

Joyce L. Connery, Chair
Thomas A. Summers, Vice Chair
Jessie H. Roberson

**DEFENSE NUCLEAR FACILITIES
SAFETY BOARD**

Washington, DC 20004-2901



June 9, 2021

The Honorable Jennifer Granholm
Secretary of Energy
US Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Secretary Granholm:

Over the past several years, the Pantex Plant has experienced a series of conduct of operations events, including multiple occurrences that led to technical safety requirement violations. In August 2019, the NNSA Production Office (NPO) noted that the contractor, Consolidated Nuclear Security, LLC (CNS), had experienced an adverse trend in its conduct of operations program and directed the contractor to develop and execute a corrective action plan.

Concurrently, the Board received multiple concerns from Pantex employees about the conduct of operations program, the training and qualification program, overtime work, and organizational culture. As a result of these concerns, the Board and its staff conducted a programmatic review and an extensive series of interviews to ascertain the extent of these issues. The enclosure to this letter summarizes the results of these evaluations and summarizes concerns provided during interviews. The Board's staff discussed the results with NPO and CNS management, who indicated that they are validating these concerns and developing corrective actions, as appropriate.

While the Board finds the concerns outlined in the enclosure to be problematic, it particularly wants to stress the overarching importance of addressing issues with organizational culture. As well as implementing requirements, the conduct of operations and the training and qualification programs are valuable tools for implementing the espoused values and expected behaviors that shape the culture of the organization. In particular, the Board is troubled that some employees appear to lack confidence in established channels for raising safety concerns at Pantex.

Pantex relies on strict procedural adherence to prevent events with high order consequences (i.e., inadvertent nuclear detonation and other accidents involving high explosives and special nuclear material). To ensure safe operations, technicians need to have the fundamental knowledge and experience to adequately perform their work, and production section managers need to know how to appropriately respond to routine and abnormal situations prior to performing their job duties. The concerns—outlined in the enclosure—regarding the conduct of operations program and the training and qualification program potentially undermine the strategy for ensuring operations are performed safely. The Board is specifically concerned with:

- (1) Ensuring that technician training has adequate content and sufficient hands-on practice in training facilities;
- (2) Ensuring that all personnel, including those conducting oversight, receive appropriate conduct of operations training;
- (3) Ensuring that any significant time gap between training and reporting for duty is addressed by refresher training;
- (4) Ensuring consistency of mentorship of new employees;
- (5) Reducing reliance on informal knowledge transfer and ensuring that appropriate knowledge transfer concepts are implemented;
- (6) Ensuring production pressure does not impact training effectiveness, personnel certification, and technician performance; and
- (7) Addressing factors that led to the series of poor conduct of operations events.

The Board understands that Pantex is aware of and plans to address many of the concerns raised in the enclosure to this letter. As noted by NPO and CNS during an April 1, 2021, briefing to the Board's staff, such improvements include enhancements to training facilities, content of training, and training resources; increased staffing in key positions; and initiation of a Labor and Management Partnership to address cultural observations. Given the impending change in the management and operating contract for Pantex, we believe that NNSA must take steps to address these concerns and ensure that corrective actions are not lost and that the issues are not compounded by the contract transition. Therefore, pursuant to 42 U.S.C. § 2286b(d), the Board requests that NNSA provide the Board, within 60 days of the receipt of this letter, with a report on the status of its actions to holistically address the issues raised in this review, including how these actions will be maintained during contract transition.

Sincerely,



Joyce L. Connery
Chair

Enclosure

c: Mr. Joe Olencz
Dr. Charles P. Verdon

Enclosure

Observations from Review of Training and Qualification Program and Conduct of Operations Implementation at the Pantex Plant

From approximately October 2018 through July 2020, the Defense Nuclear Facilities Safety Board (Board) received multiple concerns from several Pantex employees regarding the conduct of operations program, training and qualification program, overtime work, and organizational culture issues.¹ To understand and evaluate the concerns, the Board's staff conducted a programmatic assessment of the training and qualification program at Pantex. Subsequently, the Board's staff conducted interviews of a select set of Pantex employees including five production managers, ten production section managers (PSM), and fifteen technicians from several programs, as well as two nuclear safety officers (NSO).² The purpose of these interviews was to determine if the raised concerns were widely held and to assess whether other safety concerns existed. There was a delay in conducting these interviews due to the COVID-19 pandemic and the need for the Board and NNSA to finalize the logistics of conducting the interviews, including determining the appropriate group composition. Parties eventually agreed to have an NNSA—as opposed to contractor—observer and union representative present during the interviews.

The Board's staff formulated interview questions to be open-ended to avoid influencing or biasing the interviewees' answers and used the same questions for a given category of employee. During the interviews, Pantex employees raised additional concerns that had not been the subject of the original programmatic review; therefore, the Board's staff has not validated all the concerns summarized below. However, NPO and CNS management indicated that they are validating these concerns and developing corrective actions, as appropriate.

As part of its analysis, the staff summarized the answers as general statements and determined if common themes existed in the responses. The following is a listing of statements associated with answers from three or more Pantex employees. The staff also included two concerns raised by individual employees that were particularly problematic (i.e., poor communications during shift turnover, and component sensitivities and proper handling). While the interviews did not identify immediate safety concerns, they did validate the concerns previously raised by Pantex employees. In addition, the specific issues identified with the

¹ One of the concerns involved the rate of overtime worked by production personnel, which the individual believed could result in a safety issue. The Board's resident inspectors conducted an evaluation of overtime limits and technician work hours. Based on their review, the resident inspectors determined that Pantex Operations was in routine violation of its internal procedures for managing overtime. While the Pantex process for management of production work hours provides limits to control worker fatigue that are consistent with Nuclear Regulatory Commission regulations, the established limits were routinely exceeded. Pantex management implements a process to allow exceedance of those limits in emergency situations; however, the resident inspectors observed that management allowed production workers to routinely exceed the established limits for purposes of mission work. The Board's staff discussed this information with NNSA Production Office and Consolidated Nuclear Security, LLC management in October 2019, and site personnel identified plans to address this concern. As a result, overtime was not discussed further during the interviews.

² Pantex has subsequently changed the title of NSO to disciplined operations specialist.

conduct of operations program and the training and qualification programs reflect potential problems with the organizational culture at Pantex.

Organizational Culture.

1. Friction is occurring between management and technicians, and technicians perceive negative management attitudes towards technicians, resulting in a potential reluctance to bring up safety concerns due to a fear of retribution.
2. Interviewees noted a decreased presence of plant management on the production line, leading to a disconnect between perceived and actual management expectations as well as low employee morale.

Training Program Content.

1. Technician training—prior to arrival on the production line—does not include necessary topics and relies on mentorship by experienced technicians to address these gaps. To ensure consistent knowledge across all technicians, more formalized training may be warranted prior to technician arrival on the production line.
 - a. Specific topics mentioned include use of the Integrated Production Planning and Execution System, material moves, procedure annotated changes, packaging and shipping, and daily pre-shift operations.
 - b. Some technicians—particularly vacuum chamber and special nuclear material (SNM) technicians—noted that training could be better related to their specific job functions/activities.
2. Interviewees indicated the training provided to vacuum chamber and SNM technicians prior to going to the production line needed to provide a better understanding of weapon components, component sensitivity, proper handling instructions, resulting consequences if damaged, and any subsequent actions that should be taken. Interviewees noted that training did not adequately discuss hazards and component sensitivity; however, subsequent mentoring and experience eventually addressed this knowledge gap.
3. Vacuum chamber and SNM technicians have limited to no training in training bays on their specific activities prior to arriving on the production line. In addition to the interviewees' statements, the Board's staff team also identified this concern during the programmatic assessments. Dedicated training personnel and/or performance of operations in a training bay prior to conducting actual operations would be an improvement and ensure training consistency.
4. For PSMs, specific training on situations and events that occur in facilities and on ways to handle them would be beneficial prior to encountering these scenarios on the production line (e.g., backouts and the safe and stable process).

5. The Board's staff team observed limited fatigue training at a peer-to-peer level (e.g., the means for technicians to identify and address fatigue in their peers), as well as at the manager-to-worker level. When asked about fatigue training, some interviewees noted the training provided by the contractor was insufficient. Several interviewees stated that they had an adequate understanding of the subject due to training received in previous employment.
6. Technicians and line management complimented the quality and content of the extensive conduct of operations course.

Training Program Implementation in Training Facilities.

1. NSOs, PSMs, and SNM technicians do not receive the extensive multiday conduct of operations course that weapons operations technicians receive. In addition to the interviewees' statements, the Board's staff team also identified this concern during the programmatic assessments. Personnel in these positions would benefit from receiving this course prior to conducting their duties. In particular, the Board's staff team observed that NSOs and PSMs do not receive the same level of training in conduct of operations as the production personnel whom they are overseeing or managing. Interviewees and teleconference participants discussed recent efforts to extend this training to these groups. The Board's staff team views this addition as a positive measure to improve conduct of operations.
2. Training bay and trainer unit fidelity issues were noted (i.e., deviations between training bay operations and production line operations). In addition to the interviewees' statements, the Board's staff team also observed this concern as part of other oversight activities. As an example, training bay layouts are crowded; the Board's staff team notes that the limited available area complicates full practice of approach angles and standoff distances. Also, interviewees identified that revisions of special tooling used in training bay operations may not match those used on the production line.
3. Some employees experienced a time gap of several months between completion of their training and reporting to the production line due to various factors, such as enrollment in the Human Reliability Program. The employees indicated that refresher training prior to conducting actual nuclear explosive or nuclear material operations may be warranted.
4. Individuals noted a reliance on "tribal knowledge" during performance of nuclear explosive operations and nuclear operations, as well as an overreliance on senior technician experience. To better ensure knowledge sharing and retention, collaboration should be improved between training personnel and senior technicians to ensure that senior technicians have the same level of conduct of operations training and that training personnel have up-to-date knowledge of the processes for which they provide training.

5. Interviewees noted that technician training is compressed such that it may lead to learning fatigue and the inability to digest the information and relate it to their job functions.
6. Interviewees noted that training personnel have additional duties that may prevent dedicated and consistent attention to technician training. They noted additional training personnel may be warranted to address this observation, as well as the others above.

Training Program Implementation on the Production Line.

1. Training for SNM technicians and PSMs heavily relies on on-the-job mentorship. In addition to the interviewees' statements, the Board's staff team also made this observation during the programmatic assessments. The teaching skills and availability (i.e., workload) of the mentor could greatly affect this training and consistency in developing new hires. Because mentorship provides the primary means for SNM technician training on conduct of operations, the technicians may be exposed to varying examples of conduct of operations. The use of a more formalized training strategy that is less dependent on individual mentors may be appropriate.
2. Due to personnel loss, there may not be a sufficient number of certified technicians with adequate experience to perform effective and consistent mentoring while conducting their other duties. Individuals noted challenges related to simultaneously providing mentorship to newer technicians and conducting the required operations. While many interviewees identified this as a concern, no specific actionable examples were provided.

Non-standard Training Processes.

1. The non-standard training processes employed on a one-time basis for technicians performing vacuum chamber operations and W76 cell assembly operations may not be equivalent to the typical training process. For example:
 - a. It is unclear to the Board's staff team how weapon trainer unit fidelity issues were addressed during the certification of these W76 technicians. Typically, these fidelity issues are resolved on-the-job with the assistance of the technician's mentor(s).
 - b. Replacing a qualified technician with an "on-the-job experienced" technician overseen by process engineering personnel is permitted by MNL-293133, *Production Operations and Production Support Training Manual*. This approach used during vacuum chamber operations does not provide an equivalent level of operational assurance.

2. The Board's staff team acknowledges the need for this type of modified training approach in extreme circumstances but does not find it appropriate for anticipated and short-term staffing shortfalls. To prepare for future extreme circumstances, a vetted strategy across all nuclear and nuclear explosive programs may be warranted. Such a strategy could ensure knowledge dissemination and retention through use of dedicated training personnel and trainer units, including identification of fidelity issues.
3. Though it has only been used on two specific occasions—W76 cell and vacuum chamber operations—interviewees stated they perceive continued management interest in using enhanced oversight in lieu of having qualified/certified technicians on the production line (e.g., during pandemic-related technician quarantines or short-term technician absences). Interviewees expressed concerns with this approach but acknowledged that management had not yet sought to use it again.

Conduct of Operations Implementation.

1. Over the past two years, there have been several conduct of operations events at the Pantex Plant. Interviewees identified potential contributing factors to these events, including the following:
 - a. Loss of experience, knowledge, and overall number of personnel among PSMs and technicians.
 - i. Due to reduced numbers of technicians, some groups have to alternate between multiple facilities, which can lead to distractions and confusion.
 - ii. Despite these challenges, production pressures and expectations on the line have not changed, resulting in long work hours.
 - iii. PSMs have many job functions and are overworked, potentially leading to high turnover. This level of turnover contributes to a low experience level.
 - b. Distractions and stress resulting from timecard issues and the COVID-19 pandemic.
 - c. Production pressure from management.
 - d. A pervasive expectation for overtime across the production organization.
 - e. Issues with the timeliness and quality of support organization products, such as unclear or inaccurate procedures.
 - f. Ineffective communication of issues during shift turnovers.

2. Multiple interviewees noted production pressure from management affecting technician performance (i.e., conduct of operations) and lessening training effectiveness (i.e., management push to complete technician training and qualification/certification quicker than desired).
3. Interviewees observed that nuclear explosive operations during the grave shift are conducted primarily by lesser-experienced personnel.
 - a. Grave shift personnel are provided less support from other organizations and management than day shifts, making it difficult for these lesser experienced technicians to learn and perform their job functions.
 - b. Technicians expressed concern with new employees going straight to grave shift without the 60-day break-in period on day shift.
4. Interviewees noted instances of management not listening to and/or addressing technician safety concerns. In certain instances, technicians used stop work authority to ensure the safety concern was resolved prior to continuing operations.

NSO Resources and Experience.

1. NSOs identified that they are short-staffed and have limited experience. Subsequently, site personnel noted efforts that are underway to address these deficiencies.
2. NSOs indicated that they have insufficient time in the field to provide the level of oversight they would like to perform.