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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

August 3, 1994

MEMORANDUM FOR: G. W. Cunningham, Technical Director

COPIES: Board Members

FROM: D.F. Owen

SUBJECT: National Laboratory Support to Pantex

1. Purpose: This report documents a Defense Nuclear Facilities Safety Board (DNFSB) staff review of the support the National Laboratories provide to Pantex for weapons dismantlement efforts including the recently established Tri-Lab Project Office. The review was conducted from May 17-19, 1994, at Pantex. The DNFSB review team consisted of D. Owen, J. Roarty, C. Martin, J. DeLoach, and H. Waugh.

2. Summary:

- a. National Laboratory support to the Pantex dismantlement efforts has been strengthened over the last few years in the area of dismantlement procedure review and by the establishment of the Tri-Lab Project Office. Efforts to further strengthen the review processes and the participation of the Laboratories in dismantlement procedure development are in progress as part of the DOE's Stockpile Stewardship (SS-21) Program and implementation of Board Recommendations 92-6 and 93-6.
- b. The staff considers that the National Laboratories demonstrated strong technical involvement and support to Pantex in addressing the W-48 dismantlement problems and related actions being taken to address thermal limits for long term W-48 pit storage.
- c. Roles and responsibilities for the Tri-Lab Project office, however, are not presently well defined. Various reviews and other tasking from parent Laboratories limit the time for Tri-Lab Project Office personnel to observe on-going dismantlement activities. Lack of defined roles and responsibilities has resulted in a lack of definition of personnel qualification requirements and adequate manning levels for the Tri-Lab Project Office.

3. Background:

- a. In October 1992, the DOE Albuquerque Operations Office (DOE-ALO) requested a strengthening of the role of the National Laboratories of Los Alamos (LANL), Livermore (LLNL) and Sandia (SNL) in nuclear weapons dismantlement efforts at

Pantex, including establishment of a Laboratory technical support office at Pantex. In late 1993, the Tri-Lab Project Office was established at Pantex.

- b. In Recommendation 93-6, the Board noted the importance, for safety reasons, of the National Laboratories' involvement in review of dismantlement and modification procedures and in responding to problems encountered in dismantlement. The Board recommended that the participation of National Laboratory experts in the safety aspects of disassembly of weapons should be strengthened.
- 4. Discussion/Observations:** DOE, Pantex and the Laboratories discussed activities related to National Laboratory support to Pantex weapon operations. The following are the staff observations from this review:
- a. Activities Related to Dismantlement Procedures:
 - (1) DOE has assigned Pantex with primary responsibility for weapons dismantlement operations. New dismantlement procedures are developed principally by Pantex with participation from the Laboratories as noted below.
 - (2) Pantex generally uses the disassembly procedures developed for the stockpile surveillance program as a starting basis for dismantlement procedure development. As an additional basis for dismantlement procedure development, the Laboratories issue an input document called the "Retirement Specification" that provides design agency requirements, known hazards and other information such as centers of gravity, detonator information and data from the stockpile surveillance program. Laboratory personnel noted that the Retirement Specification represents most of the current formal support for dismantlement procedure development.
 - (3) The Laboratories review and agree with each dismantlement procedure upon development by Pantex. The Laboratories then participate in the Nuclear Explosive Safety Study (NESS) and the Qualification Evaluation for Dismantlement (QED) reviews for each weapon design. These reviews are performed prior to starting the dismantlement of that set of weapons. The NESS and the QED processes are being further strengthened as part of DOE's response to a Board reporting requirement letter on the NESS process and Board Recommendation 92-6 on readiness reviews.
 - (4) DOE-ALO personnel stated that there is a need to strengthen the Laboratories role in development of dismantlement procedures, beyond the review processes now established. DOE and the Laboratories noted that efforts to clearly define and increase the up-front involvement of the Laboratories in dismantlement procedure development are in progress as part of the SS-21 Program.

- (5) Laboratory personnel indicated that weapons manufacturing data are not currently being evaluated by the Laboratories or Pantex for deviations, process changes, etc., that could have an effect on postulated hazards or other safety issues related to weapons dismantlement. DOE personnel stated that actions to evaluate such data in preparation for weapons dismantlement are being considered as part of the SS-21 Program.

b. Participation in Emergent Technical Issues:

- (1) Both Pantex and Laboratory personnel noted that, as technical issues related to weapons design arise, the Laboratories become involved in addressing the issues. DOE-ALO personnel stated this participation has been increasing and actions to further enhance Laboratory support in addressing emerging technical issues are being developed under the SS-21 Program.
- (2) An example of National Laboratory support and involvement in an emergent technical issue is the response to a November 1992, occurrence where the pit cracked during disassembly of a W-48 warhead at Pantex:
 - (a) LLNL personnel provided technical direction and support for the immediate handling of the cracked pit. LLNL also directed and supported completion of other follow-up actions to remove all high explosives from the pit and perform failure analyses. The failure analyses of the W-48 cracked pit by LLNL indicated that the thermal shock method for removal of the high explosive from the pit was a primary cause for the cracked pit.
 - (b) Further evaluation of the W-48 cracked pit occurrence led LLNL to make a recommendation to limit W-48 pit storage temperature to 150 °F. During this trip, DOE-ALO, LLNL, and LANL personnel discussed related thermal analysis and on-going testing for various storage configurations. This work has shown that significant concerns exist with being able to assure that the W-48 pit will not reach the 150 °F limit, given ambient summer conditions and uncertainties associated with natural convection heat transfer in the pit storage containers and the storage magazines.
 - (c) Results of this analysis and testing by LLNL and LANL will be used to determine what limits, required storage configurations, safety systems or surveillances are required to ensure that the temperature of the stored pits do not exceed 150 °F. DOE-ALO personnel stated that any needed safety limits, required storage configurations, safety systems or surveillances will be addressed for incorporation into the safety basis of storage operations.

c. Tri-Lab Project Office:

- (1) Roles and responsibilities of the Tri-Lab Project Office have not been defined beyond the October 1992, direction from Albuquerque. There is a memorandum of understanding between Pantex and the Laboratories issued by Pantex in April 1994, containing agreements of largely an administrative nature. Laboratory personnel stated that the Tri-Lab Project Office is to serve as an extension of the weapon engineering groups at the Laboratories to provide technical interface with Pantex, and to facilitate a common methodology on cross-cutting issues between all three Laboratories and Pantex. Specific responsibilities that have evolved include coordinating and running various procedure reviews, supporting SS-21 Program activities, participating in Emergency Operations Center activities, and representing their parent Laboratory at Pantex meetings.
- (2) Tri-Lab Project Office personnel noted that there is no formal definition of roles of Tri-Lab Project Office personnel specifically related to review of on-going weapons disassembly activities in the bays and cells and reinforcement of requirements and processes important to safety. While Tri-Lab project office personnel do observe some activities in the bays and cells, performance of the other activities described above significantly limits observation of on-going disassembly activities. Concerns or deficiencies that are observed for these activities are not formally documented as there is a desire to avoid being perceived by Pantex personnel as auditors or inspectors.
- (3) Qualification requirements including specific experience, training, and levels of knowledge appropriate to these positions within the Tri-Lab Project Office have not been defined. Such requirements cannot be established without clear definition of the organization's roles and responsibilities, particularly regarding observation of on-going weapon disassembly activities in bays and cells. Additionally, without clear definition of roles and responsibilities, adequate manning levels for the Tri-Lab Project Office cannot be determined.
- (4) Pantex is in the process of implementing a "Plan of the Day" Meeting where planned dismantlement operations and facility maintenance activities are to be discussed. Tri-Lab Project Office personnel stated that they did not plan to attend these meetings. The DNFSB staff considers Tri-Lab participation in such meetings could contribute to the overall communication of dismantlement issues or safety concerns between Pantex and the Laboratories.

- 5. Future Staff Actions:** The staff will continue to follow DOE actions to strengthen National Laboratory support to Pantex including actions developed under the SS-21 program and actions implementing Recommendations 92-6 and 93-6. The staff will review results of thermal testing related to W-48 pit storage and DOE's assessment of the need for additional limits, required storage configurations, safety systems or surveillances as part of the safety basis for W-48 pit storage.