DOE/NA-0013

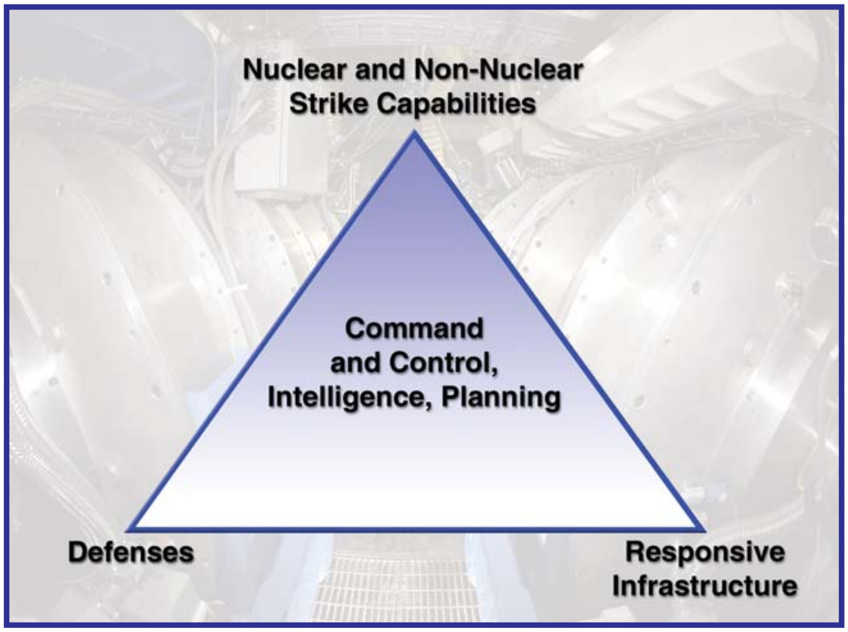
Complex 2030

An Infrastructure Planning Scenario for a Nuclear Weapons Complex Able to Meet the Threats of the 21st Century

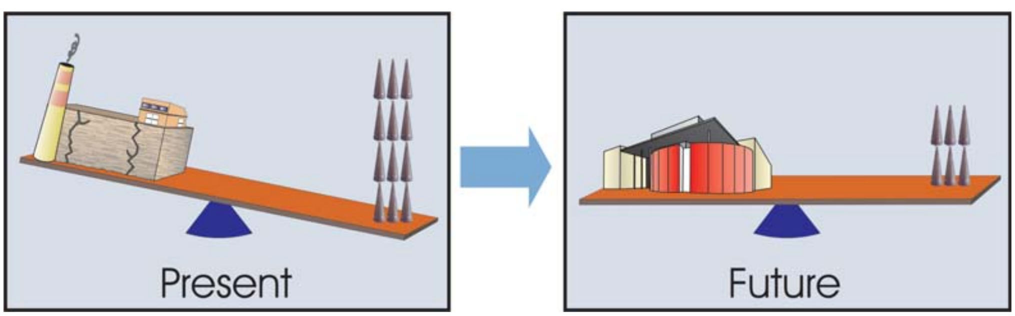
"Getting the Job Done"

October 2006

Office of Defense Programs
National Nuclear Security Administration
U.S. Department of Energy



The 2001 Nuclear Posture Review concluded that a strategic posture that relies solely on offensive nuclear forces is inappropriate for deterring the potential adversaries of the future. A New Triad is defined which consists of nuclear and non-nuclear strike capabilities, defenses, and a robust, responsive infrastructure supported by enhanced intelligence and adaptive planning capabilities. The New Triad provides a balance of capabilities suited for the emerging threat environment, and provides military options that are credible to enemies and reassuring to allies.



Development of a credible, responsive nuclear weapons infrastructure facilitates a reduction in the size of the stockpile and greater reliance on deterrence by capability.

Foreword

Start with the end in mind:

The Department of Energy (DOE) through the National Nuclear Security Administration (NNSA) and in partnership with Department of Defense (DoD), is responsible for ensuring the United States has a safe, secure, and reliable nuclear deterrent. The characteristics of this deterrent will evolve as the world changes. In 2001, the U.S. policy on strategic deterrence was revamped in recognition that the premise for our strategy had changed from one of deterring a peer adversary to one of responding to emerging threats. The 2001 Nuclear Posture Review (NPR) directed a change in the structure of the deterrent to adjust to the change in the nature of the threat. Specifically, the NPR called for the following:

- Changing the size, composition, and character of our nuclear stockpile in a way that reflects the reality that the Cold War is over;
- Achieving a credible deterrent with the lowest-possible number of nuclear warheads consistent with our national security needs, including our obligations to our allies; and,
- Transforming the NNSA nuclear weapons complex (also referred to as the "Complex") into a responsive infrastructure that supports the specific stockpile requirements and maintains the essential U.S. nuclear capabilities needed for an uncertain global future.

Deputy Administrator for Defense Programs, Thomas D'Agostino (right), gives testimony before Congress.

In our vision for the nuclear weapons enterprise of the future, the deployed stockpile will have been transformed into one smaller than today. Reliable Replacement Warhead (RRW) concepts with less stringent warhead design constraints than those imposed on Cold War systems will be more easily and efficiently manufactured at fewer, modernized facilities with safer and more environmentally benign materials. These replacement warheads will have the same military characteristics, be carried on the same types of delivery systems, and hold at risk the same targets as the warheads they replaced, but they will be re-designed for long-term confidence in reliability and greater security, and ease of production and maintenance. Confidence in the stockpile will remain high—without resumption of nuclear testing—because RRW concepts offer substantially increased performance margins and because of our deeper understanding of nuclear phenomena gained from the Stockpile Stewardship Program (SSP) and the research and development (R&D) tools that come with it. By 2030, according to our vision, the deployed stockpile will be backed up by a much smaller, non-deployed stockpile than today. The infrastructure that supports this smaller stockpile will be robust, fully capable and sufficiently flexible to fix technical problems in the stockpile, and able to respond to adverse geopolitical change. NNSA will have met quantitative responsive infrastructure objectives to provide confidence in the capabilities of the nuclear weapons complex. This transformed infrastructure will be smaller, more efficient, and designed with safety and security in mind. It will be fully integrated with uniform, efficient business practices, and risks will be managed effectively. Finally, leadership will be strong, and the next generation of nuclear weapons scientists and engineers will be trained and ready to apply their skills.

We have a tremendous resource in the talent and commitment of our people. By relying on the strength of our personnel, we are confident of success in transforming the Complex.

Executive Summary

In accordance with the policy outlined in the 2001 Nuclear Posture Review, the structure of the U.S. nuclear deterrent will transition from one that relies on deployed forces to one that relies more heavily on capabilities. NNSA must transform the nuclear weapons complex to meet the needs of the future while meeting stockpile commitments. The science-based Stockpile Stewardship Program (SSP) was established in recognition that the nation needed new tools to sustain the stockpile without underground nuclear testing. More than a decade later, these tools are being used to support the needs of the stockpile. The next step in the process of transformation is to leverage our investments in the SSP to enhance the responsiveness of the design, certification, and production components of our program.

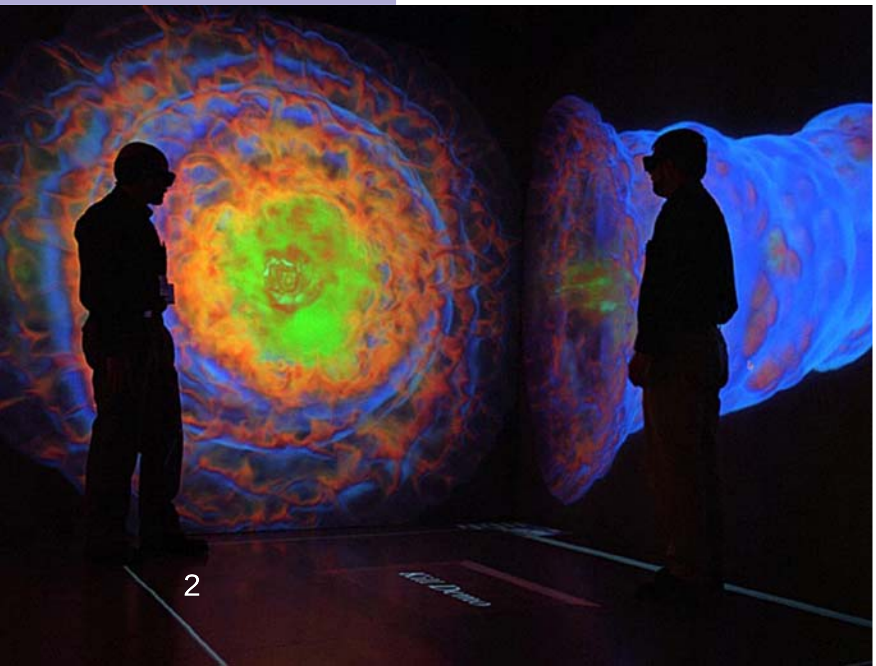
NNSA has developed a planning scenario that sets out our vision for the nuclear weapons complex of 2030. This scenario consists of four over-arching, long-term strategies:

(1) In partnership with the Department of Defense, transform the nuclear stockpile through development of Reliable Replacement Warheads, refurbishment of limited numbers of legacy designs, and accelerated dismantlement of the Cold War stockpile;
(2) Transform to a modernized, cost-effective nuclear weapons complex;
(3) Create a fully integrated and interdependent nuclear weapons complex; and,
(4) Drive the science and technology base essential for long-term national security.

These strategies are complemented by near-term actions to build confidence in the transformation process.

Our scenario for Complex 2030 is neither the Cold War complex nor today's Complex. In the 1980s, the nuclear weapons complex contained 14 sites; it contains eight today. While the scenario proposes eight sites in 2030, these sites are integrated and interdependent, and the activities at these sites would be very different than those conducted today. The table on the following page summarizes notable differences between the Complex today and Complex 2030.

Scientists observing a high-resolution numerical simulation in the Strategic Computing Complex.



Our transformation will not result in Cold War-like nuclear capabilities. The President is committed to achieving a credible deterrent with the lowest possible number of nuclear weapons. Hence, establishing a responsive infrastructure that will facilitate reductions in the size of the stockpile, developing a warhead concept that reduces the likelihood of resuming underground nuclear testing, and accelerating dismantlement of retired weapons are all essential elements of the path forward. Complex 2030 provides a vision for our transformation journey.

Executive Summary

Complex Today	Complex 2030
Category I/II quantities* of special nuclear material (SNM) present at seven of the eight nuclear weapons complex sites.	Fewer sites and fewer locations within sites with Category I/II quantities of SNM. These materials are only present at production and test sites.
All National Laboratories operate facilities with security for Category I/II quantities of SNM and some laboratories have nuclear production missions.	No laboratory operations require Category I/II SNM levels of security. Laboratory facilities are not used for nuclear production missions.
Nuclear production in aging, Cold-War-era complex including a facility operated by a national laboratory.	Modernized centers of production excellence: Plutonium – At existing Category I/II SNM site to be determined. Uranium – Y-12. Assembly/Disassembly – Pantex. Tritium – Savannah River.
Non-nuclear production at the Kansas City Plant performed in facilities from the World War II era.	Maximum use of out-sourcing with a small, new facility for components that cannot be out-sourced. This new facility is designed for lean, modern manufacturing practices.
Distributed and sometimes duplicative facilities at the labs, plants, and test sites.	Major facilities and capabilities consolidated. Major science assets operated as national user facilities. Large-scale hydro-testing at Nevada Test Site only. Shared, consolidated facilities for capabilities that are costly to maintain (e.g., operations involving high explosives, tritium, and other hazardous materials).
Facilities with a footprint of approximately 37 million square feet in 2006.	Significantly smaller nuclear weapons complex footprint supported by weapons account funding. Examples of initial planned reductions include: - Y-12 security footprint for Category I/II uranium operations reduced by up to 90%. - Category I/II plutonium operations consolidated to a single location. - Non-nuclear production footprint for Kansas City Plant operations reduced by approximately 60%. - Re-engineered flight testing approach for air-delivered weapons to significantly reduce the cost of operations and associated NNSA infrastructure. - Nuclear facility space at Los Alamos National Laboratory reduced by approximately 40%.
Approximately 27,000 contract personnel in 2006 directly supported by weapons account funds.	Fewer employees directly supported by weapons account funding consistent with a smaller, more focused Complex.
A culture that sometimes seeks to eliminate all risks at an unsustainable cost no matter how small the probability of occurrence and to substitute oversight recommendations for responsible line decisions.	A culture that manages risk through line management responsibility, risk-informed decision-making, and maintenance of a safe and secure working environment. Organizational structure drives integration of mission and operations for better risk and cost tradeoffs.
A distributed enterprise that sub-optimizes by site, relies on separate contracts without strong performance linkages for objectives of the entire Complex, and lacks uniformity in supporting technical and administrative practices.	An integrated, interdependent enterprise. Examples include: - Fewer, more uniform contracts with multi-site incentives. - Appropriately uniform business practices, technical processes, information management, and program management across the complex. - More efficient acquisition using a supply chain management center.

* Category I/II quantities are specified amounts of SNM that require the highest, thus most costly levels of security and safety.

Introduction

Plan for a transformed nuclear weapons complex able to meet the threats of the 21st century:

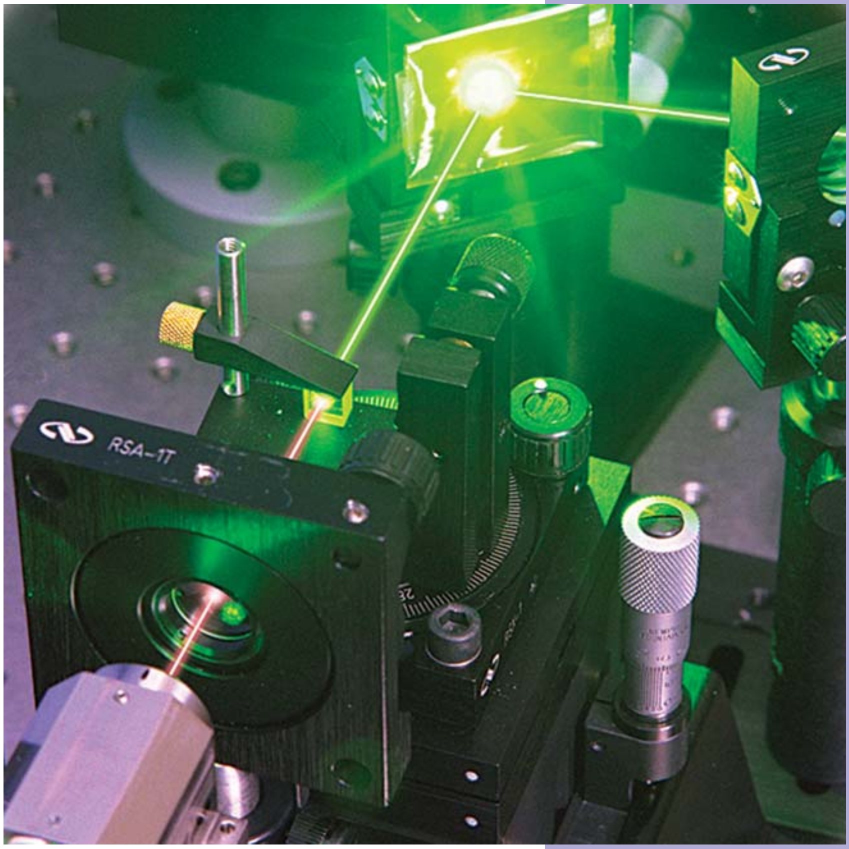
The NNSA nuclear weapons complex of the future must meet U.S. nuclear weapons requirements and support U.S. strategic objectives with a balance of research, design, certification, test, production, surveillance, dismantlement, and secure transportation capabilities. It will be integrated, responsive, safe, secure, and will respond promptly and effectively to stockpile issues or adverse geopolitical change. The Complex will enhance assurance, dissuasion, and deterrence via infrastructure capability (people, processes, and facilities) and ensure against technological surprise, in particular the weapons development by emerging adversaries. Together with a smaller stockpile, this future complex will be fully capable of meeting the Nation's nuclear deterrent needs.

Stockpile transformation is key to development of a responsive infrastructure. It is the combination of stockpile changes, through concepts such as the RRW, and achievement of a more responsive infrastructure – each enabled by the other – that will make transformation successful. This transformation builds on the success of the science-based Stockpile Stewardship Program and will be achieved with careful planning and a commitment to changing the Complex. The following principles serve as the foundation for our planning:

The Microsystems and Engineering Science Application MicroLab facility enables inclusion of innovative technologies in future systems.

Introduction

- Meet national security responsibilities to the current stockpile without interruptions;
- Preserve a premier science and technology base essential to future nuclear capabilities;
- Demonstrate all phases of production required to maintain the U.S. nuclear weapons stockpile;
- Transform the stockpile consistent with the Nuclear Posture Review through concepts such as RRW;
- Balance current life-extension programs for legacy weapons with a transition to RRW concepts; and,
- Transform the Complex to be more responsive and cost-effective.



Demonstration of a high power, frequency doubled, solid-state laser system for potential use in triggering optical switches.

To ensure our ability to maintain essential military capabilities over the long-term and to enable a smaller stockpile through reduction of reserve warheads, we must make progress towards a truly responsive nuclear weapons complex infrastructure. This future Complex must be less costly, be highly secure, manage risks effectively, and be fully capable to support national security needs on a timely basis. A future responsive infrastructure must meet the following objectives:

- Identify, understand, and fix stockpile problems in time to assure continued confidence in the reliability and safety of the stockpile;
- Dismantle warheads on a schedule consistent with policy requirements;
- Ensure warheads are available to augment the operationally deployed force on a timescale that supports DoD requirements;
- Design, develop, certify, and complete first production units of refurbished or replacement warheads with a frequency that both sustains the stockpile and exercises the supporting infrastructure and critical skills;
- Improve the capability to design, develop, certify, and complete production of new or adapted warheads in the event of new military requirements;
- Produce required quantities of warheads in time to meet military requirements;

Introduction

In a tunnel 962 feet underground, a cathode cover is prepared for a high-intensity flash x-ray system to be used for subcritical experiments..

- Demonstrate nuclear competencies that assure allies, dissuade adversaries, and ensure against technological surprise;
- Sustain readiness to conduct underground nuclear tests; and,
- Ensure an economically sustainable nuclear weapons enterprise.

From its origins in the Manhattan project, the nuclear weapons complex and the stockpile it supports have experienced major changes. Major reductions in the numbers and types of weapons, establishment of SSP, closure of material and manufacturing production sites, and re-configuration of non-nuclear production are examples of notable changes to the Complex over the past 20 years alone. Now we must identify what will best serve the needs of the future.

NNSA has developed a planning scenario for the nuclear weapons complex of 2030. We have also defined a number of first steps on the path forward. These first steps will continue ongoing transformation efforts and allow for further consideration of alternatives to achieve a responsive, dynamic enterprise for the long-term. This document provides a summary of this planning scenario. It offers a path toward achieving the President's vision of the smallest stockpile consistent with our Nation's security.

This scenario is not the only plausible future, and we do not underestimate the challenge of transforming the enterprise, but this is the future we will strive for. Other scenarios exist. Most notably, the Secretary of Energy forwarded the report *Recommendations for the Nuclear Weapons Complex of the Future* to Congress on October 19, 2005. This report was the culmination of months of intensive review by six members of a Secretary of Energy Advisory Board (SEAB) task force chaired by Dr. David Overskei. Their efforts made a key contribution towards enhancing our ability to make changes to the Complex. While our path to the future differs in some areas from the task force's recommendations, many recommendations are consistent with our plan to modernize the nuclear weapons complex, consolidate SNM, and improve operations. Our scenario would place the nuclear weapons complex on a robust path forward that meets both near-term requirements of the stockpile and long-term nuclear capabilities essential to national security. The following table summarizes similarities and differences between major SEAB task force recommendations and our scenario.

Topic	SEAB Task Force Recommendation	Complex 2030
Reliable Replacement Warhead (RRW)	Immediate design of RRW.	Our approach as well.
Consolidated Nuclear Production Center (CNPC)	Establish a CNPC as rapidly as possible (e.g., 2015).	Our approach embraces the recommendation to consolidate production but does not go as far as consolidation to one site. Our scenario is based on distributed production centers of excellence including full operations of a consolidated plutonium center at an existing Category I/II SNM site in the early 2020s.
Category I/II SNM Consolidation	Consolidate all Category I/II SNM to the CNPC in the long-term.	Consolidate Category I/II SNM to fewer sites and fewer locations within a site but not to a single production site. Category I/II materials would be removed from facilities operated by all three National Laboratories as soon as practical.
Weapon Dismantlement	Accelerate rate of dismantlement.	Underway.
Risk Management	Manage risks more effectively using risk-informed decision-making.	Our approach as well, while assuring a safe and secure working environment.
Enterprise Management	Create a more integrated, interdependent enterprise.	Our approach as well.
Office of Transformation	Establish an Office of Transformation	Completed.

Strategies

STRATEGY 1: *In partnership with the Department of Defense, transform the nuclear stockpile through development of Reliable Replacement Warheads, refurbishment of limited numbers of legacy designs, and accelerated dismantlement of the Cold War stockpile:*

The strategy comprises the following elements:

- Ensure the viability of legacy weapons deployed to the stockpile until replaced through a comprehensive strategy of maintenance, surveillance, and refurbishment;
- Accelerate dismantlement completion from calendar years 2034 to 2023 of legacy weapons currently planned for retirement;
- Engage in partnership with DoD to transform the nuclear stockpile. Upon favorable completion of the current study, implement an RRW strategy as an enabler of transformation. Establish an RRW-based stockpile plan by the end of 2007 with a majority of intercontinental ballistic missile, submarine-launched ballistic missiles, bombs, and cruise missiles transitioned to RRW-types by 2030. Ensure the stockpile has a heterogeneous mix of warheads for diversity. Use the science-based stockpile stewardship tools established over the past decade to enable RRW design and certification without resumption of underground nuclear testing. Reduce the number of legacy

The Ohio-class fleet ballistic missile submarine USS Pennsylvania (SSBN 735) returns to Naval Base Kitsap, Navy Region Northwest.

Strategies

warheads of specific types that are processed through current life-extension programs and consider canceling some life-extensions to enable a more rapid transformation of the total stockpile;

A B-2 Spirit moves into position for refueling from a KC-135 Stratotanker .

- Implement a continuous design/deployment cycle that exercises design and production capabilities and enables responsiveness of the nuclear weapons complex. Develop a business case for an optimal future design/deployment cycle that balances responsiveness objectives, weapon life-cycle costs, and training of new personnel;

- Transform the stockpile without resumption of underground nuclear testing however, sustain the capability to conduct underground tests at the Nevada Test Site (NTS); and,

- Implement changes in surveillance evaluation methods that reduce the cost of surveillance. Minimize destructive evaluation of warhead components through alternate methods of assessment. Investigate commonality in instrumentation packages and architectures, and other initiatives to reduce costs. Expand the number of modern test ranges available for testing by eliminating SNM from future flight-test units, and determine evaluation techniques that will reduce future flight-test requirements.

The stockpile will be smaller, with fewer warhead types, and will contain warheads with enhanced safety, security, and use-control features. Warheads will also be easier to manufacture with large performance margins reducing the likelihood that the United States will ever need to perform an underground nuclear test. A capability to rapidly augment the stockpile, if needed, through infrastructure responsiveness will replace a requirement to maintain warheads in reserve.

Responsiveness means understanding needs and having the capability to meet those needs with a defined set of capabilities and capacities. The Complex will demonstrate responsiveness through continuous, effective operations. Planned, periodic cycles for design, engineering development, certification, production, and dismantlement will maintain critical skills, promote workforce excellence, and provide for cross-generational training throughout the Complex. During transformation, the NNSA will continue to meet its current national security responsibilities without interruption.

Strategies

STRATEGY 2: *Transform to a modernized, cost-effective nuclear weapons complex:*

The following are proposed for this strategy:

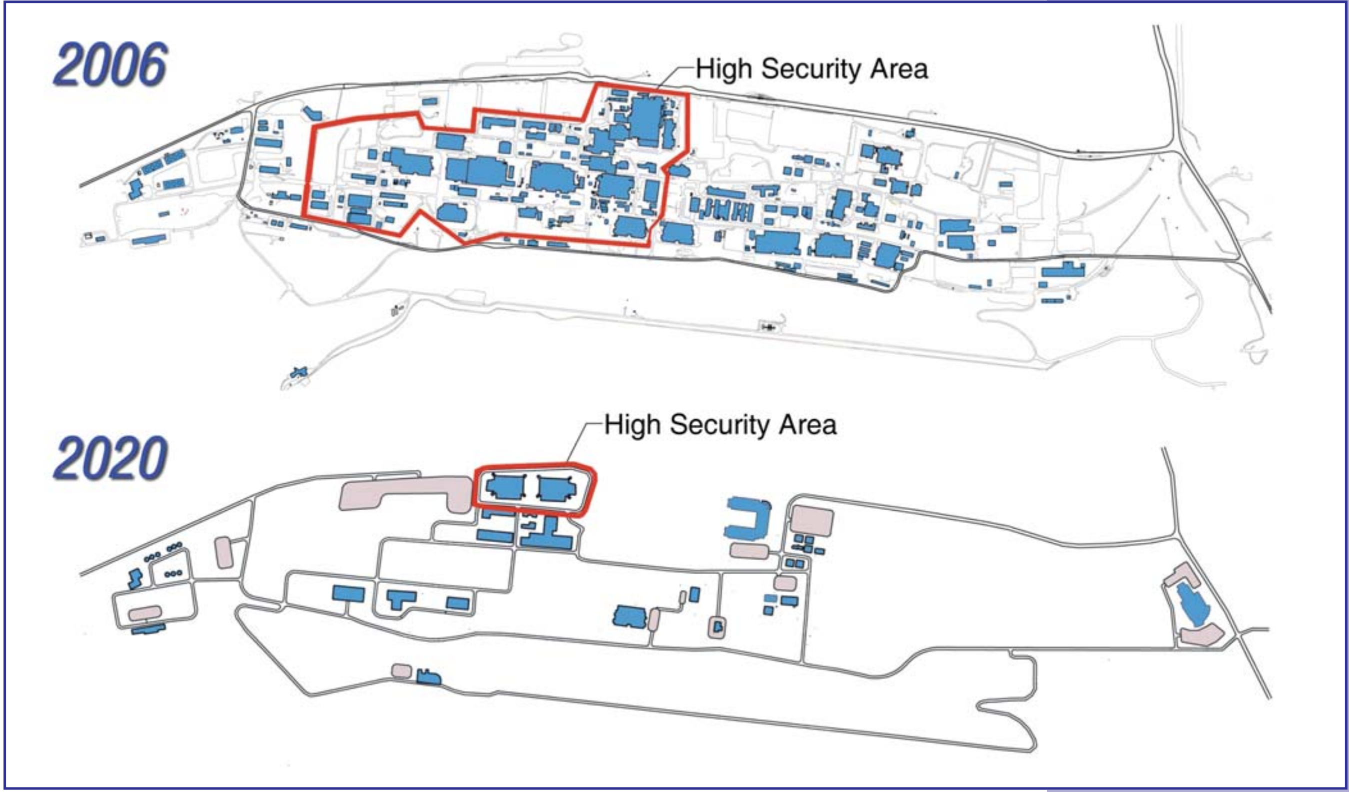
- Reduce the number of sites with Category (CAT) I/II SNM and consolidate SNM to as few locations within a given site as soon as practical.
  - Phase out operations involving CAT I/II SNM at all national laboratories.
  - Eliminate need for CAT I/II SNM security at Sandia National Laboratories (SNL) by the end of 2008.
  - Remove CAT I/II SNM from Lawrence Livermore National Laboratory (LLNL) by the end of 2014 assuming necessary capability and capacity for pit surveillance, plutonium experiments, and surety experiments will be available at Los Alamos National Laboratory (LANL). Develop a plan in 2007 for removal of CAT I/II SNM and transition of LLNL programmatic work involving CAT I/II SNM to LANL and NTS. Start moving material from LLNL in 2008 or earlier.
  - By 2022, LANL will not operate facilities containing CAT I/II quantities of SNM. The location and operator of the consolidated plutonium center will be determined following completion of appropriate National Environmental Policy Act (NEPA) reviews.

The National Security Sciences Building provides modern facilities for theoretical and applied physics and computational sciences.

Strategies

- Upgrade Y-12 facilities to serve as the CAT I/II uranium center of excellence.
  - Complete a Highly Enriched Uranium Materials Facility (HEUMF). Store consolidated CAT I/II uranium materials in the HEUMF.
  - Plan, construct, and operate a Uranium Processing Facility (UPF) at Y-12 to reduce security costs, provide an efficient means to consolidate existing uranium materials contained in legacy weapons, dismantle legacy canned subassemblies (CSAs), support highly-enriched uranium research, and provide a long term capacity for new CSA production. The UPF would have a baseline capacity of 125 units per year net to the stockpile.
  - Reduce by 90% the Y-12 security footprint for CAT I/II uranium operations and reduce square footage for all Y-12 facilities by nearly 50%.
- Plan, construct, and startup a consolidated plutonium center for long-term R&D, surveillance, and manufacturing operations. Plan the consolidated plutonium center for a baseline capacity of 125 units per year net to the stockpile by 2022.
  - Upgrade LANL plutonium facilities at Technical Area 55 to support an interim production rate of 30 to 50 RRW war reserve pits per year net to the stockpile by 2012.

Y-12 site to realize a 90% reduction in the footprint of the high security area and a 50% reduction in the footprint of buildings.



Strategies

- Complete and operate the Chemistry and Metallurgy Research – Replacement (CMRR) as a CAT I/II facility up to 2022 (use as a CAT III/IV facility and focal point and for material science thereafter) to support plutonium operations at LANL, closure of existing LANL Chemistry and Metallurgy Research (CMR) facility, and the removal of CAT I/II quantities of plutonium from LLNL.

- Improve assembly/disassembly throughput at Pantex. Upgrade and modernize Pantex for the long-term as necessary. Consider the NTS Device Assembly Facility as backup for weapon assembly and disassembly operations.

- Transition large-scale hydrodynamic testing to NTS as the Dual-Axis Radiographic Hydrodynamic Testing (DARHT) facility reaches end of life in the 2020s. In the interim, consolidate facility capacity and experimental capabilities needed to meet national hydrodynamic experiment workload. Prepare a disposition plan in 2007 for Site 300 that includes potential environmental cleanup requirements.

- Retain tritium production and stockpile support services at Savannah River Site (SRS). Continue to use commercial light-water-reactors as the source of new tritium.

Examining material at the Tritium Extraction Facility.

- Outsource non-nuclear component production to commercial suppliers and utilize commercial off-the-shelf components in designs consistent with best security practices and cost-effectiveness. For non-nuclear components currently produced at the Kansas City Plant, occupy a new, smaller, non-nuclear production facility by 2012 producing components that cannot be out-sourced, e.g., component final assembly and use-control components.

- Consolidate large-scale, high-explosives (HE) production pressing and machining at Pantex.

- Consolidate HE R&D and laboratory-scale HE testing without the presence of CAT I/II quantities of SNM.

- Maintain a secure transportation asset to support DOE requirements.

- Consolidate state-of-the-art, high speed computing at a single site, accessible complex-wide, to address the most challenging and pertinent stockpile stewardship issues. Partner with computer vendors to develop advanced architectures that meet the future computing needs of the Complex. Develop a common user

Strategies

environment for computing and reduce the footprint of weapons program capacity computing. Recognize that simulation will play an increasing role in all phases of the life cycle of nuclear weapons and will continue to underpin the nuclear deterrent.

- Operate major science facilities (e.g., the Los Alamos Neutron Science Center (LANSCE), Omega, Z, DARHT, U1a, the Joint Actinide Shock Physics Experimental Research (JASPER) facility, and the National Ignition Facility (NIF)) as effective, national, shared user facilities.
- Re-engineer flight testing approach for air-delivered weapons to significantly reduce the cost of operations and NNSA infrastructure. Options to be considered include ceasing operations at the Tonopah Test Range in 2009 and transfer of flight tests to alternative sites.
- Dispose of excess facilities.

The Dual-Axis Radiographic Hydrodynamic Test facility will provide three-dimensional imagery of hydrodynamic behavior.

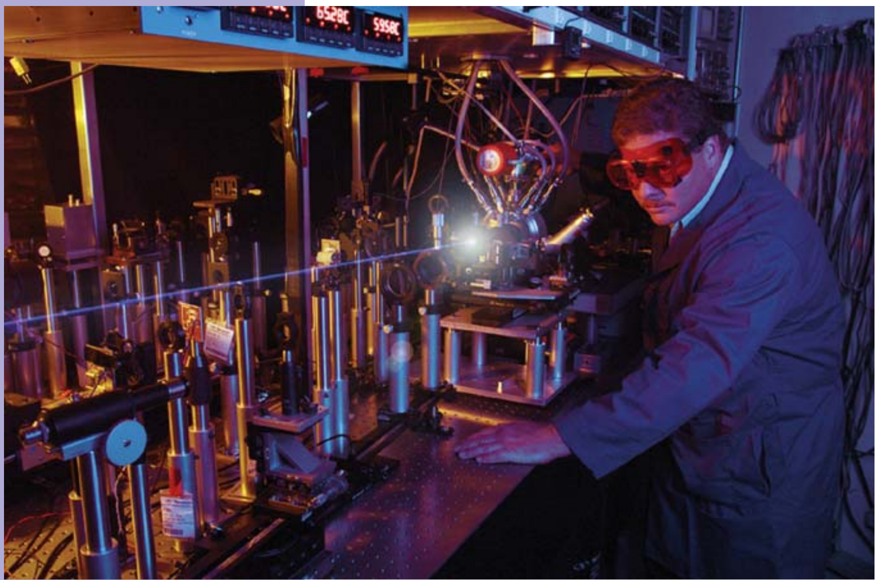
By the 2020s, the physical footprint of the weapons complex would be substantially reduced through a series of consolidation and new construction activities. This transformation would be implemented in phases to both manage risks to the nuclear deterrent and ensure the long-term infrastructure is not burdened by capabilities only applicable to legacy weapons.

Strategies

STRATEGY 3: *Create a fully integrated and interdependent nuclear weapons complex:*

This strategy will focus on changing the operating philosophy of the nuclear weapons complex to become more efficient, more interdependent with duplication eliminated (except as required to manage risks), more uniform in technical and administrative practices, more responsive, and less costly. The following are proposed for this strategy:

- Create an integrated, interdependent system of laboratories, plants, and test sites based on support of the transformed nuclear deterrent. In the near-term, add incentives to current contracts to promote integration and interdependence. Work toward fewer and more standard contracts. Provide multi-site contract incentives starting in 2006 for a nuclear weapons complex with shared risks and rewards. Reward a balanced approach to mission, safety, and security performance. This interdependent Complex will have incentives to:



Experiment being conducted at the High-Explosives Applications Facility.

  - Meet stockpile obligations and ensure stockpile safety, security, and reliability.
  - Sustain the scientific base and essential nuclear capabilities to ensure peer review and intellectual viability.
  - Consolidate missions and capabilities (within and between sites) consistent with national security and weapons workload projections.
  - Reduce weapon lifecycle costs, square footage of the Complex, and indirect costs.
  - Implement uniform technical and administrative business practices across the Complex, utilizing industrial standards to the greatest extent possible.
  - Establish a common information standard that facilitates communications.

- Ensure strong, consistent NNSA leadership to meet nuclear weapons responsibilities and balance competing priorities across missions, risks, and program elements.

  - Enhance line management structure through direct reporting that enhances balance between program, risk, and site operations management.

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- Implement improved systems integration support for Federal decision-making. This includes selecting an existing NNSA management and operating contractor to lead an integration support team under the guidance of Defense Programs.

- Streamline Federal oversight, starting with pilot projects at the Los Alamos National Laboratory and Kansas City Plant. Continue the progress being made with the model contract at Sandia National Laboratories.

Developing microwave casting technology for the Complex of the future.

- Ensure NNSA has the tools to enforce accountability on the contractors in return for increases in management flexibility.

- Establish and implement clear roles and responsibilities across the integrated Complex that emphasize the "what" and oversight role for the Federal workforce, and the "how" role for the contractor organizations.

- Create an Office of Transformation to plan and advocate change.

• Ensure the intellectual competition required for robust weapon designs, independent peer review, and essential nuclear weapon science and technology capabilities remain during consolidation of facilities at the national laboratories and the NTS. Use a process based on return on investment for improving knowledge in quantification of margins and uncertainties to aid decision-making. Retain small-scale facilities at distributed sites as necessary to retain intellectual viability.

• Develop uniform program/project management practices and project management certification for all weapon activities across the Complex. Include clearly defined responsibilities and authorities for decisions to provide accountability; flexibility in planning and execution; common metrics to evaluate program performance at all levels; Complex-wide systems to provide high quality planning data (scope/schedule/cost) and integrate resource constraints and change control; and Headquarters systems to strategically integrate priorities, expectations, and decisions.

• Use independent, national-level organizations to assist requirements development and cost estimating for large and complex construction projects.

• Manage Readiness in Technical Base and Facilities (RTBF) uniformly across the Complex by the end of 2008. Hold the Complex to a uniform definition of assets considered to be a part of RTBF. Create and annually revalidate a comprehensive uniform listing of mission critical facilities.

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- Establish a Supply Chain Management Center in 2007 to achieve more cost effective procurement of products and services across the nuclear weapons enterprise. Value will be created through: (1) current contracts for bulk procurement of common products and services that will be extended across the Complex, and (2) qualification of suppliers that will be used throughout the Complex to reduce qualification validation costs.

- Create a culture that manages risk rather than one that seeks to eliminate it.

  - Implement uniform, streamlined safety and security risk-management practices across the Complex.

  - Implement the Pantex Throughput Improvement Plan.

  - Implement a Y-12 Throughput Improvement Plan.

  - Reduce the burden of orders, regulations, and policies. Apply risk-informed decision-making to safety and security decisions. Subject rules, regulations, and major recommendations to risk-informed decision making that balances costs, benefits and risks across the spectrum of mission, safety, and security needs.

  - Implement consistent safety authorization basis practices across the site offices. Establish a safety authorization basis academy to facilitate uniformity across the weapons complex.

  - Devise and conduct a trial of a new model for responding to findings from the Office of Safety and Security Performance Assurance.

  - Achieve complex efficiencies and fundamental solutions to safety and security through implementation of new technologies and systems, including via innovative approaches to providing threat-insensitive protection of our warheads and weapons-usable material.

The Complex will have business practices, incentives, and a management philosophy that enhance agility, cost effectiveness, and responsiveness in all operations. The inherent flexibility promoted by this strategy will ensure the weapons complex is fully capable of addressing any nuclear weapons issue.

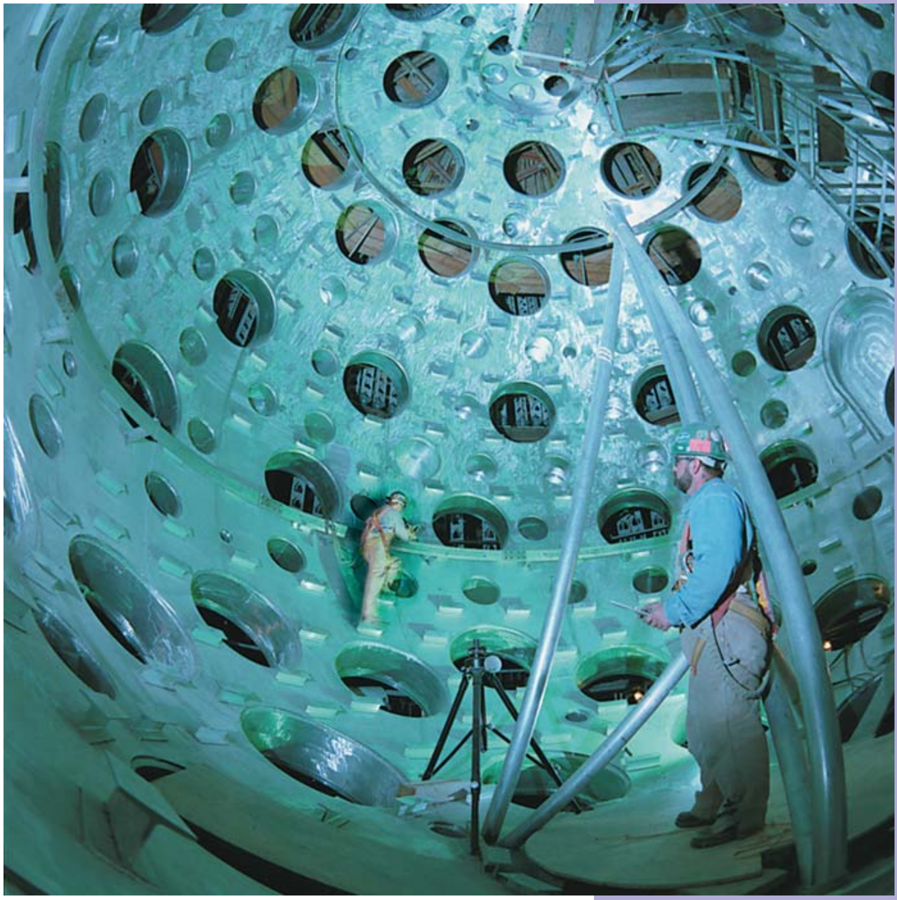
Collaboration technologies being used by teams in complex integration.

STRATEGY 4: *Drive the science and technology base essential for long-term national security:*

Long-term health of the science and technology at our nuclear weapons laboratories and plants is essential for our future. For more than a decade, a comprehensive, science-based approach has been the basis for the assessment of the continued viability of the nuclear stockpile. The need for a robust, scientific underpinning will remain as legacy systems are retained for the next few decades and the stockpile is transformed via development of RRW concepts. It is essential to maintain the capability to deal with technological surprise, to cope with planned and unforeseen changes to the U.S. stockpile and to respond to new threats. The following are proposed for this strategy:

- Address the stress on science and technology budgets resulting from competition for resources from stockpile and infrastructure transformation by enhanced management practices and teaming with others.
- Prepare field-specific science and technology roadmaps by the end of 2007 outlining the work required to sustain the transformed stockpile, and an integrated science and technology roadmap in 2008.
- Recognize that Work for Others (WFO) plays an essential role in maintaining capabilities required for the NNSA mission. Encourage stronger WFO in key mission areas. Incorporate the implications of WFO for NNSA laboratory missions into the science and technology plans.
- Transition to a lower cost of operations for NNSA national laboratories. Develop a plan in 2007 to eliminate duplicative facilities and programs while maintaining key capabilities.
- Partner with the Office of Science in developing jointly funded, integrated programs that provide leading edge science and technology capabilities needed for national security and economic competitiveness. Pilot a joint project with the Office of Science in the FY2008 budget cycle.

Workers inspect the inside of the National Ignition Facility target chamber.



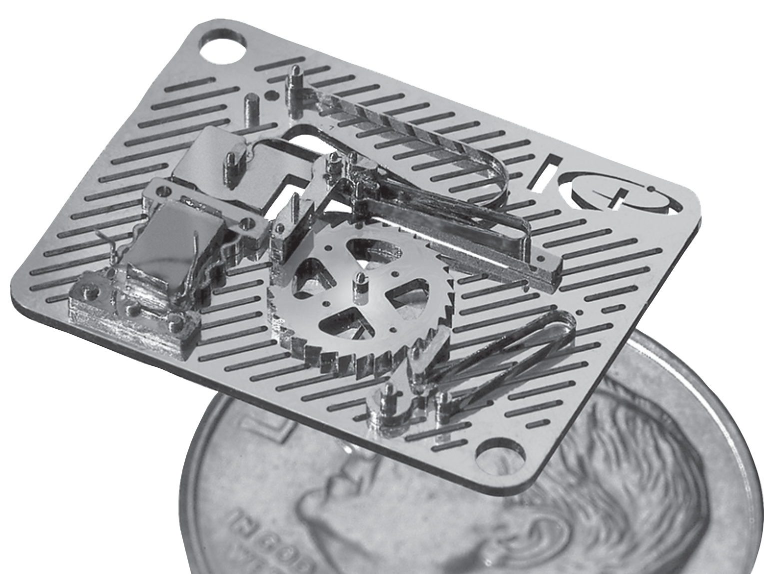
Strategies

BlueGene/L, the world's fastest supercomputer located in the Terascale Simulation facility.

- Establish performance measures in national laboratory performance evaluation plans to ensure major experimental facilities are efficiently and appropriately operated as shared, national user capabilities.
- Manage, assess, and prioritize science, technology, and simulation capabilities based both on (1) workforce management considerations and (2) requirements and "return on investment" for improving knowledge in the quantifications of margins and uncertainties. Apply a technology maturation program, in parallel with design, to ensure sufficient maturity for weapons applications.

Nuclear weapons funding is a major contributor to the U.S. science and technology base. This has multiple benefits: (1) stockpile stewardship is based on sound and leading edge technology, (2) technologies are developed that enhance U.S. competitiveness through additions to the Nation's science-base, and (3) training is supported for future generations of scientists and engineers. In this vein, assuring that the nuclear weapons complex continues to attract, recruit, and retain a workforce with the diverse set of skills needed to support the stockpile represents an important management challenge. To ensure a steady supply of technically qualified workers, NNSA, in partnership with other government agencies, will continue to sponsor fellowships, internships, and summer programs in conjunction with leading colleges and universities in the United States.

A micro-miniature electromechanical mechanism using a piezo element to provide energy to drive a series of miniature components for potential advanced stronglink manufacturing .



Commitment

Build confidence in the transformation process by Getting the Job Done:

NNSA will take sound, near-term actions to instill confidence in key stakeholders that our transformation can be achieved. During the transformation process, NNSA will continue support of the nuclear deterrent through successful execution of the planned programs of refurbishment, surveillance, limited life replacement, dismantlement, and other core activities.

Demonstrate we are "Getting the Job Done"

- Continue to deliver our products to the DoD as we have been doing.
- Eliminate the backlog of surveillance units by September 2007 consistent with an enhanced evaluation strategy (except the W84 and W88).
- Accelerate the dismantlement of retired weapons with a 49% increase from FY2006 to FY2007.
- Deliver the B61-7 First Production Unit (FPU) by June 2006 (Done) and the B61-11 FPU by January 2007.
- Deliver the W76 FPU by September 2007.
- Certify the W88 with a new pit and manufacture 10 W88 pits in 2007.
- Extract tritium for use in the stockpile by September 2007.
- Support the science base for warhead design, assessment and certification by completing and applying MESA (2008), DARHT (2008), NIF (2010), the Advanced Strategic Computing Purple machine (2006) and pit lifetime estimates (2006 - Done).
- Initiate transformation from a Life Extension Program strategy to an RRW stockpile strategy.
- Initiate transformation of the nuclear weapons infrastructure to take responsive infrastructure from concept to reality.

The B61-7 first production unit was delivered in June 2006.

Commitment

Demonstrate we are moving forward on transformation:

- Increase Pantex throughput by: dedicating part of the facility and personnel to dismantlement activities only; establishing multi-unit processing for weapons; improving process change approval timeliness by eliminating design lab approval where technically appropriate, and locating design lab personnel at Pantex when not; developing technically feasible risk-based standards for authorization basis and design basis threat issues; and continuing value stream analyses to reduce process times in half.
- Complete the RRW study and move forward with the concept as directed.
- Start a programmatic environmental impact statement process on complex transformation alternatives in 2006 (Done). In addition, begin independent business case evaluations on alternatives for transforming the Complex.
- Create an Office of Transformation within Defense Programs in 2006 to lead nuclear weapons complex transformation actions - Done.
- Implement improved systems integration support for Federal decision-making (such as being used for managing life-extension programs) to other parts of the weapons program. Select the systems integration organization from existing contractors in 2006 - Done.
- Drive uniformity in the management of the RTBF program by reducing Federal management to one program office in 2006 (Done) and through a common work breakdown structure and activity-based costing by the end of 2008.
- Implement a plan in 2007 that will reduce square footage of non-nuclear production at the Kansas City Plant to approximately one third of the current size through outsourcing and construction of a new facility by 2012 implementing modern manufacturing concepts.
- Establish a Supply Chain Management Center in 2007.
- Develop contract performance measures and facility program advisory committees in 2007 to enhance use of major science assets (e.g., LANSCE, Omega, Z, DARHT, U1a, JASPER, and ultimately NIF) as effective, shared, national user facilities. Test these measures in 2008 and fully implement them the next contract year.
- Communicate the transformation plan to all levels of the nuclear weapons complex and key stakeholders in 2006 - Done.

NNSA is committed to a transformation of both its infrastructure and practices for operation of the infrastructure. Through a series of near-term actions, NNSA will provide confidence-building measures to the DoD, other key stakeholders, and its employees that demonstrate this commitment. These measures include taking the actions identified above, while still delivering the nuclear weapons milestones negotiated with the DoD. This, in turn, will provide the basis for support of long-term transformation.

Acronyms

CAT	Category
CMR	Chemistry and Metallurgy Research
CMRR	Chemistry and Metallurgy Research - Replacement
CNPC	Consolidated Nuclear Production Center
CSA	Canned Subassembly
DARHT	Dual-Axis Radiographic Hydrodynamic Testing
DoD	Department of Defense
DOE	Department of Energy
FPU	First Production Unit
HE	High Explosive
HEUMF	Highly Enriched Uranium Materials Facility
JASPER	Joint Actinide Shock Physics Experimental Research
LANL	Los Alamos National Laboratory
LANSCE	Los Alamos Neutron Science Center
LLNL	Lawrence Livermore National Laboratory
NEPA	National Environmental Policy Act
NIF	National Ignition Facility
NNSA	National Nuclear Security Administration
NPR	Nuclear Posture Review
NTS	Nevada Test Site
R&D	Research and Development
RRW	Reliable Replacement Warhead
RTBF	Readiness in Technical Base and Facilities
SEAB	Secretary of Energy Advisory Board
SNL	Sandia National Laboratories
SNM	special nuclear material
SRS	Savannah River Site
SSP	Stockpile Stewardship Program
UPF	Uranium Processing Facility
WFO	Work for Others

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