



Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

April 23, 1999

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, N.W.
Suite 700
Washington, D.C. 20004

Dear Mr. Chairman:

DOE's initiatives to enhance formality of nuclear explosive operations at Pantex include commitments to issue several new Chapters to AL Supplemental Directive 56XB, the Development and Production (D&P) Manual. New Chapters 11.3, "Seamless Safety (SS-21) for Assembly and Disassembly of Nuclear Weapons at the Pantex Plant" and 11.4, "Authorization Basis for Pantex Plant Nuclear Explosive Operations" and a revision to Chapter 11.0 to incorporate definition changes have been issued with the attached memorandum. Issuance of Chapter 11.3 satisfies DNFSB Implementation Plan Commitment 5.2.1, Deliverable 1.

These Chapters were developed using the process defined in the letter from Mr. Gene Ives to you, dated 10 August 1998. This process ensured participation from DOE offices in Washington, Albuquerque and Amarillo, MHC, LLNL, LANL, SNL and the Defense Board staff. Comments from all organizations are compiled in resolution matrices. The comments have either been incorporated, or explanations for not incorporating the comments are included in the matrices.

With the large number of participants and their differing views on how nuclear explosive operations should be performed, it was not possible or prudent to accommodate all comments. The attached Chapters represent an approach that all participating organizations have said they can and will support.

Chapter 11.6, Readiness Reviews of the D&P Manual and AL SD 452.2 remain under development. Both of these documents are in the internal review process.

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DATE: 04/16/99
REPLY TO:
ATTN OF: WPD:RH
SUBJECT: Development and Production Manual
TO: Addressees

This is notification that Revision 1, Change 27 has been made to the D&P Manual. Change 27 consists of an updated Table of Contents and Chapter 11.0, and two new chapters. The two new chapters are Chapters 11.3, "Seamless Safety (SS-21) for Assembly and Disassembly of Nuclear Weapons at the Pantex Plant", and 11.4, "Authorization Basis for Pantex Plant Nuclear Explosive Operations". These changes should be posted very soon at the address shown below.

D&P changes are posted electronically at <http://www.explorer.doe.gov:1776/htmls/supplementaldir.html>. To achieve the widest and most effective notification for future D&P changes, I continue to rely on the site contacts identified in the addressee list to notify the appropriate personnel within their organization. Please do not hesitate to call if you or someone in your organization experiences any difficulty accessing this site.

Additionally, if there are other addressees in your organization that would like to be informed of future D&P Manual changes, please let me know and I will add them to the distribution list. I may be reached at (505) 845-6601 if you wish to discuss this further.

Original Signed By

Rod Heimgartner
D&P Manual Update Coordinator
Weapon Programs Division

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S. Schwartz, WPD
L. Paz, WPD
D. Rose, WPD
M. Eckart, WPD
C. Kenagy, WPD
R. Phillips, AAO
J. Moore, AAO
R. Holm, AAO Support
R. Hopson, MHC
P. Butler, MHC
A. Whiteman, OTSP
K. Carlson, ONDP
M. Holecek, KCAO
G. Ellenwood, KCAO
R. Burton, KCAO
R. Nowak, KCAO
K. Bauer, KCAO
M. Stine, AS-FM&T
C. Audrain, AS-FM&T
C. Loeber, SNL
K. Holswade, SNL
S. Ehle, SNL
J. Purson, LANL
G. Mara, LLNL
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L. Bullfinch, SRO
C. Miller, WSRS
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- 1.0 Purpose
- 2.0 Definitions
- 3.0 Description
- 4.0 Responsible Organization

1.0 PURPOSE

The purpose of this chapter is to describe section eleven of the Development & Production Manual and list all definitions used within this section.

2.0 DEFINITIONS

Accident: An unplanned sequence of events that results in undesirable consequences. [DOE-STD-3009-94]

Activity Based Controls Document (ABCD): An ABCD documents the controls for nuclear explosive operations that DOE relies on to prevent or mitigate accidents with consequences that meet or exceed the Nuclear Explosive Operations (NEO) Evaluation Guidelines. The goal of the ABCD for a nuclear explosive operation at the Pantex Plant is consistent with the goal for Technical Safety Requirements specified in DOE Order 5480.22.

Administrative Controls (AC): Provisions relating to organization and management, procedures, record keeping, assessment, and reporting necessary to ensure safe operations. [DOE-STD-3009-94]

Authorization Agreement (AA): The AA documents the DOE and Contractor agreement to the conditions of operation and as a minimum will:

- Define the scope of operations,
- List the applicable Authorization Basis documents,
- List other documents that support the decision to authorize operations, such as Standards/Requirements Identification Documents (S/RID), applicable readiness review reports, Nuclear Explosive Safety review reports, National Environmental Policy Act documents, and certification that all nuclear explosive surety standards are met, and
- Define any other terms and conditions.

Authorization Basis (AB): For nuclear explosive operations, the AB is defined as the applicable SER, SAR (or equivalent interim document), Pantex Plant TSR, HAR, and ABCD. These documents control the aspects of the operation relied upon by DOE.

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BIO Upgrade Program Plan: A plan supported by the individual Project Teams which describes in detail the scope of the project, the associated schedule and costs, and a work breakdown structure. The individual Project Plans, that support the overall Program Plan, define in greater detail, the expectations set forth by the Amarillo Area Office. The Program Plan must be approved by the Manager, Amarillo Area Office. It is a living document with configuration control applied to each document version.

Hazard: A source of danger (i.e., material, energy source, or operation) with the potential to cause illness, injury, or death to personnel or damage to an operation or to the environment (without regard for the likelihood or credibility of accident scenarios or consequence mitigation). [DOE 5480.23]

Hazard Analysis: The determination of material, system, process, and plant characteristics that can produce undesirable consequences, followed by the assessment of hazardous situations associated with a process or activity. Largely qualitative techniques are used to pinpoint weaknesses in design or operation of the facility that could lead to accidents. [DOE-STD-3009-94]

Hazard Analysis Report (HAR): A summary level report that draws conclusions from the hazard analysis and constitutes a portion of the AB for nuclear explosive operations performed at the Pantex Plant.

Integrated Weapons Activities Plan (IWAP): An integrated plan that includes all nuclear weapon system activities that must be supported by the Pantex Plant and the National Laboratories. Items to be incorporated in the IWAP include weapon modifications and alterations, dismantlement, surveillance activities, and facility authorization basis upgrades/modifications that support weapon operations. Project Plans for each weapon system and facility authorization basis upgrade will contain the details of the work to be completed at the Pantex Plant (scope, cost & schedule). [DOE D&P Manual chapter 11.2]

Justification for Continued Operations (JCO): A formal means for a Managing and Operating (M&O) contractor to obtain DOE approval of operations on a temporary or interim basis when the current authorization basis requirements can not be fully met.

Nuclear Explosive Operations (NEO) Evaluation Guidelines: The objective of the NEO Evaluation Guidelines is to identify accidents with consequences to the worker, the public, or the environment, of a nature that are not normally accepted by the public. DOE approved controls are required for accidents that could lead to consequences at or above the NEO Evaluation Guidelines. These guidelines are at least as conservative as those specified in DOE-STD-3009-94. The guidelines are defined as a list of accident types to focus effort on controlling these scenarios instead of analyzing whether they lead to dose levels above a defined limit at the site boundary. The NEO Evaluation Guidelines are:

- Inadvertent nuclear detonation,
- High explosive detonation/deflagration,
- Fire leading to plutonium dispersal,
- Uncontrolled release of radioactive material from the facility, and
- Death or serious worker injury resulting from non-standard industrial hazards

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Nuclear Explosive Safety: The application of positive measures to control or mitigate the possibility of unintended or unauthorized nuclear detonation, high-explosive detonation or deflagration, or fire in a nuclear explosive area. [DOE O 452.1A]

Nuclear Explosive Safety Study (NESS): A formal evaluation of the adequacy of positive measures to meet DOE nuclear explosive Safety Standards. [DOD O 452.1A]

Nuclear Explosive Safety Study Group (NESSG): The team responsible for conducting a NESS.

Program Manager's Group: An Interagency team led by a DOE employee tasked with overseeing a specific program.

Project Team (PT): A team of the Pantex Plant Managing & Operating (M&O) contractor personnel tasked with ensuring all site aspects of the project are accomplished (e.g. procedures, tooling, HAR, ABCD, etc.).

Safety Analysis Report (SAR): A report that documents the results of a safety analysis to ensure that a facility can be constructed, operated, maintained, shut down, and decommissioned safely and in compliance with applicable laws and regulations. [DOE 5480.23]

Safety Basis (SB): For the purposes of this document, the SB consists of the AB and all information serving as the foundation for the AB, such as the Weapon Safety Specification (WSS), design information, engineering analysis, fire hazard analysis, contractor safety program documentation, and technical background information for both the facility and the weapon.

Safety Basis Review Team (SBRT): The SBRT, comprised of DOE employees and consultants, will review the AB for the proposed nuclear explosive operation as directed by the DOE approval authority for those documents. The SBRT provides an independent opinion of the technical adequacy of the AB via the Safety Evaluation Report.

Safety Evaluation Report: The SER, for a given facility or operation, documents that an appropriate review of the AB documents was conducted. The SER also documents the bases for approving the documents and specifies any conditions of approval. [DOE-STD-1104-96]

Standing Management Team (SMT): The SMT provides advice to DOE line managers, and institutional commitments on behalf of the weapon design agencies and the Pantex operating contractor. [DOE D&P Manual Chapter 11.1]

Technical Safety Requirements (TSR): Those requirements that define the conditions, the safe boundaries, and the management or administrative controls necessary to ensure safe operations for nuclear explosives, and nuclear facilities. TSR for nuclear explosive operations are those controls that provide the greatest qualitative contribution to protection of the public and facility workers by reducing the risk of meeting or exceeding the NEO Evaluation Guidelines.

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Weapon System Project Plan: A plan written by the Project Team which describes in detail the scope of the project, the associated schedule and costs, and a work breakdown structure. The Project Plan defines, in greater detail, the expectations set forth by the Standing Management Team. The Project Plan must be approved by the Director, Weapon Programs Division. It is a living document with configuration control applied to each document version.

3.0 DESCRIPTION

3.1 Chapter 11.1 Standing Management Team (SMT)

Chapter 11.1 describes the roles and responsibilities of the SMT and their relationship with the Project Teams. Milestone expectations are also delineated.

3.2 Chapter 11.2 Integrated Weapons Activity Plan (IWAP)

Chapter 11.2 describes the IWAP, the project plans that make up the IWAP, and the change control process used. The IWAP is the overall agreed upon plan that includes scope, cost and schedule for Nuclear Explosive Operations and associated activities at the Pantex Plant.

3.3 Chapter 11.3 Seamless Safety Process (SS-21)

Chapter 11.3 describes the requirements of the SS-21 process for Nuclear Explosive Operations and associated activities at the Pantex Plant, and the roles and responsibilities of the Project Teams.

3.4 Chapter 11.4 Authorization Basis for Pantex Plant Nuclear Explosive Operations

Chapter 11.4 describes the Authorization Basis requirements for Nuclear Explosive Operations and associated activities conducted at the Pantex Plant.

3.5 Chapter 11.5 Target Level of Controls (TLC)

Chapter 11.5 describes the philosophy and appropriate application of TLC. TLC is a tool to be used on Nuclear Explosive Operations and associated activities at the Pantex Plant that will provide a consistent basis that an operation can be conducted safely.

3.6 Chapter 11.6 Coordinated Review Process for Nuclear Explosive Operations at the Pantex Plant

Chapter 11.6 describes the requirements of the independent reviews necessary to provide the authorization official confidence that the Nuclear Explosive Operations at the Pantex Plant are safe.

4.0 RESPONSIBLE ORGANIZATION

WPD is responsible for this chapter.

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3.0	Definitions
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1.0 PURPOSE

The purpose of this chapter is to describe the requirements of the Seamless Safety (SS-21) process. The SS-21 process integrates the weapon, facility, tooling (testers & equipment), operating procedures, and personnel to form a safe, efficient, and effective operating environment and is the preferred process for developing weapons assembly and disassembly processes at the Pantex Plant. The intent is to ensure that safety aspects of the weapons processes are considered up front, during the process development phase, not reviewed after completion. This chapter applies to nuclear weapon assembly, disassembly, and associated testing operations performed in the bays and cells at the Pantex Plant. These assembly and disassembly operations include, but are not limited to, those performed during new production, stockpile improvement programs, disassembly and inspection and selected testing for surveillance, builds, rebuilds, and dismantlement activities.

2.0 POLICY

It is Department of Energy (DOE) policy that nuclear explosive operations be developed with safety as a primary consideration. A formal process is required to ensure that only efficient, effective, and safe nuclear weapon assembly, disassembly, and associated testing operations are employed. Project Teams are expected to exercise judgment in determining how to apply the requirements contained herein and to develop and implement robust processes for which the safety implications have been considered from the beginning. The objective of each project must be to develop verifiable safety criteria and assembly/disassembly processes that enable operations to be completed safely and predictably.

To the extent possible, the safety criteria must:

1. Prevent the application of unauthorized or unanalyzed energy from sources external to the nuclear weapon, or any component of a nuclear weapon, so as to prevent the release of energy from sources internal to the nuclear weapon. Energy sources include but are not limited to:

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- a. Mechanical energy
 - b. Electrical energy
 - c. Thermal energy
 - d. Electro-mechanical energy
 - e. Potential/kinetic energy (e.g. lifting, transportation, etc.)
 - f. Chemical energy
2. Allow no single-point failure in an operation that could cause:
- a. Energy sources within the weapon, including self-contained energy sources that could have a safety concern, to be activated or released
 - b. Radioactive exposure or contamination above thresholds set in the operating procedures
 - c. Injury to personnel, environment, or public
 - d. Loss of facility operability
3. Mitigate personnel exposure to radiation and hazardous substances to "As Low As Reasonably Achievable" (ALARA) levels. Levels include, but are not limited to:
- a. An operational ALARA goal established by the responsible Health Physicist in coordination with the Project Team and the Pantex ALARA
 - b. OSHA limits
 - c. Those required by specific programs

For those situations where the above safety criteria cannot be met, sufficient controls must be in place to provide confidence that the risk in the operation is acceptable to the DOE.

3.0 DEFINITIONS

See Chapter 11.0 for definitions.

4.0 RESPONSIBILITIES

4.1 Deputy Assistant Secretary for Military Application and Stockpile Management (DASMASM), DP-20

The DASMASM has overall responsibility for the conduct of nuclear weapons operations. The DASMASM issues periodic P&PDs, setting end-of-fiscal year requirements for weapon quantities in the stockpile and other guidance.

4.2 Manager, AL

The AL Manager is the Authorizing Official (AO) for nuclear explosive operations performed at the Pantex Plant. Prior to authorization, the AL Manager provides the certifications required by DOE Order 452.1A.

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4.3 Director, Weapon Programs Division (WPD)

As the Chair of the Standing Management Team (SMT) and owner of the Integrated Weapons Activity Plan (IWAP), the WPD Director ensures the execution of the Project Team's responsibilities.

4.4 Manager, Amarillo Area Office (AAO)

As the Co-Chair of the SMT and responsible for the development and implementation of the facility authorization basis, the AAO Manager ensures the execution of the Pantex Plant's responsibilities and lessons learned on relevant projects.

4.5 Director, Weapon Surety Division (WSD)

As a member of the SMT, the WSD Director is responsible for planning and execution of the Nuclear Explosive Safety activities that support the resulting Project Plans. The WSD Director is also responsible to obtain approval from the AL Manager and DP-20 for the results of nuclear explosive safety reviews.

4.6 Deputy Assistant Manager, Office of Safety and Safeguards (OSS)

The Deputy Assistant Manager of OSS is responsible for technical support to line management from the Safety Basis Review Team, as well as for performance of independent readiness reviews conducted for the AL Manager.

4.7 Standing Management Team

The SMT will oversee the development and execution of the project and will serve as the Change Control Board for specified requirements and processes. The SMT will define expectations for projects well in advance of execution and will establish measures of success. Specific responsibilities of the SMT are found in Chapter 11.1.

4.8 Pantex Plant

The operating contractor is responsible for leading the Project Team for each weapon system, leading facility authorization basis upgrade projects and for supporting the resulting Project Plans. Upon approval of the individual Project Plans, the operating contractor must ensure proper resources are made available for implementation of the Project Plans.

4.9 Design Agencies

The Design Agencies are responsible for providing a Project Team member for each weapon system and providing technical expertise as required for facility authorization basis upgrade projects, within

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negotiated resources and priorities. The Design Agencies are also responsible for supporting the resulting Project Plans and ensuring proper resources are made available for implementation of the Project Plans.

4.10 Project Team

The Project Team (PT) will prepare the Project Plan that accomplishes the objectives for the program, as delineated in D&P Chapter 11.2 and ensure the SMT will be able to make the assertions in accordance with D&P Chapter 11.1. The PT is responsible to vigorously execute the plan as approved and to develop recovery plans as necessary, and manage the efforts of all the functional task teams. It is the responsibility of the PT to ensure approved scope completion on time and within budget.

4.11 Task Teams

The various Task Teams (TTs) will support the PT, as necessary, for the completion of the approved Project Plan. The TTs consist of technically competent individuals that maintain an expert level of knowledge in topical areas which they are providing advice on, such as Weapons Design, Operating Procedure, Operating Facility, Equipment and Layout, Tooling, Electrical Testers and Hazard Assessment.

5.0 REQUIREMENTS

5.1 General

The principal requirement is for the PT, and their associated TTs, to fulfill the objective and safety criteria as stated above in Section 2.0. The other requirements include completion and implementation of the Weapon Safety Specification (WSS), Personnel Plan, Operating Procedure, Operating Facility Readiness, Equipment & Facility Layout, Tooling, Hazard Assessment, and the Activity Based Control Document (ABCD).

5.2 Weapon Safety Specification

A WSS shall be consistent with the requirements outlined in D&P Chapter 11.4 and prepared by the cognizant Design Agencies. The WSS needs to incorporate information from design drawings, Baseline Process Flow, Use Control Report, Criticality Report, and Intrinsic Radiation Report. The WSS shall provide as-built information pertaining to the characteristic design features, safety attributes, and hazards for a nuclear weapon configuration or a family of similar nuclear weapon configurations, and safety-critical information to enable development of other documents (e.g., personnel plan, operating procedures, ABCD, Operating Facility Readiness, the updated Facility Safety Basis, HAR, Equipment and Facility Layout, and Tooling).

The Design Agencies shall review and summarize the use-control features of the warhead or bomb consistent with applicable guidelines concerning dissemination of use-control information. When

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applicable, use-control features shall be incorporated and employed at the earliest practical point in the assembly of a nuclear weapon and removed at the latest practical point in its disassembly.

The Design Agency shall also review past surveillance program data and include pertinent safety related information derived from that review in the WSS. For enduring stockpile weapon systems, the results of continuing surveillance activities must be used to annually update (if required) the WSS to include pertinent safety information. The results of the annual review will be provided to DOE for review.

Archiving is an important facet in the development of each WSS. All information contained in the WSSs is based on best-available information which has been scrutinized by the appropriate staff for correctness.

5.3 Personnel Plan

A Personnel Plan shall be generated defining the selection process and training requirements for all personnel involved in hands-on nuclear weapons work or who have direct responsibility for the assembly or disassembly operation, including production technicians, radiation technicians, line supervisors, engineers, and managers. The plan must identify requirements for general weapon training, Personnel Assurance Program, and weapon-specific training. The plan must employ methods to ensure personnel are trained, qualified, and certified before they are allowed to perform nuclear weapons work. The plan needs to incorporate methods to track personnel to ensure their training is maintained and utilize certification verification methods that support the pre-operational check process conducted at the beginning of each shift.

5.4 Operating Procedure

An Operating Procedure shall be generated and comprised of a Pre-Operational Checklist, the Nuclear Explosive Operating Procedure (NEOP), sets of modularized source information and the ABCD. The structure of the Operating Procedure information should be modular to allow for easy access to the information. The operating procedure must address normal operations and identified credible deviations and be developed to integrate interactions of the nuclear weapon, personnel, operating facility (including layout), equipment, and tooling. The operating procedure has to reflect the technical safety requirements and account for all hazards and hazardous operations that have been identified. The NEOP must be structured so that safety critical information is identified and is controlled to assure that changes to this type of information are thoroughly analyzed and subjected to hazard assessment review before allowing the change.

5.5 Activity Based Controls Document

An ABCD shall be generated in accordance with D&P Chapter 11.4 and must describe the integrated set of controls resulting from combining the facility controls with those controls required for a particular nuclear explosive activity or operation. For consistency, the facility controls should be

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termed "common" controls and the nuclear explosive operations controls "unique" controls. The two must be integrated to describe the set of controls necessary to maintain safety in the operation. The documentation of the controls must be done in the ABCD to facilitate change control and configuration management.

5.6 Operating Facility

The operating facility shall be configured and controlled such that only authorized permanent equipment, hoists, mobile equipment, and utility services are allowed for a given nuclear weapon operation. Furthermore, it must be configured to allow facility users to readily determine facility status including operability of safety systems, facility maintenance status, and quantities of Special Nuclear Material (SNM), High Explosives (HE), and other hazardous materials in the facility. The facility configuration will be subject to formal change control processes.

5.7 Equipment & Layout

A formal method for selecting equipment and development of the layout requirements for a dedicated facility must be generated. The equipment selection portion of this deliverable is for equipment typically available from commercial sources, but may also include specially designed equipment as required for the weapon-specific operation (e.g., electrical testers, leak detectors, etc.). The equipment must be selected based on need, the established safety criteria, and ergonomics. Its configuration and maintenance requirements must be formally documented. The equipment shall be allowed to enter or exit the operating environment only as authorized. The facility layout must be formally documented and take into consideration the facility configuration, tooling, equipment, and the placement of these items into and out of the operating facility.

5.8 Tooling

Tooling shall be designed, utilizing information from the WSS, to mitigate occupational hazards, to prevent insults to the nuclear weapon, and to enable the production technician(s) to perform the assembly or disassembly in an efficient, effective, and safe manner. The tooling design should improve mechanical advantage, control motion, control position, and mitigate accidents caused by misinterpretation or incorrect handling. For safety critical operations, the tooling must incorporate fail-safe designs such that a failure cannot occur that compromises safety. If this is not practical, the design must include at least two independent physical safety features or barriers that must fail before experiencing a detrimental consequence.

5.9 Hazard Assessment

A formal hazard assessment and Hazard Analysis Report (HAR) shall be performed and published in accordance with D&P Chapter 11.4. The hazard assessment shall be performed concurrent with the process development.

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5.10 Milestone Reviews

Five formal reviews (i.e. Milestones) shall be conducted by the Project Team, for the Standing Management Team (SMT), to allow the SMT to make assertions as delineated in D&P Chapter 11.1. These reviews shall be the "close-out activities" of the Task Direction and Planning, Concept Development, Preliminary Development, Implementation & Verification, and the Authorization Phases, also known as Milestones 0, 1, 2, 3 and 4. One of the goals of the Milestone reviews is for the Project Team to convince the SMT that the Safety Criteria were adequately addressed. At the same time, the PT shall apprise the SMT of the process development status, trade-off issues, and schedule status. Issues identified at these reviews must be resolved to the satisfaction of the SMT. To allow the project to quickly proceed, the SMT's acknowledgments may be given verbally followed by a documented acknowledgment. The Project Team shall document the results of each Milestone Review including decisions pertaining to safety-critical issues with reference to the SMT's acknowledgments.

Any changes adversely affecting the scope, schedule or budget of the project as delineated in the Project Plan must be presented to the SMT for consideration as outlined in D&P Chapter 11.2.

6.0 PROCESS PHASES

6.1 Task Direction and Planning Phase

The first phase is the Task Direction and Planning Phase, where requirements are identified and agreed to by all parties. The phase begins with WPD issuing a weapon-specific tasking letter to the DA's and Pantex Plant. The letter shall state that SS-21 is to be undertaken and shall identify the applicable requirements and schedule that's consistent with the IWAP. The DA's and the Pantex Plant must respond to the tasking letter by preparing resource and personnel estimates needed to support the proposed task, as well as a notice of impact on any existing schedule. The DA's and Pantex shall forward their responses to WPD. A PT is established to develop a project plan to define the task requirements for the supporting TTs. The PT establishes and employs the TTs to develop, implement, review, and verify the following throughout the subsequent phases: 1) the WSS and the applicable safety criteria, 2) an operating procedure, 3) personnel requirements, 4) an operating facility and its safety basis documentation, 5) equipment and layout, 6) tooling, and 7) a HAR.

At the completion of the Task Direction and Planning Phase, the PT shall have progressed far enough along to allow the SMT to make assertions as delineated in D&P Manual Chapter 11.1, Section 5.1, titled Milestone 0 - Project Plan Approval.

6.2 Concept Development Phase

This phase includes the following main elements:

- Review and update of the WSS
- Development of the safety criteria

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- Identification of trainer fidelity requirements
- Conducting an assessment for on-going processes
- Initiation of procedures, tooling, hazards assessment, facility selection, equipment and layout
- Completion of a Conceptual Hazards Analysis
- Illustrated process flow that depicts how the tooling interfaces with the unit's various configurations

The WSS shall be reviewed and updated and applicable baseline Safety Criteria identified and developed. Source information for the WSS needs to include the Baseline Process Flow, Archiving Data, Use-Control Report, Criticality Report, and Intrinsic Radiation Report.

During this phase, the functional requirements for a high fidelity trainer must be identified and documented. For weapon systems that have an established, approved and on-going process, a Process Assessment must be conducted to evaluate the need for any improvements. The PT along with the HATT must evaluate the existing processes against the safety criteria and existing safety basis documents.

A Conceptual Hazard Assessment (CHA) on the existing process shall be conducted and completed during this phase. The CHA and the process safety criteria assessment must identify any current process parameters (e.g., tooling, procedures, facilities, training, etc.) that do not meet the safety criteria or do not comply with facility safety basis documents.

At the completion of the Concept Development Phase, the PT shall have progressed far enough along to allow the SMT to make assertions as delineated in D&P Manual Chapter 11.1, Section 5.2, titled Milestone 1 - Acceptance of Conceptual Approach.

6.3 Preliminary Development Phase

During this phase, the following items must be completed:

- Detailed process flow
- Preliminary Hazards Analysis Report
- Baseline operating procedures
- Preliminary ABCD
- Proposed personnel selection, training and qualification plan
- Trainer requirements
- Design and qualification requirements for equipment, tooling, layout and facilities

During the Preliminary Development Phase the PT is responsible for ensuring the TTs are completing each task in a prescribed sequence that contemplates the impact of other tasks evolving in parallel. A

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significant amount of task team interactions is required in this phase. This phase also requires that each TT establish specifications for subsequent procurement, manufacture, inspection, and/or acceptance of the deliverables. A Preliminary Hazard Assessment (PHA) is performed in this phase to assess the risks associated with the concepts developed in the previous phase.

At the completion of the Preliminary Development Phase, the PT shall have progressed far enough along to allow the SMT to make assertions as delineated in D&P Manual Chapter 11.1, Section 5.3, titled Milestone 2 – Acceptance of Process Flow.

6.4 Implementation & Verification Phase

During this phase the following items must be achieved:

- Safety Criteria has been satisfied
- Weapons response analyses have been peer reviewed by the DAs
- Adequate HAR, ABCD and an effective Authorization Basis exist
- Adequate tooling, procedures, equipment and facilities exist
- Positive Verification Tryout has been completed
- Completion of a proposed scope for the Independent Review Team
- Operations personnel are trained and qualified
- Statement of readiness to proceed to independent verification

During the Implementation & Verification Phase, the PT is responsible for ensuring the Safety Criteria has been met and an effective Safety Basis is in place, thus, the SMT can make the assertions delineated in D&P Manual Chapter 11.1, Section 5.4, titled Milestone 3 – Readiness to Proceed to Independent Review.

6.5 Authorization Phase

The following items must be completed during this phase:

- Readiness and Nuclear Explosive Safety Reviews in accordance with DOE Order 452.1, 452.2A and AL SD 452.2A
- Safety Evaluation Report by the Safety Basis Review Team or equivalent
- Authorization Agreement per D&P Manual Chapter 11.4, Section 4.6

During the Authorization Phase, the PT is responsible for ensuring proper disposition of all concerns raised by the independent review teams and, when disagreements exist, presenting technical rationale to the SMT for resolution. At the completion of the Authorization Phase, the PT shall have progressed far enough along to allow the SMT to make assertions as delineated in D&P Manual Chapter 11.1, Section 5.5, titled Milestone 4 – Recommendation to Authorize Operations.

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Upon receiving authorization to proceed with operations, the Pantex Plant is responsible, with support from the PT to accomplish the authorized scope of work within the approved controls, schedule and budget. Throughout the lifetime of the operation, the Pantex Plant with the PT support will monitor and evaluate the controls through a single integrated change-control process to ensure the required safety basis is maintained with high confidence throughout the life of the task. The HAR and ABCD will be used for change control subsequent to the authorization to proceed with operations is received.

7.0 RESPONSIBLE ORGANIZATION

WPD is responsible for this chapter.

8.0 REFERENCES

1. DOE Policy 450.1, Integrated Safety Management
2. DOE Order 5480.23, Safety Analysis Reports for Nuclear Facilities
3. DOE Order 5480.22, Technical Safety Requirements
4. DOE Order 452.1A, Nuclear Explosive and Weapon Surety Program
5. DOE Order 452.2A, Safety of Nuclear Explosive Operations
6. DOE-STD-3009-94, Basis and Methods for Hazard Analysis, Accident Analysis, and TSR Derivation
7. DOE-STD-XXXX-96, Hazard Analysis Reports for Nuclear Explosive Operations
8. EP401110, Integrated Safety Process for Assembly and Disassembly of Nuclear Weapons
9. Guidelines for Hazard Evaluation Procedures, AIChE

SEPARATION

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1.0 PURPOSE

The purpose of this chapter is to delineate Authorization Basis (AB) requirements for Nuclear Explosive Operations (NEO) and associated activities conducted at the Pantex Plant.

2.0 POLICY

Consistent with DOE O 452.1A, it is Department of Energy (DOE) policy that a complete and well-documented AB be developed for nuclear explosive operations. The AB shall incorporate a level of detail and rigor commensurate with the hazards associated with the planned operations on a particular nuclear explosive. References included in this chapter are for informational purposes only. Refer to the Managing & Operating contract for applicable requirements.

3.0 DEFINITIONS

See Chapter 11.0 for definitions.

4.0 AUTHORIZATION BASIS, SAFETY BASIS, AND AUTHORIZATION AGREEMENTS

For nuclear explosive operations, the permanent AB consists of the applicable SAR (or equivalent interim document), Pantex Plant TSR, HAR, and ABCD. The SER, JCO, and analysis generated by the Unreviewed Safety Question (USQ) process (reference DOE Order 5480.21) may be temporary additions to the AB. Expectations for these AB documents are defined in sections 4.1 through 4.6. The AA invokes the AB as requirements for the operation, and references other reviews or documents relied upon by DOE in authorizing the operation. Section 4.7 discusses the relationship of selected AA documents with the AB. The SB consists of the AB and the supporting information for the AB. Expectations for selected SB documents are defined in section 4.8.

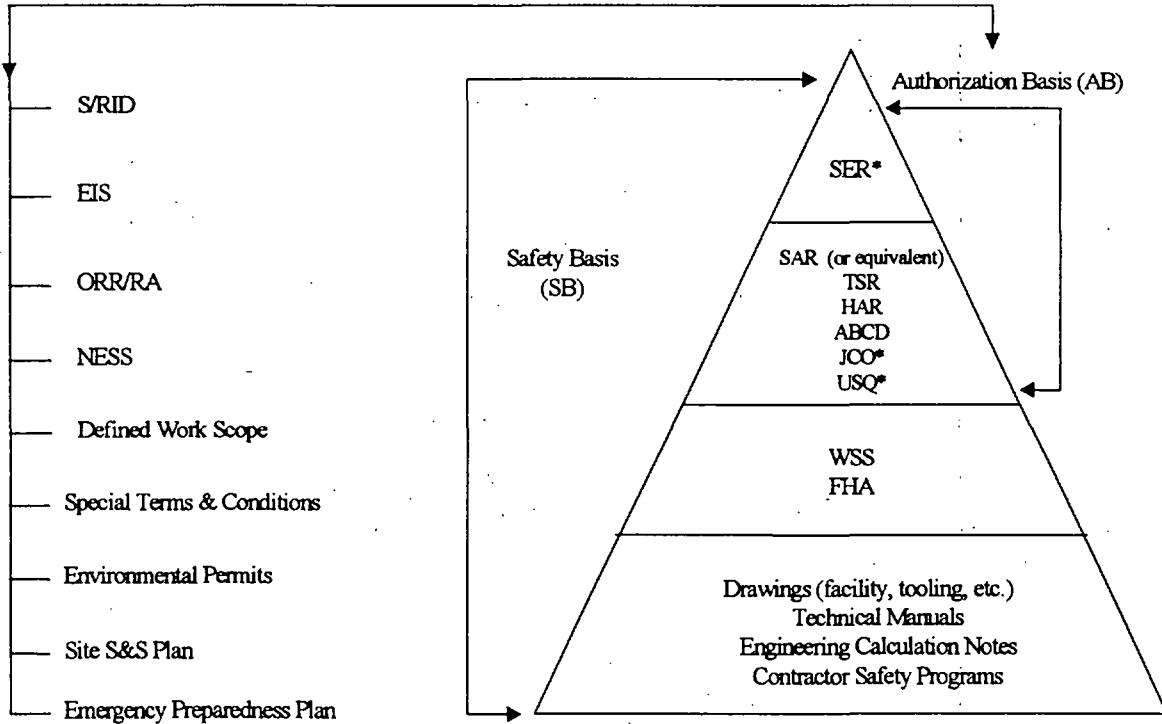
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Authorization Agreement



* The SER, JCO, and analysis generated to support USQ are temporary additions to the AB. The JCO and USQ information shall be incorporated in the permanent AB documents during the next annual update (reference paragraph 4.6).

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4.1 Safety Analysis Report (SAR) or Equivalent Interim Document

The SAR or equivalent interim document (e.g. Basis for Interim Operation – reference DOE-STD-3011) is a required portion of the DOE approved AB. The objective of the SAR is to provide the technical basis for deriving the necessary common controls and facility-related controls. DOE approval of SARs, along with other authorization basis documents, indicates that DOE has decided that the residual risk associated with operations that are performed in accordance with the stated controls is acceptable, considering the benefit of the task.

The SAR may be completed in facility and topic-related modules (e.g. bays, cells, transportation, seismic, lightning, fire, aircraft crash, general information document, etc.). Consideration of a representative nuclear explosive operation is useful to derive safety controls that are common, or site-wide. The analysis shall also include potential threats to a generic operation from natural phenomena or external hazards (e.g. appurtenances falling).

SAR shall focus on the conclusions of the analysis and the rationale for the conclusions, not the analysis itself. Providing an exhaustive set of analyses with no summary or conclusions does not meet the needs of the DOE. An acceptable approach for SARs is specified in DOE-STD-3009-94 (also reference DOE O 5480.23). The SAR shall accomplish the following:

1. Identification of hazards associated with the applicable facilities that could pose a threat to the representative nuclear explosive operation.
2. Identification of a representative set of accident scenarios potentially resulting in consequences that meet or exceed the NEO evaluation guidelines. Potential accident scenarios should be grouped into common types (e.g. drops, minor strikes, and fires), where the same controls or positive measures apply.
3. Derivation of the necessary controls to prevent accidents, to reduce their likelihood, or to mitigate their consequences. When the guidance specified in DOE-STD-3009 is not directly applicable to the type of control set needed, the Target Level of Controls (TLC) guidance in D&P Manual Chapter 11.5 may be used as guidance. The linkage of the scenarios/hazards to the applicable controls shall be clearly presented. The technical basis or methodology for selecting the most important, most effective controls shall also be provided.

4.2 Pantex Plant Technical Safety Requirements (TSR)

The Pantex Plant TSR establishes facility specific and common controls for nuclear operations (e.g. pit storage) and nuclear explosive operations as derived in the SAR. The goal of Pantex Plant TSR is to achieve the objectives of DOE O 5480.22 (DOE-STD-3009-94). Implementation of a layered defense philosophy will likely include controls that enhance safety in addition to those specified in the TSR/ABCD. Site-wide programmatic commitments shall be included in the Pantex Plant TSR.

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The TSR controls shall be presented in a manner that clearly distinguishes their relative level of importance to safety, using the concepts and approach of DOE-STD-3009-94. (Also reference DOE O 5480.22):

- Safety Limits (SL) - SLs are reserved for a small set of extremely significant features that are essential to prevent potentially major offsite impact.
- Limiting Conditions for Operation (LCO) - LCO establish the lowest functional capability or performance level of tooling/equipment/system/structure required for safe operations.
- Surveillance Requirements (SR) - Those requirements relating to test, calibration, or inspection to assure that the necessary quality of systems, tooling, or equipment is maintained to ensure operations will be within Safety Limits and that Limiting Conditions for Operation will be met.
- Bases - A brief summary of the reasons for SL, LCO, and SR that demonstrates how each requirement was derived from the hazard analysis. The basis or bases statements shall clearly explain why each SL, LCO and SR is needed, and provide a synopsis of why each is sufficient. The primary purpose for describing the basis for each requirement is to ensure that any future changes to the requirement will not inadvertently compromise its original intent or purpose.
- Administrative Controls - Provisions relating to organization and management, procedures, record keeping, reviews, and audits necessary to ensure safe operations.

4.3 Hazard Analysis Report (HAR)

The objective of a HAR for nuclear explosive operations and associated activities is to provide the technical basis for deriving the operation-specific controls. The HAR shall focus on consequences that meet or exceed the NEO evaluation guidelines. DOE relies upon site institutional safety programs, such as those required by the Pantex Plant Standards/Requirements Identification Documents (S/RID), to derive controls for accidents involving consequences below the NEO evaluation guidelines. DOE does not use the HAR to evaluate the adequacy of the site institutional safety programs (i.e. assessments), as other means exist to accomplish these evaluations.

The HAR shall include discussion that leads to the derivation of controls where needed. The focus of the HAR shall be placed on conclusions of the analysis, not the analysis itself. Details of the supporting analyses shall not be included in the report, but provided as backup by reference and shall be readily available to the reviewers. Providing an exhaustive set of analyses with no summary or conclusions does not meet the needs of the DOE. DOE-DP-STD-3016 should be used as guidance in the development of the weapon-specific HAR. As a minimum, the HAR shall accomplish the following goals at the direction of the PT:

1. The HAR shall include a concise process description and basic process flow to aid in the understanding of the above items.
2. The HAR shall provide DOE with demonstrable evidence that all significant hazards have been identified. These hazards include those posed by the weapon and its components, by the process

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(e.g. tooling, testers), the facility (e.g. fire, electrical energy), and natural phenomena (e.g. lightning, seismic). Hazard identification shall be accomplished by reviewing prior analyses (e.g. Weapon Safety Specification (WSS), SAR), coupled with process walk-down (and process videos) and additional efforts necessary to identify hazards not previously analyzed. The HAR shall demonstrate that all hazards potentially resulting in accidents with consequences that meet or exceed the NEO evaluation guidelines have been identified and analyzed. Additionally, explanation shall be provided for accident scenarios that do not require controls due to benign consequences, or because the scenarios are determined to be sufficiently unlikely.

3. The HAR shall describe the analytical technique used to analyze hazards and present the results. Analysis of a comprehensive set of potential accident initiators and event sequences potentially resulting in consequences that meet or exceed the NEO evaluation guidelines shall be identified and developed by trained and experienced analysts. Where practicable, accidents shall be grouped into common scenarios (e.g. drops, minor strikes, fires, etc.) where the nuclear explosive is in the same configuration (or has the same vulnerability) and the same controls for prevention or mitigation apply.
4. The HAR shall provide the linkage, through the accident scenario description, from the hazard to the control (i.e. show the derivation of controls).
5. The HAR may consider the TLC guidance (D&P Manual Chapter 11.5) as a tool for the initial scoping of the control set. The guidance specified in DOE-STD-3009 may also be used when applicable to the type of control set needed. An evaluation of the adequacy of the control set shall be included.
6. The HAR shall demonstrate that the safety envelope established for the facility (SAR/TSR) and the nuclear explosive operation (HAR/ABCD) cover all parts of the operation. Where prior analyses are relied upon, the HAR shall include a synopsis of the results and relevance to the proposed nuclear explosive operation. Within the text of the HAR, a specific citation to the prior analysis shall be made and a comprehensive list of references shall be included at the end of the document.
7. The text shall provide the DOE approval authority sufficient information to enable an assessment of the adequacy of the identified controls and an understanding of the residual risk DOE is accepting if the operation is authorized.

4.4 Activity Based Controls Document (ABCD)

The objective of the ABCD is to document the most significant controls relied upon to prevent or mitigate the consequences of the accident scenarios described in the HAR for a specific nuclear explosive operation. Combined with the Pantex Plant TSR, the ABCD establishes the set of safety controls that, if properly implemented, will allow DOE to conclude that there is reasonable assurance of adequate protection against accident scenarios potentially resulting in consequences that meet or exceed the NEO evaluation guidelines.

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The ABCD shall describe each control and provide the technical basis for selection of the control. The ABCD shall also present safety controls in a manner that clearly distinguishes their relative level of importance to safety, in accordance with the M&O contract using the concepts and approach of DOE Order 5480.22 and DOE-STD-3009-94 (see paragraph 4.2, Pantex Plant TSR for discussion of SL, LCO, etc.). Implementation of a layered defense philosophy will likely include controls that enhance safety in addition to those specified in the TSR/ABCD.

4.5 Safety Evaluation Reports (SER)

An SER will be prepared for AB documents (e.g. SAR, TSR, HAR, and ABC) using DOE-STD-1104-96 as guidance. The SER will not reiterate information contained in the executive summary of the document. The Safety Basis Review Team (SBRT) leader signs and submits this SER to the approval authority.

The DOE approval authority will formally document disapproval/approval of the HAR and ABCD in a letter to the operating contractor. The approval authority may impose additional operational controls or restrictions in the approval letter. These additional requirements shall be incorporated by revision of the HAR and ABCD. The DOE approval letter shall be considered a formal part of the AB until DOE approves revisions of the appropriate AB document. Any necessary revisions shall be submitted for DOE approval within 90 days of the date of the approval letter. This letter may also make the SER part of the AB by reference, at the discretion of the approval authority.

4.6 Justification for Continued Operations (JCO) and Unreviewed Safety Question

The JCO and information generated to support USQ are temporary additions to the AB. The JCO and USQ information shall be incorporated in the permanent AB documents during the next annual update. The requirements for the USQ process are found in DOE Order 5480.21.

4.7 Authorization Agreements

The AA contractually documents the DOE and Contractor agreement to the conditions of operation and as a minimum will:

- Define the scope of authorized operations,
- List the applicable Authorization Basis documents,
- List other documents that support the decision to authorize operations, such as S/RID, applicable readiness review reports, Nuclear Explosive Safety review reports, National Environmental Policy Act documents, and certification that all nuclear explosive surety standards are met, and
- Define any other terms and conditions.

The NES review and readiness reviews are discussed below.

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4.7.1 Nuclear Explosive Safety (NES) Reviews

As with any independent review, NES reviews may identify concerns with the operations/activities under review. Once the authorizing official concurs with these concerns, the corrective action shall result in appropriate modifications to the AB (HAR, ABCD, SAR, and Pantex Plant TSR).

It should be noted that the input documents for a given NES review shall include the appropriate portions of the AB and SB for the operations/activities under review. Specifically, the input document for weapon-specific NES reviews will primarily be the WSS, HAR, and ABCD. Input documents for Master Studies will primarily be the applicable portion of the AB (e.g. SAR, and Pantex Plant TSR). The documentation resulting from NES reviews will be included by reference in the Authorization Agreement as part of the basis for DOE's decision to authorize the nuclear explosive operation. Reference DOE O452.2A, DOE-STD-3015, and the associated AL supplemental directive for more detailed information regarding the NES process and requirements.

4.7.2 Readiness Review

A review confirming readiness of the operation shall be accomplished as directed by the appropriate DOE line management (DOE O 452.2A and DOE O 425.1). The report documents the team's findings and recommendations regarding the readiness of the operation. This report will be included by reference in the Authorization Agreement as part of the basis for DOE's decision to authorize the nuclear explosive operation. The readiness review report is not part of the AB. Reference the applicable chapter of AL SD 56XB for more detailed information regarding the review process for nuclear explosive operations.

4.8 Selected Safety Basis (SB) Documentation

4.8.1 Weapon Safety Specification

The objective of the WSS is to identify the hazards inherent in the weapon itself, and provide a summary of the analysis to identify the general concerns to mechanical, electrical, thermal, and chemical insults that might be anticipated to result in an untoward response. To accomplish this goal, the WSS provides safety-related information pertaining to all of the components for a nuclear weapon configuration or a family of similar nuclear weapon configurations. The Design Agency system engineers will reference use-control features of the warhead or bomb consistent with applicable guidelines concerning dissemination of use-control information.

The WSS is the vehicle by which the design agencies delineate weapon and hazardous component response information to the Pantex M&O contractor for use in evaluating accident scenarios in the HAR and, therefore, shall be completed before the HA is initiated.

The WSS must identify:

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1. All hazardous components inherent in the weapon design and assembly.
2. Known vulnerabilities for hazardous component response to mechanical, electrical, chemical, and thermal insults.

The WSS is intended as a tool to facilitate interactions between the Pantex M&O contractor and the design agencies during development of the AB. The design agencies must remain actively involved in the AB development to fulfill their responsibilities as defined in paragraph 5.6 below.

4.8.2 Supporting analysis

Supporting analysis for AB documents can take many forms, including published technical reports, work done by analysts during preparation of the document; other documents prepared to support independent reviews, etc. These supporting analyses are considered part of the SB, but are not part of the AB. These documents will not be specifically approved by DOE and will not be placed under DOE change control.

4.8.3 Additional Controls

Implementation of a layered defense philosophy will likely include controls that enhance safety in addition to those specified in the TSR/ABCD. The Pantex Plant contractor is expected to clearly identify and manage these controls.

5.0 RESPONSIBILITIES

5.1 Manager, AL

The AL Manager is the Authorizing Official (AO) for nuclear explosive operations performed at the Pantex Plant. Regarding the AB for nuclear explosive operations and associated activities, the AL manager audits, reviews and evaluates processes and results for:

- Approval of the SAR or equivalent interim document for the Pantex Plant.
- Approval of the Pantex Plant TSR.
- WPD Director approval of the ABCD for Weapon Program activities.
- WPD Director approval of the HAR for Weapon Program activities.
- AAO Area Manager concurrence with the SAR or equivalent interim document
- AAO Area Manager concurrence with the Pantex Plant TSR.

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5.2 Director, Weapon Programs Division (WPD)

For all weapon program projects, the WPD Director:

- Defines the scope of the project via the AAO Area Manager.
- Approves the project plan.
- Approves the scope and approach recommended by MHC via the project plan. This approach will be incorporated in the Integrated Weapons Activity Plan (IWAP) (reference Chapter 11.2 for information concerning IWAP).
- Charters the SBRT to review the HAR and ABCD within the same scope as the PT.
- Approves the HAR and any subsequent changes. This approval validates the HAR has met the goals.
- Approves the ABCD and any subsequent changes. This approval validates that an appropriate set of controls has been established in the ABCD for the proposed operation.

5.3 AAO Area Manager

For all site operations projects, the AAO Manager:

- Charters the SBRT (or equivalent) to review the SAR and TSR.
- Formally concurs that the SAR or equivalent interim document has met the goals prior to DOE approval.
- Formally concurs that an appropriate set of controls has been established in the Pantex Plant TSR prior to DOE approval.
- Monitors implementation of the AB for Pantex operations.
- Approves changes for SAR (or equivalent) and TSR. Approved changes will be sent to WPD with a copy to Safeguards and Security Division (SASD).

5.4 Program Manager's Group (PMG)

The PMG is responsible to:

- Ensure the scope of the analysis meets programmatic needs.
- Ensure DOE, design agencies, and the M&O contractor fulfill the responsibilities in this and other applicable directives.

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5.5 Safety Basis Review Team

The SBRT will evaluate the AB for the project. The review will focus on ensuring a comprehensive identification of hazards, an analysis of a representative set of credible accidents, and the establishment of appropriate controls. Accordingly, the SBRT is not expected to perform comprehensive confirmatory analyses, and is not required to perform specific confirmatory analyses. The SBRT is expected to use its technical judgment to identify instances when additional analysis would be beneficial to gain clarity. The evaluation will:

- Submit a signed a review plan to the approval authority.
- Validate the thoroughness and completeness of the hazard identification and accident analyses.
- Examine the analysis technique, binning methodology, and the consequence assigned to accident sequences.
- Assess adequacy of controls using technical judgment and consideration of the TLC approach.
- Determine that technical safety requirements ensure operability, reliability, and maintainability of derived controls.
- Ensure consistency and integration of nuclear explosive operations and associated activities analysis with other Pantex safety bases.
- Provide a SER, signed by the team leader, documenting the conclusions and recommendations of the team to the DOE approval authority.

The SBRT will interact with the PMG and PT; however, the SBRT may not direct the PMG or PT. The SBRT will review draft documents as available and provide informal comments to the PMG and PT. PMG and PT meetings where SB issues are being discussed will be attended as often as possible. Also, the SBRT will participate in opportunities for walk-downs and other hands-on familiarization with the project prior to its evaluation of the Pantex Managing & Operating (M&O) Contractor work product.

5.6 Design Agencies

Design Agencies contribute to the AB documents for nuclear explosive operations and associated activities. For weapon program and site operation projects, the cognizant design agencies are primarily responsible for:

- Providing weapon and hazardous component response information to the Pantex M&O Contractor for accident scenarios identified in the Hazard Analysis. This information shall be included in the WSS and other documentation,
- Reviewing the proposed operations and AB documentation to ensure that weapon response information has been understood and appropriately addressed. This includes reviewing the bases for controls section of the ABCD or TSR, and

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- Reviewing the proposed operations, AB documentation, and hazard identification processes to assess whether the Pantex M&O Contractor process provides a high level of confidence that hazards that could result in a weapon response have been identified.

The Engineering Release (ER) published by the cognizant design agencies must explicitly address their own inputs relative to the above bulleted items. The design agencies should apply resources to address the above items judiciously, keeping in mind that they are not requested to approve or formally concur with the AB documents. If there are differing opinions among the cognizant design agencies, they shall be documented in the ER.

5.7 Pantex Plant

The M&O Contractor for the Pantex Plant ensures that the safety controls relied upon to preclude undesired weapon and component responses are identified and documented in the proposed safety basis. To accomplish this, the M&O Contractor is responsible for:

- Managing the Project Team to ensure the site work products (e.g. tooling, procedures, HAR, ABCD, etc.) meet expectations and are completed on time and within budget.
- Recommending graded application of standards/controls via submission of the project plan/inputs to the IWAP.
- Ensuring the consistency among the project-specific and other portions of the AB.
- Addressing worker safety issues according to the requirements specified in the S/RID or otherwise required by the contract or applicable laws.
- Conducting and documenting the analyses (with appropriate input from the design agencies) required to develop the HAR in accordance with this Supplemental Directive (SD) and other applicable DOE directives. The HAR will be submitted to DOE for approval.
- Conducting and documenting the analysis necessary for the SAR (with appropriate input from the design agencies) and submitting it to DOE for approval.
- Documenting and submitting the ABCD to DOE for approval.
- Documenting and submitting the Pantex Plant TSR to DOE for approval.
- Maintaining all DOE-approved components of the AB (SAR, TSR, HAR, and ABCD).
- Identifying and managing controls that enhance safety in addition to those specified in the TSR/ABCD.
- Training Project Teams to ensure roles and responsibilities are clearly understood.
- Training SAR/HAR and TSR/ABCD developers to ensure roles and responsibilities, as well as the expectations of the approval authority are clearly understood.

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6.0 RESPONSIBLE ORGANIZATION

WPD is responsible for this chapter.

7.0 REFERENCES

1. DOE Policy 450.1, Integrated Safety Management
2. DOE Order 5480.23, Safety Analysis Reports for Nuclear Facilities
3. DOE Order 5480.22, Technical Safety Requirements
4. DOE Order 5480.21, Unreviewed Safety Question
5. DOE Order 452.1A, Nuclear Explosive and Weapon Surety Program
6. DOE Order 452.2A, Safety of Nuclear Explosive Operations
7. DOE AL SD 56XB, Development & Production Manual, Section 11
8. DOE-STD-1104-96, Review and Approval of Nonreactor Nuclear Facility Safety Analysis Reports
9. DOE-STD-3009-94, Basis and Methods for Hazard Analysis, Accident Analysis, and TSR Derivation
10. DOE-STD-3011-94, Guidance for Preparation of DOE 5480.22 (TSR) and DOE 5480.23 (SAR) Implementation Plans
11. DOE-STD-3015, Nuclear Explosive Safety Study Process
12. DOE-STD-3016-99, Hazard Analysis Reports for Nuclear Explosive Operations
13. EP401110, Integrated Safety Process for Assembly and Disassembly of Nuclear Weapons
14. Guidelines for Hazard Evaluation Procedures, AIChE