DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004-2901
(202) 694-7000

March 18, 2003

The Honorable Linton Brooks
Acting Administrator
of the National Nuclear Security Administration
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0701

Dear Ambassador Brooks:

The Defense Nuclear Facilities Safety Board (Board) recently observed the National Nuclear Security Administration's (NNSA) readiness assessment of the implementation of controls from the *Fire Protection Basis for Interim Operation* (FP BIO) at the Pantex Plant. A report on the staff's observations is enclosed for your information and use, as appropriate. The FP BIO and its implementation are commitments to the Board under the Department of Energy's (DOE) Implementation Plan for Recommendation 98-2, *Safety Management at the Pantex Plant.* If implemented properly, the controls in the FP BIO represent a significant enhancement to the safety of Pantex operations. However, the NNSA assessment team concluded that the FP BIO controls had not been implemented properly.

NNSA's contractor, BWXT Pantex, took immediate action to address the ineffective implementation of combustible loading controls for the W79 and W87 programs. Recent observations by the Board's staff verified improvement in the implementation of these controls. Much of this improvement resulted from a change in implementation philosophy to a simpler, more conservative approach.

The Board is encouraged by this improvement. However, the findings from the readiness assessment highlight the problems that accrue from the ever-increasing use of administrative controls. The Board continues to be concerned about the effectiveness and reliability of administrative control programs within the DOE's defense nuclear complex. The generation of new safety bases in the near future is expected to complicate the set of administrative controls still further. Board Recommendation 2002-3, *Requirements for the Design, Implementation and Maintenance of Administrative Controls* states that, as a minimum, administrative controls should have attributes that ensure effectiveness and reliability. The Board understands BWXT has a program underway to simplify and integrate controls for the current safety basis and planned safety basis upgrades. As one aspect of the implementation of Recommendation 2002-3, the Board encourages BWXT to pursue this effort vigorously. Other DOE defense nuclear sites might benefit from a similar program.

NNSA's readiness assessment of the implementation of fire protection controls was essential to identifying significant safety issues and improving the implementation of important safety controls. NNSA's Pantex Site Office is to be commended for its decision to perform an independent validation of the implementation of new safety basis documents at the Pantex Plant. As DOE sites continue to develop new safety basis documents in compliance with 10 Code of Federal Regulations 830, *Nuclear Safety Management*, it might be appropriate to require similar, appropriately tailored assessments to independently validate the implementation of controls identified in those documents, particularly where those controls differ significantly from the controls currently in place. Even when ongoing operations do not change, the controls relied upon to ensure the safety of those operations are often modified, expanded, or relied upon to perform new safety functions.

Despite the ability of the Pantex Site Office team to identify significant problems with the implementation of fire protection safety controls, as noted in the enclosed report, the Board's staff noted several issues with regard to the performance of this review. The ability to conduct thorough readiness reviews takes on added importance in view of the recent reorganization in which the site offices have been given more responsibility for conducting readiness assessments without additional resources with which to conduct those reviews. In order to maintain the rigor of readiness reviews at an appropriate level, NNSA should reevaluate its readiness process, especially with regard to the pertinent expertise, experience and availability of readiness assessment team members. The findings of the NNSA readiness assessment team also indicate deficiencies in the BWXT process.

Sincerely,

John T. Conway
Chairman

c: The Honorable Beverly Ann Cook
The Honorable Everet H. Beckner
Mr. Daniel E. Glenn
Mr. Mark B. Whitaker, Jr.

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

March 3, 2003

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: R. Rauch

SUBJECT: Implementation of Fire Protection Controls at the Pantex Plant

This report documents observations made by the staff of the Defense Nuclear Facilities Safety Board (Board) of the National Nuclear Security Administration's (NNSA) readiness assessment (RA) of the implementation of controls from the *Fire Protection Basis for Interim Operation* (FP BIO) for individual weapon programs and special-purpose facilities. Staff member R. Rauch and outside expert R. West observed the RA on December 9–13 and December 16–19, 2002. Staff members J. Deplitch and A. Matteucci and outside experts L. McGrew and R. West observed the implementation of combustible loading controls for W79 and W87 operations on January 7–9, 2003.

Background. The FP BIO evaluates fire-related accident scenarios for nuclear facilities at the Pantex Plant and identifies the controls necessary to ensure the safety of nuclear operations in those facilities. These controls, as defined in the *Technical Safety Requirements for Pantex Facilities* (TSRs); encompass fire detection and suppression systems (including surveillance requirements), facility structural requirements and other design features; and administrative controls in such areas as combustible loading and fire department response. These controls are supplemented by controls developed in a combustible (material) loading disposition (CLD) document for each weapon program that define the allowed material and required locations of combustibles to ensure that timely operation of the deluge suppression systems can protect the facility. The development, implementation, and assessment of the FP BIO controls are commitments to the Board under Recommendation 98-2, *Safety Management at the Pantex Plant.*

The Pantex Plant contractor (BWXT) implemented controls in the FP BIO in three phases. Each phase was followed by a contractor RA to determine whether the controls had been effectively implemented. Phase I involved seven site-wide administrative controls. Phases II and III consisted of specific engineered and administrative controls for weapon programs, transportation, staging, and nuclear material operations. The Pantex Site Office (PXSO) completed the NNSA RA for Phase I controls in March 2002. PXSO conducted its RA for Phases II and III in December 2002, after BWXT had made the controls applicable in the TSRs.

Implementation of Fire Protection Controls. To assess the implementation of fire protection controls, the PXSO RA team leader elected to sample three weapon programs (W79, W87, and W88) and associated special-purpose facilities. The team identified 2 pre-start and 19 post-start findings. The RA report noted that the team "was unable to conclude that BWXT had successfully implemented the [FP BIO] Phase II and III controls due to the number and type of issues identified in the RA and the limited sampling of active programs." The RA team found the fire protection controls on the W79 and W87 programs "to be poorly implemented," whereas the implementation of controls for the W88 program met expectations. The RA team also expressed concern regarding the accountability of line management for readiness.

Complexity of Combustible Loading Controls—The deficiencies noted in implementation of the administrative controls related to combustible loading appear, in part, to be due to the number of controls and their promulgation by means of numerous directives. The TSR and CLD controls are incorporated into plant standards, procedures, and general requirements documents for action by operational and support personnel. Questions about definitions of allowable combustible materials and the multiplicity of directives used for issuing controls complicate the controls' implementation. The following are examples of problems noted with the flowdown and interpretation of controls:

- Three cardboard boxes had been staged under a table in a W87 bay for some time, contrary to the TSR. The TSR specifies that, in an unoccupied facility, combustibles are not to be staged under desks, carts, on tables or on the floor to ensure clear sight lines from the detectors to the combustible materials. The applicable control procedure for combustible material contained a restriction against combustibles being stored on the floor, but did not prohibit storage under desks, carts, or tables.

- CLDs occasionally provide specific direction for handling of a combustible fuel package. Although most of this information is included in general or weapons program procedures, examples were found in which this did not occur. The W79 CLD includes direction regarding the staging of various components, but this direction was not included in the applicable procedures. Thus, operators were unaware of the proper locations for storing these combustibles.

- Inadequately defined terms caused interpretation problems for the production technicians. An example was the lack of proper control of transient combustibles when technicians misunderstood the definition of "under direct control." Another example was the improper placement of combustible material for later use within the standoff distance from a sensitive component because of a misunderstanding of the requirements for "staging" of materials.

Some weapon programs chose to interpret these requirements in a conservative but simplified manner, and prohibited any transient or not-in-use combustibles in a facility unless they were containerized or in contact with personnel. These programs (e.g., W88) appear to have been successful at implementation of controls. Other weapon programs (e.g., W79 and W87) left interpretation of the controls in the TSRs and various documents to the production

technicians. While this approach allowed more flexibility with regard to the types and locations of combustibles used in the facilities, the result was ineffective implementation of controls.

This issue was addressed in letters from the Board dated February 27 and June 21, 2001. The initial letter described some combustible loading controls as burdensome. The June 21, 2001, letter then pointed to the benefits of streamlining these controls, including reducing training requirements, improving efficiency, and further improving overall safety by decreasing the chances for human error. The Board's Recommendation 2002-3, *Requirements for the Design, Implementation and Maintenance of Administrative Controls,* also discusses the importance of effective and reliable administrative controls. The methods chosen by some program managers to implement administrative combustible loading controls ultimately compromised the effectiveness and reliability of these controls.

Following the NNSA RA, BWXT took action to address the implementation of combustible loading controls for the W79 and W87 programs. On a subsequent visit, the Board's staff noted marked improvement in the adherence of production technicians to combustible loading controls, especially on the W87 program. This improvement resulted from a change in the approach for implementing controls to the more restrictive yet simplified approach used by the W88 program. This rapid response to deficiencies identified during the FP BIO RA is encouraging. As discussed in the Board's letters, additional action is needed to reduce the continuing and potentially increasing burden of numerous administrative controls and improve their implementation, thereby providing the necessary reliability and effectiveness for these safety controls.

RA Processes—PXSO decided to validate implementation of the FP BIO controls through the RA process, and intends to use this process to verify the implementation of controls resulting from the safety documents being developed under Title 10 of Code of Federal Regulations Part 830, *Nuclear Safety Management.* The number of problems identified by the RAs indicates this approach is warranted any time significant new or modified controls are implemented. Despite the number of issues identified during the RA, deficiencies were noted with the readiness process:

- The limited duration of the review, a lack of adequate support by the contractor, and problems with the availability of personnel reduced the effectiveness of the NNSA RA. The operational observations included visits of 30 to 45 minutes to two or three bays or cells for each program. Only two of these visits occurred with operations in progress, and neither of these activities involved handling of combustible materials.

- The availability of NNSA RA team members was reduced because of the performance of routine work and time lost for personal reasons. With a small team of seven members, these losses impacted the quality of the RA. PXSO had committed to addressing the lack of dedicated team members for RAs by revising the applicable site procedure by February 2001, but this revision had not been accomplished.

- The NNSA team experienced problems in arranging meetings with key personnel and obtaining required records and procedures in a timely manner. As a result, the team accomplished little for the first two days of the assessment (a significant impact for this short review); similar problems arose throughout the review.

- The number and significance of problems identified by the NNSA RA with two of three sampled programs indicated that the contractor RA process was deficient in identifying and resolving issues. The NNSA RA report noted that the contractor RA for the FP BIO was deficient in several instances in the identification and subsequent handling and correction of deficiencies, but generated no finding for the associated core requirement.

Conclusions. The controls in the FP BIO are a significant enhancement to the safety of nuclear operations at the Pantex Plant. The effectiveness of the deluge systems in protecting against postulated accident scenarios depends on administrative controls to limit the amounts and locations of combustibles. As discussed in the Board's Recommendation 2002-3, it is important that these administrative controls be effective and reliable. This was not the case for the FP BIO controls in two of three programs reviewed. Subsequently, BWXT improved the control on combustible materials for these two programs in response to the NNSA RA findings.

The generation of new safety bases in the near future is expected to complicate the set of administrative controls still further. An effort needs to be made to simplify and integrate the controls for the current safety basis and planned safety program upgrades to provide assurance of continued implementation of all controls. It may be noted that BWXT has initiated efforts to address the elimination of unnecessary, excessively complex, or inadequate administrative controls and, where possible, to replace them with appropriate engineered controls. These efforts should be formalized and pursued vigorously.

Additionally, PXSO and BWXT should consider making improvements in their readiness review processes. There is a need to improve the thoroughness of the reviews, to improve the definition of their scope, to minimize work distractions, and to reduce the effects of various personnel impacts.