Report on the Plan for Transformation of the National Nuclear Security Administration Nuclear Weapons Complex

Congressional Defense Committees
As requested by the United States Congress in
Public Law 109-364
John Warner National Defense Authorization Act
for Fiscal Year 2007
United States Department of Energy

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ABSTRACT

The John Warner National Defense Authorization Act for Fiscal Year 2007 (Public Law 109-364) ("the Act") directs the Secretary of Energy to develop a plan, in consultation with the Secretary of Defense and the Nuclear Weapons Council, for transformation of the National Nuclear Security Administration (NNSA) nuclear weapons complex to achieve a responsive infrastructure by 2030. The Act further directs the Secretary of Energy to submit to the congressional defense committees a report on the transformation plan. The NNSA, a semi-autonomous agency within Department of Energy, articulated its proposed strategy for achieving a more responsive infrastructure in *Complex 2030: An Infrastructure Planning Scenario for a Nuclear Weapons Complex Able to Meet the Threats of the 21st Century*. This report summarizes the proposed strategy.

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

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EXECUTIVE SUMMARY

Section 3111 of the John Warner National Defense Authorization Act for Fiscal Year 2007 (Public Law 109-364) directs the Secretary of Energy to develop a plan, in consultation with the Secretary of Defense and the Nuclear Weapons Council, for transformation of the nuclear weapons complex to achieve a responsive infrastructure by 2030. (The Nuclear Weapons Council consists of the Under Secretary of Defense for Acquisition, Technology, and Logistics, the Administrator of the National Nuclear Security Administration (NNSA), the Vice-Chairman of the Joint Chiefs of Staff, the Under Secretary of Defense for Policy, and the Commander of U.S. Strategic Command. This group makes recommendations to the President on nuclear weapons strategic issues.) The section also directs the Secretary of Energy to submit to the congressional defense committees a report on the transformation plan. This report fulfills that statutory requirement.

The DOE, through the NNSA and in partnership with the DoD, ensures the United States has a safe, secure, and reliable nuclear deterrent. The NNSA nuclear weapons complex (also referred to as the "Complex") of the future must be agile and responsive to potential changes in the national security environment. Based on the Complex 2030 vision, the future stockpile would consist of replacement warheads that provide the same military capabilities as the warheads they replace. These warheads would be designed for long-term confidence in reliability, greater security, and ease of production and maintenance. Confidence in the stockpile would remain high—without resumption of nuclear testing—because the replacement warhead concepts offer substantially increased performance margins and exercise the unique design and production skills needed to maintain a credible nuclear deterrent. Confidence would also be based on the Stockpile Stewardship Program and the research and development tools that come with it, which continue to provide a fuller understanding of nuclear weapons phenomena.

The Nuclear Weapons Council determined that the Departments of Energy and Defense will conduct a Reliable Replacement Warhead (RRW) program, pending congressional approval through the budget process, as a proposed strategy for maintaining a long term nuclear deterrent capability. The RRW strategy would enable a major transformation in the nuclear weapons stockpile and Complex infrastructure. From a national security standpoint, the RRW will provide a safe, secure, reliable, and sustainable nuclear weapons deterrent and could reduce reliance on a large stockpile of reserve weapons. For the NNSA, RRW would allow reduced investment in legacy weapons, outdated equipment, obsolete technology, and storage of spare components. The use of fewer hazardous materials in RRW would enhance safety, reduce facility environment, safety, and health costs, and increase manufacturability of components. Although the stockpile would be smaller in 2030, deterrence would be enhanced because the transformed complex would be fully capable, sufficiently flexible to address technical matters relating to the stockpile in a timely manner, and able to respond to adverse geopolitical change. The Complex would be able to augment the stockpile in a timely manner to respond to a crisis. This transformed infrastructure would be smaller, more efficient, and designed to meet safety and security needs. NNSA must transform the Complex for safety, security, and efficiency needs, even if RRW were not developed.

The NNSA developed a strategy in consultation with the Secretary of Defense and the Nuclear Weapons Council to achieve a more responsive infrastructure. This strategy is articulated in NNSA's *Complex 2030: An Infrastructure Planning Scenario for a Nuclear Weapons Complex Able to Meet the Threats of the 21st Century*, released on October 23, 2006. Beginning with the Stockpile Stewardship Conference in 2003, NNSA and DoD have worked together to plan transformation actions. This consultation included DoD participation in NNSA transformation planning sessions, Nuclear Weapons Council reviews of transformation plans at scheduled meetings (January 2005, March 2006, and November 2006), and joint testimony to Congress on infrastructure transformation by DOE/NNSA and Office of the Secretary of Defense personnel (April 2006). In July 2006, a Transformation Coordinating Committee (jointly chaired by NNSA and DoD/ Office of the Secretary of Defense personnel) was established to plan and implement

stockpile and infrastructure transformation actions. Since its inception, the Transformation Coordinating Committee has met at least monthly on RRW and Complex 2030 topics. This report to Congress was a specific agenda item for the Nuclear Weapons Council/Standing and Safety Committee meeting in December 2006.

The Complex 2030 strategy would maintain the safety, security, and reliability of the stockpile during transformation. The strategy provides that Nuclear Weapons Council-approved Life Extension Programs would continue as directed, but RRW programs would be developed to replace legacy Life Extension Programs efforts. The strategy also provides for production, subject to congressional approval through the budget process, of a RRW. Capabilities would be consolidated and unnecessary duplication eliminated. The leading edge science and technology base and associated peer review needed to support nuclear weapon design and production and respond to technological surprise would be provided via enhanced integration with other agencies, increased specialization and distributed technical excellence across the national laboratories, and broader interaction with the general scientific community. The NNSA national laboratories would become part of a broader set of scientific and engineering capabilities that supports the nation's national security and economic competitiveness. The Stockpile Stewardship Program would remain the primary mission of the NNSA national laboratories, but Work for Others would be optimized to maintain a responsive infrastructure. The number of sites with large quantities of special nuclear materials (e.g. plutonium and uranium) would be minimized as soon as possible. A risk-based approach to assure compliance with safety and security requirements would be used. Dismantlement of retired weapons would be accelerated. The Complex would be operated in a more cost effective manner.

A comparison of the transformation objectives in Section 3111 with the objective of Complex 2030 shows consistent alignment with Complex 2030, with one exception. The Complex 2030 plan for removing Category I/II quantities of special nuclear materials from NNSA national laboratories not engaged in pit manufacturing has a milestone of 2014, two years after the schedule in the legislation. Lawrence Livermore National Laboratory is developing pit manufacturing technology for NNSA. Transfer of this manufacturing technology to an interim pit manufacturing facility at Los Alamos, New Mexico, cannot be completed before 2014.

As long as the United States relies on a nuclear deterrent to ensure the security of itself and its allies, there are certain capabilities that must be maintained to ensure that nuclear weapons are safe, secure, and reliable. In addition, the NNSA must maintain a range of capabilities to have an agile and responsive infrastructure. Most capabilities required to support the nuclear weapons stockpile would not change between now and 2030. However, some specific capabilities that are required would change if the stockpile transforms as planned. Specifically, elimination of conventional high explosive operations, beryllium processing, wrought processing of special nuclear materials, certain specialty material recycling and processing, and elimination of special nuclear materials in flight tests would simplify and reduce capabilities that must currently be maintained. Some of these changes would also reduce long-term safety issues, such as electrostatic discharge, that affect weapon operations within the Complex. Fewer types and smaller quantities of weapons would reduce the capacity of some capabilities that are retained.

The Complex has existed since the Manhattan Project in the 1940s. Some NNSA production facilities date from that time. Many of these facilities, notably at the Y-12 site and the Kansas City Plant, would be the first to be consolidated and modernized in Complex 2030 planning. There are several thousand buildings in the Complex today, representing over 35 million square feet of floor space at eight sites. While the functions required to sustain the U. S. nuclear deterrent in 2030 are understood, the actual facilities that would be in use in 2030 will depend on a number of factors, including decisions made after completion of the ongoing National Environmental Policy Act (NEPA) process, future consolidation of capabilities, and lifetimes of current facilities. NNSA estimates the footprint of the current Complex

funded by the Weapons Activities Account could be reduced by one-quarter to as much as one-third, if all of the Complex 2030 actions are implemented.

In 2005, the Secretary of Energy Advisory Board Task Force on Nuclear Weapons Complex Infrastructure recommended that NNSA pursue a single facility for all research, development, and production activities relating to nuclear weapons that involve significant quantities (i.e. Category I/II) of special nuclear material. The Consolidated Nuclear Production Center (CNPC), as envisioned by the Task Force, would contain all the nuclear manufacturing, production, assembly, and disassembly facilities and associated weapon surveillance and maintenance activities for the stockpile weapons currently being performed at Y-12 and Pantex, as well as the plutonium activities of the proposed consolidated plutonium center. NNSA is evaluating all comments received on the proposed action during the scoping period. Alternatives to be evaluated in the draft Supplemental Environmental Impact Statement (SEIS) are being determined after the close of the scoping period on January 17, 2007. As of the date of this document, NNSA is proposing inclusion of the CNPC concept as an alternative to be evaluated in the draft SEIS.

In terms of staffing requirements for Complex 2030, NNSA anticipates that increases in efficiency, consolidation of facilities (especially those with high security requirements), and leveraging other DOE missions and Work for Others would allow re-alignment of Complex staff funded by the Weapons Activities Account. NNSA estimates that the number of staff funded by the Weapons Activities Account could be reduced by one-quarter to as much as one-third in projections for 2030.

NNSA is determined to transform the Complex consistent with Complex 2030 through the existing program and line management structure. This eliminates counterproductive, near-term disruptions from either a major re-structuring of the NNSA weapons program or creation of a separate, competing transformation program. Complex 2030 is planned and implemented through the existing NNSA Program Planning Budget and Execution process. This process takes Presidential direction on the nuclear weapons stockpile and guidance on transformation of the Complex and creates an executable program. The President's fiscal year 2008 Budget contains some of the resources required for transformation of the Complex in ongoing base program activities, and the relevant agencies are currently developing plans and funding projections for other activities that will be required for the transformation effort. To ensure that overall transformation goals are met, NNSA established an Office of Transformation in June 2006 that reports directly to the NNSA Deputy Administrator for Defense Programs and tracks progress of Complex transformation. NNSA considers the Complex 2030 planning scenario as the best approach to balance near- and long-term commitments to the stockpile, transform the Complex, and achieve long-term cost savings.

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1.0 REQUEST FOR REPORT

The John Warner National Defense Authorization Act for Fiscal Year 2007 (Public Law 109-364) directs the Secretary of Energy to develop a plan, in consultation with the Secretary of Defense and the Nuclear Weapons Council (NWC), for transformation of the nuclear weapons complex to achieve a responsive infrastructure by 2030. The language in the Act states:

> ***SEC. 3111. PLAN FOR TRANSFORMATION OF NATIONAL NUCLEAR SECURITY ADMINISTRATION NUCLEAR WEAPONS COMPLEX.***
>
> *(a) PLAN REQUIRED.—Subtitle A of title XLII of the Atomic Energy Defense Act (division D of Public Law 107–314) is amended by inserting after section 4213 (50 U.S.C. 2533) the following new section:*
>
> ***SEC. 4214. PLAN FOR TRANSFORMATION OF NATIONAL NUCLEAR SECURITY ADMINISTRATION NUCLEAR WEAPONS COMPLEX.***
>
> *''(a) PLAN REQUIRED.—The Secretary of Energy shall develop a plan to transform the nuclear weapons complex so as to achieve a responsive infrastructure by 2030. The plan shall be designed to accomplish the following objectives:*
>
> *''(1) To maintain the safety, reliability, and security of the United States nuclear weapons stockpile.*
>
> *''(2) To continue Stockpile Life Extension Programs that the Nuclear Weapons Council considers necessary.*
>
> *''(3) To prepare to produce replacement warheads under the Reliable Replacement Warhead program at a rate necessary to meet future stockpile requirements, commencing with a first production unit in 2012 and achieving steady-state production using modern manufacturing processes by 2025.*
>
> *''(4) To eliminate, within the nuclear weapons complex, duplication of production capability except to the extent required to ensure the safety, reliability, and security of the stockpile.*
>
> *''(5) To maintain the current philosophy within the national security laboratories of peer review of nuclear weapons designs while eliminating duplication of laboratory capabilities except to the extent required to ensure the safety, reliability, and security of the stockpile.*
>
> *''(6) To maintain the national security mission, and in particular the science-based Stockpile Stewardship Program, as the primary mission of the national security laboratories while optimizing the work-for-others activities of those laboratories to support other national security objectives in fields such as intelligence and homeland security.*
>
> *''(7) To consolidate to the maximum extent practicable, and to provide for the ultimate disposition of, special nuclear material throughout the nuclear weapons complex, with the ultimate goal of eliminating Category I and II special nuclear material from the national security laboratories no later than March 1, 2012, so as to further reduce the footprint of the nuclear weapons complex, reduce security costs, and reduce transportation costs for special nuclear material. This objective does not preclude the retention of Category I and II special nuclear materials at a national security laboratory if the transformation plan required by this subsection envisions a pit production capability (including interim pit production) at a national laboratory.*

''(8) To employ a risk-based approach to ensure compliance with Design Basis Threat security requirements.

''(9) To expeditiously dismantle inactive nuclear weapons to reduce the size of the stockpile to the lowest level required by the Nuclear Weapons Council.

''(10) To operate the nuclear weapons complex in a more cost-effective manner.

''(b) REPORT.—Not later than February 1, 2007, the Secretary of Energy shall submit to the congressional defense committees a report on the transformation plan required by subsection (a). The report shall address each of the objectives required by subsection (c) and also include each of the following:

''(1) A comprehensive list of the capabilities, facilities, and project staffing that the National Nuclear Security Administration will need to have in place at the nuclear weapons complex as of 2030 to meet the requirements of the transformation plan.

''(2) A comprehensive list of the capabilities and facilities that the National Nuclear Security Administration currently has in place at the nuclear weapons complex that will not be needed as of 2030 to meet the requirements of the transformation plan.

''(3) A plan for implementing the transformation plan, including a schedule with incremental milestones.

''(c) CONSULTATION.—The Secretary of Energy shall develop the transformation plan required by subsection (a) in consultation with the Secretary of Defense and the Nuclear Weapons Council.

''(d) DEFINITION.—In this section, the term 'national security laboratory' has the meaning given such term in section 3281 of the National Nuclear Security Administration Act (50 U.S.C. 2471).''.

(b) INCLUSION IN FUTURE-YEARS NUCLEAR SECURITY PROGRAM. - Section 3253 of the National Nuclear Security Administration Act (50 U.S.C. 2453) is amended in subsection (b) by adding at the end the following new paragraph:

"(5) A statement of proposed budget authority, estimated expenditures, and proposed appropriations necessary to support the programs required to implement the plan to transform the nuclear weapons complex under section 4214 of the Atomic Energy Defense Act, together with a detailed description of how the funds identified for each program element specified pursuant to paragraph (1) in the budget for the Administration for each fiscal year during that five-fiscal year period will help ensure that those programs are implemented. The statement shall assume year-to-year funding profiles that account for increases only for projected inflation."

This report is submitted by the Secretary of Energy in response to that statutory provision. The plan referenced in the report was developed in consultation with the Office of the Secretary of Defense and the Nuclear Weapons Council.

2.0 COMPLEX 2030 VISION

The Department of Energy (DOE), through NNSA and in partnership with the Department of Defense (DoD), ensures the United States has a safe, secure, and reliable nuclear deterrent. The characteristics of this deterrent must evolve as the world changes. In 2001, the U.S. nuclear policy was updated to recognize that the premise for our strategy had changed from one of deterring only 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 this change in the threat. Specifically, the NPR called for the following: changing the size, composition, and character of the 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 national security needs, including obligations to our allies; and transforming the NNSA nuclear weapons 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.

The nuclear weapons complex of the future must be agile and responsive to potential changes in the national security environment. A historical perspective of the NNSA nuclear weapons complex is provided in Appendix A as background. The future Complex would support a deployed stockpile that is smaller than today. The proposed future stockpile would consist of replacement warheads that provide the same military capabilities as the warheads they replace. These warheads would be designed for long-term confidence in reliability, greater security, and ease of production and maintenance. Reliable Replacement Warhead (RRW) concepts with less stringent warhead design constraints than those imposed on Cold War systems would be more easily and efficiently manufactured at fewer, more modernized facilities within the Complex, with safer and more environmentally benign materials. Confidence in the stockpile would remain high—without resumption of nuclear testing—because the replacement warhead concepts offer substantially increased performance margins and exercise the unique design and production skills needed to maintain a credible nuclear deterrent. Confidence would also be based on the Stockpile Stewardship Program and the research and development tools that come with it, which continue to provide a fuller understanding of nuclear weapons phenomena.

Although the stockpile would be smaller in 2030, deterrence would be enhanced because the transformed complex would be fully capable, sufficiently flexible to fix technical problems in the stockpile, and respond to adverse geopolitical change. This would reduce the requirement to maintain a large number of non-deployed, backup weapons. NNSA would have met quantitative responsive infrastructure objectives to provide confidence in the capabilities of the Complex. This transformed infrastructure would be smaller, more efficient, and designed with safety and security in mind. Finally, the Complex of the future would be fully integrated with uniform, efficient business practices, and a culture that manages risks effectively.

The nuclear weapons complex of the future would include an integrated set of laboratories and plants that apply leading edge science and technology to nuclear weapon design and production and provide the capability to respond to technological surprise. Reducing uncertainties to the level required to maintain the stockpile in the longer term without underground testing would require increasingly focused, resource, intensive efforts in specific areas of science, technology, and engineering. This would lead to a scientific program at the national laboratories characterized by increased specialization, distributed technical excellence, and joint programs executed in collaboration with other offices and agencies. Nuclear design and weapon engineering integrated product teams, supported by advanced predictive computational tools, would couple leading edge science and technology to the stockpile and thus serve essential integration and weapon-specific peer review functions.

As this transition progresses, the NNSA national laboratories would become part of a broader fabric of scientific and engineering capabilities that support the nation's national security and economic competitiveness. The national laboratories would serve as the gateway for the nation's best scientists to apply their talents to leading edge national security science and technology problems. While the workforce that is funded by the Weapons Activities Account at the laboratories is expected to decrease, the size of a given laboratory will depend significantly on the degree to which that institution applies its specialized defense programs capabilities to the nation's broader scientific needs.

Ensuring a responsive production capability is a primary focus of planned actions to transform the Complex. The production plants would be consolidated and modernized, allowing the introduction of improved processes and more cost-effective security and operations. The plant footprints would be reduced as required capacities are reduced and the modernization allows for more efficient use of space. Better integration between the design laboratories and the production plants would lead to improvements in production rates and reduced costs.

This report addresses elements of a transformation plan which would seek to transition to an all-RRW stockpile, subject to necessary appropriations, appropriate NEPA review, the development of successful technologies, and other contingencies. There are at least three contingencies that we must consider: (1) RRW is successfully fielded in the 2012-2014 timeframe and the stockpile begins a transition over the coming decades to an all-RRW stockpile; (2) RRW is successfully fielded but a determination is made that it would be better to maintain diversity in the stockpile by fielding a mixed stockpile consisting of both Cold War legacy warheads and RRW warheads; or, (3) NNSA/DOD are not successful in fielding RRW and therefore must sustain a Cold War legacy stockpile for the foreseeable future. While moving to an all-RRW stockpile would, NNSA believe, best facilitate the transition to Complex 2030, the other two contingencies are still plausible. NNSA's plan, therefore, must be flexible in providing appropriate "off-ramps," as experience is gained with RRW.

3.0 TRANSFORMATION PLAN TO ACHIEVE COMPLEX 2030

NNSA leadership, in consultation with the DoD, developed a strategy to achieve a responsive infrastructure for the Complex of the future. This strategy is articulated in *Complex 2030: An Infrastructure Planning Scenario for a Nuclear Weapons Complex Able to Meet the Threats of the 21st Century*. This planning scenario describes elements of the plan to transform the Complex to achieve a responsive infrastructure while satisfying the continuing requirements of the nuclear deterrent. The plan is cost-effective and addresses the objectives outlined in Section 3111 of the National Defense Authorization Act for FY 2007.

Transformation to Complex 2030 relies on implementation of four strategies:

(1) **Transform the Stockpile:** In partnership with the DoD, transform the nuclear stockpile through development of RRWs, refurbishment of limited numbers of legacy designs, and accelerated dismantlement of the Cold War stockpile;

(2) **Transform the Complex:** Transform to a modernized, cost-effective nuclear weapons complex;

(3) **Transform the Operation of the Complex:** Create a fully integrated and interdependent nuclear weapons complex; and,

(4) **Drive the Science and Technology Base:** Drive the science and technology base essential for long-term national security.

These strategies are complemented by near-term commitments that focus the Complex on essential weapons program deliverables and build confidence in the transformation process by "Getting the Job Done." The Deputy Administrator for Defense Programs established a "Getting the Job Done" list for the nuclear weapons complex in April 2006. By January 2007, the following commitments were complete: (1) delivering B61-7 and B61-11 Alt 357 first production units, (2) delivering the full capability of the Advanced Simulation and Computing Purple Machine, (3) updating pit lifetime estimates, and (4) supporting the Nuclear Weapons Council decision in November 2006 to proceed with the Reliable Replacement Warhead. By FY 2008, the following commitments will be met: (1) continuing to deliver NNSA's products (e.g., limited life components) to DoD, (2) eliminating the backlog of surveillance units consistent with an enhanced evaluation strategy (except the W84 and W88), (3) accelerating (49% increase from FY 2006 to FY 2007) the dismantlement of retired weapons, (4) delivering the W76-1 first production unit, (5) certifying the W88 with a new pit and manufacturing 10 W88 pits in 2007, and (6) extracting tritium for use in the stockpile at the new Tritium Extraction Facility. Delivery on these and future near-term commitments is essential during transformation of the Complex.

Complex 2030 is neither the Cold War Complex, nor today's Complex. In the 1980s, the Complex contained fourteen sites; it contains eight today. By 2030, these sites would be integrated and interdependent, and the portion of the Complex required to perform the nuclear deterrence mission would be smaller. While eight sites are still proposed for 2030, the Complex as a whole, and each site individually, would look much different than today. Modern research, development, engineering and production facilities would be working together to support the Complex as a whole in a smaller footprint. Table 3.1 summarizes notable differences between the Complex today and Complex 2030.

Table 3.1: Comparison of the Complex Today and the Proposed Complex in 2030

Complex Today	Proposed Complex in 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 that require Category I/II SNM levels of security. Laboratory facilities are not used for SNM production missions.
Nuclear production in aging, cold-war-era Complex including a plutonium production facility operated by a national laboratory.	Modernized centers of production excellence: Plutonium – At existing Category I/II site to be determined. Uranium – Y-12. Assembly/Disassembly – Pantex. Tritium – Savannah River.
Non-nuclear production at the Kansas City Plant (KCP) performed in facilities from the World War II era.	Maximum use of commercial out-sourcing with a small facility for components that cannot be out-sourced. This new facility is designed for lean, modern manufacturing.
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 one site. 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 more than 35 million square feet in 2006.	Significantly smaller nuclear weapons complex footprint. 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 KCP operations reduced up to 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 (LANL) reduced up to or exceeding 40%.
Approximately 27,000 contract personnel in 2006 solely supported by Weapons Activities Account funding.	Fewer employees supported solely by Weapons Activities Account funding consistent with a smaller, 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. Characteristics 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 centralized supply chain management.
National laboratories with independent abilities to address scientific and engineering issues pertaining to weapon design, performance, and production. Peer review in all areas executed largely within Defense Programs.	Strong peer review by independent centers of nuclear weapons excellence is retained. Scientific program at national laboratories characterized by increased technical specialization and distributed centers of technical excellence. Integrated weapon design, engineering, and production product teams to provide integration.

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

The transformation to Complex 2030 is necessary to maintaining the U.S. strategic nuclear deterrent, as defined in the 2001 NPR. The President is committed to achieving a credible deterrent with the lowest possible number of nuclear weapons consistent with our national security needs. The transformation to Complex 2030 accomplishes this objective in two of the ways defined in the NPR. First, Complex 2030 would be fully capable of ensuring support of the nuclear arsenal. Second, Complex 2030 would be responsive to future needs, which would enable reductions in the size of the augmentation stockpile as well as allow for accelerated dismantlement of retired weapons.

Many actions to transform the stockpile, transform the operation of the Complex, and drive the science and technology base have already begun. Some decisions on transitioning the physical infrastructure of the Complex are underway while other proposed actions must await completion of the Complex 2030 NEPA process. The NEPA process has already started and as of January 17, 2007, the public scoping is completed.

DOE completed the original Stockpile Stewardship and Management Programmatic Environmental Impact Statement (SSM-PEIS) in 1996. DOE and NNSA have implemented a number of major programmatic decisions regarding the Complex over the past 10 years that were based on the SSM-PEIS, the Non-Nuclear Consolidation Environmental Assessment, the Tritium Supply and Recycling Programmatic Environmental Impact Statement, and site-wide and project-specific environmental impact statements. These have decisions to pursue the following activities:

- Constructing the National Ignition Facility (NIF),
- Constructing the Dual-Axis Radiographic Hydrodynamic Testing (DARHT) facility,
- Consolidating uranium production (secondary and case fabrication) at Y-12,
- Establishing a small interim plutonium pit fabrication capability at Los Alamos, while continuing to evaluate the need in the future for a larger production capacity,
- Down-sizing assembly and disassembly capacity at Pantex,
- Down-sizing non-nuclear component fabrication capacity at KCP,
- Ending non-nuclear component production at the Pinellas and Mound Plants,
- Transferring neutron generator production to Sandia National Laboratories (SNL),
- Storing strategic reserves of highly enriched uranium at the Y-12 Plant, and
- Storing strategic reserves of plutonium (in the form of plutonium pits) at Pantex.

On October 19, 2006, NNSA issued a Notice of Intent (NOI) stating that it would prepare a Supplement to the SSM-PEIS for Complex 2030 (Complex 2030 SEIS) in order to analyze the environmental impacts of the continued transformation of the Complex. The Complex 2030 SEIS will build upon the earlier SSM-PEIS and other relevant NEPA reviews. NNSA proposes to continue modernization of the Complex; select a site for a consolidated plutonium center for long-term R&D, surveillance (including pit disassembly and inspection), and pit manufacturing; consolidate SNM throughout the Complex; consolidate, relocate or eliminate duplicative facilities and improve operating efficiencies. The need for a larger plutonium manufacturing facility to perform pit production and other plutonium work was identified in 1996 as a program need, but a large capacity was not required at that time. The Complex

2030 SEIS addresses that need and other initiatives to improve overall infrastructure responsiveness. In the NOI, NNSA proposed to evaluate impacts of the following actions at nuclear weapons complex sites:

Los Alamos National Laboratory (LANL)/Los Alamos Site:

LANL/Los Alamos Site would be evaluated as a potential location for the consolidated plutonium center, consolidated weapons program Category I/II SNM storage, consolidated high explosive R&D, consolidated environmental testing, and consolidated tritium R&D. NNSA will analyze adding a new consolidated plutonium center to the existing and planned LANL facilities. The consolidated plutonium capability will be analyzed at the Los Alamos Site, but any proposed facility could be contractually and administratively separate from LANL. Conversely, should another site be selected for the consolidated plutonium center, LANL facilities capable of handling Category I/II quantities of plutonium would be transitioned to other uses requiring less costly security, and their functions requiring larger quantities of plutonium transferred to the new consolidated center.

In addition, NNSA will consider the consolidation, relocation or elimination of duplicative facilities to improve operating efficiencies. LANL infrastructure that could be affected include facilities for hydrotesting, nuclear materials storage, tritium R&D, high explosives R&D, and environmental testing. LANL will be considered as a potential consolidated site for these activities.

Lawrence Livermore National Laboratory (LLNL):

LLNL would be evaluated as a potential site for consolidated high explosive R&D, tritium R&D, and environmental testing. NNSA will evaluate relocating Category I/II inventories from LLNL by 2014. NNSA will also analyze the continuing need for hydrotesting operations at Site 300 (Contained Firing Facility) and operations at the plutonium facility with Category I/II quantities of SNM after 2014. If operations at this site cease, current activities at these facilities would be relocated to the other selected NNSA sites.

Sandia National Laboratories (SNL):

SNL would be evaluated as a potential site for consolidated high explosive R&D and environmental testing, as well as potential relocation of these activities to other sites. The current Category I/II inventories of SNM at SNL are being relocated so that SNL will not require security for these materials by the end of 2008.

Pantex Plant:

Pantex missions of weapons assembly and disassembly and high explosives production are not proposed for change under Complex 2030. Although weapon dismantlement activities would be accelerated under the NNSA proposed action, the earlier SSM-PEIS adequately addressed the level of proposed dismantlement for Pantex, and no further analysis is planned for the Complex 2030 SEIS. Pantex would be considered as a potential site for the consolidated plutonium center and the consolidation of weapons program Category I/II nuclear materials. In addition, Pantex will be considered as the site for consolidating all NNSA high explosives R&D.

Y-12 Plant:

Y-12 existing missions for uranium, secondary, and case fabrication are not proposed to change under Complex 2030. These operations are performed in a suite of processing facilities whose origins date back to the earliest days of the Cold War. The facilities are widely scattered and technically obsolete, past their design lifetimes, oversized for the current mission, and uneconomical to operate.

Construction of the Highly Enriched Uranium Materials Facility (HEUMF) at the Y-12 Plant in Tennessee is in progress. This facility will allow consolidation of SNM storage into a more secure facility with reduced security costs. The HEUMF, in concert with the proposed Uranium Processing Facility (UPF), would allow the following:

- Consolidation of all high-security operations into an area that is one-tenth the current size.
- Retirement of obsolete facilities.
- Reduction of risk to mission.
- Reduction of costs for maintenance and operations.

The Y-12 Plant would also be considered as a potential site for the consolidated plutonium center and the storage of weapons program Category I/II nuclear materials.

Savannah River Site (SRS):

SRS existing missions for tritium supply and recycle are not proposed to change under Complex 2030. Decisions on these activities made in the Tritium Supply and Recycle Record of Decision would not be reconsidered. SRS will be considered as a potential site for the consolidated plutonium center and the storage of weapons program Category I/II SNM. In addition, SRS will be considered as a consolidated site for NNSA tritium R&D.

Nevada Test Site (NTS):

NTS missions for nuclear testing readiness and high hazard experiments are not proposed to change under Complex 2030. NTS is being evaluated as a potential site for consolidated hydrotesting, high explosive R&D, and environmental testing. In addition, NTS will be considered as a potential site for the consolidated plutonium center, the storage of weapons program Category I/II nuclear materials, and the conduct of flight testing currently performed at the Tonopah Test Range.

Kansas City Plant (KCP):

NNSA does not plan to address KCP in the Complex 2030 SEIS. While the Complex 2030 planning scenario proposes to further consolidate non-nuclear production activities performed at KCP, this proposal will be evaluated in a separate environmental assessment as was done in the 1990s. NNSA believes that it is appropriate to separate the analyses of the transformation of non-nuclear production from the Complex 2030 SEIS because decisions regarding transformation of non-nuclear production activities neither significantly affect nor are affected by decisions regarding the transformation of nuclear production activities.

Non-nuclear components range from integrated circuits to major subsystems such as arming, fuzing, and firing systems. KCP has performed the bulk of the non-nuclear production and procurement for the nuclear weapons complex since 1949. Delivery and quality performance is outstanding, historically at levels of 99.5% or greater.

KCP has developed a plan for transformation of the non-nuclear production mission at KCP by 2012. The salient features of the plan include:

- Reducing the footprint of the plant from approximately 3 million square feet to approximately 1 million square feet, through construction of a new facility.

- Outsourcing over 65% of the components and materials.
- Reducing staff by as much as 25%, consistent with programmatic requirements.
- Enhancing cost savings through a commercial management and oversight approach.
- Producing cost savings of as much as $100 million per year after the transformation is complete.

In the NOI, NNSA proposed to evaluate the Complex 2030 proposal in addition to two other alternatives: (1) no action and (2) a reduced capability alternative. The no action alternative would evaluate no change from the status quo, i.e., no infrastructure transformation different from prior plans. Under the reduced capability alternative, NNSA would maintain the basic capability for manufacturing technologies for all stockpile weapons, and laboratory capabilities to support stockpile decisions. NNSA would take actions to reduce the production facilities to a capability-based capacity, which would give NNSA the capability to manufacture and assemble nuclear weapons at a nominal level. This production capacity would not be sufficient to meet current or predicted national security objectives. The reduced capability alternative would evaluate a scenario whereby the Complex would have the capability to perform all required functions, albeit at a very low capacity. This capacity would not be sufficient to meet predicted national security requirements.

During the 90-day scoping period from October 19, 2006, until January 17, 2007, NNSA received numerous comments on its proposed action. The NNSA NOI indicated that NNSA did not plan to evaluate a Consolidated Nuclear Production Center (CNPC) in the Complex 2030 SEIS, as recommended in 2005 by the Secretary of Energy Advisory Board (SEAB) Task Force on the Nuclear Weapons Complex Infrastructure. (See Appendix B for a summary of the SEAB Task Force recommendations.) The CNPC, as envisioned by the Task Force, would contain all the nuclear manufacturing, production, assembly, and disassembly facilities and associated weapon surveillance and maintenance activities for the stockpile weapons currently being performed at Y-12 and Pantex, as well as the plutonium activities of the proposed consolidated plutonium center. NNSA is evaluating all comments received on the proposed action during the scoping period. The public comment period closed on January 17, 2007. As of the date of this document, NNSA is proposing inclusion of the CNPC concept as an alternative to be evaluated in the draft SEIS.

4.0 COMPARISON OF COMPLEX 2030 PLAN WITH SECTION 3111 OF PUBLIC LAW 109-364

Table 4.1 summarizes the alignment of Complex 2030 with the objectives of Section 3111 of Public Law 109-364. In general, the Complex 2030 proposal would achieve the statute's objectives. For one objective (removal of Category I/II quantities of SNM from the national laboratories), the Complex 2030 proposal would accomplish the objective later than the statute requires.

1. *To maintain the safety, reliability, and security of the United States nuclear weapons stockpile.*

   The NNSA will continue to accomplish this core mission as it transforms to Complex 2030. All actions required to support the existing and transitional stockpiles, including maintenance, surveillance, and assessments, will continue during the transformation. NNSA, through the current SSP, has established a strong science and technology base that has successfully maintained the nuclear weapons stockpile and responded to numerous unanticipated stockpile issues.

2. *To continue Stockpile Life Extension Programs that the Nuclear Weapons Council considers necessary.*

   The timing and magnitude of ongoing or currently planned Life Extension Programs (LEPs) for legacy weapons are factored into the transformation strategy. NNSA will complete the required quantities of refurbishments for the W76-1, the B61, and the W88, including the production of replacement pits. Planning for any future LEPs would depend on requirements defined by strategic deterrence needs and decisions that may be taken on RRW options. NNSA and DoD will work jointly to identify reductions in number and scope of future LEPs, to release resources for steady progress in transformation of the Complex and introduction of RRW designs. These changes should be reflected in future Nuclear Weapon Stockpile Plans.

3. *To prepare to produce replacement warheads under the Reliable Replacement Warhead program at a rate necessary to meet future stockpile requirements, commencing with a first production unit in 2012 and achieving steady-state production using modern manufacturing processes by 2025.*

   The Complex 2030 planning scenario is based on the RRW feasibility study assumptions for FPU in the 2012-2014 timeframe and full steady-state production using modern manufacturing processes by 2022 when a consolidated plutonium center would be fully operational. The RRW feasibility study was completed in November 2006. At the direction of the NWC, NNSA, in cooperation with DoD, has initiated a design and cost definition phase to refine the details and schedules for RRW before proceeding with full-scale engineering development to support an FPU. This phase should be complete by the end of 2007. Interim pit production could begin at LANL by 2012. Full production would move to a consolidated plutonium center as it comes online. Production of RRW components at Y-12 would begin using existing facilities. By approximately 2016, a transition to the proposed UPF should occur. The remainder of the Complex would begin production of RRW components to support the delivery schedule that is negotiated with the DoD. Further RRW design feasibility studies would be considered, as directed by the NWC, and additional RRW development programs would follow if approved by the NWC and authorized by Congress.

4. *To eliminate, within the nuclear weapons complex, duplication of production capability except to the extent required to ensure the safety, reliability, and security of the stockpile.*

   Consolidation of plutonium, uranium, high-explosive, and tritium production, and other specialized nuclear weapon components are planned at centers within the Complex. Surplus capabilities would be eliminated. In addition, increased outsourcing for non-nuclear production would reduce the required size for non-nuclear production facilities within the Complex to a minimum.

5. *To maintain the current philosophy within the national security laboratories of peer review of nuclear weapons designs while eliminating duplication of laboratory capabilities except to the extent required to ensure the safety, reliability, and security of the stockpile.*

   Maintaining two independent centers of excellence for nuclear weapons design in order to provide a diversity of ideas, intellectual competition, and robust peer review, as well as an infrastructure that supports our science and technology base were key elements of the Complex 2030 planning scenario. This is particularly important as the United States continues to adhere to the moratorium on nuclear testing. A set of experimental and computational facilities that meets program needs without duplication of capabilities would be implemented. Major capabilities would be operated as shared user facilities. Scientific capabilities unique to Defense Programs in areas such as hydrodynamic testing would be consolidated. Collaborations with other offices and agencies in areas of broader scientific interest such as computing, high energy density physics, and materials science would be pursued. Joint programs with other offices/agencies would be established.

6. *To maintain the national security mission, and in particular the science-based Stockpile Stewardship Program, as the primary mission of the national security laboratories while optimizing the work-for-others activities of those laboratories to support other national security objectives in fields such as intelligence and homeland security.*

   Complex 2030 focuses on maintaining a laboratory system that provides the design, development, and assessment capabilities essential for our long-term nuclear security, and partnering with others when there are clear benefits to all parties. The challenge for today's designers is to replace the information previously determined by underground testing with scientific understanding so that replacement warheads can be designed and certified with confidence. Sufficient understanding of nuclear phenomena including radiation effects and surety in abnormal environments must be achieved to allow additional warhead safety and relaxed manufacturing constraints. Science and technology roadmaps are key elements of planning for this work. These tools would also be available to assess the legacy stockpile if design repairs are needed. The Complex 2030 plan supports the Defense Nuclear Nonproliferation mission and strategic use of Work for Others (WFO) programs. Many unique facilities would be managed as national user facilities, to provide access by others outside of the Complex. Opportunities for partnering with the DOE Office of Science and other leading national R&D sponsors would also be pursued in order to leverage the investment in science and technology that supports the NNSA nuclear deterrence mission.

7. *To consolidate to the maximum extent practicable, and to provide for the ultimate disposition of, special nuclear material throughout the nuclear weapons complex, with the ultimate goal of eliminating Category I and II special nuclear material from the national security laboratories no later than March 1, 2012, so as to further reduce the footprint of the nuclear weapons complex, reduce security costs, and reduce transportation costs for special nuclear material. This objective does not preclude the retention of Category I and II special nuclear material at a*

national security laboratory if the transformation plan required by this subsection envisions a pit production capability (including interim pit production) at a national security laboratory.

The NNSA plans to reduce the number of sites with Category I/II SNM and consolidate SNM to as few locations within a given site as soon as practical. The NNSA is committed to eliminating the need for Category I/II SNM security at facilities operated by national laboratories as soon as practical. This process has begun with the initial shipment in 2006 of plutonium from LLNL and the removal of Category I/II material from LANL Technical Area 18. Security for Category I/II quantities of SNM will not be required at SNL after 2008. The current target date to complete removal of SNM from LLNL by 2014 is tied to the availability of replacement plutonium-capable floor-space at LANL, or a new site. LLNL is currently developing pit manufacturing technology for NNSA. Transferring this manufacturing technology cannot be completed before 2014. The NNSA will remove SNM from LLNL as rapidly as practical. By 2022, it is anticipated that LANL would not operate facilities containing Category I/II quantities of SNM.

Current plans are for the consolidation of uranium processing and storage facilities at the Y-12 site to reduce the security footprint for operations involving Category I/II amounts of uranium by approximately 90%.

8. *To employ a risk-based approach to ensure compliance with Design Basis Threat security requirements.*

   More effective risk management is a key element of the Complex 2030 proposal. The NNSA would implement uniform, streamlined safety and security risk-management practices across the Complex. Integral to these plans is the integration of security technologies with Complex 2030 facilities that would reduce the impact of future changes in the Design Basis Threat. Proposed rules, regulations, and major recommendations would be subjected to a risk-informed decision, making process prior to their acceptance. The NNSA will strive to create a culture that manages risk rather than one that seeks to eliminate it.

9. *To expeditiously dismantle inactive nuclear weapons to reduce the size of the stockpile to the lowest level required by the Nuclear Weapons Council.*

   Under the Complex 2030 proposal, dismantlement of retired legacy weapons would be accomplished sooner than planned today. The Pantex Throughput Improvement Program is a major NNSA activity that involves NNSA, Pantex and the nuclear design laboratories. It has already resulted in a significant improvement in throughput and plans are in place to increase dismantlements by nearly 50% in FY 2007 over that achieved in FY 2006. Additional activities are also underway to increase the rate at which weapons can be dismantled and dispositioned at Y-12. As the President approves future retirements, these weapons would be dismantled in a timely manner.

10. *To operate the nuclear weapons complex in a more cost-effective manner.*

    More cost-effective operation of the Complex is a focus of the Complex 2030 proposal. The Complex would become more efficient and less costly by moving to more commonality in contracts, with improvements in governance models. System integration would improve efficiencies, reduce risk, and improve informed decision-making. Consistent safety authorization basis practices, with a reduced burden of orders, regulations, and policies, would be utilized in the future. Greater uniformity of business practices and communication systems would enhance efficiency.

Table 4.1: Complex 2030 Planning Scenario Comparison with Objectives

Objectives in FY 2007 National Defense Authorization Act (P.L. 109-364)	Consistency of Complex 2030 Planning Scenario with P.L. 109-364 Objectives
To maintain the safety, reliability, and security of the United States nuclear weapons stockpile.	Fully consistent with Complex 2030. We will continue to accomplish this core mission as we transform to Complex 2030.
To continue Stockpile LEPs that the NWC considers necessary.	Fully consistent with Complex 2030. The timing and magnitude of life-extension programs for legacy weapons are factored into the transformation strategy.
To prepare to produce replacement warheads under the RRW program at a rate necessary to meet future stockpile requirements, commencing with a FPU in 2012 and achieving steady-state production using modern manufacturing processes by 2025.	Fully consistent with Complex 2030. Planning scenario is based on an RRW FPU capability by 2012-2014 and consolidated plutonium center fully operational by 2022.
To eliminate, within the nuclear weapons complex, duplication of production capability except to the extent required to ensure the safety, reliability, and security of the stockpile.	Fully consistent with Complex 2030. Consolidation of production capabilities is a key element of Complex 2030.
To maintain the current philosophy within the national security laboratories of peer review of nuclear weapons designs while eliminating duplication of laboratory capabilities except to the extent required to ensure the safety, reliability, and security of the stockpile.	Fully consistent with Complex 2030. Maintaining a laboratory system that provides a diversity of ideas, intellectual competition, and robust peer review was a key factor in the development of Complex 2030. Consolidation and sharing of both R&D capabilities and facilities is a key element of Complex 2030.
To maintain the national security mission, and in particular the science-based SSP, as the primary mission of the national security laboratories while optimizing the work-for-others activities of those laboratories to support other national security objectives in fields such as intelligence and homeland security.	Fully consistent with Complex 2030. Building on the success of the SSP, Complex 2030 would focus on maintaining a laboratory system that provides the science and technology base essential for our long-term nuclear security while partnering with others. The Complex 2030 plan supports strategic use of WFO programs.
To consolidate to the maximum extent practicable, and to provide for the ultimate disposition of, SNM throughout the nuclear weapons complex, with the ultimate goal of eliminating Category I and II SNM from the national security laboratories no later than March 1, 2012, so as to further reduce the footprint of the nuclear weapons complex, reduce security costs, and reduce transportation costs for SNM. This objective does not preclude the retention of Category I and II SNM at a national security laboratory if the transformation plan required by this subsection envisions a pit production capability (including interim pit production) at a national laboratory.	Consistent with Complex 2030. Plans are to reduce the number of sites with Category I/II SNM and consolidate SNM to as few locations within a given site as soon as practical. NNSA is committed to eliminating the need for Category I/II SNM security at facilities operated by national laboratories as soon as practical. The current target date to complete removal of SNM from LLNL (2014) is tied to the availability of replacement plutonium-capable floor-space at Los Alamos. NNSA would remove SNM from Livermore as rapidly as practical.
To employ a risk-based approach to ensure compliance with Design Basis Threat security requirements.	Fully consistent with Complex 2030. More effective risk management is a key element of the plan.
To expeditiously dismantle inactive nuclear weapons to reduce the size of the stockpile to the lowest level required by the NWC.	Fully consistent with Complex 2030. Dismantlement of legacy weapons currently planned for retirement would be accomplished sooner under the Complex 2030 plan.
To operate the nuclear weapons complex in a more cost-effective manner.	Fully consistent with Complex 2030. More cost-effective operation of the Complex is a focus of the plan.

5.0 CAPABILITIES, FACILITIES, AND STAFFING FOR COMPLEX 2030

Capabilities

As long as the United States relies on a nuclear deterrent for the security of itself and its allies, certain capabilities must be maintained to ensure that nuclear weapons are safe, secure, and reliable. In addition, to be consistent with the 2001 NPR, NNSA must maintain a range of capabilities required to perform functions necessary to support the DoD and the stockpile in a changing and uncertain future. In general, these functions are as follows:

1. Design, develop, and certify nuclear weapons.
2. Manufacture, surveillance, and disposition of nuclear weapon-specific components:
    a. Plutonium components
    b. Uranium components
    c. Tritium production, processing, and recycling
    d. High explosives materials and components
    e. Non-nuclear components
3. Assemble and disassemble nuclear weapons.
4. Store and transport nuclear weapons, components, and materials.
5. Drive the science, engineering, and technology base essential to support the Nation's nuclear deterrent.
6. Direct and indirect support to the Complex (e.g., security, facility maintenance, human resources).

These functions would not change between now and 2030. However, some of the specific capabilities that are required within these functions will certainly change as the stockpile transitions to RRW designs and as technologies are further developed. A key aspect of a responsive infrastructure is the ability to respond with agility to a changing environment. Table 5.1 provides a further definition of the capabilities that are required to support the functions listed above. In addition, the table lists those specific capabilities that would no longer be required if all aspects of Complex 2030 proposal are implemented.

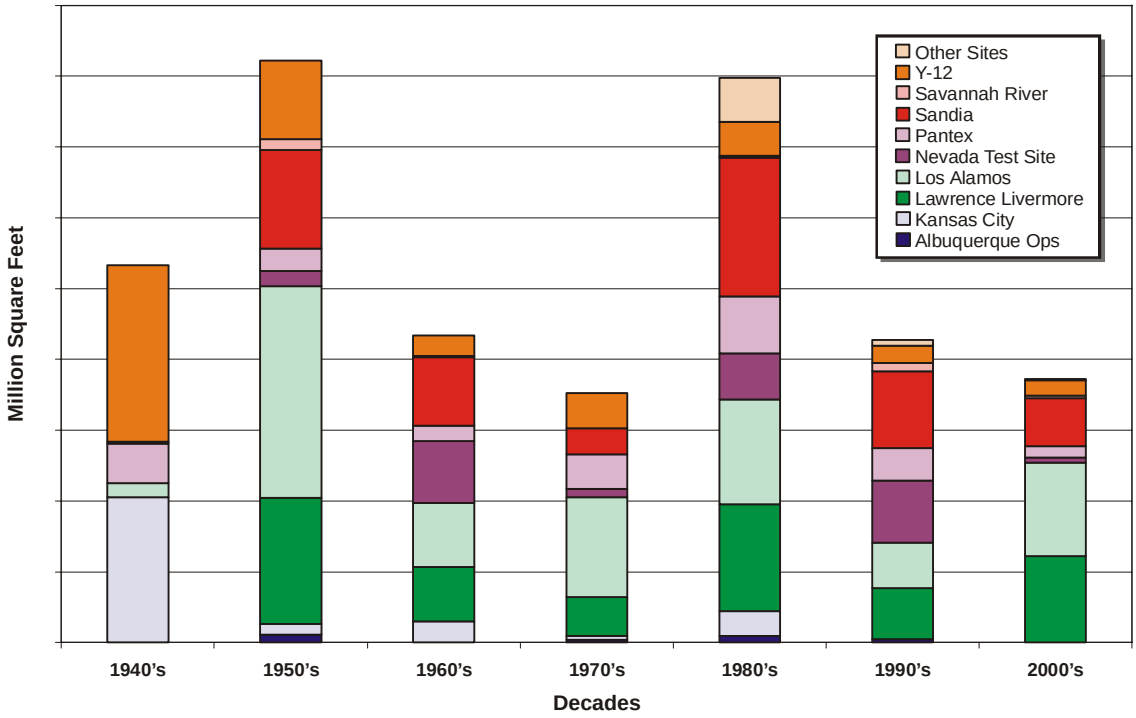
Facilities

The Complex has existed since the Manhattan Project in the 1940s and several production facilities still in use today date from that period. Many of these facilities would be the first to be consolidated and modernized in the Complex 2030 plan. Facility construction history within the Complex is shown in Figure 5.1. The chart graphically illustrates that there have been two periods of significant construction; in the 1940s and 1950s; and in the 1980s. Construction during the earlier period was primarily associated with expanding the production capacity of the Complex as the nuclear weapons stockpile grew rapidly during the Cold War.

Table 5.1: Functional Capabilities Required in 2030

Function	Capabilities	Reduced Need or Excess in 2030
Design, develop, and certify nuclear weapons	Physics (nuclear, shock/detonation, hydrodynamics, plasma, high energy-density, atomic and molecular) Materials science and engineering Computing, modeling, and simulation Experimental technologies (drivers, diagnostics, targets) Engineering (systems, component design, production) Testing (environmental, hydrodynamic, high explosive, dynamic materials, radiochemical, radiography, instrumentation) Surety (safety, security, reliability, quality, use control)	Flight test radar and optical tracking SNM in flight tests Certain types of SNM production and recycling for dynamic experimental tests
Plutonium component manufacturing, surveillance, and disposition	Advanced manufacturing Materials science and engineering (nuclear, non-nuclear) Environmental science and engineering Assembly/Disassembly Surveillance methods	Wrought processing of SNM
Uranium component manufacturing, surveillance, and disposition	Advanced manufacturing Materials science and engineering (nuclear, non-nuclear) Environmental science and engineering Assembly/Disassembly Surveillance methods	Wrought processing of SNM
Tritium production, processing, and recycling	Advanced manufacturing Materials science and engineering (nuclear, non-nuclear) Environmental science and engineering Assembly/Disassembly Surveillance methods	
High explosives materials and component manufacturing, surveillance, and disposition	Advanced manufacturing Materials science and engineering (nuclear, non-nuclear, environmental) Environmental science and engineering Assembly/Disassembly Surveillance methods	Conventional high explosive operations
Non-nuclear component manufacturing and surveillance	Advanced manufacturing Materials science and engineering Surveillance methods Quality acquisition of out-sourced components	Beryllium processing Certain specialty material processing
Assembly and disassembly of weapons and components	Surety (Safety and security) Surveillance (Inspection and evaluation)	Safety and security improvements can increase throughput
Storage and transport of weapons, components, and materials	Surety (Safety, security, and use control) Instrumentation Inspection Packaging and storage Surveillance (Inspection and evaluation) Secure transportation	Smaller storage footprint and improved surety features reduces security costs. Fewer transport convoys after consolidation.
Science and technology base required to support the Nation's nuclear deterrent	Physics (nuclear, shock/detonation, high energy-density, hydrodynamics, plasma, atomic and molecular) Engineering Sciences, materials science Computing, modeling, and simulation Experimental technologies (drivers, diagnostics, targets) Basic research	Reduced capacity computing footprint.
Direct (security and infrastructure) and indirect support	Data/knowledge management Systems engineering, including project/program management Standards and calibration Safety, safeguards and security management Physical infrastructure management and maintenance Emergency response	Smaller footprint and improved surety features reduce security support requirements. Reduced direct staff reduces indirect support requirements.

Figure 5.1: Construction History for Existing Facilities



There are several thousand buildings in the Complex today, representing over 35 million square feet of floor space at a total of eight sites. DOE maintains a database of these facilities, the Facilities Information Management System (FIMS). While the functions that are required to sustain the U.S. nuclear deterrent in 2030 are understood, the actual facilities that will be in use at that date will depend on a number of factors, including the results of the ongoing process to complete the Complex 2030 SEIS, the consolidation of capabilities, and the lifetimes of the current facilities.

Figure 5.2 presents projected reductions in the footprint of the Complex that is funded by the Weapons Activities Account, compiled by facility categories used in the FIMS database. The Complex 2030 scenario anticipates the footprint of the current Complex funded by the Weapons Activities Account can be reduced by one-quarter to as much as one-third, if all of the actions are implemented. This would result in a footprint on the order of 26 million square feet by 2030.

The facilities in the current Complex that are potentially excess for Complex 2030 fall into two categories: 1) facilities that may be eliminated because the functional capability they support is no longer needed; and, 2) facilities that would be excess because of replacement, downsizing, or consolidation. Table 5.2 provides a list of the current facilities that may be excess by 2030. This list is subject to adjustment, depending on the outcome of the ongoing Complex 2030 SEIS and other studies that are in progress regarding consolidation of capabilities.

Figure 5.2: Potential Reductions in Complex Footprint Supported by Weapons Activities Account Funding - 2030 Compared with 2006

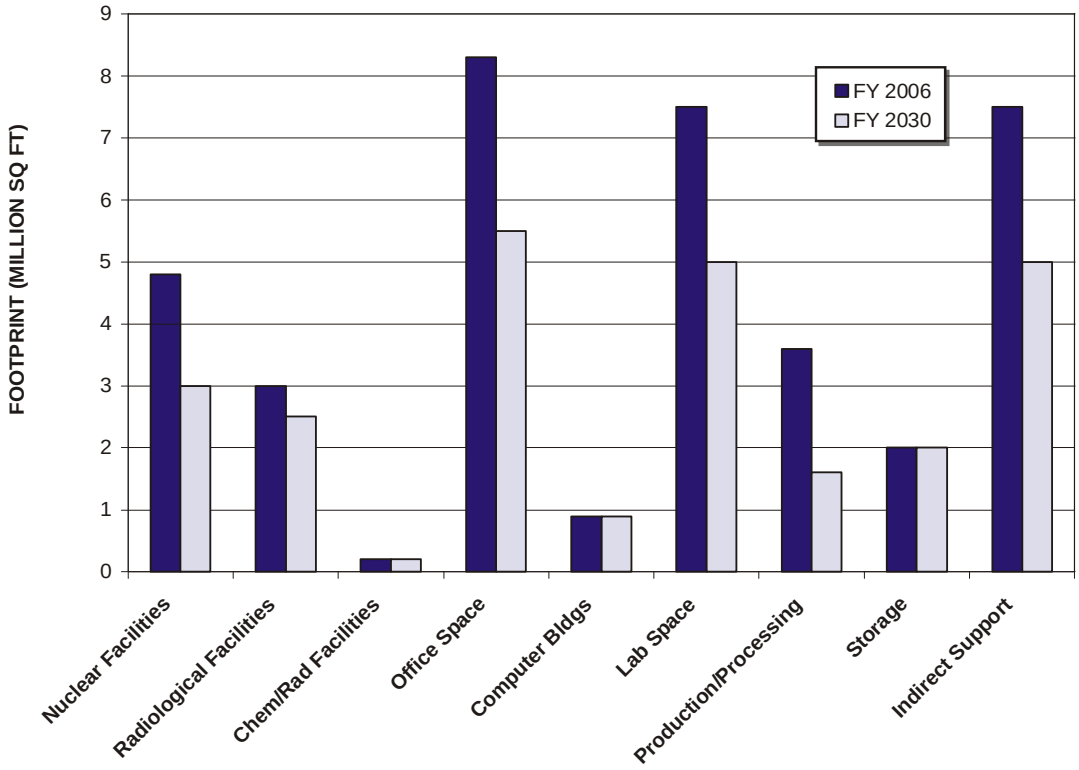


Figure 5.3: Estimated Staffing Funded by the Weapons Activities Account: 2030 Compared with 2006

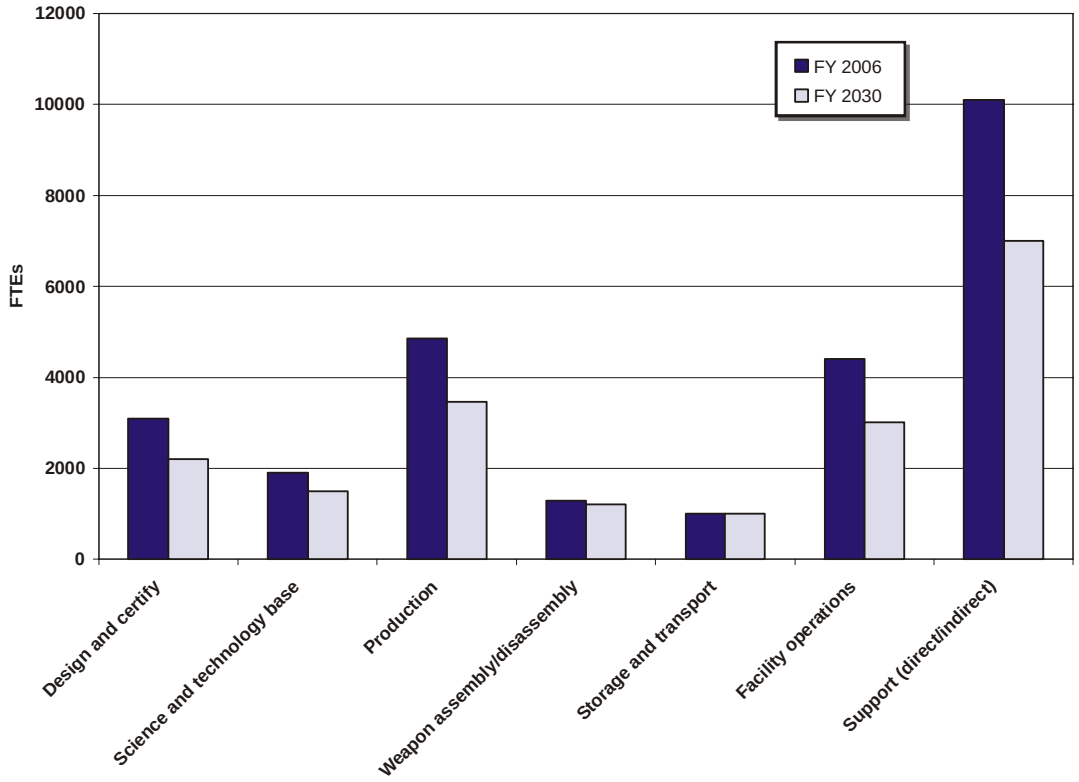


Table 5.2: Facility Plan

Facilities Considered for Excess, Consolidation, or other Action	Proposed Action
Tonopah Test Range	Close and transfer capability to support flight testing to NTS or White Sands Missile Range
Beryllium Technology Facility	Eliminate when legacy weapons are all dismantled
Existing KCP	Consolidate – Replace with a new smaller, non-nuclear production facility (~66%smaller in footprint area)
Uranium Facilities • Y-12 buildings including 9212 Complex • Sigma Facility at LANL	Consolidate – Replace with HEUMF (under construction); UPF (in conceptual design); and the Consolidated Manufacturing Facility for non-Category I/II materials (planned).
Plutonium Facilities • Chemistry and Metallurgy Research Facility (planned) and Plutonium Facility-4 at LANL • Building B332 plutonium facilities at LLNL	Consolidate – Consolidate near-term plutonium operations at Los Alamos facilities until replaced by consolidated plutonium center at site to be determined (in planning). PF-4 (then >50 years-old) becomes candidate for decontamination and decommission (D&D), and other Los Alamos facilities are transitioned to a Category III or less material science center.
Radiation Effects Testing • Sandia Pulse Reactor at SNL/NM • Building B334 at LLNL	Could be located at Device Assembly Facility at NTS if required.
Hydrodynamic testing • Contained Firing Facility at LLNL • DARHT at LANL	Consolidate – Transition capability to a single site.
High explosives R&D facilities	Consolidate – Consolidate to fewer sites where operating efficiencies can be improved
Tritium R&D facilities	Consolidate – Consolidate to fewer sites where operating efficiencies can be improved
Environmental Testing facilities	Consolidate – Consolidate to fewer sites where operating efficiencies can be improved
High Energy Density Physics facilities • NIF • OMEGA • Z	Broaden usage – Set requirements in collaboration with other offices/agencies; establish joint programs; set facility plan based on integrated national needs.
Capability Computing (advanced state-of-the-art machines at the limits of technology)	Consolidate – Consolidate to fewer sites

Staffing

Specific staffing requirements for Complex 2030 are difficult to anticipate. Improvements in how the Complex performs its work, consolidation of facilities (especially those with high security requirements), and leveraging of other DOE missions and WFO may allow re-alignment of staff funded by the Weapons Activities Account. NNSA estimates that the number of staff funded by the Weapons Activities Account could be reduced by one-quarter to as much as one-third by 2030. (Note that the total staffing in the Complex may be greater than these estimates, depending on the level of support provided by other entities to the multi-program sites.)

Figure 5.3 compares the current staffing levels supported by the Weapons Activities Account in FY 2006 (approximately 27,000 management and operating contractor personnel) with the potential number in 2030. The staffing estimates in 2030 are based on assumptions concerning consolidation of facilities and capabilities, reductions in required physical security, and efficiencies in operation.

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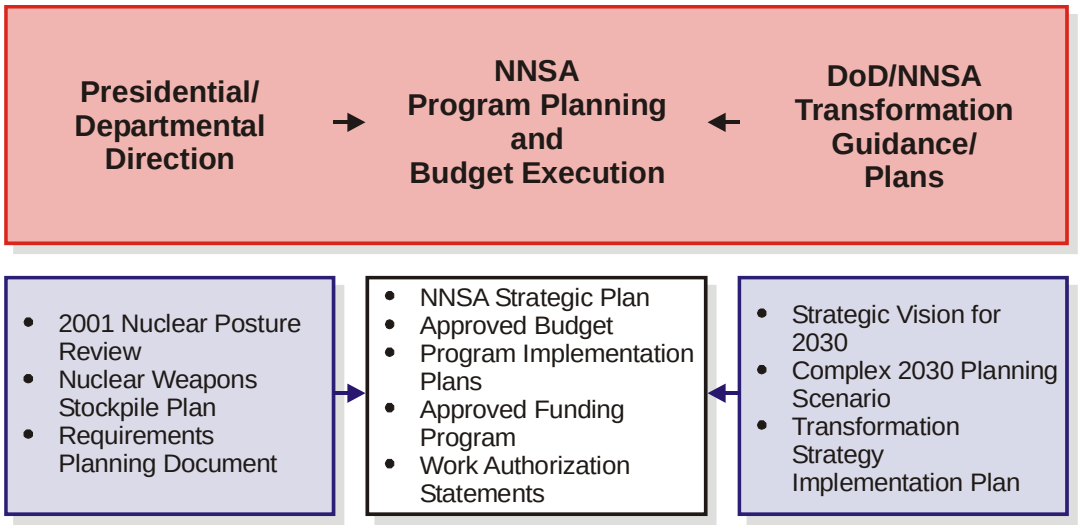
6.0 THE PLAN TO IMPLEMENT COMPLEX 2030

NNSA has proposed to transform to Complex 2030 through the existing program and line management structure. This would eliminate counterproductive, near-term disruptions from either a major re-structuring of the NNSA weapons program or creation of a separate, competing transformation program.

Complex 2030 would be implemented through the existing NNSA Program Planning Budget and Execution (PPBE) process. This process takes Presidential direction on the nuclear weapons stockpile and NNSA/DoD guidance on transformation of the Complex and creates an implementable program. Thus, the FY 2008 President's Budget request and supporting PPBE documents provide the details of the NNSA transformation plan. Figure 6-1 summarizes the major elements of this process. The NNSA FY 2008-2017 Ten-Year Site Plans would be the site planning documents in support of achieving the vision of Complex 2030.

Figure 6.1: Complex 2030 Planning and Execution



To ensure overall transformation goals are accomplished, NNSA established an Office of Transformation in June 2006 that reports directly to the Deputy Administrator for Defense Programs. The Office of Transformation works with all NNSA organizations to establish strategies and actions to implement Complex 2030. In addition, the Office of Transformation establishes and tracks metrics to measure progress by line program elements in meeting transformation goals. Figures 6.2 and 6.3 summarize key near- and long-term schedules and milestones to implement Complex 2030.

The President's FY 2008 Budget request contains some of the resources required for transformation of the Complex in ongoing base program activities, and the relevant agencies are currently developing plans and funding projections for other activities that will be required for the transformation effort. Table 6.1 summarizes the approach taken by NNSA in preparing the Complex 2030 FY 2008 budget.

NNSA PPBE documents provide the details of the NNSA transformation plan. These details are captured in Program Implementation Plans and Work Authorization Statements prepared by NNSA and issued to contractor organizations in the field. The field organizations prepare Contractor Implementation Plans to plan and manage work. Contractor Performance Evaluation Plans are used with annual fee determinations to ensure performance objectives are met.

Figure 6.2: Complex 2030 Near-Term Schedule and Milestones

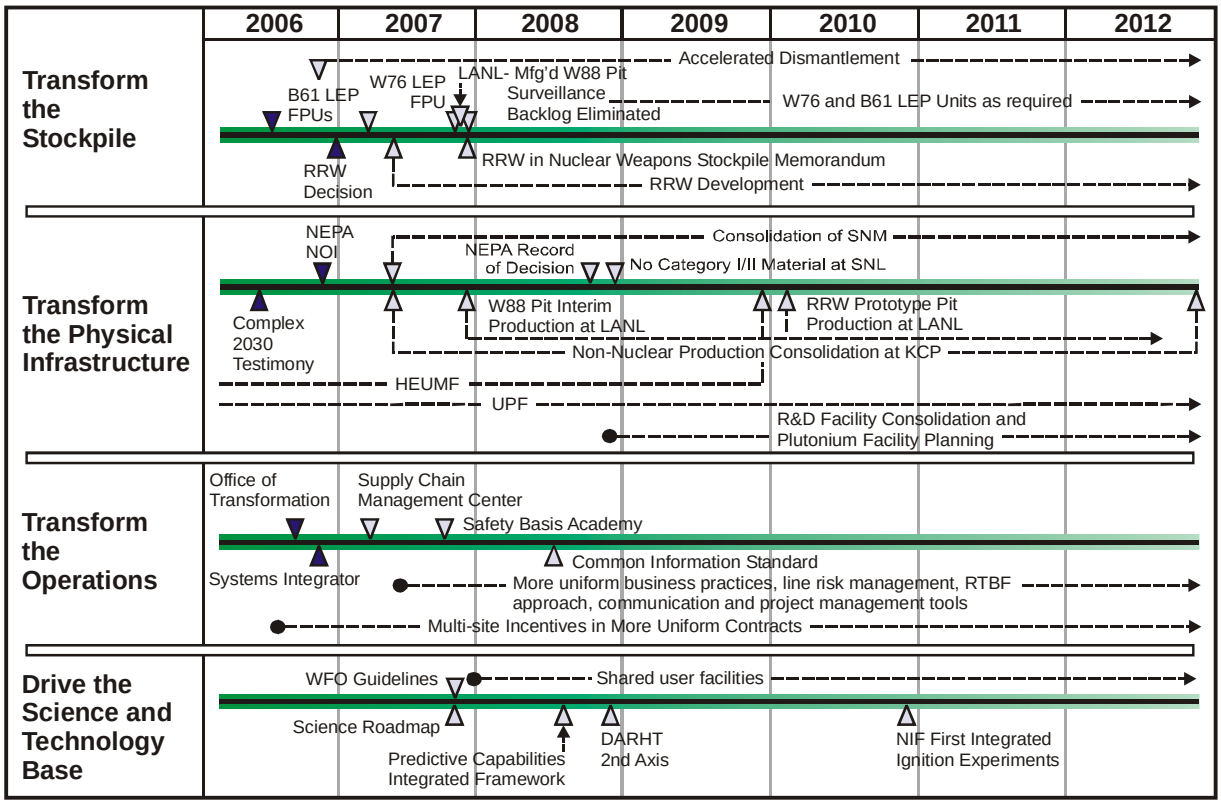
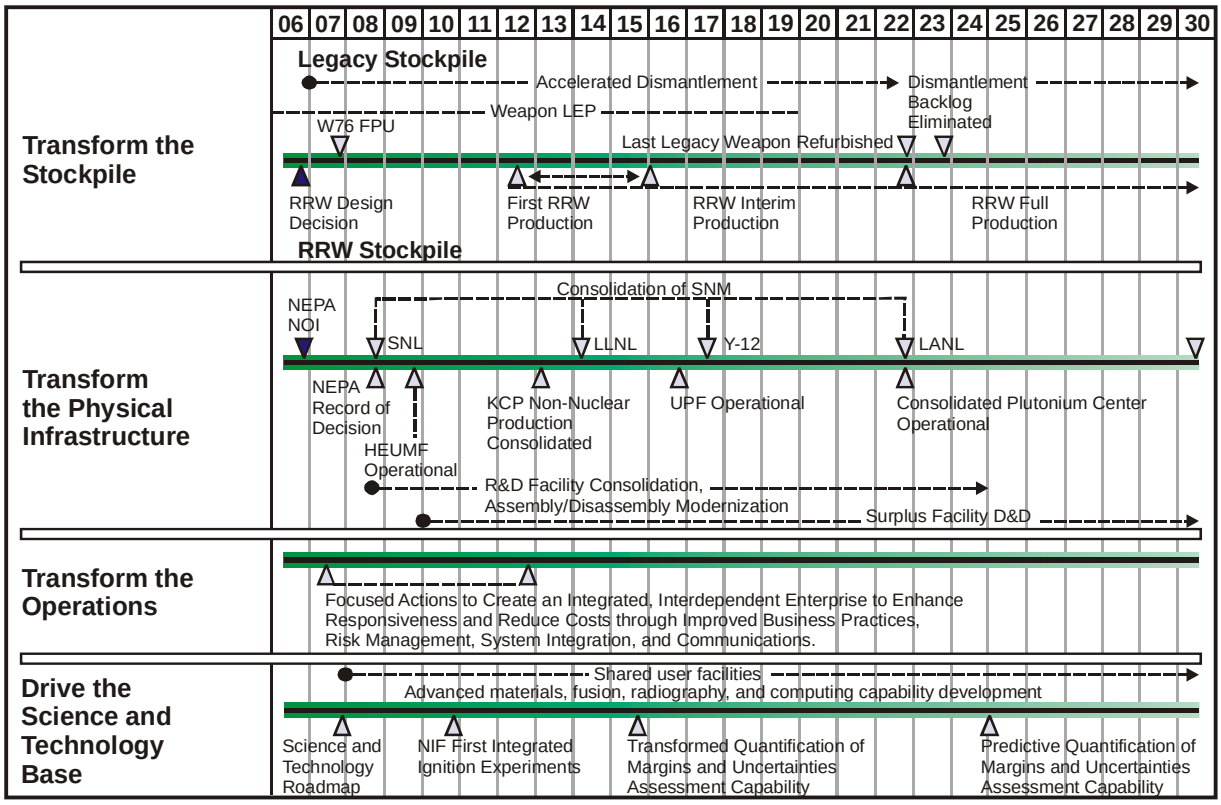


Figure 6.3: Complex 2030 Long-Term Schedule and Milestones



NNSA considers the Complex 2030 planning scenario as the best approach to balancing near- and long-term commitments to the stockpile, transforming the Complex in a constrained budget environment, and achieving long-term life cost savings. Complex 2030 relies on reductions in the cost of Complex operations to finance essential nuclear production facility consolidation.

Creating an integrated, interdependent nuclear weapons complex yields the greatest near-term cost reductions and thus is a current NNSA focus to provide relief for stockpile and physical infrastructure transformation. Maintaining a leading-edge science and technology base while consolidating facilities where appropriate would result in both near- and long-term cost reductions. Cost reductions from transforming the physical infrastructure materialize in the 2020 timeframe as the benefits of Category I/II SNM consolidation and production facility modernization would be realized. Transformation of the stockpile enables the other three strategies; however, reductions to the direct costs of maintaining and replacing weapons in the stockpile may not be realized until the 2030 timeframe.

Table 6.1: Complex 2030 Budget Preparation Approach

Strategy	Budget Approach	Other Considerations
In partnership with the DoD, transform the nuclear stockpile.	Seek to maintain a relatively level Directed Stockpile Work budget with development of RRW concepts funded through reductions in resources required to support legacy weapons.	Relies on reductions in legacy weapon requirements (e.g., number of future life extensions and stockpile size/composition) to pay, in part, for RRWs.
Transform to a modernized, cost-effective nuclear weapons complex.	Use savings from SNM consolidation, reduction in square footage, consolidation of capabilities, productivity improvements, and reductions in future legacy weapon LEPs to fund transformation.	Most cost reductions take years to be realized thus greatly slowing the potential rate of transformation especially for costly nuclear facilities. Investment is required to reduce total square footage.
Create a fully integrated and interdependent nuclear weapons complex.	Make changes to contracts, organization structure, project and risk management approaches, and technical business practices as rapidly as practical. Reprioritizing existing funding resources accommodates most changes. Integration with Defense Nuclear Nonproliferation missions.	Most cost reductions occur in overhead and risk management (safety and security) costs, i.e., a lowering of the overall cost of doing business. While many changes are accommodated from within available funds, small amounts of incremental funding for some (e.g., start-up of a supply chain management center) greatly reduce resistance and time required for implementation.
Drive the science and technology base essential for long-term national security.	Focus campaigns more directly on requirements to support RRW development. Team with the DOE Office of Science and other related organizations to ensure overall science and technology portfolio sustains the science and technology base essential to our Nation's security.	It will be essential to look for efficiencies in the science and technology infrastructure while maintaining talent and getting results. As a steward of several national level science facilities, NNSA has an obligation to determine how to support outside access with reduced budget resources.

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7.0 CONCLUDING REMARKS

Transformation of the nuclear weapons stockpile and the Complex that supports the stockpile are essential to ensuring that the nation's nuclear deterrent is reliable and credible in the 21st Century. Under the Complex 2030 plan, the stockpile would be transformed using an RRW strategy to ensure confidence in the safety, security, and reliability of nuclear weapons without underground nuclear testing. The infrastructure would be transformed to ensure responsiveness in an uncertain threat environment and to bolster deterrence by capability. Maintenance of legacy warheads requires us to sustain an extensive and expensive legacy infrastructure. We must move forward on both RRW development and Complex 2030 planning to achieve a more cost efficient path to the future, and to ensure progress towards the President's vision of the smallest possible stockpile consistent with national security. On November 30, 2006, the NWC approved the RRW program as the long-term strategy for maintaining a safe, secure and credible nuclear deterrent. This shift will require substantial planning between the Departments of Defense and Energy.

RRW development and Complex transformation are complementary. Complex transformation enables efficient development and production of RRWs while providing a responsive infrastructure that may allow significant reductions in the number of legacy weapons held in reserve. Similarly, many RRW design features, such as the elimination of conventional high explosives or problematic materials such as beryllium, enable planning for a future Complex unencumbered by many operational challenges of today. We must transform the Complex even without the RRW, although the benefits would be reduced.

As the Complex 2030 planning scenario matures, the NNSA will review the performance measures (goal, indicators, and endpoint and annual targets) to ensure that they are consistent with the planned approach and to develop any required new measures. Within a level funding profile and the need to meet near-term commitments to DoD and Congress, NNSA has limited flexibility to rapidly transform into a responsive infrastructure. For the FY 2008 budget, the greatest impact of a level funding profile is on the rate of transformation to a modernized, cost-effective complex (i.e., the physical infrastructure and facilities). Further planning is subject to the ongoing Complex 2030 NEPA process. This public process, which will analyze critical aspects of the Complex 2030 proposal, started with the NOI on October 19, 2006, and will not be completed until a record of decision is issued. Significant revisions to the Complex 2030 planning scenario may result as public comments are received and as the NEPA process is completed.

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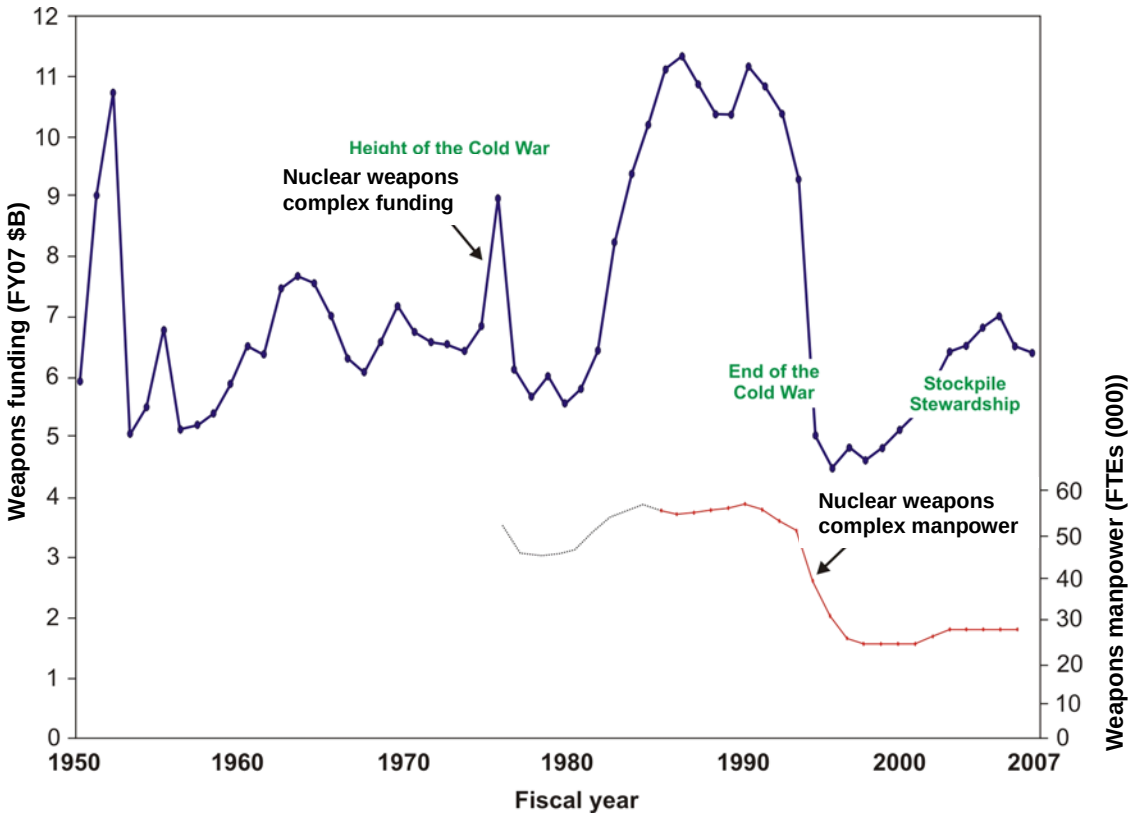
APPENDIX A:
HISTORICAL PERSPECTIVE OF THE NUCLEAR WEAPONS COMPLEX

Figure A.1 shows the historical cost and staffing of the nuclear weapons complex since the 1950s. The cost data includes the production of special materials such as plutonium and highly enriched uranium. This was costly in the 1950s and 1980s. With the exception of tritium, production of these materials is no longer conducted. Large increases in funding and staffing occurred at the beginning of the Cold War in the 1950s, and in the 1980s. The most significant decreases occurred at the end of the Cold War in the early to mid 1990s. It is important to note that the cost of the Complex does not scale directly with the size of the stockpile. This is due to the complex set of basic capabilities that must be maintained to assure a capable and responsive infrastructure.

Figure A.1: Historical Cost and Staffing for the Nuclear Weapons Complex



Today's stockpile systems were designed in the Cold War environment. A driving requirement was to package more and more yield in smaller and lighter packages, whether for ballistic missile or air carried delivery. Evolving military needs and delivery vehicle modernization often led to new warhead requirements with different yield, weight, size and other characteristics. Consequently, each warhead that was added to the nation's stockpile was of a new design, manufactured by unique processes and procedures. The entire composition of the stockpile turned over every twenty years.

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APPENDIX B: SEAB TASK FORCE RECOMMENDATIONS INCORPORATED INTO PLANNING

The Secretary of Energy Advisory Board (SEAB) Nuclear Weapons Complex Infrastructure Task Force performed a service to the Nation and the NNSA with the development of recommendations for the nuclear weapons complex of the future. The following table indicates how these recommendations were incorporated into the Complex 2030 planning scenario. One recommendation not included in the Complex 2030 proposal is the SEAB Task Force concept for a single integrated site for manufacturing, assembly, and disassembly of components and systems containing SNM, called the Consolidated Nuclear Production Center (CNPC).

Table B.1: Comparison of Major SEAB Recommendations with Complex 2030 Proposal

Topic	SEAB Task Force Recommendations	Complex 2030 Proposal
RRW	Immediate design of RRW.	Planned approach.
CNPC	Establish a CNPC as rapidly as possible (e.g., 2015).	Our approach embraces consolidation, but does not go as far as consolidation to one site. Complex 2030 is based on distributed production centers.
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 Security Laboratories as soon as practical.
Weapon Dismantlement	Accelerate rate of dismantlement.	Planned approach.
Risk Management	Manage risks more effectively.	Planned approach, while assuring a safe and secure working environment.
Enterprise Management	Create a more integrated, interdependent enterprise.	Planned approach. It should be noted that a number of detailed recommendations (e.g., site office managers directly reporting to the Deputy Administrator for Defense Programs and enterprise-wide contract incentives) have already been implemented.
Office of Transformation	Establish an Office of Transformation.	The Office of Transformation was created on June 8, 2006, and a charter was sent to Congress within 60 days of that date.

The NNSA, in partnership with the DoD, developed a proposal to achieve a responsive infrastructure to support the U. S. strategic nuclear deterrence in the coming decades. This proposal is articulated in *Complex 2030: An Infrastructure Planning Scenario for a Nuclear Weapons Complex Able to Meet the Threats of the 21st Century* and does not include a CNPC as recommended by the SEAB Task Force on the Nuclear Weapons Infrastructure. NNSA carefully considered the SEAB Task Force recommendation when it was submitted, and does not agree with some of the assumptions that support it, particularly with regard to the ability to begin operating a CNPC by 2015. Supporting the existing stockpile, maintaining the skills that serve as the foundation of our nuclear deterrent, and fiscal realities were among the primary factors considered by NNSA in concluding not to pursue a CNPC. Nonetheless, the NOI for the Complex 2030 SEIS invited comments on the question whether a CNPC should be considered. The public scoping period ended on January 17, 2007. As of the date of this document, NNSA is proposing inclusion of the CNPC concept as an alternative to be evaluated in the draft SEIS.

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ACRONYMS

CNPC	Consolidated Nuclear Production Center
Complex 2030 SEIS	Supplement to the SSM-PEIS for Complex 2030
D&D	decontamination and decommission
DARHT	Dual-Axis Radiographic Hydrodynamic Test
DoD	Department of Defense
DOE	Department of Energy
FIMS	Facilities Information Management System
FPU	first production unit
HEUMF	Highly Enriched Uranium Materials Facility
KCP	Kansas City Plant
LANL	Los Alamos National Laboratory
LEP	Life Extension Program
LLNL	Lawrence Livermore National Laboratory
NEPA	National Environmental Policy Act
NIF	National Ignition Facility
NNSA	National Nuclear Security Administration
NOI	notice of intent
NPR	Nuclear Posture Review
NTS	Nevada Test Site
NWC	Nuclear Weapons Council
PPBE	Program Planning Budget and Execution
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 materials
SRS	Savannah River Site
SSP	Stockpile Stewardship Program
SSM-PEIS	Stockpile Stewardship and Management Programmatic Environmental Impact Statement
UPF	Uranium Processing Facility
WFO	work for others

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