



**Department of Energy**  
Washington, DC 20585

March 13, 2007

The Honorable A. J. Eggenberger  
Chairman  
Defense Nuclear Facilities Safety Board  
625 Indiana Avenue, NW.  
Suite 700  
Washington, D.C. 20004

Dear Mr. Chairman:

The purpose of this letter is to report the completion of the three remaining commitments, 4.2.2, "Issue Technical Business Practice Guidance on Weapon Response," 4.4.6, "B83 SS-21 Startup Authorization," and 4.5.1, "Comprehensive Assessment of Recommendation 98-2," listed in the Department of Energy's (DOE) Implementation Plan (IP) for the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 98-2, "Safety Management at the Pantex Plant."

Commitment 4.2.2 relates to the DOE issuing further guidance on expectations for the evaluation of weapon response via a Technical Business Practice. Per the January 26, 2006, letter from Secretary Bodman, the DOE modified the 4.2.2 Commitment deliverable to be the revised version of the DOE-DP-STD-3016-99, "Hazard Analysis Reports for Nuclear Explosive Operations" and, if necessary, a corresponding update to the Development and Production (D&P) Manual, Chapter 11.8, "Integration of Weapon Response into Authorization Bases at the Pantex Plant." With the formal release of the DOE-NA-STD-3016-2006 in May 2006 and the cancellation of the D&P Manual, Chapter 11.8, we consider this commitment to be complete. Additionally, the enclosed Commitment 4.5.1 Final Assessment Report contains a section titled DOE-NA-STD-3016-2006. This section responds to your December 15, 2006, letter requesting the National Nuclear Security Administration's (NNSA) plans and criteria for review and approval of design agency processes related to expert elicitation, expert judgment, and peer review for weapon response information be provided to the Pantex Plant.

Commitment 4.4.6 relates to the DOE's implementation of the Seamless Safety for the 21<sup>st</sup> Century (SS-21) process for an Insensitive High Explosive (IHE) Weapon System. The weapon program listed in DOE's IP was the B83. However, in discussions during the 98-2 monthly briefings to the DNFSB, we proposed that this deliverable be changed to the B61 because it was our first IHE Weapon System to complete the SS-21. The B61 SS-21 Program was authorized in June 2006 and, therefore, we consider this commitment completed as well.

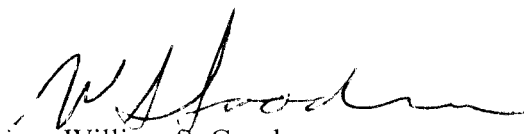


The last remaining commitment in the 98-2 IP is 4.5.1 which states that the DOE will provide an assessment of actions taken in response to Recommendation 98-2. This report is enclosed.

With the completion of the three remaining commitments and the NNSA's continued interaction with the DNFSB regarding the safe operation of nuclear explosive operations at the Pantex Plant, the DOE considers the actions in the IP to be fulfilled. Additionally, the enclosed report describes the completion of the six requested actions from the DNFSB's Recommendation 98-2.

If you have questions, please contact me or have your staff contact Ms. Wendy Baca at 505-845-6340.

Sincerely,



William S. Goodrum  
Assistant Deputy Administrator  
for Military Application and  
Stockpile Operations  
Defense Programs

Enclosure

cc:

K. Fortenberry, DNFSB  
A. Matteucci, DNFSB  
R. Rauch, DNFSB  
J. McConnell, NA-2.1  
M. Whitaker, HS-1.1  
S. Erhart, PXS0

### **Commitment 4.5.1 Final Assessment Report**

The purpose of this report is to fulfill Commitment 4.5.1, "Comprehensive Assessment of Recommendation 98-2," to complete a comprehensive assessment of the actions taken in response to the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 98-2, "Safety Management at the Pantex Plant." Commitment 4.5.1 is the final commitment in the Department of Energy's (DOE) Revised Implementation Plan (IP) dated October 1, 2002. As stated in the IP, several actions had already occurred in addition to the 27 commitments listed in the revised version. Actions to meet the commitments and other enhancements implemented over the past several years have resulted in many improvements to the National Nuclear Security Administration's (NNSA) ability to safely conduct weapon operations at the Pantex Plant.

In broad terms, the actions to improve safety have included revising or creating directives to better identify the unique safety criteria applicable to nuclear explosive operations (NEO); upgrades to plant equipment and facilities to increase the reliability of safety systems or reduce/eliminate hazards; upgrades to the safety basis to meet the requirements of Title 10, Code of Federal Regulations, Part 830, Subpart B (10CFR830); and implementation of Seamless Safety for the 21<sup>st</sup> Century (SS-21) programs. Each of these topics is discussed below in the section titled:

1. Documentation
2. Facility upgrades and Site-wide Process Improvements
3. SS-21 Programs

Each of these sections describes actions taken and lists the associated commitment number from the revised IP. The conclusion of this report includes the NNSA's assessment of completion of the six actions contained in Recommendation 98-2 that the DNFSB considered necessary to improve the safety of NEOs at the Pantex Plant. A record of the basis for completion of each IP commitment is identified in the DOE Safety Issues Management System.

Also included in this report is a section in response to the December 15, 2006, DNFSB letter regarding plans and criteria for the NNSA's review and approval of laboratory processes for expert elicitation, expert judgment, and peer review of weapon response (WR) information.

#### **Documentation**

In support of Recommendation 98-2 actions and associated commitments listed in the revised IP, several directive and guidance documents were reviewed and updated. The current set of approved documents related to the actions and commitments includes:

- DOE Order 452.2C, "Nuclear Explosive Safety," dated June 12, 2006;
- Development and Production (D&P) Manual, Chapter 11.3, "Seamless Safety for Assembly and Disassembly of Nuclear Weapons at the Pantex Plant," dated March 31, 2004;
- D&P Manual Chapter 11.6, "Independent Review Process for Nuclear Explosives Operations at the Pantex Plant," dated March 31, 2004;
- D&P Manual Chapter 11.7, "Nuclear Explosive Operations Change Control Process," dated December 15, 2004;
- DOE-Standard-3015, "Nuclear Explosive Safety Evaluation Process," dated November 2004;
- DOE-NA-Standard-3016-2006, "Hazard Analysis for Nuclear Explosive Operations," dated May 2006; and
- Technical Business Practice (TBP) 901, "Integrated Safety Process for Nuclear Weapons Operations and Facilities."

The above listed set of documents and associated Pantex Plant management and operating (M&O) contract provisions address Commitments 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.2.6, 4.4.1, 4.4.2, and 4.4.3 which are all focused on having proper guidance and documentation regarding hazard control classification, expectations for WR, Unreviewed Safety Question (USQ) determination and change control, and associated M&O contract direction. Commitment 4.4.4 is specifically related to the Nevada orders which were revised in Fiscal Year (FY) 2002. Regarding implementation of TBP 901, "Integrated Safety Process for Nuclear Weapons Operations and Facilities," listed in Commitment 4.1.2, assessments of the Pantex M&O contractor and the national laboratories occurred in 2001 and the corresponding documentation was forwarded to the DNFSB. The Integrated Safety Management Authorization Basis Manual revision referenced in Commitment 4.2.5 was transmitted to the DNFSB on January 31, 2001.

Each of the documents listed above reflects various initiatives, process updates, and changes to meet the Recommendation 98-2 intent. The NNSA updated the documentation listed above to ensure clear direction through DOE orders, standards, and D&P Manual chapters. National laboratory and Pantex Plant interface and process documents are contained in the TBP. Additionally, the NNSA derived TBP 907 (renumbered TBP 908) in FY 2006 to provide guidance for more streamlined WR and hazard analysis (HA) processes. The TBP 908 enables documented WR assessments previously conducted against postulated hazard scenarios for one weapon system to be applied to similar postulated hazard scenarios on another similar weapon system operation. This streamlining results in a fully documented set of hazards with associated WR, while allowing the national laboratory resources to focus on newly identified hazards for a particular weapon system operation. As part of the Pantex Throughput Improvement Plan activities, the NNSA is currently evaluating the D&P Manual Chapters 11.1, "Standing Management Team," 11.2, "Integrated Weapons Activity Plan," and 11.4, "Development of Documented Safety Analyses, Technical Safety Requirements, Unreviewed Safety Question Determination, Justification for Continued Operations, and Authorization Agreements for Nuclear Explosive Operations and Facilities," for redundancies against information already contained in the D&P Manual chapters and DOE standards listed above.

As part of the Basis for Interim Operations/Safety Analysis Report (BIO/SAR) upgrade modules, the NNSA also reviewed controls identified in the site-wide nuclear explosive safety (NES) master studies that should be included as Technical Safety Requirements (TSR) and incorporated them, as appropriate (Commitment 4.1.1). Additionally, the Pantex Site Office (PXSO) and the Pantex Plant contractor revised and upgraded the safety basis for nuclear explosive and nuclear material operations to meet the requirements of 10CFR830. A significant safety improvement resulting from the safety basis upgrades was the establishment of TSRs based on formal HA and facility and process improvements precipitated by the development of those controls.

Although no substantive changes to the IP occurred after Revision 1, the DOE continued its commitment to provide the DNFSB with timely notification of any substantial changes should they have occurred (Commitment 5.2.1). As part of the DOE's commitment to provide the DNFSB status and updates relating to safety management, Recommendation 98-2 quarterly reports were issued through FY 2006 (Commitment 5.2.2). Additionally, since February 2005 the NNSA has provided monthly Recommendation 98-2 briefing updates to the DNFSB.

### **Facility Upgrades/Site-Wide Process Improvements**

Over the past several years, the Pantex Plant designed and implemented facility and plant equipment upgrades to improve the safety of NEOs. Through the facility documented safety analyses and weapon program HA reports, hundreds of TSRs were derived and implemented. These TSRs include fire protection (Commitment 4.3.1 and 4.3.2) and on-site transportation (Commitment 4.3.3 and 4.3.4), the use of enhanced transportation carts as described below, improved lightning protection, improved protection against electro-static discharge (ESD) including the use of static dissipative flooring and an ongoing effort to replace the hoists in the bays and cells with ASME NUM-1 qualified equipment. Additionally, some hazards such as drops due to potential hoisting-related failures have been reduced or eliminated through process changes and new tooling designs. Furthermore, the NES master studies were reviewed to determine the applicability and inclusion of any TSR-level controls into the site-wide BIO/SAR modules (Commitment 4.3.5).

A beneficial site-wide process improvement was the Solvent Substitution Program where flammable solvents such as isopropyl alcohol were eliminated from NEOs (Commitment 4.3.6). The solvent substitution program greatly reduced the overall combustible loading in the bays and cells.

One of the most significant process improvements was the design and production of the Enhanced Transportation Carts (ETC) for on-site transportation in the ramps of the Pantex Plant Zone 12, south. The ETC I and II provide enhanced protection against a range of insults including mechanical, accidental firearms discharge, and lightning for various full and partial assembly configurations that must be transported among the bays and cells for processing (Commitment 4.3.7).

One of the most significant facility upgrades was the Building 12-44 fire detection and suppression system conversion to infrared-activated deluge capability which provides better fire detection than the ultra-violet-activated systems it replaced. This improvement has been employed since 2003 (Commitments 4.3.8, 4.3.9). The fire alarm system control panels for the Pantex Plant nuclear facilities were also replaced (Commitments 4.3.10 and 4.3.11).

### **SS-21 Programs (Commitments 4.4.5, 4.4.6 and 4.4.7)**

The SS-21 programs reflect the most substantial change in the way the NNSA conducts HA, tooling, and process development. Over the past several years our approach and processes have changed in efforts to ensure the original SS-21 technical safety objectives established in 1993 listed below continue to be met:

- Prevent the application of unauthorized/unanalyzed external energy sources to the weapon so as to prevent release of internal energy sources in the weapon. This means all forms of mechanical, electrical, electro-mechanical, and thermal energy. Lifting and transport operations are also considered to be potential and kinetic energy sources.
- No single point failure in operations will cause energy sources in the weapon to be activated or released (even if self contained), abnormal radioactive contamination (radioactive contamination above thresholds set in procedures), or serious injury to operating personnel (lost workday injuries to operating personnel).
- Exposure to radiation and hazardous substances will be “as low as reasonably achievable.”

Since the advent of the SS-21 concept, these principles have been incorporated into the development of weapon processes through a variety of means including rules and directives such as 10CFR830, 10CFR835, DOE-STD-3009, DOE-NA-STD-3016-2006, and the revised NES DOE Order 452 series. The NNSA considers the recent history of preparing for and performing nuclear work under the requirements developed utilizing the SS-21 principles provides ample evidence of improvements to safety and that those principles have been properly institutionalized.

The completion of the W76-0/1 and W80 SS-21 are planned in FY 2007. Once these programs are complete, the only remaining programs to undergo SS-21 are the W88 Cell Operations, the B53, and the W84. These programs will benefit from the HA process changes and controls that were derived during SS-21 activities for the previous programs. Each of the approved SS-21 programs contributed in various ways to the increased safety of operations at the Pantex Plant. Some of the most significant changes include reduction of hoist lifts, implementation of the ETC for on-site transportation, and mitigation and minimization of ESD hazards. These improvements all contribute to meeting the intent of the original SS-21 objectives.

In Commitment 4.4.6, the NNSA originally agreed to authorize startup of the B83 SS-21 process. The intent of this commitment was to reflect the improvements in tooling and process design, and successful completion of the other aspects of the SS-21 process for a weapon system containing Insensitive High Explosives. In May 2006, the NNSA proposed substituting startup of the B61 SS-21 process due to a programmatic requirement to complete the B61 First Production Unit. The DNFSB agreed with this proposal based on the similarity between the B61 and B83 weapons. The B61 process startup was authorized in June 2006.

In conjunction with the Pantex Throughput Improvement Plan and revision of the Standing Management Team to the Senior Management Team, the NNSA intends to continue improvements to our SS-21 process with a focus on meeting the original intent and ensuring the implementation of controls to mitigate hazards.

#### DOE-NA-STD-3016-2006

This section is included in response to the DNFSB letter dated December 15, 2006, to the Deputy Administrator for Defense Programs. In this letter the DNFSB requested that the NNSA provide a completion date for this Final Assessment Report (Commitment 4.5.1 to “Complete a comprehensive assessment of the actions taken in response to Recommendation 98-2,” which is included herein) and in it address plans and criteria for NNSA's review and approval of critical processes as part of the design agencies quality assurance requirements in accordance with 10CFR830, Subpart A. The critical processes referred to in the DNFSB letter are expert elicitation, expert judgment, and peer review. Currently, all sites are undergoing the impact and implementation assessment for DOE-NA-STD-3016-2006. Within 6 months after confirmation that the laboratories have implemented DOE-NA-STD-3016-2006, NNSA will ensure compliance by conducting a review of their processes. The review team lead will be jointly designated by the Assistant Deputy Administrator for Military Application and Stockpile Operations (NA-12) and the Pantex Site Office (PXSO) Manager. The team lead will develop criteria to verify compliance with the requirements of DOE-NA-STD-3016-2006 in terms of formality and documentation.

#### Conclusion

Recommendation 98-2 described six actions the DNFSB considered necessary to improve the safety of NEOs at the Pantex Plant. The first action requested that a practice be instituted that delivers the benefits of SS-21 but promises to consume less time and resources. Although the SS-21 practice evolved over the years, it remained sound and lessons learned from each preceding program were incorporated into the next. Recent efforts have reaffirmed the soundness of SS-21 while streamlining the process with better utilization of resources. The second action requested that an administrative process similar to the USQ process be implemented to address nuclear explosive process changes. The direction for this process is reflected in D&P Manual, Chapter 11.7, and has been successfully implemented on numerous occasions. The third action stressed that the Pantex Plant contractor should be the organization that issues and defends documentation

for operations and be able to defend it. This practice occurs as part of the normal HA and WR process today. The fourth action specified that the nuclear explosive safety study (NESS) review teams should consider proposals for actions made by the organization responsible for conducting the work and not dictate specific remedies. The current process reflects that the NESS Group (NESSG) provides findings and minority opinions. After review and acceptance by the PXSO Manager and NA-12, the project team works to close the findings and present the closure packages to the NESSG. The NESSG does not dictate the closure, it only judges if it meets the NESS standards reflected in the DOE Order 452. The fifth action requested that DOE establish a standing NESS committee whose membership is centered on individuals of emeritus status. This action is fulfilled by the employment of the NESS Senior Technical Advisors also specified in the DOE Order 452. The sixth action requested that work and safety planning processes be organized and pursued as linked components of the Integrated Safety Management (ISM) as described in the DNFSB's Recommendation 95-2, "Safety Management." The November 2006 closure of Recommendation 95-2 reflects ongoing actions to ensure fulfillment of the sixth action including the recently created ISM Council.

The closure of the 26 commitments from the IP, the completion of the 6 actions listed in the recommendation, and the delivery of this Final Assessment Report as the final commitment result in the NNSA's completion of Recommendation 98-2. One of the most significant improvements realized during the fulfillment of Recommendation 98-2 commitments and executing the SS-21 programs is the practice of eliminating the hazardous conditions through either engineered or administrative controls. This practice is the underpinning of the SS-21 technical safety objectives. In the case of hazards common to all weapon program operations such as electrical, including lightning and electro-static discharge, fire, and chemical, the NNSA has instituted site-wide and program specific-controls. However, as part of our ongoing safety basis processes, we will continue to study hazards and conduct analysis to ensure the proper level of mitigation is developed and implemented to prevent undesired consequences.