Chapter 5
Stockpile Management, Processes, and Organizations

5.1 Overview

Stockpile management is a complex undertaking because of the sophistication of U.S. nuclear weapons and the numbers of weapons and components involved. All stockpile management activities are coordinated between the DoD and the DOE/NNSA. Stockpile management is the sum of the activities, processes, and procedures for the design engineering, concept development, production, quality assurance, fielding, maintenance, repair, storage, transportation, physical security, employment (if directed by the President), dismantlement, and disposal of U.S. nuclear weapons and associated components and materials. It ensures the stockpile is safe, secure, and reliable to perform as the Nation's nuclear deterrent.

The stockpile management process is dynamic. Programs and activities must be properly coordinated to ensure all U.S. nuclear weapons will work as designed, when authorized, and remain safe and secure at all times. For example, weapon surveillance,[1] scheduled maintenance, refurbishment programs, and assembly or disassembly activities must all be coordinated in the context of future year resources such as budgets, human capital, and facilities.

5.2 Stockpile Management Evolution

The U.S. approach to stockpile management has evolved over time to reflect the military and political realities of the national and international security environment, as well as U.S. national security priorities and objectives. From 1945 to 1991, U.S. nuclear warheads were designed, developed, produced, deployed in the stockpile (usually for a period of 15 to 20 years), and retired and dismantled to be replaced by new, more modern weapons that generally offered unique military capabilities and better safety and security features. **Figure 5.1** illustrates U.S. nuclear stockpile management during the Cold War. This continuous replacement cycle was used to ensure U.S. nuclear weapons exploited technological advances and achieved the greatest military performance possible.

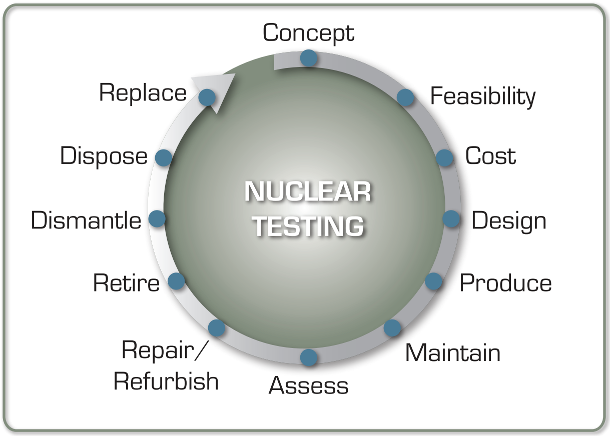


Figure 5.1 U.S. Nuclear Stockpile Management during the Cold War

During the Cold War, a primary objective in U.S. nuclear weapons design and development was to maximize yield in the smallest possible package, resulting in a maximum yield-to-weight ratio. Warheads were designed to be carried by increasingly more sophisticated and more capable delivery systems.[2] A second objective was to incorporate

---

[1] Surveillance is the term used to describe the activities to ensure weapons continue to meet established safety, security, and reliability standards. Surveillance involves system and component testing and is conducted with the goal of validating safety, estimating reliability, and identifying and correcting existing or potential problems with the weapons. As the stockpile continues to age well beyond its original planned life, the quality assurance approach has been expanded to include planned replacement for many key components before they begin to degrade in performance.

[2] The first nuclear delivery system, the *Enola Gay*, was a specially modified long-range bomber. Since 1945, the United States has added intercontinental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs) to its force posture to achieve the nuclear triad for strategic systems. For additional information on nuclear delivery systems, see *Chapter 3: U.S. Nuclear Forces and Weapons*.

modern safety and security features in the warheads, which added to the design complexity and the level of production sophistication. A third objective was to achieve operational flexibility in the stockpile. At the height of the Cold War, the United States had more than 50 different types of nuclear weapons in five delivery categories. This offered the President a wide range of options in the event nuclear weapons would need to be used. For a list of these delivery options, see **Figure 5.2**.

Figure 5.2 Cold War Nuclear Weapon Delivery Options

STRATEGIC, OFFENSIVE

- Intercontinental Ballistic Missiles*
- Strategic Heavy Bombers*
- Submarine-Launched Ballistic Missiles*
- Air-Delivered Bombs*
- Air-Launched Cruise Missiles*

STRATEGIC, DEFENSIVE

- Air Defense Missiles
- Anti-Ballistic Missiles

TACTICAL, OFFENSIVE

- Dual-Capable Aircraft (DCA)*
- Air-Delivered Bombs*
- Free-Flight Rockets
- Surface-Launched Ballistic Missiles
- Surface-Launched Cruise Missiles
- Artillery-Fired Atomic Projectiles

TACTICAL, DEFENSIVE

- Air Defense Missiles
- Atomic Demolition Munitions

TACTICAL, SEA

- Carrier-Based DCA
- Anti-Submarine Depth Bombs
- Air-Delivered Bombs
- Sea-Launched Cruise Missiles
- Torpedoes
- 16-inch Battleship Guns

* indicates currently existing U.S. nuclear weapon delivery vehicles

Weapons were designed so every component had to work independently and together exactly as specified for proper functioning of the weapon. The current U.S. nuclear stockpile is composed of a subset of these weapons. All of the weapons in the current stockpile were developed and produced during the Cold War and are approaching or have exceeded their original planned life.

In the period between the mid-1980s and the early 1990s, U.S. stockpile management strategies shifted significantly. The end of the Cold War in the late 1980s coincided with the closure of the Rocky Flats production facility.[3] The United States adjusted our national security

[3] The Rocky Flats Plant in Colorado was the only U.S. facility that mass-produced plutonium fissile components (called "pits"). When the Rocky Flats Plant closed, the United States lost capacity to mass produce pits. As recognized by the Nuclear Posture Review and subsequent Nuclear Enterprise Reviews, reestablishing a pit production capability (including plutonium processing) and building a modern secondary production facility are necessary steps for the DOE/NNSA to achieve a modernized and responsive capacity to produce nuclear components for stockpile life extension. When component manufacturing is reestablished in quantity, it will mark the beginning of a new stockpile support paradigm whereby the DOE/NNSA can meet stockpile requirements through its production infrastructure, rather than through the retention of a large inactive stockpile to support requirements. An important benefit of the

priorities and reconsidered the appropriate role for our nuclear weapons. In the early 1990s, there was a desire to realize the benefits of the "peace dividend," especially with reduced funding for nuclear weapons and nuclear forces. There was also an increasing awareness that nuclear proliferation and the possibility of a nuclear accident or nuclear terrorism was becoming the most urgent threat facing the United States and its allies. In response to these changing geopolitical circumstances, President George H. W. Bush announced the immediate termination of additional nuclear weapons production in 1991 and a moratorium on nuclear testing, which began in 1992 and has continued ever since. As a result, the nuclear weapons modernization and replacement model was abruptly terminated and replaced with a mandate for the indefinite retention of the weapons in the legacy stockpile without underground nuclear testing. To fulfill this mandate, stockpile management strategies evolved to maintain an established stockpile of aging weapons without underground nuclear testing that were originally designed to last no more than 20 years when supported with nuclear testing.

5.2.1 Stockpile Life Extension from 1992–Present

By 1992, when warhead production and underground nuclear testing had ended, the designs of each type of weapon in the stockpile had been confirmed with nuclear testing, and U.S. nuclear scientists and engineers were very confident in both the designs and manufacturing processes that produced the weapons. Because of this confidence, the primary stockpile management strategy to ensure the continued safety, security, and reliability of U.S. nuclear weapons was to maintain the weapons in the U.S. stockpile as close as possible to their original designs and specifications. This has been achieved through stockpile refurbishment life extension programs (LEPs). During this period, each weapon-type in the enduring stockpile had LEPs planned as far into the future as practicable, in many cases up to two decades. The LEP planning and the reductions in numbers associated with the various treaties led to a revised life-cycle for nuclear weapons as illustrated in **Figure 5.3.**

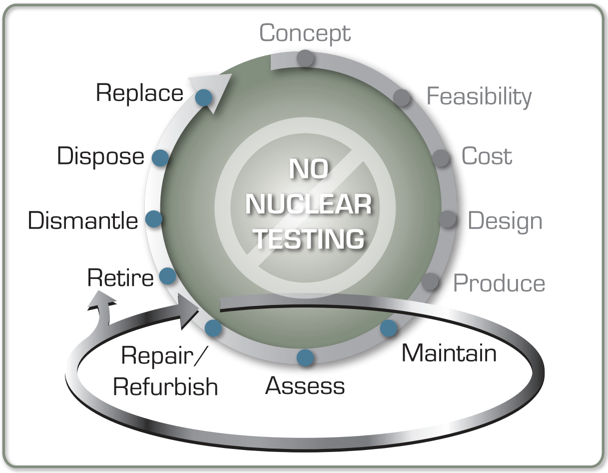
Refurbishment LEPs, which have been conducted since the 1990s, involve the use of existing or newly manufactured components that are based on the original designs specific to that weapon. Additionally, nuclear and non-nuclear components are produced as closely as possible to the original designs for a specific warhead. Deviations from original designs are often a result of "sunset" technologies (where there are no longer technologies

---

re-creation of this capability will be the eventual reduction in the total number of warheads retained in the stockpile and the creation of a responsive infrastructure that has the ability to respond to technical and geopolitical surprise. For a more in-depth discussion of this subject, see *Chapter 3: U.S. Nuclear Forces and Weapons*.

in existence to produce items) or manufacturing processes that cannot be replicated because of environmental or health hazards.

Figure 5.3 U.S. Approach to Stockpile Management, 1992–Present



There are two increasingly problematic issues with a refurbishment-only stockpile maintenance strategy. First, as a growing number of incremental changes are made to nuclear weapons through the refurbishment process, the further away from their original specifications the weapons become. Because these legacy weapons were built to push the envelope of the technologically possible in terms of achieving yield-to-weight ratios, very little margin for error exists so any deviations from very exact specifications could negatively impact confidence in the performance of the weapon in all its aspects (safety, security, and reliable yield). As confidence degrades and uncertainty is introduced, it is increasingly difficult to certify these weapons continue to meet safety, security, and yield standards.

The second issue is refurbishment offers little opportunity to enhance safety or security performance by introducing modern technological improvements. Currently fielded stockpile weapons have safety and security features that were developed in the 1970s and 1980s. Today, the United States has the technical capacity to produce safety and security features that are superior to those in the current warheads. However, the refurbishment LEP process restricts incorporation of more advanced safety and security features due to the limited ability to understand how these new technologies would interact with the function of existing safety, security, and yield characteristics of the weapon due to the testing moratorium.

5.2.2 Advancement of Stockpile Life Extension

The United States is taking advantage of innovations in safety and security and to preclude the need to resume underground nuclear testing. U.S. strategy is to ensure the continued safety, security, and effectiveness of the aging U.S. nuclear stockpile through the expansion of life extension options beyond a refurbishment-only approach. Every LEP involves the potential use of existing and newly manufactured nuclear and non-nuclear components. LEPs do not provide new military capabilities, nor do they result in "new" warheads.[4]

The newly expanded life extension process includes three technical approaches:

- *Refurbishment LEP approach*—replaces aging or otherwise defective non-nuclear and/or nuclear components using the same design as in the originally fielded warhead. This is the approach that has been used since the end of underground nuclear testing in the United States.
- *Reuse LEP approach*—replaces aging or otherwise defective nuclear components using a previously tested design from another type of weapon.[5]
- *Replacement LEP approach*—replaces aging or otherwise defective nuclear components using a previously tested design that has never been fielded in any U.S. weapon (but would not require underground nuclear testing to certify).

The LEP strategy is based on the following principles:

- LEPs will only use nuclear components based on previously tested designs and will not support new military missions or provide for new military capabilities.
- Without underground nuclear testing, each LEP will be certified to ensure the weapons meet military requirements and safety and security standards.
- Each LEP will follow the established Phase 6.X Process and will consider all three technical approaches. For more detailed information about the Phase 6.X Process, see *Appendix B: U.S. Nuclear Weapons Life-Cycle*.
- The use of the replacement LEP approach requires presidential approval and congressional authorization.

[4] A warhead is defined as "new" if the design of one or more of the nuclear components (within the nuclear explosive package—the pit or the secondary, either individually or together) was neither previously produced or tested nor based on previously tested designs. The use of newly manufactured non-nuclear components does not cause a nuclear weapon to be considered new.

[5] Both refurbishment and reuse LEPs may involve minor modifications to the nuclear components to ensure warhead safety, security, and reliable yield. Additionally, non-nuclear replacement components are routinely manufactured for use in warhead maintenance and stockpile sustainment.

5.3 Dual-Agency Responsibility for Stockpile Management

The U.S. nuclear weapons stockpile is co-managed by the Departments of Defense and Energy. Because of the special nature of the weapons, the management process is complex. Stockpile management is governed by laws, presidential directives, and joint agreements. Additionally, both the DoD and the DOE/NNSA have rules, processes, and documentation governing stockpile management. However, neither department is bound by the internal rules and regulations of the other. To further complicate the process, the DoD and the DOE/NNSA are appropriated funds to pay for nuclear weapon activities through different congressional committees.

> *"... this Stockpile Stewardship Program has allowed the Secretaries of Energy and Defense to certify to the President that the nation's nuclear weapons stockpile is safe, secure, and reliable, and that there is no need to resume underground testing... Thanks to the dedication of our 25,000 men and women across the country, using the best science and engineering tools, we have a more complete understanding of the health of the stockpile with each passing year."*
>
> *Dr. Everett H. Beckner, Former Deputy Administrator for Defense Programs, NNSA*

5.3.1 1953 Agreement

The responsibilities for nuclear weapons management and development were originally codified in the *Atomic Energy Act* of 1946, which reflected congressional desire for civilian control over the uses of atomic (nuclear) energy and established the Atomic Energy Commission (AEC) to manage the U.S. nuclear weapons program. Basic departmental responsibilities and the development process were specified in the *1953 Agreement Between the AEC and the DoD for the Development, Production, and Standardization of Atomic Weapons*, commonly known as the "1953 Agreement."

In 1974, an administrative reorganization transformed the AEC into the Energy Research and Development Agency (ERDA). A subsequent reorganization in 1977 created the Department of Energy. At the time, the Defense Programs (DP) portion of the DOE assumed the responsibilities of the AEC/ERDA. In 1983, the DoD and the DOE signed a Memorandum of Understanding (MOU), *Objectives and Responsibilities for Joint Nuclear Weapon Activities*, providing greater detail for the interagency division of responsibilities. In 2000, the NNSA was established as a semi-autonomous agency within the DOE responsible for the U.S. nuclear weapons complex and associated nonproliferation activities. **Figure 5.4** illustrates the evolution of the AEC to the NNSA. **Figure 5.5** illustrates the timeline of basic DoD-DOE nuclear weapons organization.

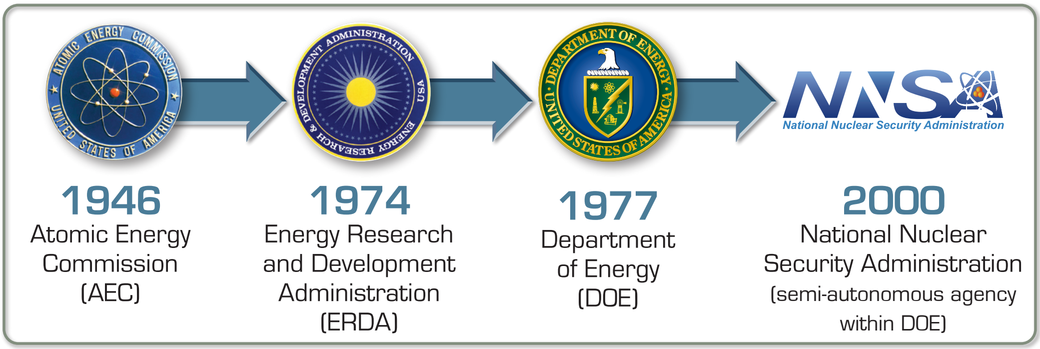


Figure 5.4 AEC to NNSA

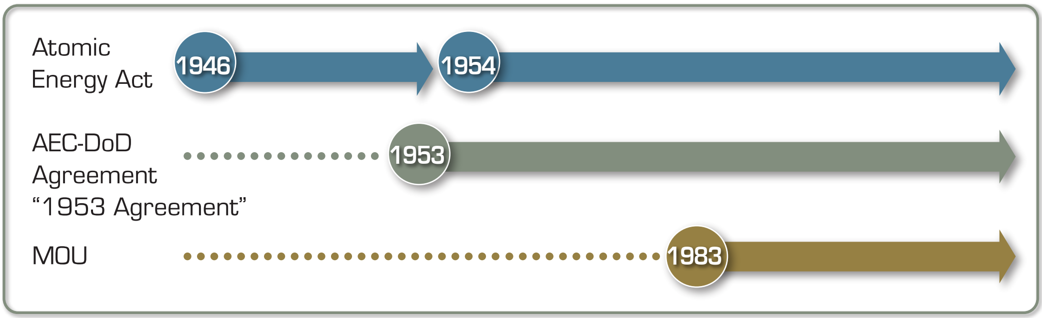


Figure 5.5 Timeline of DoD-DOE Nuclear-Related Agreements

While the fundamental dual-agency division of responsibilities for nuclear weapons has not changed significantly, the 1953 Agreement was supplemented in 1977 to change the AEC to the ERDA, again in 1984 to incorporate the details of the 1983 MOU, and most recently in 1988 to incorporate the then newly established Nuclear Weapons Council (NWC).

5.3.2 Departmental Responsibilities

The DoD is responsible for identifying the requirements that drive the retention of existing weapons and the need for modifications or additional weapons. The DoD is also responsible for operational employment preparedness, security, accountability, and logistical maintenance of weapons in DoD custody. Overall the DOE/NNSA is responsible for developing, producing, and maintaining nuclear weapons.

Specifically, the DoD is responsible for:

- participating in authorized concept and feasibility studies;
- developing requirements documents that specify operational characteristics for each warhead-type and the environments in which the warhead must perform or remain safe;
- participating in the coordination of the engineering interface requirements between the warhead and the delivery system;
- determining design acceptability;
- specifying military/national security requirements for specific quantities of warheads;
- receiving, transporting, storing, securing, maintaining, and, if directed by the President, employing fielded warheads;
- accounting for individual warheads in DoD custody;
- participating in the joint nuclear weapons decision process (including the NWC, the NWC Standing and Safety Committee (NWCSSC), working groups, and the warhead Project Officers Group (POG));
- developing and acquiring the delivery vehicle and launch platform for a warhead; and
- storing retired warheads awaiting dismantlement in accordance with jointly approved plans.

The DOE/NNSA is responsible for:

- participating in authorized concept and feasibility studies;
- evaluating and selecting the baseline warhead design approach;
- determining the resources (funding, nuclear and non-nuclear materials, human capital, facilities, etc.) required for the program;
- performing development engineering to establish and refine the warhead design;

DoD

- Establish military requirements
- Design, develop, test, and produce delivery systems
- Operate complete nuclear weapons system
- Secure and maintain nuclear weapons
- Train personnel and plan for employment

Nuclear Weapons Council

DOE

- Maintain safety, security, and reliability of the stockpile
- Research and develop nuclear weapon science, technology, and engineering
- Support stockpile levels
- Validate warhead safety and access reliability
- Produce and manage nuclear materials
- Train personnel and plan for employment

The DoD-DOE/NNSA Relationship

- engineering and establishing the required production lines;
- producing or acquiring required materials and components;
- assembling components and sub-assemblies into stockpile warheads (if approved by the President);
- providing secure transport within the United States;
- developing maintenance procedures and producing replacement limited life components (LLCs) and replacement components for refurbishment;
- conducting a jointly approved quality assurance program;
- developing a life extension plan, when required, for sustaining the stockpile;
- securing warheads, components, and materials while at DOE/NNSA facilities;
- accounting for individual warheads in DOE/NNSA custody;
- participating in the joint nuclear weapons decision process;
- receiving and dismantling retired warheads; and
- disposing of components and materials from retired warheads.

Both the Department of Defense and the Department of Energy rely primarily on the Nuclear Weapons Council to serve as a coordinating body for interagency activities associated with stockpile management.

The two departments communicate through multiple channels, which range from direct interaction among personnel from the scientific and engineering communities and military operators, to dialogue and activities among more senior officials and policy makers. Both the DoD and the DOE/NNSA rely primarily on the NWC to serve as a coordinating body for interagency activities associated with stockpile management.

5.3.3 Nuclear Weapons Council

The NWC serves as the focal point for interagency analyses and decisions to maintain and manage the U.S. nuclear weapons stockpile. The NWC is a joint DoD-DOE organization established to facilitate cooperation and coordination, reach consensus, and set priorities between the two departments as they fulfill their dual-agency responsibilities for U.S. nuclear weapons stockpile management.

The NWC provides policy guidance and oversight of the nuclear stockpile management process to ensure high confidence in the safety, security, and reliability of U.S. nuclear weapons. It meets regularly to raise and resolve issues between the DoD and the DOE/NNSA regarding concerns and strategies for stockpile management. The NWC is responsible for a number of annual reports that focus senior-level attention on important nuclear weapons issues. Specifically, the NWC is required to report to the President regarding the safety and reliability of the U.S. stockpile as well as to provide an annual recommendation on the need to resume underground nuclear testing to preserve the credibility of the U.S. nuclear deterrent. The NWC is obligated to evaluate the surety[6] of the stockpile and to report its findings to the President each year. **Figure 5.6** illustrates NWC membership as stated in *Title 10, section 179 of the U.S. Code*. For more information on the NWC and its subordinate bodies, see *Appendix A: Nuclear Weapons Council and Annual Reports*.

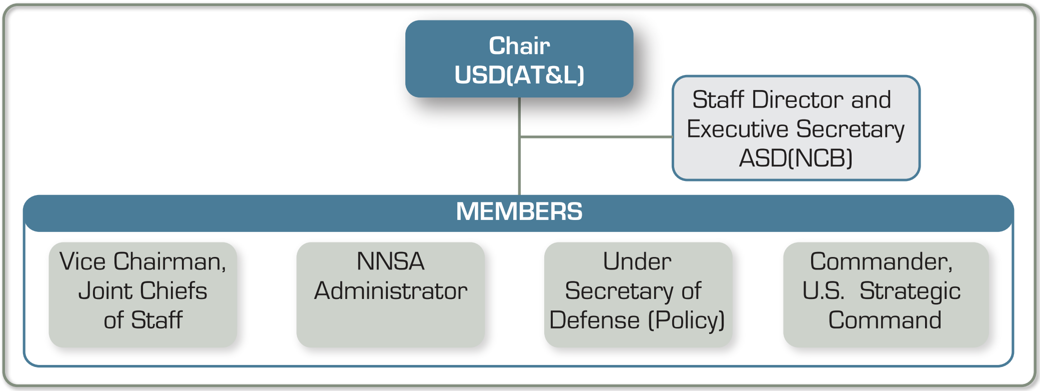


Figure 5.6 NWC Membership

5.4 Nuclear Weapon Development and Acquisition Policy

Existing nuclear weapons have been maintained well beyond their original programmed life. To ensure these weapons remain safe, secure, and reliable, the Departments of Defense and Energy have developed several approaches for maintaining these weapons. For the foreseeable future, there exists a need for a nuclear weapon development and acquisition policy. The responsibility to provide forces and the acquisition of military capability rests solely with the Military Departments.

[6] Nuclear weapons surety refers to the materiel, personnel, and procedures that contribute to the security, safety, and reliability of nuclear weapons and to the assurance there will be no nuclear weapon accidents, incidents, unauthorized weapon detonations, or degradation in performance at the target. For more on surety, see *Chapter 7: Nuclear Surety*.

5.4.1 Process Flow

Figure 5.7 depicts the high-level process flow associated with the development and maintenance of nuclear weapons.[7] Presidential guidance, as promulgated through national security documents like Nuclear Posture Reviews, National Security Strategies, and Quadrennial Defense Reviews, informs planning documents that DoD Combatant Commanders (CCDRs) use in the development of operational plans. In turn, these planning documents include requirements for capabilities and forces. Established requirements create a demand for resources to ensure the required capabilities are available to support CCDRs. Resource requirements are consolidated and sent to the President for approval and submission into budget requests.

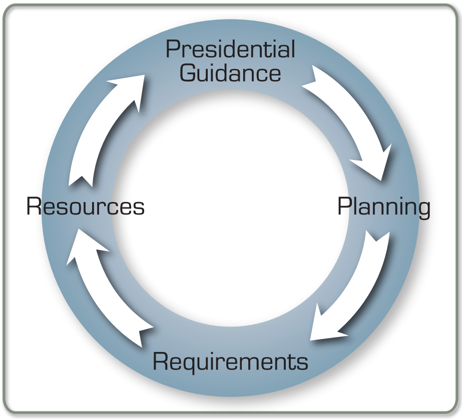


Figure 5.7 High-Level Process Flow

Nuclear weapons policy and strategy guidance originate from presidential direction. Each president has his own naming convention for these direction documents; in the recent past, presidents have used the terms National Security Directives (NSDs), Presidential Decision Directives (PDDs), and National Security Presidential Decisions (NSPDs). Currently, the term Presidential Policy Directives (PPDs) is used. While the names may differ, the intent is the same, to provide national-level guidance on U.S. national security issues such as those related to nuclear weapons.

After guidance is promulgated by the President, the Secretary of Defense reviews and refines departmental guidance to ensure consistency before issuing it to the Chairman of the Joint Chiefs of Staff (CJCS). These documents include the Defense Planning/Programming Guidance (DPG), nuclear-related Department of Defense Directives (DoDDs), and Department of Defense Instructions (DoDIs).

Based on the detailed guidance and CCDRs' general planning, nuclear weapons requirements are developed by the CCDRs, the Military Departments, and the Joint Staff. These requirements are submitted to the NWC staff and combined with other inputs to

7 This process also applies to life extension programs and major weapons alterations and modifications.

inform the development of the internal NWC Requirements and Planning Document (RPD). The RPD includes specific policies, military requirements, joint DoD-DOE/NNSA planning factors, a long-range projection of nuclear forces, and supporting programmatic details. The RPD is the basis for the draft presidential Nuclear Weapons Stockpile Plan (NWSP), usually in the form of a five-year table of stockpile quantities, that is submitted annually to the President through the Nuclear Weapons Stockpile Memorandum (NWSM), signed by the Secretaries of Defense and Energy. When the President signs the associated PPD, the NWSP table becomes the presidential guidance on stockpile quantities that starts the process flow all over again.

This continuous cycle relies on the current CCDRs' operational plans as a basis for the requirements analysis process. If necessary, requirements are modified based on the most recent detailed guidance. If the fielded weapons stockpile does not meet those requirements, the next version of the RPD, the NWSM, and the draft NWSP incorporates the necessary changes needed to ensure compliance. However, if the difference is within 10 percent, a simple update to the NWSP can be issued by the NWC before the next full version is published. During the Cold War, the majority of requirements changes were made to gain increased weapon effectiveness, to achieve better weapon safety and security, and to increase weapons quantities. If a required capability does not exist, the Military Departments begin the acquisition process to provide the capability. If the required capability is a delivery platform, the Military Departments use the Joint Capabilities Integration and Development System (JCIDS) process. If the requirement is a nuclear weapon, the interagency Joint Acquisition Process for Nuclear Weapons, more commonly known as the Phase Process, is used.

The Joint Capabilities Integration and Development System

The JCIDS was established by the CJCS and the Joint Requirements Oversight Council (JROC) (established through CJCS Instruction (CJCSI) 5123.01G, *Charter of the JROC*) to identify, assess, and prioritize joint military capability needs. The JCIDS is governed by CJCSI 3170.01I, and its associated manual. Its scope includes major acquisitions or modifications such as nuclear launch platforms (e.g., ballistic missile submarines) and delivery vehicles (e.g., intercontinental ballistic missiles). The Military Departments retain the responsibility for developing and acquiring the appropriate capability. The JCIDS is an intra-DoD system operating among the Military Departments and DoD Agencies and does not operate in an interagency manner between the DoD and the DOE/NNSA. The Vice Chairmain of the Joint Chiefs of Staff (VCJCS) leads the JROC in the JCIDS process. This "closes the loop" between the CJCS, Combatant Commands, and Military Departments in the development of system requirements.

DoDD 5000.01, *The Defense Acquisition System* and DoDI 5000.02, *Operation of the Defense Acquisition System* govern the management process by which the DoD provides effective, affordable, and timely systems to the users. Commonly referred to as "The 5000 Process," this system is managed by the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) as the primary process for transforming validated capability requirements into materiel capability solutions. Capability requirement documents created through the JCIDS provide the critical link between validated capability requirements and the acquisition of materiel capability solutions through the five major 5000 Process phases: 1) Materiel Solution Analysis; 2) Technology Maturation and Risk Reduction; 3) Engineering and Manufacturing Development; 4) Production and Deployment; and 5) Operations and Support.

Acquisition efforts in all phases inform further refinement of capability requirements for proposal to the appropriate validation authority, and the generation of additional or refined capability requirement documents that will re-enter the JCIDS process for staffing and validation.

The Joint Acquisition Process for Nuclear Weapons

The nuclear weapon acquisition process has been in existence for nearly six decades. The process, which covers the seven life-cycle phases of a nuclear weapon from concept to retirement, is often called the "Phase Process." When the United States was developing and fielding new nuclear weapons, the Phase Process was relied on throughout the life-cycle of each weapon-type. However, in the 1990s, the Phase Process was modified to account for the previously described system of weapons refurbishments, commonly referred to as the Phase 6.X Process. Today, the Phase 6.X Process is used to manage all nuclear weapons life extension programs, including major weapon alterations (Alts) and modifications (Mods) to stockpile weapons. While U.S. policy precludes the development and fielding of new nuclear weapons, the Phase 6.X Process (and Phase 7, Retirement, Dismantlement, and Disposal) allow the NWC to manage all aspects of nuclear weapons refurbishment. For more detailed information about the Phase Process, see *Appendix B: U.S. Nuclear Weapons Life-Cycle*.

There are two groups, under the NWC, responsible for integrating the interagency acquisition of nuclear weapons, the NWCSSC and the POGs. The NWCSSC serves as a flag-level organization that executes and evaluates actions related to the U.S. nuclear stockpile for the NWC. The POGs are joint DoD-DOE/NNSA committees usually led by the Military Departments that provide support for their assigned weapon-type. In addition to a POG for each weapon-type, there is also a use control POG. The POGs are chartered by the NWC and have representation from both the DoD and the DOE/NNSA. They coordinate and approve all activities associated with maintaining nuclear weapons in accordance with DoD and DOE/NNSA requirements. For major actions on weapons (e.g., life extension programs), the POGs collect information on the requirements and submit them to the NWCSSC and then the NWC for approval in accordance with the *Nuclear Weapons Council Procedural Guideline for the Phase 6.X Process*.

DoDI 5030.55, *DoD Procedures for Joint DoD-DOE Nuclear Weapons Life-Cycle Activities* implements DoD's acquisition processes and procedures as they apply to joint DoD-DOE/NNSA nuclear weapon development, production, sustainment, and retirement activities (including studies) and as it applies to refurbishment guidelines issued by the NWC.

5.4.2 Acquisition Process Drivers

The nuclear weapons program is not static and various changes to nuclear weapons are routinely considered. In the past, new weapons capabilities were developed in response to requirements for increased military capability as a result of changing geopolitical circumstances or for a nuclear capability in a new delivery system, to attain greater military flexibility, or to incorporate newer and better safety or security features.

Today, aging weapons components may require action in order to sustain the warheads' safety or reliability. These actions could be in the form of a Mod or an Alt. A Mod is generally a change that impacts military operations (e.g., a change in logistical procedures for maintenance or transportation) or a change in weapon effects due to a change in yield or fuze functioning. An Alt is usually a replacement of an older component with a newer component that does not impact military operations, logistics, or maintenance. Alts are usually transparent to the military unit.

Aging components cause the majority of the problems and concerns that lead to requirements for Alts or Mods. These problems may be detected in a variety of ways, including through evaluations from non-nuclear flight and laboratory testing, observations made by field maintenance technicians, special laboratory surveillance of aging components, or changes to the delivery system requiring different electrical or mechanical interface between the warhead and the delivery vehicle.