FY 2011 Stockpile Stewardship and Management Plan Summary

May 2010

National Nuclear Security Administration
United States Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

U.S. DEPARTMENT OF ENERGY

National Nuclear Security Administration

The President's Vision

In April 2009, President Obama articulated a powerful and compelling vision for the United States nuclear deterrent which called for the United States to

> *"… take concrete steps toward a world without nuclear weapons. To put an end to Cold War thinking, we will reduce the role of nuclear weapons in our national security strategy, and urge others to do the same. Make no mistake: As long as these weapons exist, the United States will maintain a safe, secure, and effective arsenal to deter any adversary, and guarantee that defense to our allies ... "*

Message from the Secretary

The *Stockpile Stewardship and Management Plan* (SSMP) is aligned with the *2010 Nuclear Posture Review*. Indeed, it communicates the Department of Energy and the National Nuclear Security Administration's strategy for executing the policy outlined in the review. The plan encompasses all major elements of the nuclear weapons complex: the stockpile; the science, technology and engineering base; production and laboratory infrastructure; and the federal and contractor workforce.

Implementation of the SSMP will continue to maintain our country's stockpile safe, secure, and effective without the production of new fissile materials or a need to resume underground nuclear tests. It will also extend the progress toward a more efficient complex. The plan identifies the detailed activities by which individual nuclear weapons are assessed and maintained throughout their life cycle, from current stockpile conditions, through service life extensions, to retirements, to dismantlements – in accordance with national security policy.

The SSMP consists of a package of five documents that provides an integrated, consolidated response to several related statutes and recent congressional enactments and reports as fully described in the *Preface* section of the summary document.

Finally, the plan also aligns with the report that was directed by Congress to accompany the President's submission to the Senate of the New START Treaty for ratification consideration [Section 1251 of the *National Defense Authorization Act (NDAA) For FY 2010* (P.L. 111-084)].

Together, these documents – the *2010 Nuclear Posture Review*, the FY 2010 NDAA Section 1251 report, and the *FY 2011 Stockpile Stewardship and Management Plan* - represent an unprecedented and comprehensive effort to detail the plans for managing the Nation's nuclear deterrent in the coming decades. This SSMP is being provided to the following:

- **The Honorable Daniel K. Inouye**
  Chairman, Senate Committee on Appropriations

- **The Honorable Thad Cochran**
  Ranking Member, Senate Committee on Appropriations

- **The Honorable David R. Obey**
  Chairman, House Committee on Appropriations

- **The Honorable Jerry Lewis**
  Ranking Member, House Committee on Appropriations

- **The Honorable Carl Levin**
  Chairman, Senate Committee on Armed Services

- **The Honorable John S. McCain**
  Ranking Member, Senate Committee on Armed Services

- **The Honorable Ike Skelton**
  Chairman, House Committee on Armed Services

- **The Honorable Howard P. McKeon**
  Ranking Member, House Committee on Armed Services

- **The Honorable Byron L. Dorgan**
  Chairman, Senate Subcommittee on Energy and Water Development

- **The Honorable Robert F. Bennett**
  Ranking Member, Senate Subcommittee on Energy and Water Development

- **The Honorable Peter J. Visclosky**
  Chairman, House Subcommittee on Energy and Water Development

- **The Honorable Rodney P. Frelinghuysen**
  Ranking Member, House Subcommittee on Energy and Water Development

- **The Honorable Ben Nelson**
  Chairman, Senate Subcommittee on Strategic Forces

- **The Honorable David Vitter**
  Ranking Member, Senate Subcommittee on Strategic Forces

- **The Honorable James Langevin**
  Chairman, House Subcommittee on Strategic Forces

- **The Honorable Michael R. Turner**
  Ranking Member, House Subcommittee on Strategic Forces

If you have any questions, please contact me or Ms. Betty A. Nolan, Senior Advisor, Office of Congressional and Intergovernmental Affairs, at (202) 586-5450.

Sincerely,

Steven Chu

The Administrator's Plan for the NNSA

To support the President's vision, the National Nuclear Security Administration (NNSA) of the U.S. Department of Energy has developed a plan for maintaining and evolving the stockpile and infrastructure. This plan is aligned with the 2010 Nuclear Posture Review and encompasses all major elements of the nuclear weapons complex: the stockpile; the science, technology and engineering base; production and laboratory infrastructure; and, most importantly, the federal and contractor workforce. As we address technical issues within the stockpile, we do not expect to be called upon to develop new weapons to enhance military capabilities. We will, however, complete a series of life extension activities that will enhance stockpile safety, security, and effectiveness without requiring additional underground nuclear tests.

Table of Contents

List of Figures

List of Tables

This Page Intentionally Blank.

FY 2011 Stockpile Stewardship and Management Plan Summary

Preface

Stockpile Stewardship and Management Plan: Purpose, History, and Statutory Requirements

The Stockpile Stewardship Program is the National Nuclear Security Administration's (NNSA) overarching program that maintains the U.S. nuclear stockpile in a safe, secure, and effective condition without the need for additional underground nuclear testing. Under the program, Stockpile Management determines the detailed activities by which individual nuclear weapons are assessed and maintained – to include the life cycle of the weapon, from service life extension, to retirement, to dismantlement – in accordance with national security policy.

Under the Stockpile Stewardship Program, experiments are conducted to assess the current state of the stockpile and the results of which are validated against data collected from the underground nuclear tests conducted prior to the end of testing in 1993. The recently completed 2010 Nuclear Posture Review reaffirms this strategy, as follows: "By pursuing a sound Stockpile Management Program for extending the life of U.S. nuclear weapons, we can ensure a safe, secure, and effective deterrent without further nuclear testing."

Each year the NNSA reports on how it plans to maintain the nuclear weapons stockpile. Specifically, Section 4203 of the Atomic Energy Defense Act (Title 50 of the U.S. Code, Section 2523) requires that: "The Secretary of Energy shall develop and annually update a plan for maintaining the nuclear weapons stockpile. The plan shall cover at a minimum, stockpile stewardship, stockpile management, and program direction." This document, originated in February 1996, came to be known as the *Stockpile Stewardship Plan* and has been submitted to Congress every year since 1998.

Recently, several legislative actions required additional details and scope on the NNSA's plan for maintaining the nuclear weapons stockpile. First, Section 4204 of the Atomic Energy Defense Act (50 U.S.C. 2524(c) and (d) directs that in carrying out the Stockpile Management Program, the Secretary of Energy shall develop a long-term plan to extend the effective life of the weapons in the nuclear weapons stockpile without the use of underground nuclear testing. The Secretary is requested to annually update the plan and shall submit it to Congress as part of the *Stockpile Stewardship Plan*. The United States Congress also requests specific information regarding the status of the nuclear weapons stockpile and the approaches used for assessing the stockpile (50 U.S.C. Sections 2522 and 2523).

Second, Section 3255 of Subtitle D of the NNSA Act (50 U.S.C. 2455) requires the Administrator and Under Secretary for Nuclear Security to prepare and submit with the budget materials for each odd-numbered fiscal year a "Biennial Plan and Budget Assessment on the Modernization and Refurbishment of the Nuclear Security Complex." Third, Section 4202 of the Atomic Energy Defense Act (50 U.S.C. 2522) directs that: "In each odd-numbered year, beginning in 2011, the Secretary of Energy shall include in the stockpile stewardship plan a report" that addresses specific elements on how the funded Science, Technology, and Engineering (ST&E) tools are utilized to assess the nuclear stockpile and address other national security needs. The required ST&E elements to be addressed include assessment criteria that are applied with these tools, capability gaps and plans for improvement, and requirements involving technical competencies and critical skills.

Section 1251 of the National Defense Authorization Act (NDAA) of 2010 requires the President of the United States to submit a one-time report on the "Plan for the Nuclear Weapons Stockpile, Nuclear Weapons Complex, and Delivery Platforms" by the time a follow-on treaty to the Strategic Arms Reduction Treaty is submitted to the Senate for its advice and consent. While the Department of Defense (DoD) is responsible for the delivery platforms and will respond to Congress accordingly, the NNSA's *Stockpile Stewardship and Management Plan* (*SSMP*) is an annually updated summary of the NNSA proposed actions to sustain the deterrent and the supporting infrastructure consistent with the NPR. The *SSMP* will provide the information requested by Congress in Section 1251 of the NDAA mentioned above. The *SSMP* includes the multi-decade investment strategy needed to extend the life of key nuclear weapons systems, rebuild and modernize facilities and enable physical and intellectual infrastructure, and sustain the science, technology and engineering federal and contractor workforce essential to our national security needs.

This year, the NNSA (the agency responsible for authoring the legislated reports described above) has developed the integrated *SSMP* to help guide and connect all of these inter-related plans and programs. This *SSMP* will provide a comprehensive response to all applicable statutory requirements. The *SSMP* consists of five separable but companion documents:

- FY 2011 Stockpile Stewardship and Management Plan Summary (unclassified)
- Annex A - FY 2011 Stockpile Stewardship Plan (unclassified)

- Annex B - FY 2011 Stockpile Management Plan (classified: Secret Restricted Data)
- Annex C - FY 2011 Science, Technology, and Engineering: Report on Stockpile Stewardship Criteria and Assessment of Stockpile Stewardship Program (classified: Secret Restricted Data)
- Annex D - FY 2011 Biennial Plan and Budget Assessment on the Modernization and Refurbishment of the Nuclear Security Complex (unclassified)

The organization and content of these five documents are described below.

The *Stockpile Stewardship and Management Plan Summary (*the *Summary)* provides an overview of the national vision for nuclear security and deterrence, providing the context for the NNSA mission. Key national policy and strategies affecting NNSA weapons activities arising from the 2010 Nuclear Posture Review and the DoD Quadrennial Defense Review are reviewed. The *Summary* communicates the NNSA mission, priorities, and commitments specifically as they pertain to the implementation of the stewardship and management of the nuclear weapons stockpile in accordance with national policy and current strategies. The *Summary* portrays the current status and the envisioned future state for three critically important elements: 1) the stockpile itself; 2) the essential ST&E foundations upon which rest stockpile assessment and certification, and responses to broader national security needs; and; 3) the physical and intellectual infrastructure. Finally, the *Summary* explains the nuclear weapons complex investments and projections.

Annex A — FY 2011 Stockpile Stewardship Plan

The *Stockpile Stewardship Plan (*the *Plan)* describes the comprehensive program implemented to ensure the Nation's nuclear stockpile is safe, secure, and effective without the need to resume underground nuclear weapons testing. The *Plan* supplements the FY 2011 – FY 2015 budget request submitted by the President to the Congress for NNSA's weapons activities, and describes the NNSA with particular emphasis on the portions that pertain to stewardship activities. An overview of recent stewardship accomplishments, expected accomplishments/milestones, challenges, and approaches is provided. The *Plan* details each individual category of NNSA's weapons activities: 1) Directed Stockpile Work; 2) Science Campaign; 3) Engineering Campaign; 4) Inertial Confinement Fusion Ignition and High Yield Campaign; 5) Advanced Simulation and Computing Campaign; 6) Readiness Campaign; 7) Readiness in Technical Base and Facilities; 8) Secure Transportation Asset; 9) Nuclear Counterterrorism Incident Response; 10) Facilities Infrastructure and Recapitalization Program; 11) Site Stewardship; 12) Defense Nuclear Security; and, 13) Cyber Security.

Annex B — FY 2011 Stockpile Management Plan

The *Stockpile Management Plan (SMP)* outlines the details by which the Nation's nuclear weapons stockpile is managed in accordance with national policy and strategies. It specifically addresses the current status of the stockpile, including weapon types and quantities, age of the weapons, dismantlement projections, and present concerns

associated with each weapon type. The *SMP* describes the projected future state of the current stockpile, including weapon types and quantities out to twenty years, the strategic rationale for each type, and corresponding life cycle costs. Plans and processes are detailed for extending the effective life of the stockpile through life extensions, including the manufacturing, maintenance, surveillance, and assessment mechanisms employed. Concerns that could affect recertification of each warhead type are also addressed.

Annex C — FY 2011 Science, Technology, and Engineering (ST&E): Report on Stockpile Stewardship Criteria and Assessment of Stockpile Stewardship Program

The *Science, Technology, and Engineering Report* describes the ST&E tools and capabilities used to assure the continuing safety, security, and effectiveness of the U.S. nuclear deterrent. These ST&E capabilities also provide our country the means to respond to a broad array of nuclear security needs, such as nuclear forensics in support of non-proliferation efforts, the detection of weapons of mass destruction in the hands of our adversaries, analysis of nuclear weapon capabilities, or to counter the smuggling of nuclear materials.

In 2005, at the direction of Congress, the NNSA reevaluated and updated the ST&E criteria applied when assessing the nuclear stockpile. The "Report on Criteria for Stockpile Stewardship Tools" explained the scientific and engineering criteria applied in the weapons assessment process, explained the critical role that combined simulation and expert judgment play in conclusions about weapon safety and reliability, and provided a summary of the assessment tools employed. Much of the information in this comprehensive publication remains applicable and accurate, and a complete update is included as part of the FY 2011 *SSMP*.

Annex D — FY 2011 - The Biennial Plan and Budget Assessment on the Modernization and Refurbishment of the Nuclear Security Complex

The infrastructure *Biennial Plan* defines the physical and intellectual capabilities necessary to sustain the stockpile and implement the strategies delineated in the 2010 Nuclear Posture and the DoD Quadrennial Defense reviews. It explains the composition and configuration of the stockpile and the infrastructure required to support it. An overall path for modernizing the NNSA is communicated, with specifics on major capabilities, including the areas of ST&E; plutonium; uranium; weapons assembly and disassembly and high explosives; production of non-nuclear components; tritium; the Nevada Test Site; and, secure transportation facilities. The current state of the intellectual infrastructure represented by the federal and contractor workforce is described, and plans for sustaining this critical asset into the future are provided. Costs over five and twenty years are projected along with major milestone schedules.

1. National Policy and Strategy

The purpose of the FY 2011 *SSMP* is to first communicate national security policy and strategy directing the size and composition of the U.S. nuclear stockpile. Second, this *Summary* describes the physical infrastructure, federal and contractor workforce, and science, technology, and engineering necessary to support the present and future U.S. nuclear deterrent. The Annexes to the *Summary* provide additional background information, details, and classified aspects of the plan for the complex and NNSA's stockpile stewardship and management mission.

1.A. The Nuclear Posture Review

The 2010 Nuclear Posture Review (NPR) outlines the Administration's approach to promoting the President's agenda for reducing nuclear dangers and pursuing the goal of a world without nuclear weapons, while simultaneously advancing broader U.S. security interests. The NPR calls for a reduced role for nuclear weapons while maintaining a safe, secure, and effective nuclear deterrent consistent with national security objectives. The NPR focuses on five key objectives:

1. Preventing nuclear proliferation and nuclear terrorism;

2. Reducing the role of U.S. nuclear weapons in U.S. national security strategy;

3. Maintaining strategic deterrence and stability at reduced nuclear force levels;

4. Strengthening regional deterrence and reassuring U.S. allies and partners; and,

5. Sustaining a safe, secure, and effective nuclear arsenal.

The NNSA supports these key objectives consistent with the direction of the Congressionally-mandated *Stockpile Management Plan* [50 USC 2524(c)] to extend the life of the nuclear weapons in the stockpile without the use of underground nuclear testing. The FY 2011 NNSA budget request is the first step to realize the President's nuclear security agenda and the objectives stated in the NPR.

1.B. International Treaty Obligations

The United States is committed to meeting its obligation to pursue nuclear disarmament under Article VI of the Nuclear Non-Proliferation Treaty and will make progress toward nuclear disarmament over the next decade. The NNSA will support these efforts by managing a safe, secure, and effective nuclear arsenal without developing new weapons, conducting underground nuclear testing, or providing any new military capabilities to existing weapon systems. The NNSA will continue to safely meet prior commitments to dismantle the remnants of the nuclear stockpile no longer needed for the Nation's nuclear deterrent. The NNSA will continue to apply its critical knowledge to assist in achieving verifiable and credible progress in the area of nuclear arms reduction, as well as in other critical nuclear nonproliferation and counterterrorism activities.

The NNSA's responsibility is to ensure that the Senate can consider new treaty obligations, including the New Strategic Arms Reduction Treaty (START) and the Comprehensive Test Ban Treaty (CTBT), with the assurance that the Nation's nuclear stockpile remains safe, secure, and effective. In order to maintain this assurance, the NNSA will maintain and modernize the complex needed as a hedge against technological or geopolitical surprise. A modernized complex will enable further reductions in the stockpile over time. The NNSA has maintained a safe, secure, and effective stockpile for almost two decades without needing to conduct underground nuclear testing and will continue to utilize and further develop the enabling technological innovations and confidence in our stockpile that will support Senate advice and consent to the ratification of the CTBT.

1.C. Other National Security Needs

The NNSA ST&E competencies are essential, not only for confident stewardship and sustainment of our stockpile, but also for closely related activities. These other activities include assessing foreign nuclear weapons; monitoring nuclear testing and nuclear proliferation risks; analyzing intelligence; and determining adversary countermeasures, in order to ensure our stockpile meets intended military requirements. Certain NNSA competencies and capabilities are beneficially applied to other national and international challenges such as nuclear fuel cycles; global climate change modeling; and, energy research. The NNSA ST&E base provides world-class capabilities critical to sustaining U. S. leadership in science and technology.

1.D. NNSA Implementation

In implementing the President's nuclear agenda, the NNSA will put the federal and contractor workforce first and then achieve balance between the stockpile, the underpinning ST&E base, and the supporting physical infrastructure. This focus sustains capabilities that contribute to additional nuclear security and broader energy and security concerns. The NNSA intends to invest in the ST&E base, extend and sustain the life of today's warheads to achieve a safe, secure and effective deterrent, and recapitalize the nuclear security infrastructure.

With Congressional approval, the Department of Energy and NNSA are funded through FY 2015 to achieve the following milestones to meet the President's vision and meet key requirements identified in the NPR:

- Complete the ongoing Life Extension Program (LEP) for the W76 warhead and full nuclear scope LEP study and follow-on activities for the B61 bomb to ensure first production begins in FY 2017.

- Begin an LEP study in FY 2011 to explore the life extension options for the W78 system.

- Complete the design and begin construction of the Chemistry and Metallurgy Research Facility Replacement Nuclear Facility at the Los Alamos National

Laboratory. Plan and program to complete construction by 2020, and ramp up to full operations by 2022.

- Increase pit manufacturing capacity and capability at the Plutonium Facility (PF)-4 (part of the main plutonium facility) at Los Alamos.

- Complete the design and begin construction of the Uranium Processing Facility at the Y-12 National Security Complex. Plan and program to complete construction by 2020, and ramp up to full operations by 2022.

- Increase warhead surveillance and essential ST&E investments to support stockpile assessment and certification in the absence of underground nuclear testing.

This Page Intentionally Blank.

2. NNSA's Mission and Priorities Overview

2.A. NNSA's Mission

The mission of the NNSA is to strengthen America's security through the military application of nuclear energy and to reduce the global threat of terrorism and weapons of mass destruction. In collaboration with the DoD, the NNSA is the Department of Energy entity responsible for the safety, security, and effectiveness of the Nation's nuclear weapons stockpile; for maintaining the vitality of its nuclear weapons complex; and, for working with other Federal agencies to address a broad spectrum of national security challenges. The NNSA shares responsibility with the DoD for implementing actions prescribed in the 2010 NPR.

Additionally, the NNSA provides capabilities which support propulsion systems for the U.S. Navy, nonproliferation, nuclear counterterrorism, nuclear forensics, and an ability to respond to nuclear incidents involving improvised nuclear devices or other radiological threats.

2.B. Path Forward

Our Nation's nuclear weapons lifespan must be extended and their performance recertified while simultaneously confronting challenges that arise from the loss of original manufacturing capabilities, processes, and specialized skills. The NNSA will complete a series of life extension activities to enhance warhead safety and security without underground nuclear tests. It is imperative to maintain the high confidence levels that underpin the Nation's deterrent capability.

Appropriately Size and Strengthen the Skilled Federal and Contractor Workforce

World-class laboratories and production plants are sustained through the engagement and application of the best and brightest minds. All the elements of a Stockpile Stewardship Program ultimately rely on an engaged, highly-trained and motivated federal and contractor workforce. However, the management and operating (M&O) contractor workforce supported by NNSA Defense Programs has been reduced significantly in the past 20 years which, along with a variety of other pressures, has resulted in the decreased availability of required critical skills. Similarly, but on a smaller scale, the federal workforce must be maintained to provide competent Headquarters direction and Site Office oversight of activities performed by the M&O contractors. The President's budget puts the NNSA on the right path of revitalizing and exercising the federal and contractor workforce through execution of Life Extension Programs and investments in ST&E.

Sustain the Stockpile

The President currently commands a Cold War legacy nuclear stockpile which was designed for high nuclear-yield-to-weight ratios and optimized with little margin against potential failure. In the past, the size and breadth of the stockpile, coupled with the constant development of new systems, reduced worries about life cycle or sustainability. Today's situation is radically different; the U.S. does not conduct full nuclear tests and is committed to not developing new nuclear weapons.

During the past fifteen years, the NNSA has made significant investments in our nation's stockpile stewardship capabilities. While challenges remain, NNSA investments have successfully implemented two recent and successful warhead life extensions and numerous warhead alterations without requiring additional nuclear tests.

The Priorities

Sustain and refurbish the nuclear stockpile without a need for nuclear tests and in alignment with the 2010 Nuclear Posture Review.

Maintain a vigorous ST&E foundation upon which the stockpile and our national security rests, with particular emphasis on the human talent that underpins all endeavors.

Right-size and modernize the infrastructure of the nuclear weapons complex.

Contribute to broader national security needs, including nonproliferation, counterterrorism, and the mitigation of global threats.

Enhance governance and business practice efficiencies to reduce costs.

Maintain a Vigorous Science, Technology, and Engineering Foundation

The NNSA ST&E capabilities must be strong to sustain the deterrent. As the stockpile decreases in size, the role of ST&E in deterrence increases in importance. Our credibility relies on the active engagement of NNSA scientists and engineers to understand the aging stockpile in all its complexities. Our capabilities enable us to annually assess the stockpile, to resolve significant finding investigations (discovered departures from design and/or manufacturing specifications), to extend nuclear weapon lifetimes, to assess other Nations' nuclear capabilities, and to dismantle retired weapons.

A renewed sense of urgency reflecting the President's priorities in his April 2009 Prague speech, combined with the very challenging technical program, create an environment that attracts highly-trained and motivated personnel. The rejuvenation of our scientists and engineers can be achieved through vigorous engagement of ST&E capabilities with sustainable programs, including Life Extension Programs, and an increased level of investment. The NNSA path forward will serve to attract, maintain, and manage the necessary federal and contractor workforce to sustain nuclear deterrence, as well as other nuclear and energy security missions. This path sustains capabilities that also contribute to broader energy and security concerns and supporting U. S. leadership in ST&E.

Right-Size and Modernize the Infrastructure

Key elements of the nuclear weapon infrastructure established during the Cold War are now 50-60 years old and are beginning to exceed their original design lifetimes. The infrastructure must be recapitalized to be made more efficient, correctly-sized and able to execute life extension activities, dismantlement of surplus weapons, surplus fissile

materials management, and other nuclear security programs. The identified path forward, with right investments and priorities, will serve to sustain the physical infrastructure capabilities needed for the long-term. The highest infrastructure priorities are the construction of major new nuclear facilities for plutonium and uranium. Construction of a Chemistry Metallurgy Research Replacement Nuclear Facility and improvements to Plutonium Facility-4 at Los Alamos are part of a modernized infrastructure plan. Given the risks of intermittent shutdown associated with existing facilities, immediate investments are also needed in uranium capabilities and therefore, a new Uranium Processing Facility is planned. In addition, construction of replacement high-explosive facilities will reduce age-degradation risks for the production of those essential components. Other infrastructure issues associated with research and development; design and manufacturing of non-nuclear components; assembly/disassembly processes; continuing tritium processes; environmental test facilities; storage; and, test readiness are discussed in Appendix D.

Contribute to Broader National Security

NNSA's mission requires collaboration with other Federal entities to confront and resolve national challenges – for example: to achieve greater reductions in the number of nuclear weapons throughout the world or to assess and develop technological solutions that mitigate threats from nuclear, chemical, or biological attacks. While NNSA nuclear weapons activities are clearly focused on the strategic deterrence aspects of the NNSA mission, they also inform and support with critical capabilities other aspects of national security. The NNSA complex will bring ST&E tools to bear on these broader national security needs, including nonproliferation, counterterrorism, and the mitigation of global threats.

Enhance Governance and Business Practice to Reduce Costs

NNSA is fundamentally changing the ways in which the enterprise does business, through financial contract, business, project management, and human capital initiatives to better enable mission performance through managerial excellence. NNSA established Enterprise Reengineering, Management Transformation, and Governance Initiatives to make meaningful changes to the way the agency operates as it moves from a Cold War nuclear weapons complex into a 21st century nuclear security enterprise.

The purpose of the NNSA Transformation Initiatives is to develop an approach to administration that supports in a cost-effective manner a safer, more secure, and more efficient enterprise; that reduces the cost of operations in order to maximize funding available for mission programs; and, that operates as an enterprise that leverages the scientific and technical capabilities of the workforce to maximize missions accomplishment.

This Page Intentionally Blank.

3. Stockpile

3.A. Stockpile Composition

Weapons in the U.S. nuclear stockpile include bombs, cruise missiles, Submarine-Launched Ballistic Missiles (SLBM), and Inter-continental Ballistic Missiles (ICBM). The stockpile provides options to meet military and geopolitical objectives. The NPR affirms the need to maintain a triad of nuclear delivery systems to deter nuclear attacks against the U.S. and its allies. This nuclear triad is reflected in the nuclear stockpile composition, shown in Figure S-1. Some changes to this composition will be made as directed by the NPR. Additional details regarding weapon capabilities, quantities, and life extension plans are provided in classified Annex B.

BOMBS					
Type	Description	Carrier	Laboratories	Mission	Military
B61-3/4	Non-Strategic Bomb	F-15; F-16, certified NATO Aircraft	LANL/SNL	Air to Surface	Air Force
B61-7	Strategic Bomb	B-52 and B-2	LANL/SNL	Air to Surface	Air Force
B61-11	Strategic Bomb	B-2	LANL/SNL	Air to Surface	Air Force
B83-1	Strategic Bomb	B-52 and B-2	LLNL/SNL	Air to Surface	Air Force
WARHEADS					
Type	Description	Carrier	Laboratories	Mission	Military
W78	ICBM Warhead	MM III ICBM	LANL/SNL	Surface to Surface	Air Force
W87	ICBM Warhead	MM III ICBM	LLNL/SNL	Surface to Surface	Air Force
W76-0/1	SLBM Warhead	D5 Missile Trident Sub	LANL/SNL	Underwater to Surface	Navy
W88	SLBM Warhead	D5 Missile Trident Sub	LANL/SNL	Underwater to Surface	Navy
W80-0	TLAM/N	Attack Sub	LLNL/SNL	Underwater to Surface	Navy
W80-1	ALCM/ACM	B-52	LLNL/SNL	Air to Surface	Air Force

Note the TLAM/N is correctly included in this list as a weapon system in the current stockpile, though the NPR indicated this system will be retired. This represents a recent change in policy not yet reflected in the current stockpile.

Figure S-1. Current Types of U.S. Nuclear Warheads and Associated Delivery Systems.

3.B. Stockpile Lifetime

All the systems in today's nuclear stockpile are being sustained beyond their original design lifetimes. During the Cold War, the stockpile was shaped and reshaped by rapid changes in military requirements and a continuous demand for new and improved capabilities. Rapid stockpile turnover and deliveries drove technology, skill development, and federal and contractor workforce recruitment. During the 1990s, the NNSA evolved from this model to an initial post-Cold War model of sustainment and life extension without underground testing.

Now, the NNSA must further refine this model to sustain a safe, secure and effective, but smaller, stockpile with a capable complex geared to respond quickly to emerging

and sometimes unpredictable strategic needs. In 2009, at the request of the Congress, a JASON study provided five recommendations as noted in the box to the right. These recommendations have informed and helped shape *SSMP*.

2009 JASON Study Recommendations

Determine the full potential of refurbishment, as exemplified by LEPs executed to date, for maintaining or improving the legacy stockpile.

Quantify potential benefits and challenges of LEP strategies that may require reuse and replacement, to prepare for the possibility of future requirements such as reduced yield or enhanced surety.

Strengthen and focus science programs to anticipate and meet potential challenges of future LEP options, including challenges associated with boost and surety science.

Revise the surveillance program so that it meets immediate and future needs.

Assess the benefits of surety technologies in the context of the nuclear weapons complex as a system, including technologies that can be employed in the near term.

To maintain the safety, security, and effectiveness of the nuclear stockpile without a return to underground nuclear testing, Congress created the Stockpile Management Program in the 2010 National Defense Authorization Act. Consistent with that program, and as stated in the 2010 NPR:

> *"The United States will not develop new nuclear warheads. Life Extension Programs will use only nuclear components based on previously tested designs, and will not support new military missions or provide for new military capabilities."*

> *"The United States will study options for ensuring the safety, security, and reliability of nuclear warheads on a case-by-case basis, consistent with the congressionally mandated Stockpile Management Program. The full range of LEP approaches will be considered: refurbishment of existing warheads, reuse of nuclear components from different warheads, and replacement of nuclear components."*

> *"In any decision to proceed to engineering development for warhead LEPs, the United States will give strong preference to options for refurbishment or reuse. Replacement of nuclear components would be undertaken only if critical Stockpile Management Program goals could not otherwise be met, and if specifically authorized by the President and approved by Congress."*

The NNSA Administrator has testified that this is a sustainable model and the Laboratory Directors have concurred. In a Tri-Lab Director's statement on the Nuclear Posture Review, they said:

> *"We believe that the approach outlined in the NPR, which excludes further nuclear testing and includes the consideration of the full range of life extension options (refurbishment of existing warheads, reuse of nuclear components from different warheads and replacement of nuclear components based on previously tested designs), provides the necessary technical flexibility to manage the nuclear stockpile into the future with an acceptable level of risk. We are reassured that a key component of the NPR is the recognition of the importance of supporting 'a modern physical infrastructure – comprised of the national security laboratories and a complex of supporting facilities – and a highly capable workforce with the specialized skills needed to sustain the nuclear deterrent.'"*

The Laboratory Directors will ensure that the full range of LEP approaches, including refurbishment, reuse, and replacement of nuclear components are studied for warheads on a case–by-case basis. While the NPR expresses a policy preference for refurbishment and reuse in decisions to proceed from study to engineering development, the Laboratory Directors will be expected to provide findings associated with the full range of LEP approaches, and to make a set of recommendations based solely on their best technical assessments of the ability of each LEP approach to meet critical stockpile management goals (weapons system safety, security, and effectiveness).

To support these national nuclear security objectives, the Administration proposed a 9.8 percent increase in the NNSA nuclear weapons FY 2011 budget. A portion of this funding supports the W76 (see figure S-2) and B61 (see figure S-3) LEPs and allows for a follow-on LEP study to identify the path forward for the W78 (see figure S-4) warhead. The W78 study will include the possibility of using the resulting warhead on both ICBMs and SLBMs to reduce the number of warhead types. Other stockpile systems will require action within the next decade.

Investments that have been made in the Stockpile Stewardship Program over the past 15 years and experience with earlier LEP activities provide the confidence that these warhead life extensions can be successfully implemented without the need for further nuclear testing. The following three charts highlight the past and projected costs for the W76, B61, and W78 and associated LEPs. It is important to note that these charts reflect only the cost of stockpile management and do not include the underlying cost of infrastructure that makes LEPs possible.

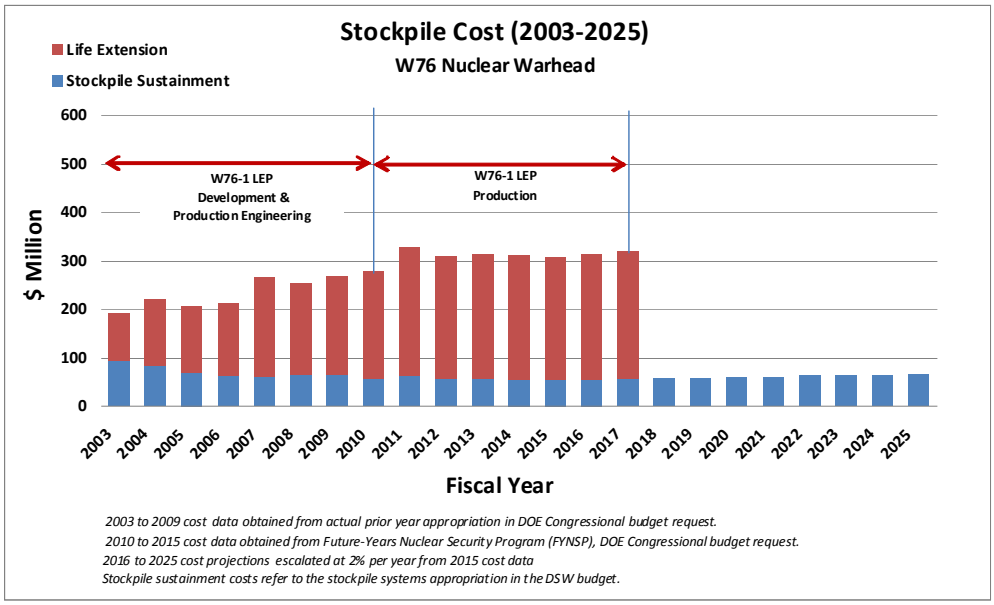
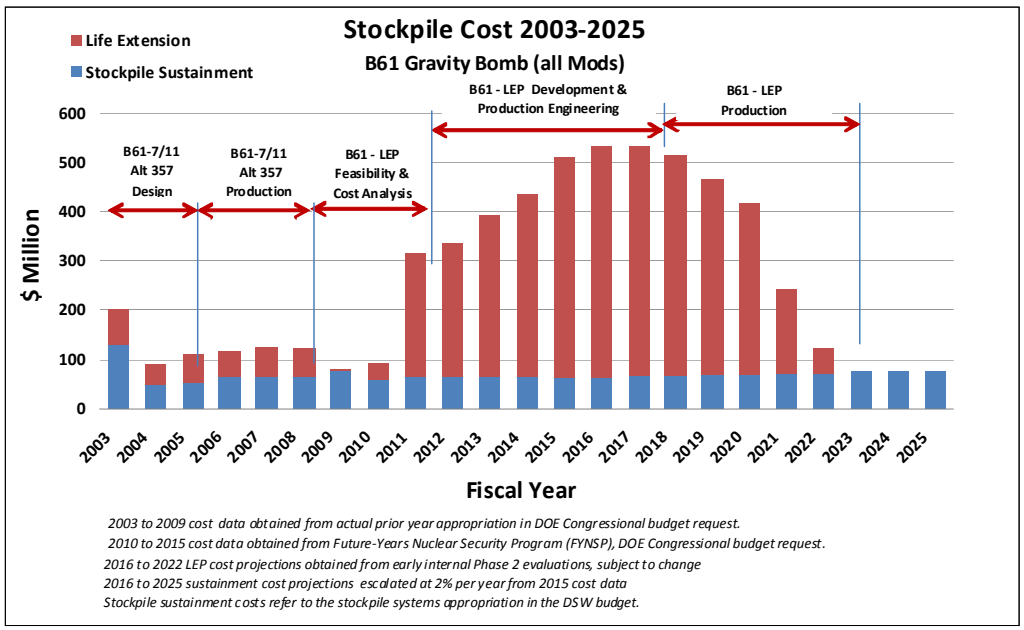


Figure S-2. Stockpile Cost (W76 Nuclear Warhead).



Note that the costs for the B61 LEP are in excess of the W76 LEP due to the broader level of scope required for the B61 including significant efforts in non-nuclear components.

Figure S-3. Stockpile Cost (B61 Gravity Bomb).

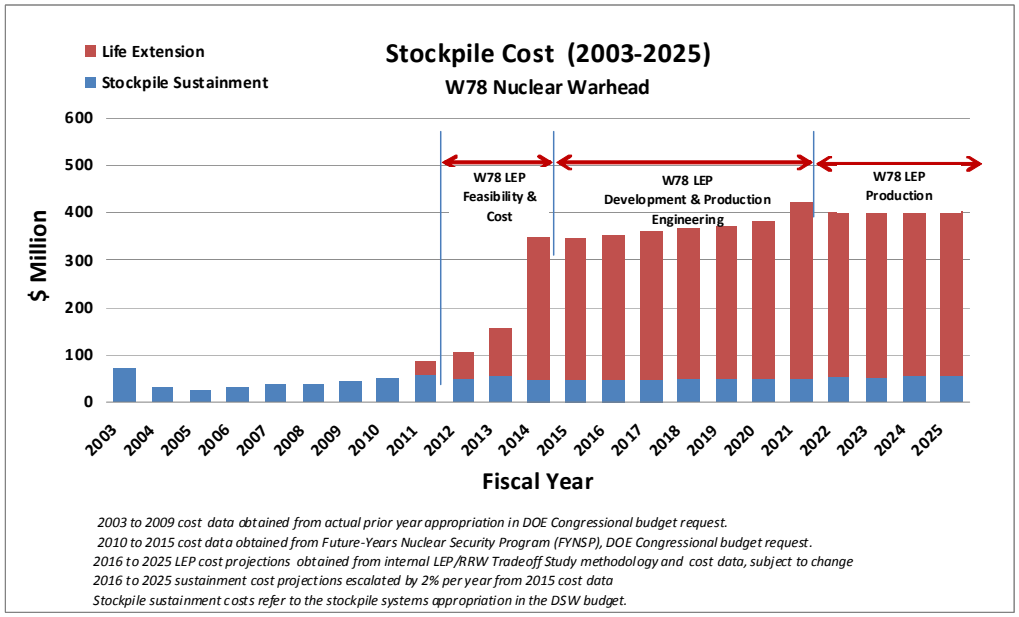


Figure S-4. Stockpile Cost (W78 Nuclear Warhead).

3.C. Stockpile Management

Current statute (Section 4203 of the Atomic Energy Defense Act, 50 U. S. C. Section 2523) requires that: "The Secretary of Energy shall develop and annually update a plan for maintaining the nuclear weapons stockpile. The plan shall cover stockpile stewardship, stockpile management and program direction." Annex B – FY 2011 Stockpile

Management Plan provides the Secret/Restricted Data on the stockpile that provides the details requested by Congress. The following paragraphs focus on the mechanisms comprising stockpile management.

Ongoing Limited Life Component Exchange Activities

Many age-related changes affecting various nuclear warhead components are predictable and well understood. The Limited Life Component (LLC) Exchanges replace these components periodically throughout the lifetime of the weapon. Components such as power sources, neutron generators and tritium reservoirs deteriorate predictably and must be replaced before their deterioration adversely affects warhead function or personnel safety. The NNSA will be working with the DoD to align LLC production requirements with post-NPR stockpile size and composition.

Surveillance

Surveillance provides a key component of the responsive infrastructure, by providing the foundation to plan for activities necessary to support the continued availability of a given system. As stockpiles are reduced in size and the NNSA transforms the infrastructure to a capability-based capacity, the surveillance program will play a larger role in assuring that priority is given to identifying potential problems and responding within the given capacities. A strong monitoring program regularly providing comprehensive state-of-the-weapon data is essential to sustain the stockpile. Weapons surveillance activities are increased in the President's FY 2011 budget to ensure early knowledge and understanding relative to the status of each weapon system and increase the availability of data to aid in that understanding. The FY 2011 request supports improved stockpile surveillance activities, including laboratory and component testing for specific weapons systems, support to the annual assessment and certification process, and development of new surveillance techniques.

Life Extension Programs

Figure S-5 shows the planning schedule for life extension activities, dependent upon Nuclear Weapons Council approval of a new program and planning directive to reflect Nuclear Posture Review guidance. Each nuclear weapon system will be studied to identify options for extending its lifespan. This will include modifying Cold War era weapons for enhanced margin against failure, increased safety, and improved security and use control. For example, insensitive high explosives can replace conventional high explosives. Additionally, designs could be employed to provide greater reliability, thus enabling a smaller stockpile, and components and materials with known compatibility and aging issues could be replaced employing better alternatives. Also, future LEP studies will consider the possibility of using the resulting warhead on multiple platforms in order to reduce the number of warhead types. In all LEP studies, the NNSA will rely on fundamental and applied ST&E to improve its understanding of nuclear weapon behavior and to assure the safety, security, and effectiveness of our nuclear deterrent supported by a reduced and more sustainable, efficient and appropriately-sized nuclear security infrastructure.

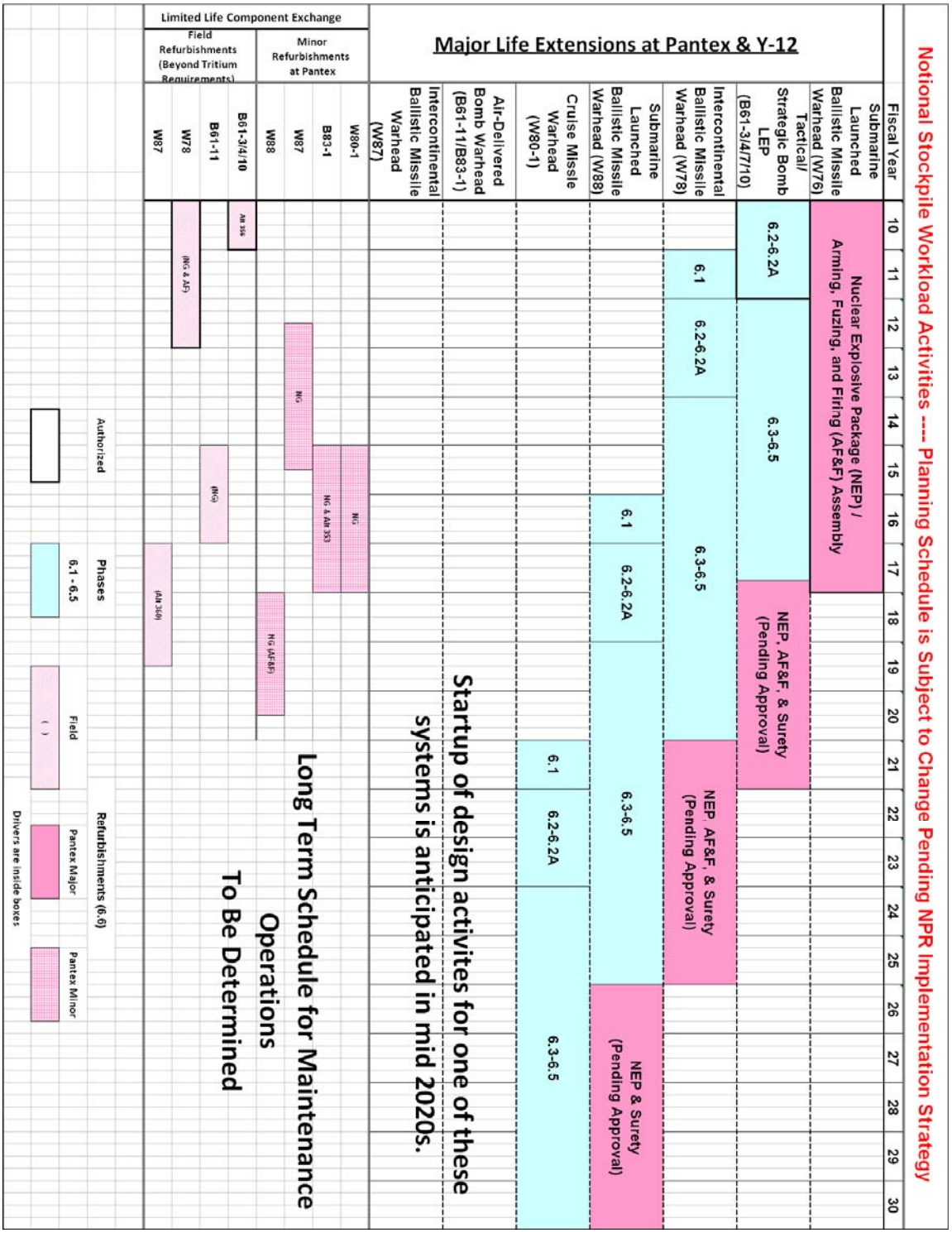


Figure S-5. Schedule for the Stockpile Life Extension Program.
See Annex A Chapter 1.G for definitions of the development process

Dismantlement

Weapons are retired from the stockpile as a result of the stockpile evaluation program and changes in strategic requirements. Many factors affect dismantlement rates, including the logistics required to conduct assembly and disassembly activities utilizing the same technicians, equipment, and facilities. The NNSA has addressed these factors in its plans for transforming the complex, its capabilities and facilities. In the end, the NNSA is committed to meeting or exceeding its objectives in the dismantlement plan submitted to Congress. The current program of record reflects a completion date of 2022 for the inventory of weapons slated for dismantlement. The program of record will be adjusted should the new START enter into force.

3.D. Path Forward

The NNSA, in collaboration with the Department of Defense, will sustain a safe, secure, and effective nuclear arsenal consistent with the NPR via the following actions:

1) Pursue continual assessments of present nuclear weapon systems, which culminate in annual assessment reports on the status of the existing stockpile. Investigate significant findings discovered in the nuclear stockpile with resulting resolution of issues found.

2) Extend the life of existing warheads. Life Extension Programs will use only nuclear components based on previously tested designs, and will not support new military missions or provide for new military capabilities.

3) Pursue stockpile stewardship and management approaches that ensure high confidence in the technical performance of warheads retained in the stockpile and guarantee that their safety and security are aligned with 21st century requirements and technical capabilities.

This Page Intentionally Blank.

4. Science, Technology, and Engineering

4.A. Essential Capabilities and Approach

NNSA ST&E capabilities are the foundation upon which the nuclear deterrent is built and maintained. The ST&E base enables our federal and contractor workforce to annually assess the stockpile; resolve significant finding investigations; extend nuclear weapon lifetimes; accelerate the dismantlement of retired weapons; implement safety and surety upgrades; and, assess foreign systems. The full complement of ST&E capabilities within the NNSA spans a diversity of discovery science to applied research and development that promotes technical excellence and vitality. Key ST&E capabilities include: experimental facilities to perform materials characterizations and provide fundamental data and validation data; computational platforms for simulation, physics-based models; simulation codes for weapons performance; archival data; and, the necessary expertise and expert judgment of knowledgeable, trained ST&E staff. Our approach is to integrate these ST&E capabilities and develop the predictive capability tools needed to support, assess and certify the current and future stockpile. A Predictive Capability Framework (PCF), the NNSA label for its ST&E goals, provides the integrated roadmap for tackling outstanding ST&E issues across multiple programs, in a systematic manner. The PCF is more fully described in Annex C.

The NNSA's strong ST&E capability has enabled a paradigm shift from a deterrence supported by underground nuclear testing (UGT), to a stockpile whose credibility is underpinned by a growing knowledge of weapons performance, allowing the laboratories to annually assess and, as required, extend the lifetimes of the warheads without UGT. Investments in experimental facilities are providing unprecedented access to realms previously reachable only through underground nuclear testing. Prior investments in ST&E are advancing high-performance computing in the physical sciences (e.g., plasma physics, materials, nuclear engineering, radiation sciences and chemistry) and are building a comprehensive basis for understanding nuclear weapon behavior. The increasing insight gained via the Stockpile Stewardship Program provides (through a modern ST&E base) the essential bridge by which existing underground nuclear test data is connected with the resolution of today's stockpile maintenance concerns. The details on the status of this effort are discussed in Annex C.

As noted previously, weapons in the U.S. stockpile are aging and changing in response to a number of factors that can often be monitored and controlled, but not eliminated. To maintain confidence in the weapons, a host of aging-, materials substitution-, and manufacturing process-induced changes are monitored through a combination of science-based analysis, prediction and surveillance of the stockpile. The challenge is to extend the predictive capability tools beyond underground nuclear testing-based calibration to science-based predictive capability, based on a strong ST&E foundation. The elements that comprise this predictive capability make credible the current and future stockpile, regardless of its size or composition.

This transition to stockpile stewardship and management has expanded our knowledge base such that the Directors of the National Laboratories have said "The technical

weapons community has more understanding than ever before of the first-principle physics as it applies to the operation of the nuclear explosive package. This improved understanding enables us to better know what can be done to correct stockpile problems, the limits of what can be done, and how to do it." Thus, we believe that the stockpile can be maintained in the future without resorting to underground nuclear testing.

Path Forward

A full suite of ST&E tools are needed to design and qualify next generation technologies and components to improve the safety, security, and effectiveness of the future stockpile through planned life extensions. The current program and budget request makes an adequate, long-term investment in NNSA ST&E activities. The goal is to close or narrow present gaps in specific physics and engineering issues identified in the Predictive Capability Framework. Key experimental needs include materials data in regimes of interest and platforms that reach extreme conditions. Full utilization will be made of flagship facilities such as the National Ignition Facility, Z machine, Dual Axis Radiographic Hydrodynamic Test and Los Alamos Neutron Science Center. High-performance computational platforms to meet the simulation requirements are funded and investment in physics-based model development and validation is being accelerated.

Tools Required to Continue Stockpile Assessment and Certification

The Predictive Capability Framework outlines the technical program that guides our ST&E activities; establishes robust certification methodologies; enables modern surveillance methods; and, provides the ST&E underpinning for manufacturing modernization. The ST&E tools planned and funded to accomplish these programs include: higher performance computational machines to run increasingly sophisticated codes for weapons simulations; experimental tools that explore extreme conditions, including hot dense matter and plasma states not currently achievable; and, validated science and engineering models to predict weapon behavior across the entire stockpile-to-target sequence of environments. Sustained ST&E competencies to support the development of these tools include: high-energy-density physics; diagnostics; materials science; nuclear science; driver technologies for experimental platforms, statistical methods and uncertainty quantification methodologies; advanced computational platforms and algorithms; engineering sciences, including microelectronics and micro-systems; environmental testing; and, a rigorous stockpile surveillance program.

Computational Capabilities

The computational simulation infrastructure for improving design and certification can be viewed in terms of: 1) high-performance computing platforms and supporting systems such as visualization; 2) specific nuclear explosive design simulation tools for design engineers; 3) physics and engineering theoretical and computational models; and, 4) verification and validation methodologies and test suites. Computational simulation (which is mathematically verified and experimentally validated) performed with adequate resolution on high-performance computing platforms underpins design and certification of all parts of the nuclear warhead. These activities have become increasingly important as the available experimental validation data from underground

nuclear testing is limited to material properties and responses, rather than integrated system performance including nuclear yield. Experimental data from key facilities and stockpile surveillance validate these numerical algorithms and material/system behavior models, while quantification of uncertainties determines the required accuracy. ST&E capabilities are key to better understand the uncertainties associated with weapon designs and performance as a function of time.

Experimental Capabilities

Simulations must be informed and constrained by experimental data obtained from: 1) small-scale experimental capabilities acquiring information such as material properties and chemistry; 2) intermediate-scale experimental activities acquiring information such as material dynamic response using (for example) gas guns for shock impulse or pulsed power systems for tailored pressure profile isentropic compression coupled with advanced diagnostics; and, 3) large-scale integrated performance experiments such as hydrodynamic tests using large flash radiographic capabilities or integral dynamic plutonium experiments. These large- scale experiments at facilities such as NIF, DARHT and other facilities at the Nevada Test Site are complex and require the interaction of multiple organizations. These experiments emphasize integration at the highest level possible short of nuclear testing and are of critical importance to provide the most relevant data possible as well as exercise integrated teams and capabilities.

Continued strengthening of the ST&E base is funded across a suite of disciplines to reinvigorate modern steward expertise. This base provides core support to prediction and surveillance in areas spanning aging and normal, abnormal, and hostile environments that include:

- Materials science such as materials compatibility for high explosives, special nuclear materials, and materials used in non-nuclear components, subsystems, and systems throughout the warhead;
- Acquisition of essential high-accuracy material, component and dynamic response data to inform and constrain computational simulations and to iterate towards improved physical science-based numerical models;
- Atomic and nuclear processes involved in radiation production, radiation transport and nuclear energy release;
- Radiation sciences to design and certify the performance of electrical and mechanical systems in hostile environments;
- Precision diagnostics in each area of data capture;
- New material design and synthesis to support highly stable, age-tolerant component designs;
- Physics-based materials aging models to support predictive, age-aware performance assessments;

- Data from weapon surveillance, flight tests, and laboratory experiments; and
- Modeling, design, fabrication, and evaluation of unique components and subsystems including nuclear explosives packages, micro-electronic and micro-mechanical systems, gas storage, and transfer.

Key Milestones

Key milestones on our path to a revitalized ST&E future include:

- **2010:** Develop, implement, and apply a suite of physics-based models and high-fidelity databases to enable predictive simulation of the initial conditions for secondary performance.
- **2010:** Conduct a credible fusion ignition experiment.
- **2012:** Demonstrate baseline Uncertainty Quantification aggregation methodology for full system weapon performance prediction; provide a new Sequoia Platform computational capability.
- **2014:** Demonstrate predictive capability for weapon system response to hostile radiation environments; develop, implement, and apply a suite of physics-based models and high-fidelity databases to enable predictive simulation of the initial conditions for primary boost; provide a full-system safety assessment.
- **2016:** Provide capabilities underpinning advanced fire safety.
- **2018:** Provide capabilities to assess and certify surety improvements; provide a validated capability for primary boost and yield prediction.
- **2020:** Deliver a physics-based capability to enable quantitative assessment of secondary performance.

5. Infrastructure (Federal and Contractor Workforce and Facilities)

5.A. Essential Capabilities

The objective of the NNSA modernization plan is to ensure that the capabilities are in place to support national security requirements over the next decades in the areas of deterrence, arms control, nonproliferation, and counterterrorism.

Historical approaches emphasized warhead production in a regime where nuclear testing was permitted and stockpile turnover was frequent. In contrast, our approach has transitioned over the last two decades from reliance on extensive underground nuclear testing to reliance on stewardship of the stockpile without underground nuclear testing. Stockpile stewardship is accomplished through a robust ST&E federal and contractor workforce and unique science-focused facilities that provide simulation tools and experimental capabilities required for fundamental knowledge of the weapons we assess and certify. Finally, the modern strategy puts increased emphasis on an integrated approach to managing the stockpile, redeveloping the ST&E base, and implementing a modern physical infrastructure.

5.B. Federal and Contractor Workforce

NNSA's Three Key Plan Elements

- A strong ST&E base
- The requisite infrastructure
- Successful execution of the required stockpile Life Extension Programs

These key elements rest upon the strength of the federal and contractor workforce. The suite of skills necessary to design, produce, assess, and dismantle highly specialized nuclear devices and weapons are specialized, diverse, and highly demanding. It will not be possible for the NNSA plan to succeed without explicit focus on recruiting, training, retaining, and motivating the federal and contractor workforce.

Accomplishing the stockpile stewardship and management goals requires a highly capable federal and contractor workforce with the specialized skills needed to sustain the nuclear deterrent and support related national security goals. As the United States moves to reduce the role and numbers of nuclear weapons, there is an urgent need to refresh the intellectual infrastructure of the Federal and management and operations (M&O) contractor workforce. Critical skills needed to perform the mission are at risk due to a variety of pressures over time. The NNSA will continue to offer opportunities to exercise unique and essential skills in sustained stable programs of national importance to preserve their viability. The President's budget puts the NNSA complex on the path of revitalizing and exercising the federal and contractor workforce through execution of LEPs and investments in meaningful ST&E national security challenges.

Path Forward

The NNSA will maintain an enduring suite of critical skills and capabilities to assure the safety, security, and effectiveness of the nuclear stockpile, even as the Nation reduces the numbers of warheads and decreases reliance on nuclear weapons. Numerous critical skills studies have been conducted over the last decade which records the advancing age of the NNSA federal and contractor workforce and the growing concern

over the ability of the nuclear weapons complex to attract and retain qualified and skilled replacements. Meeting these challenges in concert with the growing concerns over the aging stockpile places a high premium on intellectual excellence and the need to attract and retain the next generation of scientists and engineers. Our future requires:

NPR Analysis of the Nuclear Weapons Complex Physical infrastructure

- Today's aged physical infrastructure, especially in areas dealing with plutonium and highly enriched uranium, is not adequate for the future.
- Essential nuclear facilities will require years to build and become operational.
- A capability-based approach to the infrastructure represents an appropriate balance between risk and cost and can support the range of NPR alternatives.

- Emphasis on the integration of science into product;
- Commitment to product realization and quality through an expanding reliance on computation and simulation, supported by a strong experimental test basis;
- An environment where design and qualification employ new tools, new technologies, and a deep scientific understanding of our core products; and
- Challenging work that enhances competency and teamwork along with product realization.

Maintaining the right mix of skilled federal and contractor workforce as the NNSA mission evolves is a significant human capital management challenge. Sustaining the necessary ST&E base with the required critical skills to support the nuclear weapons complex and meeting the needs of an aging stockpile and infrastructure will require even more reliance on intellectual excellence.

5.C. Physical Infrastructure

Although substantial science, technology, and engineering investments were made over the past 15 years under the auspices of the Stockpile Stewardship Program, the overall operational complex, most specifically the manufacturing plants, remains to be transformed into a modern physical infrastructure that will enable the skilled federal and contractor workforce to make the level of contribution commensurate with its talent and capabilities. The NNSA will continue to engineer the physical infrastructure to be smaller, safer, more secure, and more effective.

The strategy for reducing the scale of the infrastructure is guided by an operational philosophy that calls for moving from a capacity-based complex, capable of designing and manufacturing thousands of nuclear warheads, to a smaller, more agile, capability-based nuclear weapons complex with the critical skills and facilities essential to maintain an effective nuclear deterrent. Smaller stockpiles or fewer manufacturing demands will not lead to a significantly smaller infrastructure because core capability must be maintained to assure that, regardless of size, the stockpile remains safe, secure, and effective. The modernized nuclear weapons complex will be achieved over the next two

decades and must provide all the essential ST&E and production capabilities to support projected stockpile requirements.

The President believes that sustained investments are needed over the coming decades to accomplish this transformation. The Vice President has noted that these investments are both necessary for our national security and as an enabler of our broader global nuclear security and nonproliferation efforts. The Administration is fully committed to taking the steps now, and over the longer term, to achieve the needed complex modernization and undertake the needed recapitalization.

Some major facilities dating to the 1940s and 1950s are oversized, costly to maintain, and pose mounting safety, security, and environmental challenges. These must be replaced. The highest priorities are the major nuclear materials processing facilities for plutonium and uranium. Accordingly, the Administration is seeking Congressional support to replace the Chemical and Metallurgy Research (CMR) facility with the CMR Replacement project at Los Alamos National Laboratory, and to build a new Uranium Processing Facility at the Y-12 Plant in Oak Ridge, Tennessee. Notable observations on the infrastructure consistent with the NPR include:

- New plutonium and uranium facilities are not projected to be available until the 2020 timeframe. To realize these capabilities in this timeframe will require an extended commitment, due to the long time period for acquisition.

- Existing Los Alamos plutonium facilities are not sustainable and do not provide an inherent manufacturing capacity sufficient for the range of possible future scenarios. Improvements to PF-4 and waste processing capabilities will be necessary for a sustainable infrastructure.

- Given the significant risk of shutdown of existing uranium facilities at Y-12, a sustainable future will only be possible with a new Uranium Processing Facility.

- Construction of replacement high-explosive facilities at Pantex will reduce age-degradation risks for facilities that currently produce that essential weapon component.

- The significant new investment in the NNSA recognizes that this capability-based approach is not without technical and production risks. Managing these risks requires an integrated approach to managing the stockpile, ST&E development, and implementation of a modern physical infrastructure. Infrastructure modernization will be needed under all future stockpile scenarios, and will take over a decade to be fully operational.

Path Forward

Key physical infrastructure actions and milestones for the next ten years to support our path to achieve a future transformed nuclear weapons complex, include the following:

- Complete the design and begin construction of the Chemistry and Metallurgy Research Replacement Nuclear Facility at Los Alamos (a facility that conducts

plutonium research and development and provides analytical chemistry and materials characterization to all plutonium programs such as surveillance, manufacturing, and plutonium disposition.) Plan and program to complete construction no later than 2020, and ramp up to full operations in 2022.

- Increase pit processing capacity and capability at the adjoining PF-4 (part of the main plutonium facility) at Los Alamos to demonstrate pit reuse by 2017 and manufacturing by 2018-2020. Plan and program to ramp up to a manufacturing capability of up to 80 pits per year in 2022. Complete required investment in PF-4 infrastructure and waste processing capabilities in time to support expected plutonium capability in 2022.

- Complete the design and begin construction of the Uranium Processing Facility at Y-12 to support production and surveillance of highly-enriched uranium components. Plan and program to complete construction no later than 2020; ramp up to a production capability of up to 80 canned subassemblies per year by 2022.

It is also important to highlight that the focus of this summary has been on the "major" nuclear projects. In terms of a strategic timeline, Figure S-6 depicts the NNSA major infrastructure milestones. There are a few major projects that have not been discussed that are presented with more detailed information in Annex D.

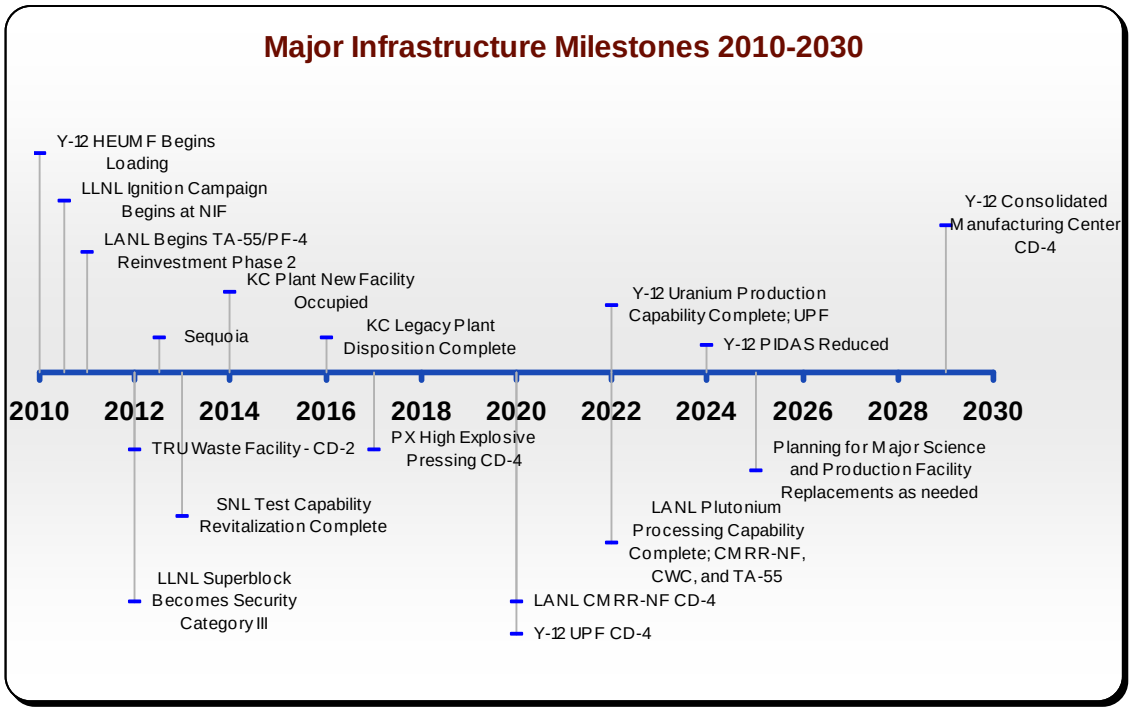


Figure S-6. NNSA Major Infrastructure and Key Milestones

6. Program Direction

The Stockpile Stewardship Program preserves the Nation's nuclear stockpile in a safe, secure, and effective status without a need for underground testing. Stockpile Management activities provide the details by which that stockpile is maintained, assessed, made more safe and secure, has its effective service life extended through planned refurbishments, and is eventually retired and dismantled in accordance with national policy.

Governance (how the M&O contractors relate to NNSA) will continue to improve and result in cost-effective practices. Governance reforms will be sustained over periods measured in years.

Program Direction: Managing the Work

The NNSA nuclear weapons complex consists of an overall mission; overarching strategies for achieving this mission; unique scientific, technological, engineering, and fabrication capabilities that enable the execution of the mission and its strategies; and, ultimately, the successful application of these capabilities to produce solutions that meet national needs. The nuclear weapons complex will execute its functions in a manner that is safe, secure, and respectful of the environment, while continuing to implement effective practices that manage risks and costs.

Methods for the management of performance, costs, and schedules to complete Stockpile Stewardship and Management project deliverables are in place. More details of how the Stockpile Stewardship Program is managed are found in Annex A. These methods ensure that Weapons Activities are integrated, both programmatically and geographically across the entire nuclear weapons complex.

The DOE has committed to project management principles to improve performance on all projects in general and major construction projects specifically. A key element of these principles is the requirement to advance design maturity to a sufficient level prior to establishing the performance baseline that is essential to project management success. As an example, major nuclear facility construction projects will not have cost and schedule baselines until design is nearly 90 percent complete.

Assignment of Roles, Allocation of Workload

The NNSA assigns roles and work to each of the sites in order to balance the effort in a manner that best leverages resources and capabilities at a given facility to achieve the overarching mission. The NNSA allocates work by first prioritizing major design, qualification, production, assembly, disassembly and inspection efforts, then shifting schedules for work to time periods of lesser demand. Activity peaks and valleys are, therefore, minimized and moderated. The outcomes from these extensive workload optimization exercises, fully negotiated with the Department of Defense, are reflected in the Production and Planning Directive (P&PD).

Program Management Approaches

The NNSA manages the performance, costs, and schedules to achieve Stockpile Stewardship Program deliverables. One Integrated Priority List has been created for all the efforts encompassed in the eight programs and campaigns of the NNSA Weapons Activities. A national work breakdown structure (NWBS) has been generated for all Defense Programs efforts. It is being deployed in stages, and should be fully implemented in 2011. The subdivisions of the work that the NWBS provides serve to organize a major portion of the Stockpile Stewardship and Management endeavor across the entire weapons complex. By developing the NWBS in complete alignment with budget funding categories, the structure not only serves to organize the scope of performance but is also intrinsically linked with financial tracking systems, which enables effective cost management with clarity in expenditure categories.

Independent Warhead Assessment

In May 2009, the Department of Energy Secretary approved a memorandum[1] outlining requirements and expectations for how annual assessments of the nuclear stockpile benefit from rigorous peer reviews. The memorandum, in its summary section, states: "*In a world without nuclear weapons testing, the assessment process is a complex evaluation of risks. All of the facets of these complex evaluations converge at the (NNSA) Lab(oratory) Directors as the integrator. All contributions to this assessment need to be as transparent as possible to contribute to credibility. The enhanced laboratory review and the external expert review will support the credibility of the product for the Secretaries of Energy and Defense.*" With memorandum approval, the Secretary established a departmental policy that "*…an independent assessment of the warhead condition (be conducted) relative to its system requirements by a laboratory challenge team not responsible for fielding the warhead. This independent assessment would be provided to the laboratory directors responsible for the system and would be used as part of their annual assessment or certification process*."

Consequently, the NNSA tasked the national laboratories to develop a plan for independent warhead assessment that utilizes independent teams to provide evaluations to the Laboratory Directors for their use in the annual stockpile assessment process.

Funding for Weapons Activities

The President's FY 2011 Budget Request submitted to Congress incorporates significant increases of approximately 10 percent for the Weapons Activities, including:

- More than $2.0 billion for Stockpile Support activities (up $405 million, or ~25 percent);
- $1.6 billion for ST&E (up $153 million, or 10.4 percent), and

[1] Action memorandum from Thomas P. D'Agostino, NNSA Administrator to the Secretary; Subject: "*Action-Peer Review within Warhead Assessments*"; approved by Department of Energy Secretary on May 10, 2009

- More than $2.3 billion for infrastructure (up $102.6 million, or 4.8 percent) – including funding for major long-term construction projects to replace aging and expensive-to-maintain buildings that house critical capabilities for plutonium and uranium.

The President's FY 2011 submittal to Congress contains information for five years (FY 2011-2015) as required by section 3253 of P.L. 106-065, entitled Future-Years Nuclear Security Program (FYNSP). This report provides further projected estimates through FY 2030 as requested by statutory language. The following caveats apply to this further extrapolation of anticipated budget requirement estimates:

- A number of anticipated events cannot be precisely accounted for at this time, because project baselines are still being developed. For example, the construction baselines for UPF and CMRR-NF are not expected to be available until FY 2013. Other examples are the LEP studies that first must be completed before future costs can be estimated.

- There are a number of situations which could impact these funding profiles. The most significant would be a lack of availability in the infrastructure before planned replacements can be brought on line. Further examples include the threat of surprise in the stockpile and unexpected effects on funding due to demands to support promised pensions.

- The budget projection summarized below reflects Uranium Processing Facility and Chemistry and Metallurgy Research Replacement Nuclear Facility completion in 2020. Consistent with new DOE project planning principles, these projects will not be baselined until the design is nearly completed. Once the baselines for these projects are established (2012/2013), the plan will be updated.

Table S-1. The Future -Years Nuclear Security Program (FYNSP) in Billions of Dollars for Weapons Activities

	FY 2011 Congressional Budget					FYNSP + 5				
Fiscal Year	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Directed Stockpile Work	1.898	1.901	1.999	2.240	2.346	2.4	2.5	2.5	2.4	2.5
Science Technology & Engineering Campaigns	1.737	1.732	1.716	1.717	1.731	1.9	2.0	2.1	2.2	2.3
Readiness in Technical Base and Facilities	1.849	1.873	1.841	1.927	1.998	2.5	2.7	2.7	2.4	2.2
Other Weapons Activities	1.525	1.527	1.525	1.517	1.573	1.6	1.7	1.7	1.7	1.8
(dollars in billions) Total	**7.009**	**7.033**	**7.082**	**7.401**	**7.648**	**8.4**	**8.9**	**9.0**	**8.7**	**8.8**

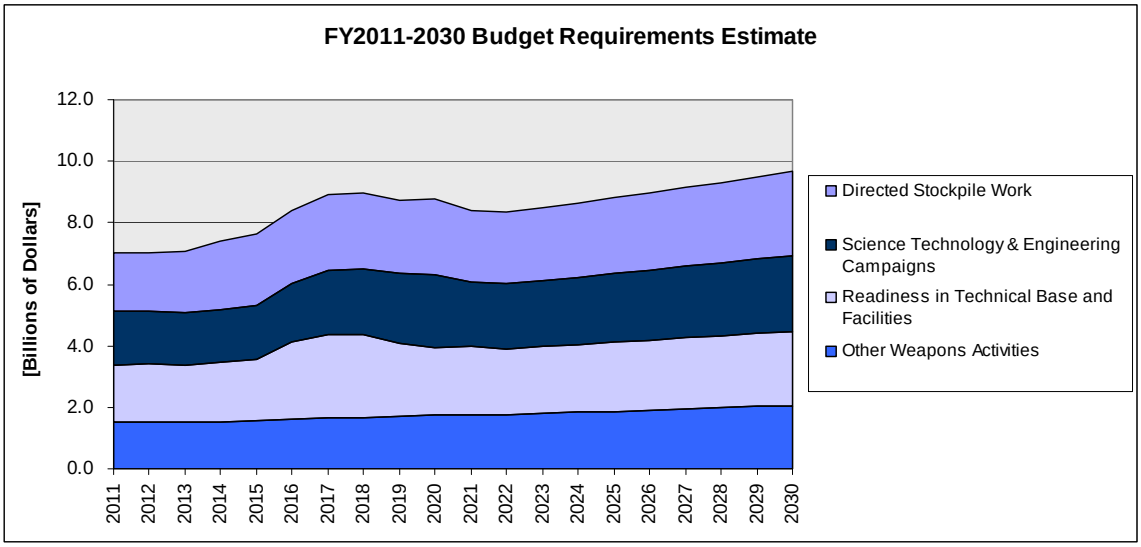


Figure S-7. An Out-Years Budget Requirements Estimate of NNSA Weapons Activities[2] in then-year dollars.

[2] FY 2011-2015 figures are from the President's FY 2011 Budget Request submitted to Congress in February

7. Key Points and Conclusions

Evolving national policy, reflected in the 2010 Nuclear Posture and Quadrennial Defense Reviews, provides guidance for the size and composition of the nuclear stockpile for the foreseeable future. It also reaffirms the necessity for the nuclear deterrent to be sustained without underground nuclear testing, without the production of new fissile materials, and without development of new nuclear military capabilities. As the DoD translates the nuclear policy and strategy into specific stockpile details with Presidential approval, the NNSA will evolve its stockpile life extension plans to reflect the NPR requirements. Simultaneously, the existing stockpile will be continually assessed and sustained and retired weapons will be dismantled.

Articulated national policy direction also allows the NNSA to plan the required future physical and intellectual infrastructure. The most significant physical infrastructure achievements will be the completion of the Chemistry and Metallurgical Research Replacement Nuclear Facility and the Uranium Processing Facility. The NNSA does not project significant changes in federal and contractor workforce size or composition in the near term. The NNSA will, however, be diligent about assuring the right skill mix is maintained for the future, within an appropriately sized federal and contractor workforce to accomplish its mission.

The NNSA will:

- Deliver required W76-1 warheads to the Navy;
- Complete the B61 LEP for the Air Force;
- Initiate an LEP study in 2011 on the W78 for the Air Force;
- Build the physical infrastructure required to support the stockpile of tomorrow;
- Attract and retain the top national talent and expertise;
- Advance the ST&E base to provide key nuclear weapon scientific understanding and maintain the ability to acquire key weapon-relevant data; and
- Provide the opportunity to fully exercise design and production skills.

The NNSA plans will enable the sustainment of the stockpile and modernization of the physical infrastructure within appropriated resources.

This Page Intentionally Blank.

Appendix A

Requirements Mapping

US Code of Federal Regulations – Title 50		
Location	**Language**	**NNSA Response**
2523(a)	Plan for stewardship, management, and certification of warheads in the nuclear weapons stockpile (a) Plan requirement The Secretary of Energy shall develop and annually update a plan for maintaining the nuclear weapons stockpile. The plan shall cover, at a minimum, stockpile stewardship, stockpile management, and program direction and shall be consistent with the programmatic and technical requirements of the most recent annual Nuclear Weapons Stockpile Memorandum. (b) Plan elements The plan and each update of the plan shall set forth the following:	Annexes A and B
2523(b)(1)	(1) The number of warheads (including active and inactive warheads) for each warhead type in the nuclear weapons stockpile.	Annex B, Section 1.B
2523(b)(2)	(2) The current age of each warhead type, and any plans for stockpile lifetime extensions and modifications or replacement of each warhead type.	Annex B, Chapter 2
2523(b)(3)	(3) The process by which the Secretary of Energy is assessing the lifetime, and requirements for lifetime extension or replacement, of the nuclear and nonnuclear components of the warheads (including active and inactive warheads) in the nuclear weapons stockpile.	Annex A, Sections 1.H and 1.I; 2.C, 2.E Annex B, Chapter 2
2523(b)(4)	(4) The process used in recertifying the safety, security, and reliability of each warhead type in the nuclear weapons stockpile.	Annex A, Sections 1.H and 1.I; 2.C, 2.E Annex B, Section 5.B
2523(b)(5)	(5) Any concerns which would affect the ability of the Secretary of Energy to recertify the safety, security, or reliability of warheads in the nuclear weapons stockpile (including active and inactive warheads).	Annex B, Chapter 6

US Code of Federal Regulations – Title 50		
Location	**Language**	**NNSA Response**
2523(c)	(c) Annual submission of plan to Congress The Secretary of Energy shall submit to Congress the plan developed under subsection (a) not later than March 15, 1998, and shall submit an updated version of the plan not later than May 1 of each year thereafter. The plan shall be submitted in both classified and unclassified form.	Annex A Annex B

P.L. 111-84	National Defense Authorization Act for Fiscal Year 2010 (H.R. 2647)	
Location	**Language**	**NNSA Response**
3112 (a) 50 USC 2522(c)(1)	REPORT.—(1) In each odd-numbered year, beginning in 2011, the Secretary of Energy shall include in the stockpile stewardship plan required by section 4203 a report containing the following elements:	Annex C, Section 1.C
3112(a) 50 USC 2522(c)(1)(A)	''(A) A description of the information needed to determine that the nuclear weapons stockpile is safe and reliable and the relationship of the science-based tools to the collection of that information.	Annex C, Section 1.C
3112(a) 50 USC 2522(c)(1)(B)	A description of any updates to the criteria established under subsection (a) during— ''(i) the previous two years; or ''(ii) with respect to the report in 2011, the period beginning on the date of the submission of the report under section 3133 of the National Defense Authorization Act for Fiscal Year 2004 (Public Law 108–136; 117 Stat. 1751; 50 U.S.C. 2523 note) and ending on the date of the submission of the 2011 stockpile stewardship plan required by section 4203.	Annex C, Section 1.C Annex B, Section 5.C
3112(a) 50 USC 2522(c)(1)(C)	For each science-based tool to collect information needed to determine that the nuclear weapons stockpile is safe, secure, and reliable that is developed or modified by the Department of Energy during the relevant period described in subparagraph (B)— ''(i) a description of the relationship of the science based tool to the collection of such information; ''(ii) a description of criteria for assessing the effectiveness of the science-based tool in collecting such information.	Annex C, Section 1.D
3112(a) 50 USC 2522(c)(2)(A) 50 USC 2522(c)(2)(D)	An assessment described in paragraph (2). An assessment described in this paragraph is an assessment of the stockpile stewardship program conducted by the Administrator for	Annex C, Section 1.D

P.L. 111-84	National Defense Authorization Act for Fiscal Year 2010 (H.R. 2647)	
Location	**Language**	**NNSA Response**
	Nuclear Security in consultation with the directors of the national security laboratories. Such assessment shall set forth the following: ''(A) An identification and description of— ''(i) any key technical challenges to the stockpile stewardship program; and ''(ii) the strategies to address such challenges without the use of nuclear testing.	Annex B, Chapter 6
3112(a) 50 USC 2522(c)(2)(B)	''(B) A strategy for using the science-based tools (including advanced simulation and computing capabilities) of each national security laboratory to ensure that the nuclear weapons stockpile is safe, secure, and reliable without the use of nuclear testing.	Annex C, Section 1.D
3112(a) 50 USC 2522(c)(2)(C)	''(C) An assessment of the science-based tools (including advanced simulation and computing capabilities) of each national security laboratory that exist at the time of the assessment compared with the science-based tools expected to exist during the period covered by the future-years nuclear security program.	Annex C. Section 1.D
3112(a) 50 USC 2522(c)(2)(D)	''(D) An assessment of the core scientific and technical competencies required to achieve the objectives of the stockpile stewardship program and other weapons activities and weapons-related activities of the Department of Energy, including— ''(i) the number of scientists, engineers, and technicians, by discipline, required to maintain such competencies; and ''(ii) a description of any shortage of such individuals that exists at the time of the assessment compared with any shortage expected to exist during the period covered by the future-years nuclear security program.''.	Annex C, Section 1.D
3113(a) 50 USC 2524(c)	PROGRAM PLAN.—In carrying out the stockpile management program under subsection (a), the Secretary of Energy shall develop a long-term plan to extend the effective life of the weapons in the nuclear weapons stockpile without the use of nuclear weapons testing. The plan shall include the following:	Annex B
3113(a) 50 USC 2524(c)(1)	Mechanisms to provide for the manufacture, maintenance, and modernization of each	Annex B, Chapter 4

P.L. 111-84	National Defense Authorization Act for Fiscal Year 2010 (H.R. 2647)	
Location	**Language**	**NNSA Response**
	weapon design in the nuclear stockpile, as needed.	
3113(a) 50 USC 2524(c)(2)	Mechanisms to expedite the collection of information necessary for carrying out the program, including information relating to the aging of materials and components, new manufacturing techniques, and the replacement or substitution of materials.	Annex B, Section 4.C
3113(a) 50 USC 2524(c)(3)	Mechanisms to ensure the appropriate assignment of roles and missions for each nuclear weapons laboratory and production plant of the Department of Energy, including mechanisms for allocation of workload, mechanisms to ensure the carrying out of appropriate modernization activities, and mechanisms to ensure the retention of skilled personnel.	Annex A, Section 1.D, 12.C
3113(a) 50 USC 2524(c)(4)	Mechanisms to ensure that each national laboratory of the National Nuclear Security Administration has full and complete access to all weapons data to enable a rigorous peer review process to support the annual assessment of the condition of the nuclear weapons stockpile required under section 4205.	Annex A, Section 1.H, 12.C; Annex B, Section 4.C
3113(a) 50 USC 2524(c)(5)	Mechanisms for allocating funds for activities under the program, including allocations of funds by weapon type and facility.	Summary Chapter 6; Annex A, Sections 1.D, 1.E, 1.H, and 1.L
3113(a) 50 USC 2524(c)(6)	An identification of the funds needed, in the fiscal year in which the plan is developed and in each of the following five fiscal years, to carry out the program.	Annex A, Section 1.L, plus Chapters 2 thru 14, Section I
3113(a) 50 USC 2524(d)	ANNUAL UPDATES.—The Secretary of Energy shall annually update the plan required under subsection (c) and shall submit the updated plan to Congress as part of the stockpile stewardship plan required by section 4203(c).	Annex A
3113(a) 50 USC 2524(e)	PROGRAM BUDGET.—In accordance with the requirements under section 4209, for each budget submitted by the President to Congress under section 1105 of title 31, United States Code, the amounts requested for the program under this section shall be clearly identified in the budget justification materials submitted to Congress in support of that budget.''.	Annex D
3116	Sec 3255 - BIENNIAL PLAN AND BUDGET	Annex D

P.L. 111-84	National Defense Authorization Act for Fiscal Year 2010 (H.R. 2647)	
Location	**Language**	**NNSA Response**
	ASSESSMENT ON THE MODERNIZATION AND REFURBISHMENT OF THE NUCLEAR SECURITY COMPLEX.	
3116 (a) 50 USC 2455 (a)(1)	The plan for the modernization and refurbishment of the nuclear weapons complex described under subsection (b)	Annex D, Chapter 2
3116 (a) 50 USC 2455 (a)(2)	An assessment by the Administrator of whether both the budget for such fiscal year and the future-years nuclear security program submitted to Congress in relation to such budget under section 3253 provide for funding of the nuclear weapons complex at a level that is sufficient for the modernization and refurbishment of the nuclear weapons complex in accordance with the plan described under subsection (b).	Annex D, Chapter 1.A. Summary, Chapter 1
3116 (a) 50 USC 2455 (b)	PLAN ELEMENTS.—(1) The plan required under subsection (a)(1) shall be designed so that the nuclear weapons complex is capable of supporting ''(A) the national security strategy of the United States, as set forth in the most recent national security strategy report of the President under section 108 of the National Security Act of 1947 (50 U.S.C. 404a), except that, if at the time such plan is submitted with the nuclear security budget materials a national security strategy report required under such section 108 has not been submitted to Congress, then such plan shall be designed so that the modernization and refurbishment of the nuclear weapons complex provided for under such plan is capable of supporting the nuclear weapons complex recommended in the report of the most recent Quadrennial Defense Review; and ''(B) the nuclear posture of the United States as set forth in the most recent Nuclear Posture Review.	Summary, Chapters 1, 2, 4 and 5
3116 (a) 50 USC 2455 (b)(2)(A)	A description of the modernization and refurbishment measures the Administrator determines necessary to meet the requirements of the national security strategy of the United States or the most recent Quadrennial Defense Review, whichever is applicable under paragraph (1)(A), and the Nuclear Posture Review.	Summary, Chapter 1 Annex D, Sections 1.D, 1.E, Chapter 2 and Section 3.C
3116 (a)	A schedule for implementing those measures	Annex D, Section 5.A

P.L. 111-84	National Defense Authorization Act for Fiscal Year 2010 (H.R. 2647)	
Location	**Language**	**NNSA Response**
50 USC 2455 (b)(2)(B)	determined necessary under subparagraph (A) during the 10 years following the date of the plan.	
3116 (a) 50 USC 2455 (b)(2)(C)	The estimated levels of annual funds the Administrator determines necessary to carry out the program, including a discussion of the criteria, evidence, and strategies on which such estimated levels of annual funds are based.	Annex D, Sections 4.A and 4.B
3116 (a) 50 USC 2455 (c)	BUDGET ASSESSMENT.—If the Administrator determines a budget request is insufficient for the modernization and refurbishment of the nuclear weapons complex provided for in the plan required under subsection (a)(1), the Administrator shall include with the nuclear security budget materials for such fiscal year a further assessment that describes and discusses the risks and implications associated with the ability of the nuclear weapons complex to support the annual certification of the nuclear stockpile of the United States and maintain its long-term safety, security, and reliability. Such assessment shall be coordinated in advance with the Secretary of Defense and the Commander of the United States Strategic Command	Annex D, Chapter 4

NNSA Stockpile Stewardship and Management Plan (*SSMP*)
Other Legislation and Reports Affecting the *SSMP*

House Report 110-185 to accompany H.R. 2641, FY08 E&W Development Appropriations Act		
Location	Language	NNSA Response
	Therefore, the Committee directs the Secretary, in consultation with the Department of Defense and Intelligence Community, to submit to the House and Senate Committees on Appropriations, a comprehensive nuclear security plan that: Includes a comprehensive nuclear defense and non-proliferation strategy, developed by all relevant stakeholders across the Administration, defining the future U.S. nuclear deterrent requirements and nuclear non-proliferation goals. To the extent this strategy involves the production and deployment of new warheads and acceleration of legacy warhead dismantlements, a statement of how such actions will impact the state of global security, with respect to the future U.S. nuclear deterrent and non-proliferation goals, should be included in the comprehensive strategy.	NPR
	Therefore, the Committee directs the Secretary, in consultation with the Department of Defense and Intelligence Community, to submit to the House and Senate Committees on Appropriations, a comprehensive nuclear security plan that. . . Includes a detailed description, prepared by the Department of Defense (DoD) and the Department of Energy (DOE), that translates the strategy described in (1) above into a specific nuclear stockpile, that:	NPR and Annex B, Section 1.A
	a. Aligns estimated global threats to the required characteristics of the U.S. nuclear stockpile in terms of specific numbers and types of warheads, both active and inactive, and associated delivery systems.	NPR
	b. Includes a complete, quantitative status of the current stockpile warhead inventory by type and delivery system and anticipated changes to reach the 2012 Moscow Treaty commitments, including an unclassified summary of the topline stockpile quantity.	NPR and Annex B, Chapter 1

House Report 110-185 to accompany H.R. 2641, FY08 E&W Development Appropriations Act		
Location	Language	NNSA Response
	c. Defines, in year by year increments planned changes in the size and composition of the nuclear stockpile through fiscal year 2030 required to meet the strategy described in (1) above up through 2030.	Annex B, Chapter 4
	Identify changes in the stockpile related to the nuclear force structure based on the strategy described in (1) above;	NPR
	the impact of accelerated warhead retirements and dismantlements based on out year stockpile requirements under the Moscow Treaty, as well as, potential reductions associated with the strategy described in (1) above;	Annex B, Section 1.C
	the impact of completing planned life extension milestones to extend the service life of the existing stockpile;	Annex B, Section 4.A
	the impact on the future stockpile employing both existing warheads and new warheads under the RRW proposal; required Life Extension Program throughput rates; required production rates for an operationally deployed RRW replacing an existing system; and associated dismantlement rates. This should include an unclassified summary of the topline stockpile quantity, per year,	No longer applicable
	required production rates for an operationally deployed RRW replacing an existing system;	No longer applicable
	and associated dismantlement rates. This should include an unclassified summary of the topline stockpile quantity, per year,	Summary Chapter 3.C; Annex B, Chapter 3
	a detailed analysis comparing the risks, costs and activity as a baseline;	No longer applicable
	b. A year-by-year resource plan from fiscal year 2008 through fiscal year 2030, subdivided into five-year milestones for dismantlements	Annex B, Section 1.C
	b. A year-by-year resource plan from fiscal year 2008 through fiscal year 2030, subdivided into five-year milestones for stockpile reduction, cost savings (with respect to the established, fiscal year 2008 baseline) . . . and how achievement of such milestones aligns with long-term complex transformation goals, specifically identifying the cost impacts of alternative strategies. This should include an unclassified summary of dismantlement progress, relative to the topline stockpile quantity for the given year	Annex B, Summary Chapter 3.B and 6

House Report 110-185 to accompany H.R. 2641, FY08 E&W Development Appropriations Act		
Location	Language	NNSA Response
	b. A year-by-year resource plan from fiscal year 2008 through fiscal year 2030, subdivided into five-year milestones for . . . complex consolidation . . . and how achievement of such milestones aligns with long-term complex transformation goals, specifically identifying the cost impacts of alternative strategies.	Summary Chapter 6 Annex D, Section 4.B
	b. A year-by-year resource plan from fiscal year 2008 through fiscal year 2030, subdivided into five-year milestones for . . . s . . . and how achievement of such milestones aligns with long-term complex transformation goals, specifically identifying the cost impacts of alternative strategies.	Annex B, Section 4.A
	b. A year-by-year resource plan from fiscal year 2008 through fiscal year 2030, subdivided into five-year milestones for. . . warhead refurbishments . . . and how achievement of such milestones aligns with long-term complex transformation goals, specifically identifying the cost impacts of alternative strategies	Annex B, Chapter 4
	b. A year-by-year resource plan from fiscal year 2008 through fiscal year 2030, subdivided into five-year milestones for . . . special nuclear material consolidation . . . and how achievement of such milestones aligns with long-term complex transformation goals, specifically identifying the cost impacts of alternative strategies.	Annex D, Section 4.B
	b. A year-by-year resource plan from fiscal year 2008 through fiscal year 2030, subdivided into five-year milestones for.. . . physical and cyber security requirements . . . and how achievement of such milestones aligns with long-term complex transformation goals, specifically identifying the cost impacts of alternative strategies.	Annex D, Section 4.B
	b. A year-by-year resource plan from fiscal year 2008 through fiscal year 2030, subdivided into five-year milestones for . . . proposed RRW production and deployment . . .	No longer applicable
	c. A detailed description of the potential impacts of significant reductions in the overall stockpile in terms of cost savings, physical security benefits, complex consolidation, and stockpile reliability, safety, and security.	Summary Chapter 5.B

House Report 110-185 to accompany H.R. 2641, FY08 E&W Development Appropriations Act		
Location	Language	NNSA Response
	d. Estimates of staffing requirements corresponding to achievement of five-year milestones and long-term complex transformation plans.	Annex D, Section 3.B
	e. A detailed cost-benefit analysis comparing the resources required to maintain the existing facilities for the existing stockpile to new facilities required to support RRW production and deployment, and a description of how NNSA will mitigate the potential risks and costs associated with simultaneously managing both competing objectives in the near term.	No longer applicable

House Report 111-203 to accompany H.R. 3183, FY10 E&W Development Appropriations Act		
Location	Language	NNSA Response
Page 128	*Report on Nuclear Stockpile.*—The Secretary of Energy shall, not later than December 1 of each year, submit a report to Congress specifying, for the due date of the report and projected for 5, 10, 15, and 20 years after that date, (1) the number of nuclear weapons of each type in the active and reserve stockpiles . . . Describe stockpile composition (active and reserve) for the report due date and projected forward for the next 5, 10, 15 and 20 years.	Annex B, Chapter 1
Page 128	(2) the strategic rationale for each type, and . . . Describe the strategic rationale for each weapon type for the report due date and projected forward for the next 5, 10, 15 and 20 years.	Annex B, Section 1.A
Page 128	(3) the past and projected future total direct life cycle cost of each type.	Annex B, Chapter 3

P.L. 111-84	National Defense Authorization Act for Fiscal Year 2010 (H.R. 2647)	
Location	Language	NNSA Response
1251(a)	Report on the Plan for the Nuclear Weapons Stockpile, Nuclear Weapons Complex and Delivery Platforms	Summary, Section 3.A
1251(a)(1)	REPORT REQUIRED.—Not later than 30 days after the date of the enactment of this Act or at the time a follow on treaty to the Strategic Arms Reduction Treaty (START Treaty) is submitted by the President to the Senate for its advice and consent, whichever is later, the President shall submit to the congressional defense committees, the Committee on Foreign Relations of the Senate, and the Committee on Foreign Affairs of the House of Representatives a report on the plan to— (A) enhance the safety, security, and reliability of the nuclear weapons stockpile of the United States; (B) modernize the nuclear weapons complex; and (C) maintain the delivery platforms for nuclear weapons.	Summary
1251(a)(2)	ELEMENTS.—The report required under paragraph (1) shall include the following:	Annexes A and D
1251(a)(2)(A)	A description of the plan to enhance the safety, security, and reliability of the nuclear weapons stockpile of the United States.	Annex A, Chapter 1
1251(a)(2)(B)	A description of the plan to modernize the nuclear weapons complex, including improving the safety of facilities, modernizing the infrastructure, and maintaining the key capabilities and competencies of the nuclear weapons federal and contractor workforce, including designers and technicians.	Annex D
1251(a)(2)(C)	A description of the plan to maintain delivery platforms for nuclear weapons.	Not applicable
1251(a)(2)(D)	An estimate of budget requirements, including the costs associated with the plans outlined under subparagraphs (A) through (C), over a 10-year period.	Annex D, Chapter 4

P.L. 111-84	National Defense Authorization Act for Fiscal Year 2010 (H.R. 2647)	
Location	Language	NNSA Response
3114(a)(1)	(a) DUAL VALIDATION.— (1) PLAN.—Not later than March 1, 2010, the Administrator for Nuclear Security shall submit to the congressional defense committees a plan (including a schedule) to carry out subsection (c) of section 4205 of the Atomic Energy Defense Act (division D of Public Law 107–314; 50 U.S.C. 2525), as added by paragraph (2) of this subsection.	Annex A, Section 1.G
3114(a)(2) 50 USC 2525 (c)	(c) DUAL VALIDATION TEAMS IN SUPPORT OF ASSESSMENTS.— In support of the assessments required by subsection (a), the Administrator for Nuclear Security may establish teams, known as 'dual validation teams', to provide each national security laboratory responsible for weapons design with independent evaluations of the condition of each warhead for which such laboratory has lead responsibility. A dual validation team established by the Administrator shall—	Annex A, Section 1.G
3114(a)(2) 50 USC 2525 (c)(1)	(1) be comprised of weapons experts from the laboratory that does not have lead responsibility for fielding the warhead being evaluated;	Annex A, Section 1.G
3114(a)(2) 50 USC 2525 (c)(2)	(2) have access to all surveillance and underground test data for all stockpile systems for use in the independent evaluations;	Annex A, Section 1.G
3114(a)(2) 50 USC 2525 (c)(3)	(3) use all relevant available data to conduct independent calculations; and	Annex A, Section 1.G
3114(a)(2) 50 USC 2525 (c)(4)	(4) pursue independent experiments to support the independent evaluations.	Annex A, Section 1.G
50 USC 2525 (d)	(d) Use of teams of experts for assessments The head of each national security laboratory shall establish and use one or more teams of experts, known as "red teams", to assist in the assessments required by subsection (a). Each such team shall include experts from both of the other national security laboratories. Each such team for a national security laboratory shall -	Annex A, Section 1.G
50 USC 2525 (d)(1)	(1) review both the matters covered by the assessments under subsection (a) performed by the head of that laboratory;	Annex A, Section 1.G
50 USC 2525 (d)(2)	(2) subject such matters to challenge; and any independent evaluations conducted by a dual	Annex A, Section 1.G

P.L. 111-84	National Defense Authorization Act for Fiscal Year 2010 (H.R. 2647)	
Location	Language	NNSA Response
	validation team under subsection (c)'	
50 USC 2525 (d)(3)	(3) submit the results of such review and challenge, together with the findings and recommendations of such team with respect to such review and challenge, to the head of that laboratory.	Annex A, Section 1.G
50 USC 2525 (e)	(e) Report on assessments Not later than December 1 of each year, each official specified in subsection (b) shall submit to the Secretary concerned, and to the Nuclear Weapons Council, a report on the assessments that such official was required by subsection (a) to complete. The report shall include the following:	Annex A, Section 1.G
50 USC 2525 (e)(1)	(1) The results of each such assessment.	Annex A, Section 1.G
50 USC 2525 (e)(2)(A)	(2)(A) Such official's determination as to whether or not one or more underground nuclear tests are necessary to resolve any issues identified in the assessments and, if so - (i) an identification of the specific underground nuclear tests that are necessary to resolve such issues; and (ii) a discussion of why options other than an underground nuclear test are not available or would not resolve such issues.	Annex A, Section 1.G
50 USC 2525 (e)(2)(B)	(B) An identification of the specific underground nuclear tests which, while not necessary, might have value in resolving any such issues and a discussion of the anticipated value of conducting such tests.	Annex A, Section 1.G
50 USC 2525 (e)(2)(C)	(C) Such official's determination as to the readiness of the United States to conduct the underground nuclear tests identified under subparagraphs (A)(i) and (B), if directed by the President to do so.	Annex A, Section 1.G
50 USC 2525 (e)(3)	(3) In the case of a report submitted by the head of a national security laboratory -	Annex A, Section 1.G
50 USC 2525 (e)(3)(A)	(A) a concise statement regarding the adequacy of the science-based tools and methods being used to determine the matters covered by the assessments;	Annex A, Section 1.G
50 USC 2525 (e)(3)(B)	(B) a concise statement regarding the adequacy of the tools and methods employed by the manufacturing infrastructure required by section 2532 of this title to identify and fix any inadequacy with respect to the matters covered by the assessments	Annex A, Section 1.G

P.L. 111-84	National Defense Authorization Act for Fiscal Year 2010 (H.R. 2647)	
Location	Language	NNSA Response
50 USC 2525 (e)(3)(C)	(C) a concise summary of the findings and recommendations of any teams under subsection (d) that relate to the assessments, together with a discussion of those findings and recommendations, and	Annex A, Section 1.G
50 USC 2525 (e)(3)(D)	(D) a concise summary of the results of any independent evaluation conducted by a dual validation team under subsection (c).	Annex A, Section 1.G
50 USC 2525 (e)(4)	(4) In the case of a report submitted by the Commander of the United States Strategic Command, a discussion of the relative merits of other nuclear weapon types (if any), or compensatory measures (if any) that could be taken, that could enable accomplishment of the missions of the nuclear weapon types to which the assessments relate, should such assessments identify any deficiency with respect to such nuclear weapon types.	Annex A, Section 1.G
50 USC 2525 (e)(5)	(5) An identification and discussion of any matter having an adverse effect on the capability of the official submitting the report to accurately determine the matters covered by the assessments.	Annex A, Section 1.G
50 USC 2525 (f)(1)	(f) Submittals to the President and Congress (1) Not later than March 1 of each year, the Secretary of Defense and the Secretary of Energy shall submit to the President -	Annex A, Section 1.G
50 USC 2525 (f)(1)(A)	(A) each report, without change, submitted to either Secretary under subsection (e) during the preceding year;	Annex A, Section 1.G
50 USC 2525 (f)(1)((B)	(B) any comments that the Secretaries individually or jointly consider appropriate with respect to each such report;	Annex A, Section 1.G
50 USC 2525 (f)(1)((C)	(C) the conclusions that the Secretaries individually or jointly reach as to the safety, reliability, performance, and military effectiveness of the nuclear weapons stockpile of the United States; and	Annex A, Section 1.G
50 USC 2525 (f)(1)((D)	(D) any other information that the Secretaries individually or jointly consider appropriate.	Annex A, Section 1.G
50 USC 2525 (f)(2)	(2) Not later than March 15 of each year, the President shall forward to Congress the matters received by the President under paragraph (1) for that year, together with any comments the President considers appropriate.	Annex A, Section 1.G

P.L. 111-84	National Defense Authorization Act for Fiscal Year 2010 (H.R. 2647)	
Location	Language	NNSA Response
50 USC 2525 (g)	(g) Classified form Each submittal under subsection (f) shall be in classified form only, with the classification level required for each portion of such submittal marked appropriately.	Annex A, Section 1.G
50 USC 2525 (h)	(h) Definitions In this section: (1) The term "national security laboratory" has the meaning given such term in section 2471 of this title. (2) The term "Secretary concerned" means - (A) the Secretary of Energy, with respect to matters concerning the Department of Energy; and (B) the Secretary of Defense, with respect to matters concerning the Department of Defense.	Annex A, Section 1.G
50 USC 2525 (i)	(i) First submissions (1) The first submissions made under subsection (e) shall be the submissions required to be made in 2003. (2) The first submissions made under subsection (f) shall be the submissions required to be made in 2004.	No longer applicable