SUPPLEMENTAL DIRECTIVE

NNSA SD 452.3-2A

Approved: 11-08-22
Certification Due:11-08-25

PHASE X / PHASE 6.X PROCESSES

NATIONAL NUCLEAR SECURITY ADMINISTRATION
Office of Defense Programs

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PHASE X / PHASE 6.X PROCESSES

1. PURPOSE. To establish the policy for implementing the National Nuclear Security Administration's (NNSA) roles and responsibilities pertaining to the Nuclear Weapons Council's (NWC) *Procedural Guideline for the Joint DoD-DOE/NNSA Nuclear Weapons Life-Cycle Process* (commonly referred to as Phase X) and the *Procedural Guideline for the Phase 6.X Process* (commonly referred to as Phase 6.X) and describes the sequence of activities and interactions with the Department of Defense (DoD) during the execution of these processes. This directive supplements Department of Energy (DOE) Order 452.3, *Management of the Department of Energy Nuclear Weapons Complex*.

   It should also be noted that this Supplemental Directive (SD) addresses only the actions that need to be taken by organizations that report directly to the Administrator, such as the Office of Cost Estimating and Program Evaluation (NA-1.3), Office of Defense Programs (NA-10), Office of Infrastructure (NA-90), and field office organizations with the responsibility for any phase of the nuclear weapons process, including the development, testing, and production of proposed nuclear weapons and refurbishments of the nuclear weapons stockpile. Activities that are conducted by organizations within NA-10 are documented by internal NA-10 processes and not in this SD.

2. AUTHORITY. DOE Order 452.3, *Management of the Department of Energy Nuclear Weapons Complex*; Nuclear Weapons Council's (NWC), *Procedural Guideline for the Joint DoD-DOE/NNSA Nuclear Weapons Life-Cycle Process,* and the *Procedural Guideline for the Phase 6.X Process.*

3. CANCELLATION. NNSA SD 452.3-2, *Phase 6.X Process,* DATED 01-19-17.

   Cancellation of a directive does not, by itself, modify or otherwise affect any contractual obligation to comply with the directive. Contractor Requirements Documents (CRDs) that have been incorporated into a contract remain in effect throughout the term of the contract unless and until the contract is modified to either eliminate requirements that are no longer applicable or substitute a new set of requirements.

4. APPLICABILITY.

   a. Federal. This SD applies to all federal organizations responsible for maintaining and enhancing the safety, reliability, and performance of the United States nuclear weapons stockpile including the ability to design, produce, and test, to meet national security requirements.

   b. Contractors. The Contractor Requirements Document (CRD), provided as Attachment 1, sets forth requirements of this directive that apply to contractors.

      The CRD must be included in contracts of Nuclear Security Enterprise (NSE) Management and Operating (M&O) Contractor sites performing work for NNSA, shown in Figure 1.

NSE M&O Contractor Site Name	Kansas City National Security Campus	Lawrence Livermore National Laboratory	Los Alamos National Laboratory	Nevada National Security Site	Pantex Plant	Sandia National Laboratories	Savannah River Site	Y-12 National Security Complex
Site Designator	KCNSC	LLNL	LANL	NNSS	PX	SNL	SRS	Y-12

Figure 1: Participation by NSE Site

c. Equivalency. In accordance with the responsibilities and authorities assigned by Executive Order 12344, codified at 50 United States Code (U.S.C.) sections 2406 and 2511, and to ensure consistency throughout the joint Navy/DOE Naval Nuclear Propulsion Program, the Deputy Administrator for Naval Reactors (Director) will implement and oversee requirements and practices pertaining to this Directive for activities under the Director's cognizance, as deemed appropriate.

5. SUMMARY OF CHANGES. Incorporated elements of the NWC's *Procedural Guideline for the Joint DoD-DOE/NNSA Nuclear Weapons Life-Cycle Process*.

6. BACKGROUND. A weapon's acquisition life cycle comprises the phases indicated below:

- Phase 1 – Concept Assessment
- Phase 2 – Feasibility Study and Design Options
- Phase 2A – Design Definition and Cost Study
- Phase 3 – Development Engineering
- Phase 4 – Production Engineering
- Phase 5 – First Production
- Phase 6 – Full-Scale Production/Sustainment
- Phase 7 – Retirement, Dismantlement, and Disposal

These phases were established in various DOE/DoD Memoranda of Agreement and reflect the logical progression of activity for the development, production, deployment, and retirement of a nuclear weapon. This process, formerly called the *7 Phase process*, is now known as the *Phase X process*. The Phase X process provides a common framework to conduct and manage activities for new production and refurbishments of nuclear weapons. Stockpile refurbishment activities are divided into sub-elements of Phase 6, denoted by Phase 6.X, as in 6.1, 6.2, 6.2A, etc. The individual phases (6.1 through 6.6) follow the sequence of the acquisition process with Phase X. For purposes of the Phase 6.X process, the enduring stockpile sustainment phase is designated Phase 6 and is the beginning and end point of the Phase 6.X process, as shown in Figure 2. Today, many of the weapons within the present stockpile were refurbished under the Phase 6.X process to extend their operational life. The Phase 6.X process makes the maximum use of the established structure, flow, and practices from the Phase X process and both processes end with a major decision point to go forward into the next phase.

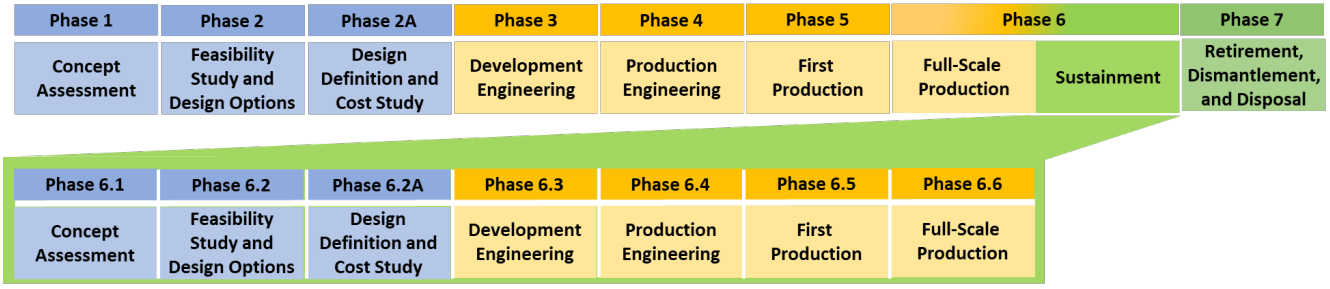

Figure 2. Nuclear Weapon Life Cycle Process

For each proposed new weapon or refurbishment activity, a Project Officer Group (POG) is authorized by the NWC to coordinate joint efforts in NNSA-DoD nuclear weapons programs. NNSA provides membership to the POG and supports its coordination efforts.

Historically, all responsibilities for nuclear weapon activities were carried out within Defense Programs (NA-10). With the establishment of the Office of Cost Estimating and Program Evaluation (NA-1.3), new responsibilities and requirements have been established per Title 50 U.S.C. sections 2411 and 2537. Additionally, with the establishment of the Office of Infrastructure (NA-90), some responsibilities transitioned from NA-10 to NA-90.

7. REQUIREMENTS.

   a. NNSA organizations participating on programs following either the Phase X or Phase 6.X acquisition framework must support the implementation of this Supplemental Directive. At a minimum, the participating organizations must identify roles and responsibilities, organizational interfaces (internal and external stakeholders), deliverables, reporting, conflict resolution, and governance structures.

   b. NNSA organizations must comply with the Phase X or Phase 6.X process detailed in Appendix A. If a perceived or actual discrepancy between this SD and Defense Programs Business Process System (SD 452.3-1A) exist, SD 452.3-2A takes precedence.

8. RESPONSIBILITIES.

   a. Administrator (NA-1).

      (1) Is the NNSA member and Vice Chair of the NWC; and

      (2) Approves the NNSA cost and schedule position at Phase 2 or Phase 6.2 through the end of Phase 4 or Phase 6.4.

b. Deputy Administrator for Defense Programs (NA-10).

(1) Serves as the senior NNSA member of the Nuclear Weapons Council Standing and Safety Committee (NWCSSC);

(2) Ensures overall execution of NNSA's responsibilities as outlined in the NWC's *Procedural Guideline for the Joint DoD- DOE/NNSA Nuclear Weapons Life-Cycle Process* and *Procedural Guidelines for the Phase 6.X Process*; and,

(3) Requests threat assessment support from the DOE Office of Intelligence and Counterintelligence.

c. Associate Administrator for Infrastructure (NA-90). Ensures that all facilities required to support the Phase X and Phase 6.X processes are provided and maintained in an operational status (brought up to standards in preparation) and provide support for preparation of applicable Phase X and Phase 6.X documents.

d. Associate Administrator for Management and Budget (NA-MB). Provides a federal cost estimating lead to NA-10 to offer programmatic cost estimating support for programs governed by Phase X and Phase 6.X processes.

e. Director for Cost Estimating and Program Evaluation (NA-1.3). In accordance with paragraphs 10.a. and 10.b. of this directive:

(1) Provides an independent cost estimate (ICE) of each new nuclear weapon system or each nuclear weapon system undergoing a major alteration or life extension – at the completion of Phase 2A or Phase 6.2A, at the completion of Phase 3 or Phase 6.3, and at the completion of Phase 4 or Phase 6.4, and before initiation of Phase 5 or Phase 6.5;

(2) Provides an independent cost review (ICR) of each new nuclear weapon system or each nuclear weapon system undergoing life extension at the completion of Phase 2 or Phase 6.2;

(3) Provides other independent cost reviews and estimates as directed by the Administrator; and

(4) Develops and manages the submittal of the Selected Acquisition Reports for nuclear weapons systems undergoing life extension or a major alteration.

f. Field Office Contracting Officers. Incorporate SD 452.3-2A into the *List of Applicable Directives* identified in the Laws, Regulations, and DOE Directives clause of the M&O contracts for the listed NSE sites (see Figure 1).

9. DEFINITIONS/ACRONYMS. See Attachment 2.

10. REFERENCES.

a. 50 U.S.C. Section 2411, *Director for Cost Estimating and Program Evaluation*, which describes the roles and responsibilities of the NNSA Director for Cost Estimating and Program Evaluation.

b. 50 U.S.C. Section 2537, *Selected Acquisition Reports and independent cost estimates and reviews of certain programs and facilities*, which describes the requirements for submitting Selected Acquisition Reports, independent cost reviews, and independent cost estimates.

c. 50 U.S.C. Section 2525, *Annual assessments and reports to the President and Congress regarding the condition of the United States nuclear weapons stockpile*, which describes the requirements for annual assessments of the nuclear weapons stockpile.

d. *An Agreement between the Atomic Energy Commission (AEC) and the Department of Defense (DoD) for the Development, Production, and Standardization of Atomic Weapons*, March 21, 1953, which provides the basic document that establishes the interrelationships between the two agencies to cooperate in the development, production, and maintenance of nuclear weapons.

e. *Supplement to the 1953 Agreement for the Development, Production, and Standardization of Atomic Weapons between the Department of Energy and the Department of Defense,* dated September 5,1984, which delineates the functions of the two agencies during joint feasibility studies for nuclear weapons [Phase 2], design definition and cost studies [Phase 2A], and development engineering [Phase 3].

f. Department of Defense and Department of Energy Nuclear Weapons Council *Procedural Guideline for the Phase 6.X Process*, dated December 16, 2015, which describes the roles and functions of the NWC, NWCSSC, DoD, and NNSA for the Phase 6.X nuclear weapon refurbishment activities.

g. Department of Defense and Department of Energy Nuclear Weapons Council *Procedural Guideline for the Joint DoD-DOE/NNSA Nuclear Weapon Life-Cycle Process*, dated April 2021, which describes the roles and functions of the NWC, NWCSSC, DoD, and NNSA for the Joint DoD-DOE/NNSA Nuclear Weapons Life-Cycle Process, referred to as the Phase X Process.

h. DOE Order 452.3, *Management of the Department of Energy Nuclear Weapons Complex,* dated 06-05-2005, which defines and affirms the authorities and responsibilities of the NNSA for the management of the DOE Nuclear Weapons Complex and emphasizes that the management of the U.S. nuclear weapons stockpile is the DOE's highest priority for the NNSA and the Nuclear Weapons Complex.

i. DOE Order 452.1E, *Nuclear Explosive and Weapon Surety Program*, dated 01-26-2015, which describes the Nuclear Explosive and Weapon Surety Program, with its objective to prevent unintended/unauthorized detonation and deliberate unauthorized use of nuclear explosives.

j. DOE Order 452.4C, *Security and Use Control of Nuclear Explosives and Nuclear Weapons,* dated 08-28-2015, which describes the quality, surety and assurance, requirements applicable to NNSA nuclear weapons activities.

k. NNSA SD 452.3-1A, *Defense Programs Business Process System (DPBPS)*, dated 02-25-2016, which establishes the DPBPS Portal as the mechanism for implementing DOE O 452.3. The Portal delivers business requirements and processes specific to the Deputy Administrator for Defense Programs for directing, managing, operating, and executing programs at the nuclear weapons production facilities and laboratories within the NSE.

l. SD 452.4-1, *Nuclear Enterprise Assurance (NEA)*, dated 01-27-22, which establishes NEA requirements to ensure consistent and coordinated NSE-wide federal and M&O contractor application of NEA to nuclear weapon programs throughout the nuclear weapons lifecycle (new development, sustainment, modernization, and retirement.

m. NNSA NAP 401.1A Admin Chg. 1, *Weapon Quality Polic*y, dated 07-22-2021 (provides the quality requirements that ensure the early and continuous application of quality principles when realizing Mark Quality products throughout all lifecycle phases of a nuclear weapon system).

n. NAP 413.3A, *Responsibilities for Independent Cost Estimates*, dated 04-30-2021, which establishes the policy, roles, and responsibilities for conducting independent cost estimates [ICEs] and independent cost reviews [ICRs].

o. NAP 413.4, *Technology Readiness Assessments*, dated 04-16-20, which describes the processes and procedures for conducting Technology Readiness Assessments for any given acquisition process.

p. NAP 413.5, *Programmatic Cost Estimating*, dated 06-30-21, which establishes the roles and responsibilities for programmatic cost estimating activities within NNSA.

q. NNSA BOP 413.9, *Cost Analysis Requirement Description (CARD)*, dated 01-22-2018, which provides for the requirements, responsibilities, and expectations relating to the CARD.

11. CONTACT. Assistant Deputy Administrator for Systems Engineering and Integration (NA-18), (505) 845-6088.

BY ORDER OF THE ADMINISTRATOR:

Jill Hruby
Administrator

Attachments:
1. Contractor Requirement Document
2. Definitions

Appendix:
A. Phase X / Phase 6.X Process Mapping of Roles and Responsibilities

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ATTACHMENT 1: CONTRACTOR REQUIREMENTS DOCUMENT (CRD) NNSA SD 452.3-2A, PHASE X / PHASE 6.X PROCESSES

1. INTRODUCTION. This Management and Operating (M&O) Contractor Requirements Document (CRD) establishes the requirements for National Nuclear Security Administration (NNSA) M&O Contractors within the Nuclear Security Enterprise (NSE) that have the responsibility for any phase of the nuclear weapons process, including the development, testing, and production of proposed nuclear weapons, and the refurbishments of the nuclear weapons stockpile.

   The contractor is responsible for complying with the requirements of this CRD. The contractor is responsible for flowing down the requirements of this CRD to subcontractors at any tier to the extent necessary to ensure the contractor's compliance with the requirements.

2. REQUIREMENTS.

   a. M&O contractors must work in concert with NNSA and other M&O contractors to achieve successful execution of the Phase X or Phase 6.X process and deliverables as defined in this Supplemental Directive (SD), including input needed for Nuclear Enterprise Assurance (NEA) activities at every phase and managing individual site plans for Phase X or Phase 6.X activities. If a perceived or actual discrepancy between this SD and Defense Programs Business Process System (SD 452.3-1A) exists, SD 452.3-2A takes precedence.

   b. M&O contractors must support NNSA in meeting Phase 1 or Phase 6.1 (Concept Assessment) requirements, providing input needed for NNSA to support:

      (1) initial Nuclear Enterprise Assurance (NEA) activities.

      (2) initial identification of system vulnerabilities, threats, and potential mitigations needed.

      (3) preliminary cost and technological risk estimates.

      (4) proposed draft of or potential changes to Military Characteristics (MC), Stockpile-to-Target Sequence (STS), and any NNSA driver of requirements (**Note**: Within Phase X the MCs and STS are developed and for Phase 6.X they already exist and will need to be updated).

      (5) safety (nuclear and personnel), security, and use control architectures and relative effectiveness.

(6) potential weapon design concepts and a discussion of performance parameters, interface requirements, transportability, storage, and operational concepts (**Note**: transportability, storage, and operational concepts are not necessary for Phase 6.X).

(7) initial identification of requirements for facilities and infrastructure.

c. M&O Contractors must support NNSA in meeting Phase 2 or Phase 6.2 (Feasibility Study and Design Options) requirements, providing input needed for NNSA to:

(1) develop design options and execute an analysis of down-select options.

(2) develop a joint integrated Phase 2 or Phase 6.2 study plan.

(3) down-select design options to be costed in Phase 2A or Phase 6.2A.

(4) develop draft MCs or update existing MCs.

(5) update the NEA activities.

(6) develop or update existing Interface Control Documents (ICDs), as required (**Note**: within Phase X the ICDs are developed and for Phase 6.X they already exist and will need to be updated).

(7) deliver a final Phase 2 or Phase 6.2 study report for the Nuclear Weapons Council Standing and Safety Committee (NWCSSC) including a Major Impact Report (MIR) on the down-selected options as an appendix.

(8) analyze updated or new MCs to assess the ability to produce, qualify, and certify the design options and, if required, control ICD updates with the appropriate Service.

(9) begin coordination of agreements for facilities and infrastructure interface requirements which incorporates the support for the program from other organizations.

d. M&O Contractors must support NNSA in meeting Phase 2A or Phase 6.2A (Design Definition and Cost Study) requirements, providing input needed for NNSA to:

(1) create the Joint Integrated Project Plan (JIPP) to implement the proposed down- selected set of options.

(2) update the NEA activities.

(3) develop the Weapon Design and Cost Report (WDCR).

(4) develop summary inputs for the Phase 2A or Phase 6.2A study report.

e. M&O contractors at NNSA national laboratories must complete the Phase 2A or Phase 6.2A (Design Definition and Cost Study) requirements to conduct a System Requirements Review or Customer Requirements Review.

f. M&O contractors must support NNSA in meeting Phase 3 or Phase 6.3 (Development Engineering) requirements, providing input needed for NNSA to:

(1) update the JIPP, MCs, STS, and ICD documents and NEA activities.

(2) submit the initial Selected Acquisition Report (SAR) to Congress.

(3) update the WDCR and reissue it as the Baseline Cost Report (BCR).

(4) prepare, in coordination with the Defense Threat Reduction Agency (DTRA), a Product Change Proposal (PCP) (for Phase 6.X only).

g. M&O contractors at NNSA national laboratories must complete the Phase 3 or Phase 6.3 (Development Engineering) requirements to:

(1) prepare a draft addendum to the Final Weapon Development Report (FWDR) or create a new FWDR draft, in support of the Design Review and Acceptance Group (DRAAG) report.

(2) conduct a Conceptual Design Review and Baseline Design Review.

h. M&O contractors must support NNSA in meeting Phase 4 or Phase 6.4 (Production Engineering) requirements, providing input needed for NNSA to update the JIPP, BCR and NEA activities.

i. M&O contractors must support NNSA in meeting Phase 5 or Phase 6.5 (First Production) requirements, providing input needed for NNSA to:

(1) update the JIPP and NEA activities.

(2) formally issue the Major Assembly Release (MAR).

j. M&O contractors at NNSA national laboratories must complete the Phase 5 or Phase 6.5 (First Production) requirement to finalize and release the addendum to the FWDR and attach a nuclear system certification letter.

k. M&O contractors must support NNSA in meeting Phase 6 or Phase 6.6 (Full-Scale Production/Sustainment) requirements, providing input needed for NNSA to:

(1) support preparation of the final JIPP/End-of Project Report.

(2) provide a full-scale production plan briefing to the NWCSSC.

(3) deliver and release into Department of Defense (DoD) custody, new or refurbished weapons on a schedule agreeable to both DoD and NNSA.

l. M&O contractors must support NNSA in meeting Phase 6 (Sustainment) requirements to:

(1) perform routine maintenance and limited life exchanges per the established schedule.

(2) provide stockpile evaluation (surveillance) to evaluate weapon reliability, safety, and performance.

m. M&O contractors at NNSA national laboratories must as part of Phase 6 (Sustainment) provide the annual certification as a review of the stockpile's current health.

n. M&O contractors must support NNSA in meeting Phase 7 (Retirement, Dismantlement, and Disposal) requirements to:

(1) perform the safe storage until dismantled.

(2) perform the safe dismantlement, demilitarization, and sanitization of components, and disposal.

(3) meet the dismantle schedule.

o. M&O contractors at NNSA Production Agencies must, as part of Phase 7 (Retirement, Dismantlement, and Disposal), maintain traceability of accountable components they disposition.

ATTACHMENT 2: DEFINITIONS

Note: This Attachment applies to contractor and federal personnel. Definitions are also contained in the Defense Programs Business Process System (DPBPS) Glossary on the DPBPS website (dpbps.sandia.gov).

a. Alteration (Alt). Any change or changes that typically affect the assembly, testing, maintenance, or storage of weapons. An Alt may address identified defects and component obsolescence but does not change a weapon's operational capabilities.

b. Baseline Cost Report (BCR). This document formally updates the Weapon Design and Cost Report (WDCR) based on late development and pre-production activities.

c. Certification Letter. A letter signed by the Directors of the appropriate nuclear weapon laboratories that serves as the formal certification of a new or refurbished weapon. It may be published as a stand-alone document or attached to the Final Weapon Development Report (FWDR).

d. Cost Analysis Requirements Description (CARD). A description of the relevant features of the acquisition program or project and of the system itself. It is the common description of the technical and programmatic features of the program that is used by the teams when preparing the independent cost estimate (ICE) or program office cost estimates. It is intended to define the program to a sufficient level of detail such that no confusion exists between the many parties who may be concerned with estimating the program's cost.

e. Design Review and Acceptance Group (DRAAG). A DoD group, usually consisting of the Lead Project Officer (LPO) from the Service and one representative from each affected military Service and the Defense Threat Reduction Agency (DTRA), responsible for providing an independent review of the down-selected weapon design to determine the compliance of the design with requirements specified by the Military Characteristics and Stockpile-to-Target Sequence. DRAAG findings and recommendations are forwarded through the Service to the Nuclear Weapons Council (NWC) for consideration.

f. End-of-Project Report. This document serves as the final Joint Integrated Project Plan (JIPP) and reflects what actually occurred throughout the entire weapon activity. It also includes an analysis of lessons learned.

g. Final Weapon Development Report (FWDR). A report issued in late Phase 6.5 to provide warhead/bomb design objectives, description, test program results, ancillary equipment, and programming as of the time of the first production for stockpile. If there is a significant change to Military Characteristics (MCs), an analysis would be required to determine if a supplemental FWDR needs to be issued.

h. Independent Cost Estimate (ICE). A cost estimate prepared by an organization independent from the government line manager's authority and the contractor organization responsible for the project or program, using the same detailed technical and procurement information to develop the program or project estimate in accordance with Government Accountability Office best practices.

i. Independent Cost Review (ICR). An evaluation of a program's or project's cost estimate that examines the reasonableness of the estimate quality, assumptions, and risks, also prepared by an organization independent from the government line manager's authority and the contractor organization responsible for the project or program.

j. Interface Control Document (ICD). A document between DOE/NNSA and the Service that exchanges warhead and delivery vehicle information, including changes in new production, to resolve interface design problems and to ensure adequate interface control between the delivery system and DOE/NNSA components.

k. Joint Integrated Project Plan (JIPP). The JIPP documents coordinated planning between DoD and DOE/NNSA for the proposed program activity. JIPP content should be tailored for each program with the following suggested topics, as applicable:

- Project scope;
- Design definition;
- Integrated project requirements management plan;
- Integrated project schedule (including joint DoD/DOE/NNSA milestones, planned management briefings and reviews, and certification schedules);
- Independent cost estimate or validated cost analysis (by the participating parties); costs must include applicable Service-related costs;
- JIPP configuration management of joint documents;
- Qualification and certification plans;
- Nuclear Enterprise Assurance and supply chain protection program plan;
- Service test and evaluation plans;
- MCs, stockpile to target system (STS), and ICD;
- System memorandums of understanding between DoD and DOE/NNSA;
- Stockpile evaluation planning;
- Operational safety implications (integrated safety process);
- Nuclear design safety considerations;
- Nuclear explosive safety considerations;
- Proposed changes to technical publications;
- Trainers and type weapon requirements;
- Spares, handling gear, use-control equipment, tools, gauges, and field testers;
- Joint development testing and modeling support requirements;
- Process development and product qualification;
- Archiving and lessons learned;
- Joint risk management;
- Classification and classification management review; and
- Human System Integration requirements.

l. Joint Task Group (JTG). An operation designed to provide Sandia National Laboratories (SNL) with an evaluation of a complete bomb, warhead, ancillary equipment, or change thereto, from an operational viewpoint. The task group is scheduled by DTRA in conjunction with the Services at a time consistent with hardware, equipment, and procedure availability; the evaluation is convened with full military participation, the military providing evaluation team members, consultants, and any required Service hardware.

m. Laboratory Task Group (LTG). The LTG conducts the preliminary assembly of military technical publication operations manuals for a weapon or ancillary equipment prior to the conduct of the final JTG verification. Together, the activities of the LTG and JTG constitute verification of the operational use of technical publications for the weapon.

n. Major Assembly Release (MAR). A DOE/NNSA statement that war reserve (WR) weapon material is satisfactory for release on a designated effective date to the DoD for specified uses that are qualified by exceptions and limitations.

o. Major Impact Report (MIR). A report published by the DOE/NNSA, as a part of the Phase 2A or Phase 6.2A for any nuclear weapons program, which identifies those aspects of the program that could be significant factors (including nuclear physics design, testing, production processes, or resource availability) affecting the schedule or technical risk of the development or production of the nuclear weapon.

p. Manual File Conference. A meeting convened by DTRA when data from two or more agencies are involved. This meeting identifies the proposed publications and the writing agency for each publication. Any required Source Data and the originator are identified, and the scope data and acquisition milestones mutually agreed upon. DTRA records and transmits the agreement to all participants.

q. Military Characteristics (MCs) for Nuclear Weapons. A document submitted to the DOE/NNSA that specifies performance requirements and physical characteristics for a nuclear warhead, bomb, or basic assembly to be compatible with a specific weapon system or systems. NWC or Nuclear Weapons Council Standing and Safety Committee (NWCSSC) approved MCs are forwarded to DTRA for publication/distribution.

r. Modification (Mod). Any alteration of a permanent nature made after production to an end item, component, or assemblage of materiel that results in a change to the MCs that affects weapon employment, fuzing, ballistics, or logistics.

s. Nuclear Weapon System Surety Group (NWSSG). This group conducts the Pre-Operational Safety Study, which examines safety procedures for new or modified nuclear weapons systems and aspects of the concept of operations that affect the safety to determine if DoD nuclear weapon system surety standards are met. The group proposes new weapon system safety rules and recommends changes to existing weapon system safety rules to maximize system surety consistent with operational requirements.

t. Pre-Operational Safety Study. Initiated by the Service and conducted by the NWSSG, this study examines safety procedures for weapon systems, and aspects of the concept

of operations that affect the safety of the nuclear weapon system to determine if the DoD nuclear weapon system surety standards are met. This is the first opportunity to draft weapon system safety rules for the system. The study focuses principally on the procedural aspects of handling, transporting, and storing nuclear weapons.

u. Process Prove-In (PPI). A component of pilot production in which production agency activity is principally aimed at evaluating newly installed equipment and related operational factors. PPI is the immediate predecessor to formal production qualification.

v. Product Change Proposal (PCP) (for Phase 6.X only). A formal recommendation for changes of the following types: (1) all proposed retroactive changes to WR and training weapons, and associated test and handling equipment; (2) all in-process changes requiring modification or alteration identification of WR and training weapons materiel; and (3) all in-process changes to field test and handling equipment resulting in alphabetical suffix identification, or complete redesign.

w. Project Officers Group (POG). A group of DOE/NNSA-DoD personnel assigned to coordinate the development of compatibility assurance of a designated nuclear weapon system and its associated interfaces. POGs are chaired by the cognizant Service.

x. Refurbishment. Refurbishment refers to all nuclear weapon modifications to address life extension, and other warhead modernization activities due to revised military requirements at the system, subsystem, or component level. It encompasses current policy to use warhead remanufacturing, component reuse, and component replacement. These refurbishments are assigned a new alteration or modification number for stockpile management purposes.

y. Stockpile-to-Target Sequence (STS). (1) The order of events involved in removing a nuclear weapon from storage, and assembling, testing, transporting, and delivering it on the target; and (2) a document that defines the logistical and employment concepts and related physical environments involved in the delivery of a nuclear weapon from the stockpile to the target. It may also define the logistical flow involved in moving nuclear weapons to and from the stockpile for quality assurance testing, modification and retrofit, and the recycling of limited life components.

z. Weapon. The *Atomic Energy Act of 1954* defines an atomic weapon as being any device using atomic energy, exclusive of the means for transporting or propelling the device (where such means is a separable and divisible part of the device), the principal purpose of which is for use as, or for development of, a weapon, a weapon prototype, or a weapon test device.

aa. Weapon Design and Cost Report (WDCR). The WDCR provides a description of the option and preliminary cost estimates for design, qualification, and production activities.

APPENDIX A: PHASE X / PHASE 6.X PROCESS MAPPING OF ROLES AND RESPONSIBILITIES

Note: The office with primary responsibility is indicated in parentheses after each item.

1. INTRODUCTION. This Appendix addresses the actions that need to be taken by organizations that report directly to the Administrator, such as the Office of Cost Estimating and Program Evaluation (NA-1.3), the Office of Defense Programs (NA-10), and the Office of Infrastructure (NA-90), with the responsibility for any phase of the nuclear weapons process, including the development, testing, and production of proposed nuclear weapons and refurbishments of the nuclear weapons stockpile.

2. REQUIREMENTS.

   a. Phase 1 or Phase 6.1 – Concept Assessment.

      (1) Organizations must support the Project Officers Group (POG) to provide a summary of study results to the Nuclear Weapons Council Standing and Safety Committee (NWCSSC) to include:

         (a) Initial Nuclear Enterprise Assurance (NEA) activities to include the following:

            1 Initial assessment of supply chain protection considerations (NA-10); and

            2 Safety and security considerations (NA-10);

         (b) Initial identification of system vulnerabilities, threats, and potential mitigations needed (NA-10);

            1 Request threat assessments support from DOE Office of Intelligence and Counterintelligence;

         (c) Proposed draft of or potential changes to Military Characteristics (MCs), Stockpile-to-Target Sequence (STS), and any National Nuclear Security Administration (NNSA) driver of requirements (NA-10);

         (d) Safety (nuclear and personnel), security, and use control architectures and relative effectiveness (NA-10);

         (e) Potential weapon design concepts and a discussion of performance

parameters, interface requirements, transportability, storage, and operational concepts, (note transportability, storage, and operational concepts are not Phase 6.X) (NA-10); and

(f) Preliminary cost and technological risk estimates (NA-10).

(2) Organizations must:

(a) conduct Technology Readiness Assessments of Management and Operating (M&O)-proposed technology down-selects to ensure that they are meeting levels of confidence associated with appropriate overall system performance (NA-10).

(b) perform reviews of Technology Readiness Assessments conducted by NA-10 (NA-1.3).

(c) provide initial identification of facilities and infrastructure requirements to NA-90 (NA-10).

(d) begin coordination to address initial facilities and infrastructure requirements provided by NA-10 (NA-90).

b. Phase 2 or Phase 6.2 – Feasibility Study and Design Options.

(1) Organizations must support the POG to:

(a) develop design options and execute an analysis of down-select options (NA-10); **Note:** An analysis of down-select options is like an alternatives analysis and is focused more on component and technology design options and includes design trade studies and cost/benefit analyses. A classical analysis of alternatives (AoA) is not required at this phase because a material solution has already been determined before Phase 6.1. Any formal AoAs dealing with major weapon down-selects would be led by Department of Defense (DoD).

(b) develop a joint integrated Phase 2 or Phase 6.2 study plan (NA-10).

(c) down-select design options to be costed in Phase 2A or Phase 6.2A (NA-10).

(d) update existing MCs (or draft new MCs) , and evaluate and update draft STS and Interface Control Documents (ICDs) to reflect DoD requirements (NA-10).

(e) coordinate changes to STS (NA-10)

(f) deliver a final Phase 2 or Phase 6.2 study report to the NWCSSC (NA-10).

(2) Organizations must:

(a) analyze updated or new MCs to assess the ability to produce, qualify, and certify the design options and, if required, control ICD updates with the appropriate Service (NA-10).

(b) prepare a Major Impact Report (MIR) on the down-selected options as an appendix to the final Phase 2 or Phase 6.2 study report. The MIR reflects that building and facility (infrastructure) support and requirements are necessary and sufficient for each specific program going through the Phase X or Phase 6.X process (NA-10).

(c) support the preparation of the MIR (NA-90).

(d) develop the Cost Analysis Requirements Description (CARD) of the potential design options (NA-10) and update the CARD, in accordance with BOP 413.9, *Cost Analysis Requirement Description (CARD)*.

(e) develop cost estimates of down-selected design options (NA-10).

(f) provide an Independent Cost Review (ICR) of the potential design options at the completion of Phase 2 or Phase 6.2, and at completion submit the ICR report to the Administrator (NA-1.3).

(g) review any differences in cost, schedule, and risks of the initial cost estimates with the ICR, adjudicate on the reconciled position prior to Phase 2A or Phase 6.2A authorization, and transmit the reconciled position to Congressional Committees and the NWC (NA-1).

(h) begin coordination of facilities interface requirements agreements that incorporate the support for the program from other organizations (NA-10).

(i) support the coordination of facilities interface requirements agreements (NA-90).

(j) plan and execute a product realization process through the end of production.

c. Phase 2A or Phase 6.2A – Design Definition and Cost Study.

(1) Organizations must support the POG to:

(a) create the Joint Integrated Project Plan (JIPP) to implement the proposed potential design options (NA-10).

(b) present a summary of the Phase 2A or Phase 6.2A study report to the NWCSSC (NA-10).

(2) Organizations must:

(a) develop the Weapon Design and Cost Report (WDCR). The WDCR is a preliminary cost estimate and not a cost performance baseline and contains elements similar to a CARD (NA-10).

(b) develop an independent cost estimate (ICE) for design, qualification, production, and life-cycle activities, and at completion submit the ICE Report to the Administrator (NA-1.3).

(c) review any differences in cost, schedule, and risks of the WDCR with the ICE, adjudicate on the reconciled position prior to Nuclear Weapons Council (NWC) Phase 3 or Phase 6.3 authorization, and transmit the reconciled position to Congressional Committees and the NWC (NA-1).

(d) review the Phase 6.2A report and WDCR with the Administrator and participating organizations, prior to the NWC Phase 3 or Phase 6.3 authorization (NA-10).

d. Phase 3 or Phase 6.3 – Development Engineering.

(1) Organizations must support the POG to update the JIPP, MCs, STS, and ICD documents (NA-10).

(2) Organizations must:

(a) submit an initial Selected Acquisition Report (SAR) to Congress and continue to submit SARs until the end of Phase 6 or Phase 6.6. The SAR must be submitted after the cost and schedule baseline is established during the first third of the Development Engineering phase to adhere to Title 50 and minimize potential SAR changes (NA-1).

(b) update the WDCR in coordination with NA-90 and reissue it as the Baseline Cost Report (BCR) (NA-10).

(c) update the ICE, and at completion submit the ICE Report to the Administrator (NA-1.3).

(d) review any differences in cost, schedule, and risks of the BCR with the ICE, adjudicate on the reconciled position prior to Phase 4 or Phase 6.4 authorization, and transmit the reconciled position to congressional committees and the NWC (NA-1).

(e) prepare, in coordination with the Defense Threat Reduction Agency (DTRA), a Product Change Proposal (PCP) (for Phase 6.X only) identifying refurbishment scope, schedule, and specific NNSA and DoD roles and responsibilities (NA-10).

(f) support the preparation of the PCP (NA-90) (for Phase 6.X only).

(g) direct the NNSA National Laboratories to prepare a draft addendum to the Final Weapon Development Report (FWDR) or create a new FWDR draft. The NNSA reviews the FWDR before submitting it to the Design Review and Acceptance Group (DRAAG) and conducts a Conceptual Design Review and a Baseline Design Review (BDR) (NA-10).

(h) determine whether to authorize the NNSA National Laboratories and production agencies to enter into Phase 4 or Phase 6.4. The transition from Phase 3 or Phase 6.3 to Phase 4 or Phase 6.4 is an internal NNSA decision and does not occur on a specific date. As Phase 3 or Phase 6.3 activities are completed, Phase 4 or Phase 6.4 activities begin, so the transition occurs over time (NA-10).

e. Phase 4 or Phase 6.4 – Production Engineering.

(1) Organizations must support the POG to update the JIPP and provide it to the NWCSSC (NA-10).

(2) Organizations must:

(a) update the BCR (NA-10).

(b) update the ICE, and at completion submit the ICE Report to the Administrator (NA-1.3).

(c) review any differences in cost, schedule, and risks of the BCR with the ICE, adjudicate on the reconciled position prior to Phase 5 or Phase 6.5 authorization, and transmit the reconciled position to congressional committees and the NWC (NA-1).

(d) determine whether to authorize the NNSA National Laboratories and production agencies to enter into Phase 5 or Phase 6.5. The transition from Phase 4 or Phase 6.4 to Phase 5 or Phase 6.5 is an internal NNSA decision (NA-10).

f. Phase 5 or Phase 6.5 – First Production.

(1) Organizations must support the POG to:

(a) update the JIPP (NA-10).

(b) request approval from the NWC to proceed into Phase 6 or Phase 6.6 (NA-10).

(2) Organizations must:

(a) direct the NNSA National Laboratories to finalize and release the addendum to the FWDR and attach a nuclear system certification letter (NA-10).

(b) formally issue the Major Assembly Release (MAR) (NA-10).

g. Phase 6 or Phase 6.6 – Full-Scale Production/Sustainment

(1) Organizations must support the POG to prepare the final JIPP/End-of Project Report (NA-10).

(2) Organizations must:

(a) provide a full-scale production plan briefing to the NWCSSC (NA-10).

(b) deliver and release into DoD custody new or refurbished weapons on a schedule agreeable to both DoD and NNSA (NA-10).

(3) For Phase 6 Sustainment, organizations must:

(a) support the POG in the annual reviews (NA-10).

(b) perform routine maintenance and achieve the limited life exchanges schedule (NA-10).

(c) perform stockpile evaluation (surveillance) to evaluate weapon reliability, safety, and performance (NA-10).

h. Phase 7 – Retirement, Dismantlement, and Disposal

(1) Organizations must work with the POG to coordinate storage requirements, establish necessary weapon modifications for storage, and develop weapon return schedules (NA-10).

(2) Organizations must:

(a) plan and execute the plan for safe dismantlement, demilitarization, and sanitation of components, and final disposal (NA-10).

(b) plan and execute the Nuclear Explosive Safety Study (NA-10).