our environmental stewardship efforts by awarding us Gold Level membership status in their Clean Texas Program for environmental accomplishments.

In closing, I can assure you that B&W Pantex can incorporate the NNSA's preferred alternatives into its current mission work and can sustain that capacity if funding is appropriated. B&W Pantex will support the schedule detailed in the NWC Transformation Integrated Master Schedule for preferred scenario transformation activities contingent upon the availability of transition and transformation funding. Schedules for the recommended additional new missions for B&W Pantex that are not in the preferred scenario will be developed as the SPEIS Record of Decision is finalized.

Thank you for this opportunity to speak. I will take any questions.

# STOCKPILE STEWARDSHIP AND COMPLEX TRANSFORMATION

Hearing of the House Committee on Armed Services
Subcommittee on Strategic Forces

July 17, 2008

Dr. George H. Miller, Director
Lawrence Livermore National Laboratory

## Opening Remarks

Madam Chairman and Members of the Committee, thank you for the opportunity to provide my perspective on the continuing importance of the Stockpile Stewardship Program and the Preferred Alternative for transforming the nation's Nuclear Weapons Complex. I fully support transformation of the complex to make it more cost effective, smaller, safer, more secure, and responsive to stockpile requirements to meet 21st-century deterrence needs. I want to thank Congress and especially this Committee for your strong interest in the future of the nation's nuclear weapons enterprise, as evident from this hearing and your leadership in establishing the Congressional Commission on Strategic Posture of the United States. My testimony emphasizes three points:

- The Stockpile Stewardship Program is providing the basis for confidence that the nation's nuclear weapons stockpile remains safe, secure, and reliable without requiring nuclear tests. Sustaining the investments in stockpile stewardship is critical to both maintaining confidence in a likely increasingly smaller stockpile and providing the science and technology foundations that allow the Laboratory to confront the defining issues of the 21st century—the threats of proliferation and terrorism to global security and the needs for abundant energy and environmental quality, improved human health, and U.S. industrial competitiveness.
- The Preferred Alternative provides a vision for transforming the complex by consolidating missions and capabilities at existing sites. It is an ambitious undertaking, developed with recognition of the challenge of balancing investments between human capital and new facilities. Livermore is working toward the success of the Preferred Alternative and the specific goals identified for our Laboratory.
- The path forward for the Preferred Alternative will greatly benefit from timely agreement by the Administration and Congress on essential elements of a nuclear weapons policy, deployment strategy, and stockpile requirements. Actions required by the FY 2008 Consolidated Appropriations Act and the FY 2008 National Defense Authorization Act will help this process. With such agreement, NNSA can build on the Preferred Alternative to refine planned investments in manufacturing, maintaining, and dismantling nuclear weapons while sustaining the underlying intellectual and human capital.

## Budget Realities and NNSA's "Preferred Alternative"

The future of NNSA's nuclear weapons program and Nuclear Weapons Complex builds on the successes of the Stockpile Stewardship Program. The program provides the basis for confidence that the nation's nuclear weapons stockpile remains safe, secure, and reliable in the absence of further nuclear testing. It has been successful to date because of

the continuing investment the nation is making in people and the tools needed to understand the underlying science and engineering issues central to nuclear weapons performance. This understanding is required to recognize issues as they arise in an aging nuclear weapons stockpile, decide how to deal with them, assess and certify without nuclear tests the performance of weapons after necessary modifications, and provide national leaders confidence in the assessment/certification processes and the weapons. This investment is critical regardless of the details of the path forward.

Continuing investments in stockpile stewardship are bringing on line vastly improved experimental and computational capabilities—tools that NNSA scientists and engineers are using to resolve arising issues about the stockpile, which will grow more challenging as weapons continue to age. Confidence in the stockpile relies on these scientists and engineers and their judgments. Failure to sustain these activities would over time erode nuclear weapons expertise and lower confidence in the stockpile.

The draft *Supplemental Programmatic Environmental Impact Statement* (SPEIS), issued in January 2008, describes NNSA's vision for transforming the Nuclear Weapons Complex to become more cost effective, smaller, safer, more secure, and responsive to stockpile requirements to meet 21st-century deterrence needs.

The transformation aims to consolidate special nuclear materials to five sites by the end of 2012 and significantly reduce square footage and the workforce directly supporting the weapons program over the next decade. Duplicate facilities will be largely eliminated and more efficient and uniform business practices will be implemented across the complex. NNSA also aims to reestablish a plutonium-parts production capability and accelerate the dismantlement of retired weapons. The ambitious plan faces a variety of programmatic and technical challenges. Livermore is working toward the success of the Preferred Alternative and the specific goals identified for our Laboratory. In the Preferred Alternative, which features distributed centers of excellence with consolidation of missions and capabilities, Livermore shoulders key responsibilities. These include:

***Center of Excellence for Nuclear Design and Engineering.*** Preserving the essential and highly successful two-laboratory approach, both Livermore and Los Alamos national laboratories are to serve as centers of excellence for nuclear design and engineering. They will provide necessary intellectual independence while coordinating programmatic work and sharing facilities, technical information, and best business and operations practices.

Livermore will retain its special responsibilities for nuclear warhead design and development, including ensuring the safety, security, and reliability of its designated stockpiled weapons and certification of changes made through life-extension programs. With the aging of weapons, risks are growing that safety, security, or reliability issues will arise, and modifications to extend the stockpile lifetime of weapons are likely to become more complex and challenging to certify. The computational and experimental tools and methods used for weapons certification must continue to be refined to improve the quality of assessments. I strongly support implementation of a more comprehensive peer review process to strengthen the Annual Assessments process by having both Livermore and Los Alamos provide complete assessments of the entire stockpile.

Better assessments and certification of an aging nuclear weapons stockpile depend on increased knowledge of the details of nuclear weapons performance—in particular, key

issues about the performance of weapons in the nuclear phase that previously had only been accessible through nuclear testing: boost, energy balance, and secondary performance. Progress in resolving these "grand challenges"—and eliminating principal reasons why a future nuclear test might be needed—are only now possible with the computational and experimental capabilities that are now coming on line.

***Supercomputing Platform Host Site.*** Outstanding successes in the Advanced Simulation and Computing (ASC) program are turning simulation into an exceedingly capable tool of predictive science. Key discoveries made through vastly improved simulations are reducing sources of uncertainty in weapon performance. Livermore's Terascale Simulation Facility is home to two of the world's most powerful supercomputers, ASC Purple and BlueGene/L. Livermore has pioneered the approach by which these machines are effectively being used by all three NNSA laboratories for stockpile stewardship.

Roadrunner (at Los Alamos) and Sequoia (at Livermore) are important investments for the future of ASC. These machines take different approaches to the difficult problem of integrating computer architecture and simulation codes. The need for further advances in simulation to resolve the remaining weapons performance issues and improve assessment capabilities is too great to pursue only one approach. Based on the successful BlueGene/L approach, Sequoia aims to achieve a higher level of performance than Roadrunner—10 quadrillion operations per second (petaflops) peak speed, with sustained performance of 1+ petaflop—and apply it to full weapons-physics simulation codes.

***The National Ignition Facility (NIF) as a Center of Excellence.*** Construction of NIF and commissioning of its 192 laser beams will be completed in March 2009, and the first ignition experiments will begin in FY 2010. NIF is the only facility capable of creating in a laboratory the conditions necessary to experimentally access the physics regimes of all nuclear-phase operations important to modern nuclear weapons. The National Ignition Campaign (NIC), which includes a consortium of laboratories, encompasses all development activities for the ignition campaign and the transition of NIF to routine operations by 2012 as a user facility with unique, highly flexible capabilities. NIF will be used to explore high-energy-density physics (an important, exciting frontier area of science) and inertial confinement fusion as a possible future source of clean energy.

Because they are critical to the success of stockpile stewardship, continued support of NIF and NIC is crucial. Key uncertainties in the thermonuclear performance of weapons present grand challenges; their resolution depends on data and insights from NIF experiments to develop and validate simulation models. More generally, NIF experiments will teach critical skills and test the capabilities and judgment of the scientists and engineers that the nation will depend on to ensure the continued safety, security, and reliability of the nuclear weapons stockpile.

***The High-Explosive Research and Development Center of Excellence.*** With the High Explosives Applications Facility (HEAF), Livermore will serve as a Center of Excellence for High Explosive Research and Development (in amounts up to 10 kilograms). HEAF is a state-of-the-art explosives research facility for formulating, characterizing, processing, and testing energetic materials. Some supporting activities currently conducted at Site 300, the Laboratory's remote testing site, will require continuing support for consolidated set of facilities at Site 300 or construction of an annex to HEAF.

***Plutonium Research and Consolidation of Special Nuclear Materials.*** Plutonium is an extremely complex material, fundamental to the performance of the U.S. nuclear stockpile, and understanding its detailed properties is a major scientific challenge. Livermore scientists will continue research activities to better understand plutonium, improve plutonium part manufacturing processes, and provide surveillance of stockpiled weapons. However, large-scale work with special nuclear materials at Livermore's Superblock will be phased out. Funding permitted, all Category I/II quantities of special nuclear materials will be removed from Livermore by the end of 2012 and consolidated elsewhere. Three shipments of material have already been completed. Category III amounts of nuclear materials will remain for small-scale experiments. To meet mission responsibilities, Laboratory researchers will use other NNSA facilities for larger-scale activities. To this end, it is essential that the nation proceed with the Chemistry and Metallurgy Research (CMR) Building Replacement Project at Los Alamos.

***Hydrodynamic Testing and Livermore's Site 300.*** Hydrodynamics testing provides valuable data to diagnose the performance of primaries in weapons before they enter the nuclear explosive phase of operation. In accordance with a National Hydrotest Program, such experiments are currently conducted at the Contained Firing Facility (CFF) at Site 300 and the newly commissioned Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT) at Los Alamos. Long-term plans call for significantly reduced NNSA support for Site 300 and closure of CFF in the 2015 timeframe when its use for hydrotesting is no longer programmatically necessary. Livermore scientists and engineers will then carry out their hydrodynamic experiments at other sites. Accordingly, it is critically important that there be sufficient funding to fully utilize DARHT's new capabilities.

***Facility and Infrastructure Consolidation.*** NNSA anticipates a 30 percent reduction in support for buildings and infrastructure at the Laboratory's main site (up to 90 percent at Site 300) over the next decade. The Laboratory has been consolidating facilities and is accelerating the process through a Strategic Space Consolidation Initiative. The goal is to remove up to two million gross-square-feet (of 7.2 million) by the end of FY 2010.

***Workforce Reductions.*** A complex-wide 20 to 30 percent reduction in employees supported by NNSA Defense Programs is expected over the coming decade. Livermore has already downsized considerably. From a workforce of nearly 9,600 in FY 2003, LLNL will decline to approximately 7,000 heads by the end of FY 2008. Nearly 2,000 of these reductions have come in the last two years. Our focus is on reducing support costs and preserving programmatic capabilities, yet more than 500 of those that have recently left the Laboratory are highly-trained scientists and engineers.

Livermore's strategy for absorbing further reductions in the NNSA Defense Programs-supported workforce includes two key elements. First, the Laboratory is striving to increase operational efficiency and workforce productivity to provide sponsors high-quality work at lower cost. Second, Livermore is striving to expand its existing programs that support other pressing national needs in areas that build on and contribute to the core missions and strengths of the Laboratory. In doing so, Livermore will apply its unique capabilities in multidisciplinary, large-scale science to support our nation's defense, energy, environmental, and economic security. These strategies will take time to implement, and further dramatic cuts in the Laboratory's workforce in the near term could irreparably harm our ability to execute our nuclear weapons mission.

**Challenges and the Path Forward for NNSA's "Preferred Alternative"**

The path forward for Nuclear Weapons Complex transformation faces many challenges, largely stemming from resources constraints and the need to recapitalize enduring production facilities while sustaining investments in human capital—the stockpile stewards whose analyses and critical judgments provide the basis for confidence in the nation's nuclear deterrent.

A key step in the path forward will be the Administration and Congress reaching an agreement on essential elements of nuclear weapons policy, deployment strategy, and stockpile requirements that define the composition and size of the "new/modified weapons stockpile." The size and/or makeup of the "new/modified weapons stockpile" must be such that the cost of sustaining the stockpile and the underlying human capital, tools, and capabilities will fit within the provided budget.

Agreement on the essential elements of the "new/modified weapons stockpile" will permit detailed planning, the design of new facilities, the phasing of personnel actions, and transfer of operations within the complex in a timely manner. In particular, NNSA can build on the Preferred Alternative to refine planned investments in manufacturing, maintaining, and dismantling nuclear weapons while sustaining the level of stockpile stewardship activities necessary to sustain confidence in the stockpile. The phasing of the new facilities and re-structured site missions can be integrated, planned, and executed over a 10+ year period and appropriately meshed with stockpile stewardship requirements to remain within budget constraints.

At the NNSA laboratories, the demands on the workforce and human capital planning will be extraordinary. The challenge of sustaining confidence in the nation's aging nuclear weapons stockpile in the absence of nuclear testing remains difficult. There is much to be done: sustain advances in weapons physics; support the Centers of Excellence; conduct rigorous assessments/certification; address issues arising in the stockpile; pursue life-extension programs or develop reliable replacements as required; continue to develop highly qualified staff; and provide intellectual leadership in determining how to most effectively meet stockpile requirements through advanced technologies and improved manufacturing processes.

With the projected continued decline in nuclear weapons support for the underlying fundamental science and technology, maintaining core competencies and a skilled workforce at the NNSA laboratories will require a strategic partnership across the country's broad national security enterprise. The laboratories have unique capabilities that are being broadly applied to the nation's most pressing issues. These efforts can be strengthened and expanded as priorities evolve—but only if the underlying science and technology "infrastructure" is sustained. Sustaining this infrastructure or capability is in my view the most significant challenge for the Preferred Alternative.

Livermore is supportive of the vision of transformation and prepared to face the challenge. Our success in meeting transformation goals will depend on your continuing support for our Laboratory and our important national security missions.

Statement of Ambassador C. Paul Robinson, President Emeritus of Sandia Corporation and former Laboratories Director, Sandia National Laboratories

United States House of Representative

Committee on Armed Services
Strategic Forces Subcommittee

July 17, 2008

## Introduction

I am C. Paul Robinson. I have testified before this Committee many times in the past: (1) in the 1980's when I led the nuclear weapons and national security efforts at Los Alamos, (2) in the late 1980's when I served as Ambassador and Head of the United States Delegation to the Nuclear Testing Talks between the U.S. and the USSR in Geneva, Switzerland, and (3) at Sandia, when I served as President and Laboratories Director from 1995 to 2005. I retired from full-time work in January of 2006, but continue to serve the country on a number of government advisory committees and boards.

I agreed to testify at this hearing in order to discuss perspectives I gained in these past posts and in my current roles. I will focus on what I believe are the most important problems plaguing the U.S. nuclear deterrent force, and which are causing its current malaise. I will stress the three issues you have requested be given priority in this hearing. My bottom line is: Since the end of the Cold War, the purpose of our nuclear deterrent has grown more and more confused. Now, the U.S. appears to be drifting, on what ought to be our most important defense issue.

## Discussion of the Stockpile Stewardship Program (SSP)

The program was formulated in the early 1990's as an attempt of the Clinton administration to support a Comprehensive Test Ban. The SSP seeks to devise an alternative means to certify the performance of U.S. nuclear weapons rather than relying on underground nuclear tests. It uses large supercomputer models to better model the physical processes of all parts of a nuclear weapons device —from command through explosion— rather than relying only on data obtained from underground nuclear explosives testing. Such tests had formed the basis for certifying weapon functioning and reliability from the Trinity test, in 1945, to the last U.S. underground test in 1992.

I will repeat only a few of the words that most of us with responsibilities for U.S. warheads said at the time—e.g. that "there is no precedent for such complex technological devices to be depended on unless they were periodically tested" and that

"fielding of first-of-a-kind new devices without testing would be the most stressful challenge."

I also said in my October 7, 1999 testimony to the SASC (in hearings prior to the ratification votes on the proposed CTBT) that: "For a device as highly consequential as a nuclear weapon, testing of the complete system, both when it is first developed and periodically throughout its lifetime ... is the preferred methodology … To forego that validation through testing is, in short, to live with uncertainty."

Although all of the weapons labs, including my own laboratory —Sandia, agreed that we would support the concept of the "science-based" Stockpile Stewardship Program to the best of our abilities, I noted that I could not offer a proof that it could succeed as a substitute for nuclear testing. Now, here we are —nearly a decade later— and I cannot (nor —I believe—can anyone else) offer such a proof. Thus, we must continue to live with uncertainty as we also labor to sustain the U.S. stockpile and continue to develop the SSP, all without nuclear testing.

Some areas of the SSP program have admittedly worked better than I anticipated, as have the developments of far more powerful supercomputers that were deemed critical in order to undertake even more complex and detailed calculations of weapons phenomenology.

But in other areas we are just as uncertain today. My belief is that most weapons designers have less confidence about making changes to their designs than they had in the past. I particularly found the recent colloquy between the JASON group and the lab designers most curious —as they each speculated over the difficulties of fielding designs under the contemplated Reliable Replacement Weapon (RRW) effort. Although you will doubtless find a spectrum of views at the labs, my take is that uncertainties will necessarily (and quite naturally) grow over time for several of our systems.

I should add here that I was quite disappointed with the reception given the RRW here on the Hill. I was present for the meeting at LLNL where the idea of the RRW was born. It emerged from a question which Gen. Larry Welch, the Chairman of the Strategic Command SAG, asked "Will every future President have to be placed in a position where you Labs might suddenly come in and say 'Mr. President, there are sufficiently serious problems in key portions of our nuclear stockpile that we believe we must forsake the moratorium and conduct nuclear tests to adequately fix the problems.'?" General Welch challenged the labs by asking the follow-up question: "What could you be doing now that could significantly reduce the probability of that ever having to occur?"

After some discussion, the key idea of the RRW then emerged —that if we incorporated designs of "different genetic diversity" in each leg of the TRIAD, there would be a much lowered likelihood that all would fail at the same time from a common problem. Yet from what I've read, the Congressional support for the idea has been less than lukewarm —as evidenced by your canceling of the RRW funding, with some suggesting that the labs might be trying to "create new designs that would necessitate underground testing" in order to field the RRW. I assure you that this suggestion is just not true. RRW was

conceived to lessen the likelihood that testing would be needed. At the very least I must conclude that "there has been a significant failure to communicate", and I believe we must not let such misunderstandings perpetuate, when there is so much at stake.

Comments on the NNSA Complex Transformation Plan (SPEIS)

The second issue you requested was my opinion about the NNSA plan released this past year. My reactions are mixed. While the plan is doubtless much improved over the previous version (Complex 2030), it still does not present a compelling solution to the many problems facing the nuclear weapons complex. I do believe the NNSA (SPEIS) plan meets the admonition of "Do no harm." The suggestion to reduce the overall size from the complex whose capacity created a Cold War arsenal numbering in the tens of thousands just has to be in the right direction. But little attention is given to the new complex's ability to rapidly fix problems that are more likely than ever to arise as the current stockpile, which has the oldest components in history, develops failures.

I do have concerns that in drafting this SPEIS, the NNSA received too little guidance from the Defense Department about what stockpile size and weapons characteristics the transformed complex should produce and maintain (including the need to rapidly fix problems.) I assure you that these issues are vitally important ones, and that having to guess at what the answers may be, is not a wise course. Nor is configuring a production complex only for generic (vice specific) designs, without knowing likely production rates. But, in light of the current state of confusion in our policy, it is a small miracle that NNSA was able to produce a Preferred Alternative for Complex Transformation at all.

The DoD has not yet been able to sufficiently develop its own long-range plans for future nuclear delivery systems, even though many carrier systems for the TRIAD are rapidly reaching obsolescence and must soon be taken out of service (e.g. both air- and sea-launched cruise missiles). Similarly the Minuteman ICBMs and the Trident submarines and missiles will soon need to be replaced. More attention must be given to determining the future U.S. needs for nuclear delivery systems.

The top-level guidance from the last Nuclear Posture Review (NPR) of 2001 was the basis used in drafting the SPEIS, but it hardly fits the world of today, much less what we are likely to face in the future. Some key assumptions of the NPR are today in question, while other parts have simply been overcome by world events. The NPR declared that the U.S. should put behind us the "threat-based approach of the Cold War" in favor of a "capabilities-based approach." Arguments given for that choice was the belief that the future security environment was going to be sufficiently uncertain that precise nuclear force levels could not be predicted with any degree of certainty. But, reliance on "virtual capabilities" with nascent warheads, rather than real forces to deter, will not work.

The NPR had introduced a new Global Strike philosophy where conventional forces were to be coordinated within attack plans to hold at risk some strategic targets that previously would have been candidates only for nuclear strikes. [It was believed that such an approach would give flexibility in attack plans on rogue states that had Weapons of Mass

Destruction.] Unfortunately, these ideas have not proven nearly as useful as their originators thought they would be, because this approach would have required us to blur what had always been a clear separation between nuclear forces and conventional forces. The primary purpose for nuclear weapons must be for deterring conflicts, while the purpose of conventional forces is war fighting. It is important that we not confuse the two. Our policy should be revised to make clear that we would only consider the use of nuclear weapons if deterrence should fail, and then —only as a matter of last resort.

The most critical need, in my view, is the need for national leaders to directly engage these issues and to help articulate the national purpose(s) of our nuclear weapons and the currency of deterrence in international relations. That engagement needs to be deep and frequent and must demand and achieve the integration of the DoD, DOE, all supporting elements of the US deterrent, and of course the U.S. Congress.

## My Concerns and Priorities for Complex Transformation

I shift now to the last topic that you requested —to identify any concerns I foresee for securing the continuing effective execution of the science-based SSP and the priorities I would set for the Preferred Alternative. I do have two suggestions that I think could improve the resultant plan.

The first involves a significant organizational problem within the DOE, in the separation of responsibilities and accountability for Safety and Security, which has been in place nearly since the formation of the NNSA. These problems were discussed in the recent DSB study on Nuclear Capabilities, and arose when the program management for these responsibilities were placed outside of the NNSA, with managers who had no direct responsibilities for nuclear weapons nor for meeting production deliveries (and in some cases with managers who had little interest in nuclear weapons.) These represent classic cases of separating risks and costs from being compared and balanced. Instead, both the NNSA, lab, and plant managers (and the workers themselves) have little or no roles in setting criteria for safety and security. Not unexpectedly, the costs for both have sharply grown in an unconstrained manner. The effect on Complex Transformation has been a huge escalation in costs for new facilities. In the case of any facility that has radiation (or explosives) hazards as well as sensitive/classified materials that must be protected, the costs have doubly soared!

The details show that construction costs for NNSA facilities have escalated far above any market comparisons. The enormous growth in costs for construction (and subsequently for operations) is destined to break-the-bank of the weapons budgets —as ever more stringent and unconstrained orders and directives seek to achieve “zero defects” in operations, but with no conscious tradeoffs of these risks against program purpose or needs. As per the old adage about “a divided house”, the enterprise seems destined to surely “fail” based on new budget requirements alone. Not fixing these problems will also continue to produce “frustrated workers” across the complex. Admiral Chiles, who chaired the DSB Task Force on Nuclear Personnel Expertise, in examining these same issues, noted that: “Worker feelings range from anger to resigned despair.”

Of course, you may ask, wouldn't it be better to require better risk management decisions and tradeoffs to undo the outrageous cost growths that have occurred from safety and security rule changes? The answer is: of course! But, I assure you the road to remove excessive requirements is never easy. If reform is to succeed, it will require a willingness by DOE to once again streamline its organizational responsibilities, and for internal and external regulatory bodies (e.g. the Defense Nuclear Facilities Safety Board) to appoint experienced and empowered people to take charge of the risk/tradeoffs process.

One stopgap approach that could be employed, would be to examine other existing facilities within the NNSA (or the larger DOE) complex, which could be more economically reconfigured to meet some program needs, rather than building new facilities now. One example that should be considered, is the relocation of the Plutonium 238 power source work from the valuable floor space within Los Alamos' PF-4 (the major weapons plutonium facility) to other areas within Los Alamos (or, if necessary, by relocation to other sites.) Although this program originally was intended to impact the weapons efforts, decisions were made a number of years ago to no longer consider such power sources for weapons uses. Yet the continuing delivery of such sources for NASA and other customers is taking up much extremely valuable space that could be freed up for more urgently needed tasks in the weapons program today. The costs would be small for moving that work to floor spaces with lower security costs (as neither strict material protection nor classification protection are now required for $^{238}$Pu.)

## Summary

Deterrence of major acts of aggression through a force-in-being of nuclear weapons should be restored as the cornerstone of US defense policy, now and for the foreseeable future. Achieving this will insure that we can prevent future wars. It would also assure allies and friends within the free world. Without that, the prospect of world wars looms large. Such wars would be far more destructive than the devastation of World War II, as a result of war fighting with even more destructive nuclear (and WMD) weapons than were available in WW II.

The proven formula of deterrence for preserving the peace remains our best near-term hope. While all human beings can wish for a time in which the threat of nuclear weapons for deterring aggression would no longer be required, or for a time in which nations would no longer stockpile weapons for aggression at all; but to achieve these would require fundamental changes in the nature of mankind. Even then, it is impossible to believe that such changes could occur without the dangers of recidivism always casting a huge shadow over the course of human affairs. I also see little or no chance that the idea of complete elimination of all weapons is likely to occur in any near term, and believe we must therefore continue to invest in other options.

We should all be capable of coming together to take great pride in our nation and its continuing nuclear weapons efforts —not just to keep others from attacking the United States (and our allies and friends)— but in our continuing to be the most powerful force for preserving the peace and freedoms we all value.

**Written Statement of Vincent L. Trim**

**President, Honeywell Federal Manufacturing & Technologies (FM&T)**

**On**

**Complex Transformation**

**Before the**
**Committee on Armed Services**
**Subcommittee on Strategic Forces**

**July 17, 2008**

Honeywell Federal Manufacturing & Technologies (FM&T) appreciates the opportunity to submit written testimony to the Members of the Committee on Armed Services' Subcommittee on Strategic Forces regarding the National Nuclear Security Administration's (NNSA) vision for Complex Transformation.

## Background

Honeywell FM&T operates the Kansas City Plant (KCP) on behalf of the NNSA under a Management and Operations (M&O) contract and is a minority partner in the M&O companies that manage the Pantex and Savannah River sites. FM&T has played a key role in past transformational activities including the consolidation of various non-nuclear operations into the KCP from sites in Florida, Colorado and Ohio.

The KCP produces non-nuclear components for the nuclear weapons stockpile and performs national security work for other government agencies. The vast size and breadth of capability in both technology and human capital make the KCP one of the most unique manufacturing facilities in the United States. The KCP is the nation's primary repository of manufacturing and supply chain knowledge related to non-nuclear component product realization. The plant represents 60,000+ years of integrated specialized manufacturing knowledge.

## Kansas City Responsive Infrastructure Manufacturing and Sourcing (KCRIMS) Initiative

FM&T is actively supporting the NNSA's Complex Transformation vision through the Kansas City Responsive Infrastructure Manufacturing and Sourcing (KCRIMS) initiative. This initiative will lead to savings of roughly $100 million per year on an NNSA plant budget of approximately $400 million per year. Contractor-led budget reductions of this magnitude in a "fee on cost" environment reflect the sense of urgency generated by NNSA leadership to fundamentally change the way we perform our mission.

**KCRIMS supports NNSA's vision for Complex Transformation by delivering:**

- **A vastly smaller, more modern manufacturing facility** – The proposed new facility will be roughly one third the size of the present facility and will be constructed to optimize energy efficiency and minimize infrastructure-related costs. It is configured for optimum flexibility to meet the Complex's changing manufacturing needs.

- **Streamlined commercial business processes that will reduce overhead costs by 30 percent over the next 4 years** – Business process transformation is moving the KCP to more commercial-like practices by making business processes more efficient, effective and integrated for maximum impact. FM&T has identified transformation improvements using assessments against the Baldrige criteria and other "best in class" performance standards.

- **Effective KCRIMS program execution within budget and on schedule** – FM&T has created an Integrated Project Plan (IPP) to capture interdependencies, assumptions, and risks across the enterprise in order to maintain our performance in cost, schedules, and customer satisfaction during the transition. Major activities include producing build ahead components and assemblies to prevent downtime, implementing workforce transformation plans to ensure that needed skill sets are maintained, shifting certain work to U.S. suppliers, and the application of lean principles throughout the manufacturing process.

**The Special Programmatic Environmental Impact Statement (SPEIS)**

FM&T supports the NNSA's Complex Transformation plans described in the SPEIS. The preferred alternative comprehends the importance of retaining vital human capital and attendant experience while addressing an aging infrastructure and ever increasing support costs. That said, FM&T remains on a more aggressive timeline to reduce overhead support costs at the KCP consistent with KCRIMS objectives.

Transformation is correctly focused on reductions in infrastructure and overhead costs but the NNSA is also addressing the need to reduce procurement costs. The Complex has demonstrated through the recently established Supply Chain Management Center (SCMC) that collaborative efforts among all NNSA sites to leverage purchasing power yields savings that can be used to partially fund transformation. Since its inception the SCMC has generated cost savings of $14 million that will increase to well over $30 million by year's end. The SCMC approach gives suppliers the opportunity to participate in Complex Transformation.

**Conclusion**

Transformation is more than a fiscal imperative. Like other contractors, FM&T is concerned about demographic realities that are changing the face of the Nuclear Weapons Complex. Talented scientists, engineers and manufacturing technologists are retiring at an increasing rate as the Cold War hiring wave plays itself out. The Complex will likely struggle to attract comparable talent in the future if we don't invest in the transformation of facilities, processes and weapons systems today.

FM&T remains committed to the Transformation vision outlined by Mr. Thomas D'Agostino and will continue to leverage opportunities to team with other production plants and laboratories to meet NNSA goals and objectives for the future – to ensure that America's nuclear stockpile is safe, secure and reliable.

**House Armed Services Committee**
**Strategic Forces Subcommittee**
**July 17, 2008**

**Testimony of**
**Stephen M. Younger**
**President, National Security Technologies, LLC**

Thank you for the opportunity to discuss an issue vital to the future national security of the United States – the transformation of our nuclear deterrent and the suite of capabilities that will ensure its safety and reliability for years to come. I strongly believe that these transformations can only be done following a rigorous analysis of the requirements for nuclear weapons in a rapidly changing world. There are four key questions that must be addressed:

- What is the mission for nuclear weapons in the twenty-first century?
- What weapons are required to meet this mission?
- What is required to sustain these weapons?
- How can this capability be provided at minimum cost and risk?

I will address each of these in turn.

**Nuclear Weapons in the Twenty-First Century**

The fundamental role of nuclear weapons is the same today as it was during the Cold War – to provide an unassailable deterrent force that assures any aggressor that they cannot win a military engagement that threatens the survival of the United States. While the basis of deterrence remains intact, the means by which we support that deterrence will certainly change. Some missions, such as holding at risk mobile missiles containing weapons of mass destruction, no longer require nuclear weapons for their success. Advanced conventional weapons on long-range delivery platforms can accomplish the same thing without the use of nuclear explosives. However, there are other assets, such as deeply buried weapons facilities and very large targets, that are beyond the capabilities of any conventional weapon. Only a nuclear weapon can hold these targets at risk and fulfill the fundamental mission of deterrence by assuring an adversary that they cannot shield offensive capability that could be used against us.

**Types and Numbers of Nuclear Weapons**

We will need fewer nuclear weapons in the future due to changes in the geopolitical environment and because non-nuclear weapons can replace nuclear weapons in certain missions. However, I believe that a rigorous analysis of nuclear missions may reveal that current weapons are ill-suited to future missions for two reasons. First, the high yields of some current weapons are not required for most future missions. Second, the very sophisticated nuclear weapons designs of the past are difficult to maintain and lack desirable security and safety features. High performance nuclear weapons are no different from high performance automobiles in this respect – each requires care and maintenance to avoid mission failure.

It would be counterproductive to maintain an arsenal of very high yield weapons when smaller, safer weapons are actually better tuned to the mission. This does not mean that we should make more "usable" weapons. I strongly believe that the United States should be among the last nations to use a nuclear weapon for the simple reason that our superb conventional forces can handle military contingencies short of all-out strategic war on several fronts. Indeed, the United States should do everything that it can to reinforce the mystique surrounding nuclear weapons and the notion that any nuclear use would cross a fundamental threshold in international affairs. Nuclear weapons – regardless of their yield - are weapons of last resort designed to deter or destroy an existential threat to our interests.

**Sustaining Our Nuclear Deterrent**

All of the nuclear weapons in our arsenal were designed during the Cold War. None were intended to last for the very long periods currently anticipated and none are able to be remanufactured "just the way we made them" due to changes in material availability and manufacturing.

I do not believe that the United States will be able to sustain its current nuclear arsenal indefinitely without nuclear testing. There are three alternatives:

1. Accept lower confidence in our current weapons
2. Replace our current arsenal with more robust designs
3. Return to some level of underground nuclear testing.

Nuclear weapons are extraordinarily complex objects that achieve conditions found nowhere else in nature outside of exploding stars. They are highly compact and were designed to employ the minimum amount of nuclear materials to achieve their mission. Some of the materials and processes that were used in their manufacture are no longer available – either because they were deemed a risk to health and safety or because we no longer have the capability to make them. Using new materials and manufacturing processes is certainly possible, but doing so introduces small changes into the weapon, the effects of which we can only estimate. We can be confident of the safety and performance of our nuclear arsenal today – the issue is how long that confidence can be maintained.

An alternative to maintaining old designs is to introduce new ones that are easier to maintain and have larger margins than our existing weapons. The Reliable Replacement Warhead is a step in this direction. It is intended to improve our ability to maintain an existing military capability; hence it is not a new nuclear weapon. It is based on tested designs so it has a demonstrated pedigree. And it is capable of being manufactured and maintained into the future. However, the RRW is only a step toward the transformation of the nuclear stockpile, one that depends on the requirements analysis discussed above.

I see no specific technical issue that would demand a return to nuclear testing, but I also appreciate that science – including the science behind nuclear weapons - proceeds through an interchange between theory and experiment, between hypotheses and the testing of hypotheses. NNSA's Advanced Strategic Computing program has achieved extraordinary progress since its inception – we now have supercomputers that can perform over one thousand trillion calculations per second, enabling unprecedented levels of detail to be included in a computer simulation of a nuclear explosion. But science requires a balance of theory and experiment. Any experienced scientist will tell you that it is entirely possible for even the most powerful computer

to get the wrong answer because of gaps in our understanding of underlying phenomena. The National Ignition Facility will play a vital role in accessing conditions close to those occurring in a nuclear weapon, but we must also maintain an ability to perform experiments on weapons-scale quantities of plutonium and high explosives: experiments that can only be performed at the Nevada Test Site.

**The Role of the Nevada Test Site in Maintaining the Nuclear Deterrent**

The Nevada Test Site (NTS) is a 1375 square mile NNSA facility located approximately 60 miles northwest of Las Vegas, NV. Originally established as a continental test site during the early years of the nuclear weapons program, it has evolved into a unique multi-function national security asset.

NTS is the only location that can perform experiments with weapons-relevant quantities of plutonium and high explosives. These do not involve a nuclear explosion, hence the term "sub-critical experiments", but they can include all of the engineering and material features involved in a real weapon. For example, scientists can take a newly-manufactured plutonium pit and high-explosive assembly, place a measuring device at its center, and compare the quality of the implosion of remanufactured components to original factory-produced items. They can measure the subtle effects of aging on weapons implosions. In a subcritical experiment, everything happens as it would in a nuclear detonation – the high explosive is detonated and the plutonium is imploded - but the assembly never goes critical and hence produces no nuclear energy. These experiments are conducted safely and securely in our U1a facility, located 963 feet below the desert floor 76 miles from Las Vegas.

The Device Assembly Facility (DAF) at NTS was intended as a facility in which to build nuclear explosives for underground tests. It is a modern facility with outstanding security. Approximately one third of DAF will be occupied by the Critical Experiments Facility, which will house nuclear experiments moved from TA-18 at Los Alamos National Laboratory. This leaves over 40,000 square feet of nuclear-certified space for other national missions at a time when new nuclear space costs on the order of $65,000 per square foot to construct.

The JASPER gas gun at NTS is a high-precision cannon that fires projectiles at small samples of plutonium to measure plutonium's response to intense shock waves, such as are found in an operating nuclear weapon. We know that we don't know enough about plutonium and JASPER is filling in key aspects of our understanding.

NNSA's Complex Transformation plan envisions moving all open-air high explosive testing to NTS. Our Big Explosives Experimental Facility (BEEF) currently conducts a wide range of high-explosives experiments safely and far from residential areas. (The closest residence to BEEF is in the small town of Amargosa Valley, 36 miles away.)

The Non-Proliferation Test and Evaluation Complex (NPTEC) can release toxic materials such as chlorine into the air to measure vital parameters associated with a possible terrorist attack involving chemicals. At the other extreme, the chemically clean nature of our desert environment enables NPTEC to test sensors for detecting minute quantities of materials associated with foreign WMD activities. Industrial firms come to NTS to train their personnel in realistic chemical environments, improving their ability to respond to real-world emergencies.

NTS is the only place where substantial quantities of special nuclear materials can be brought out into the open to test nuclear detectors for the Department of Homeland Security and others. Detectors being considered for placement at border crossings and other locations were tested at NTS.

NTS has trained over 60,000 first responders in how to deal with a radiological emergency. We work closely with organizations as diverse as the New York City Police Department and United States Central Command to enable detection and neutralization of threats to our country and our troops abroad. Much of our work in the area is classified, but field commanders have repeatedly noted that technology provided by NTS saves lives in Iraq and Afghanistan.

**Complex Transformation**

Nuclear weapons are not scientific curiosities - they are real objects that require maintenance and occasional remanufacture. The weapons fabrication capability in the United States is in dire need of refurbishment. Some buildings, dating from the early 1950's, are literally falling down and simply need to be replaced. Others require substantial modifications to comply with modern safety and security regulations. NNSA's Complex Transformation plan uses current military requirements to define a weapons complex that can satisfy future needs at minimum cost. However, this plan was based on a large stockpile of weapons that may not represent the best picture of the future. It is vital that the United States conduct an "end to end" review of its nuclear needs and the capabilities required to meet those needs. Only after we know how many and what types of weapons we must maintain for national security, and then identify those activities – science, engineering, and manufacturing - needed to ensure the deterrent, can we identify the facilities required to perform those activities.

There is a base set of capabilities that must be maintained no matter how many weapons we require. NNSA must maintain a capability to manufacture plutonium pits, a capability that employs unique skills and technology and one that is unique to the nuclear weapons mission. While the production capacity will depend on the size of the stockpile, the time required to effect a significant build, and the anticipated life of existing pits, the existence of a production line is essential, just as it is in maintaining other special-purpose productions lines such as those related to submarines. A similar argument can be made for maintaining a uranium production capability, ability to manufacture high explosives, and assembly/disassembly operations on weapons.

While part of the nuclear weapons complex is old and expensive to maintain, other facilities are new, capable, and underutilized. Before building new buildings and machines, we should ensure that those currently available are fully utilized. This may require shifting missions from one site to another, always a difficult proposition, but the alternative is to spend billions of dollars to maintain a capability at a specific site while other space stands idle.

The United States is at a crossroads in its nuclear forces. The geopolitical environment has changed with the breakup of the Soviet Union and the proliferation of nuclear weapons to other countries. New technologies have arisen that reduce the need for a large nuclear weapons stockpile. We have the opportunity to redefine the notion of deterrence in the post Cold-War period and size the NNSA complex to meet the needs of the future. Thank you again for the opportunity to share these thoughts with you.