DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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

July 8, 2008

The Honorable Thomas P. D'Agostino
Administrator
National Nuclear Security Administration
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0701

Dear Mr. D'Agostino:

The Defense Nuclear Facilities Safety Board (Board) periodically reviews the adequacy of the contractor training and qualification program at the Pantex Plant, operated by the National Nuclear Security Administration (NNSA). The Board's staff recently conducted a review of this program and found that it meets the requirements of Department of Energy Order 5480.20A, *Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities*. The enclosed report presents details of the staff's review and outlines areas for improvement for the program.

The reports accompanying the Board's letters of April 4, 2003, and March 27, 2006, raised issues concerning the maintenance and fidelity of the mock-up units used for nuclear weapon training. At that time, the Board's staff found that some weapon trainer units were no longer adequate for training and testing of personnel. The recent review by the Board's staff at the Pantex Plant revealed that NNSA and the contractor have invested funds and effort in upgrading a number of weapon trainer units to support current and upcoming weapon training activities. However, there is no formal preventive maintenance program for the units. There is also no formal program within NNSA to direct and coordinate funding and procurement of long-lead-time parts from other NNSA sites and the design agencies to ensure continued operation of the trainer units. Unless such formal processes are established and funded, the fidelity issues associated with these weapon trainer units that have persisted for the past 15 years will resurface.

In addition, the Board's staff notes that weapon design courses taught by the design agencies, which have been discontinued in recent years, were of significant value to the Pantex staff.

Therefore, pursuant to 42 U.S.C. § 2286b(d), the Board requests a report within 60 days of receipt of this letter regarding the measures necessary at both the site and NNSA to address the long-term fidelity of the weapon trainer units at the Pantex Plant.

Sincerely,

A. J. Eggenberger
Chairman

c: The Honorable William C. Ostendorff
The Honorable Robert L. Smolen
Mr. Steven C. Erhart
Mr. Mark B. Whitaker, Jr.
Mr. Robert J. McMorland

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

May 28, 2008

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: J. A. DeLoach

SUBJECT: Review of Contractor Training and Qualification Program, Pantex Plant

This report documents a review of the contractor's training and qualification program at the Department of Energy's (DOE) Pantex Plant in Amarillo, Texas. The review was conducted April 7–11, 2008, by members of the staff of the Defense Nuclear Facilities Safety Board (Board) J. DeLoach, B. Laake, C. Roscetti, T. Hunt, and R. Rauch, assisted by outside expert R. Lewis.

Background. Babcock and Wilcox Technical Services, LLC (B&W) Pantex operates the Pantex Plant under the direction of the National Nuclear Security Administration's (NNSA) Pantex Site Office (PXSO). Since 2003, a number of training and qualification reviews have been conducted at the site by outside organizations. These included a review of training and conduct of operations by the Board's staff in 2003, triennial assessments of nuclear training conducted by NNSA in 2003 and 2006, a review of conduct of operations by the Board's staff in 2005 that addressed certain training deficiencies, and a biennial review of the site's nuclear safety performance conducted by the NNSA Chief of Defense Nuclear Safety in 2007. In addition, reviews of personnel selection, qualification, and training requirements were conducted in 2003, 2006, and 2007 by PXSO.

Summary. The Board's staff found that B&W's training and qualification program met the requirements of DOE Order 5480.20A, *Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities*. Observed practical and classroom training was satisfactory. The drill records of the Manufacturing Division were reviewed and indicated that a satisfactory number of drills were being conducted and documented. As noted above, since 2003, the training and qualification program had undergone no fewer than five reviews by various outside organizations, plus three reviews by PXSO. Issues identified during these reviews have largely been resolved, significantly enhancing the program.

The Board's staff interviewed 39 personnel concerning their experiences with the training and qualification program. These interviews indicated that the use and effectiveness of mentors to guide qualifying personnel varied significantly among organizations, and that weapon design courses previously taught by the design agencies had been of significant value, but are no longer available.

The fidelity of weapon trainer units has improved since the Board's staff reviewed contractor training in 2003 and conduct of operations in 2005. NNSA and B&W have invested funds in upgrading a number of weapon trainer units to support current and upcoming weapon training activities. However, there is no established preventive maintenance program for the units after usage (teardown and rebuild) for one or more training sessions. Maintenance of the units is conducted on an as-needed or reactive basis, provided NNSA funding is available. There is also no formal program within NNSA to direct and coordinate funding and procurement of long-lead-time parts for the trainers from other sites (Y-12 National Security Complex, Savannah River Site Tritium Operations, and Kansas City Plant) and the design agencies. Unless long-term measures to address these deficiencies are institutionalized at the site and NNSA, the fidelity issues associated with these weapon trainer units that have persisted for the past 15 years will resurface.

At the time of the staff's visit, PXSO's oversight of the contractor's training and qualification program consisted of reviews of startup activities and "shadowing" of the contractor during Contractor Assurance System reviews to meet the requirements of DOE Order 5480.20A. While these efforts may have provided some training oversight, they did not fully meet the day-to-day oversight requirements prescribed in DOE Order 5480.20A. Subsequent to the staff's visit, PXSO took steps to remedy this situation by assigning training oversight duties to a senior individual.

Discussion. During the course of the staff's review, training and qualification documents were examined; several briefings by B&W management were conducted; training sessions associated with weapon operations and the development of Documented Safety Analyses were observed; and the capabilities of the PLATEAU system, used to track personnel qualification requirements and status, were demonstrated. The administration of B&W's training and qualification program meets the requirements and intent of DOE Order 5480.20A with regard to personnel involved in or supporting nuclear activities. As noted above, issues identified during the reviews by the Board, DOE, and NNSA from 2003 to 2007 have largely been resolved, significantly enhancing the program.

The 39 personnel interviewed included production technicians, production section managers (PSMs), nuclear safety officers, process engineers, Unreviewed Safety Question (USQ) evaluators, authorization basis (AB) analysts, and their respective supervisors. The

interviews, which focused on experiences with respect to training and qualification, brought several points to light:

- The PLATEAU system was lauded by supervisors and nonsupervisory personnel who had access to the system.

- As noted above, the use and effectiveness of mentors to guide qualifying personnel varied significantly—anywhere from being hailed as the lifeblood of the qualification process to, in at least one case, a lack of awareness that mentorship was a part of the qualification process.

- The discontinued weapon design courses previously taught by the design agencies were considered of significant value to the process engineers, AB analysts, and USQ evaluators that had the opportunity to take them. These courses may be worth reinstituting to educate the next generation of contractor and federal engineers at Pantex.

Qualification, Certification, and Use of Mentors—Completion time frames for qualification and certification of positions are not well defined and need to be clearly identified, tracked, and monitored by managers and supervisors. Training is currently tracked and monitored using the PLATEAU system, but the same attention is not given to qualification because of the lack of clarity and expectations with respect to the completion of qualification for various positions. For example, production technicians are granted "P" status after completing classroom training and successfully completing written and oral examinations. They are then teamed with a fully certified production technician to perform actual weapon work. After a time, the "P" production technicians may be tested and granted full certification. The staff found during the review that B&W procedures allow production technicians to retain "P" status for an indefinite period of time without becoming certified, a practice that fails to meet the intent of DOE Order 5480.20A, Chapter I, Section 6. Additionally, DOE Order 5480.20A, Chapter I, Section 12.b. states: "Extensions of certification of operators and supervisors may be approved only by the Operations Office Manager/Field Manager for NNSA Operations." Since B&W's procedures did not prescribe a date for completion of certification, in one case, B&W did not forward a request to PXSO for an extension of the certification of a production technician who had been in "P" status for 18 months.

The site places heavy reliance on mentors for the qualification of new personnel in many support areas. Mentors basically serve as qualifying officials on many qualification cards. In the AB department, the mentor program is working well, although the department manager reported that one mentor was responsible for eight new employees. All interviewees from the AB department reported that they had received adequate support through their informal mentor program to complete qualification requirements. In the process engineering department, the mentor program is poorly implemented and represents a major weakness. Some process engineers reported that the program had worked well, and they had completed qualification in

less than the time specified; others were, for all intents and purposes, lost in the system and took more than three times longer than the allotted time to qualify.

The selection criteria, roles, and responsibilities of mentors need to be defined in plant procedures. The plant would best be served by evaluating the key competency areas on a qualification card and determining whether a mentor is the appropriate individual to assess a candidate in the competency, or if a subject matter expert would be better qualified to do so.

Practical and Classroom Training– The staff observed practical training on weapon trainer units for the W80 and W88—one of three practical training sessions conducted in the course of readying personnel to start their qualification process. The three sessions consist of (1) a "demonstration" session, in which the instructor(s) perform the designated operations on a trainer and explain what they are doing while the trainees observe; (2) a "coaching" session, during which the trainees perform the operations while the instructor(s) coach them as necessary; and (3) a "performance evaluation," during which the trainees are graded on their ability to conduct operations on a weapon trainer unit without assistance.

The staff observed a coaching session during the review. This session appeared to be appropriate for the trainees' level of experience. Because of the nature of the coaching effort, however, only rudimentary precepts of conduct of operations and operational formality could be addressed, and some deficiencies were noted. Although B&W has placed significant emphasis on improving conduct of operations, primarily through efforts of the nuclear safety officers and others, it appears that emphasis occurs after an individual has completed training and is working on qualification. Consideration might be given to upgrading training in conduct of operations during the training period as a foundation for future qualification.

The staff also examined the closeout forms from weapon system training for the past 3 years. Many of these forms contained specific and noteworthy suggestions or raised issues with regard to Nuclear Explosive Operating Procedures, tooling, or training materials. The staff determined that direct feedback was not provided to students on the issues raised. Given the nature of the operations and the significance of the suggested changes, the plant would benefit from a more direct feedback mechanism explaining to students how their issues or suggested changes have been resolved.

The staff observed several hours of a week-long class on the development of Documented Safety Analyses. The class was held off-site, and the quality of instruction, instructor knowledge, and handout materials were excellent. The course structure approached what can be a highly complex subject in a logical, step-by-step manner.

Drill Performance––The staff reviewed the B&W Manufacturing Division's drill records for fiscal year (FY) 2006 and FY 2007. In general, the division conducts 25–30 standard-level drills each year. Added to these are drills conducted in support of readiness verifications, contractor readiness assessments, federal readiness assessments, requirements of DOE Order 5480.20A, site-level drills, and accountability drills. A total of 65 drills were conducted in

FY 2006 and 97 drills in FY 2007. The drill records indicated that the 27 standard-level drills conducted in FY 2007 resulted in 23 observations, 11 improvement items, 9 coaching items, and 3 lessons learned, as well as corrective action validations for 3 previous drills. For FY 2008, 26 standard-level drills are scheduled.

The staff reviewed the qualification card for PSMs. The staff noted that participation in, discussion of, or observation of a drill involving an emergency or abnormal occurrence was not required. Most PSM candidates have typically served as production technicians and have been exposed to drills involving abnormal conditions prior to assuming their supervisory role. However, one PSM candidate currently in training had not been a production technician and would not have had the benefit of participating in drills involving emergency or abnormal occurrences. Most personnel had attended a conservative decision-making course, which addresses the need for conservatism during abnormal conditions.

Fidelity of Weapon Trainer Units—As noted above, the fidelity of weapon trainer units has improved since the Board's staff reviewed contractor training in 2003 and conduct of operations in 2005. Although NNSA and B&W have invested funds in upgrading a number of these units to support current and upcoming weapon training activities, ownership of the units could not be determined during the staff's visit. In addition to the lack of an established preventive maintenance program for the units, the units are not under a consistently monitored and tracked configuration management and control system. A preventive maintenance program would aid in sustaining the quality and fidelity of the units to support the long-term training requirements that are vital to the site's stockpile stewardship mission.

A preventive maintenance program does not exist at the site level or at the NNSA level to direct and coordinate the funding and procurement of long-lead-time parts from other sites (Y-12 National Security Complex, Savannah River Site Tritium Operations, and Kansas City Plant) and the design agencies. Additionally, an evaluation of the weapon trainer units has not been performed to determine such matters as the number of units required to support future campaigns, the availability of critical long-term parts, ownership of the units, a configuration management process, and which parts should be replaced with fidelity quality replacement parts as opposed to war reserve parts. The design of the units was also inconsistent across systems. For example, the units for some systems had been designed with screw-on pit tubes that could easily be replaced when they wore out. Other systems had not been designed to allow easy replacement of pit tubes, resulting in major impacts on the training program when tubes were broken.

Federal Oversight of Contractor Training—DOE Order 5480.20A requires field managers to perform "...systematic evaluations of training and qualification programs, using DOE-STD-1070-94 [*DOE Standard Guidelines for Evaluation of Nuclear Facility Training Programs*], and provide day-to-day oversight of nuclear facility personnel training and qualification activities...." At the time of the staff's visit, PXSO relied on the results of startup activities and "shadowing" of the contractor during Contractor Assurance System reviews. While these efforts may have provided some training oversight, they did not fully meet the

requirements of DOE Order 5480.20A. Subsequent to the staff's visit, PXSO created a senior management position --with access to matrix support from within the site office—to devote the appropriate attention to the contractor and federal training programs, including periodic oversight and monitoring of B&W's training and qualification activities.