

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

November 1, 1994

MEMORANDUM: G. W. Cunningham, Technical Director

COPIES: Dan Burnfield

FROM: Board Members

SUBJECT: Pantex Radiological Protection Review

1. **Purpose:** This report documents visits by Defense Nuclear Facilities Safety Board (DNFSB) staff member, Dan Burnfield, and outside expert, Ted Quale, to Pantex on June 6-10, 1994, and October 12-13, 1994, to review the status of the radiological protection program at the site.
2. **Summary:**
 - a. The radiological control program at Pantex was assessed to be adequate. Good progress has been made toward raising the level of technical knowledge of radiological workers and their supervisors; however little overall improvement in the entire program was observed.
 - b. The Pantex external dosimetry system has improved since the staff review in 1993. The majority of the issues addressed in DNFSB's July 16, 1993, letter to the Department of Energy (DOE) on external dosimetry have been addressed. One exception is the Pantex decision to not perform a retrospective review of external doses assigned to workers to determine the extent and magnitude of errors that could have occurred in the assigned dose equivalent. It is not clear whether DOE concurred in this decision.
3. **Background:** The June 1994 review included an assessment of DOE compliance with the DOE Radiological Control Manual and other applicable standards. Compliance was assessed from two perspectives. First, compliance was reviewed from the administrative or procedural standpoint. Second, an adherence-based assessment of compliance was conducted that consisted of tours of work areas and discussions with radiological protection personnel, engineering personnel, and operators.

In 1993, outside experts from Auxier and Associates performed a review of the Pantex external dosimetry system following concerns centered around the ability of the neutron dosimetry to accurately measure the doses received to personnel from neutron exposure in the field. The results of their review were forwarded to DOE in July 1993 and formed the basis for the outside expert's October 1994 review.
4. **Discussion:**
 - a. As a part of the continuing assessment of the radiological protection programs at

the sites, the staff reviewed the performance of the Pantex radiological protection program. The following are specific comments on the program:

1. The technical knowledge displayed by site personnel qualified to do radiological work was above average. This includes radiological workers and their supervisors, as well as the radiological protection technicians and their supervisors. Specifically, personnel who are qualified as radiological control technicians had an exceptional level of knowledge.
2. Because Mason and Hanger did not adequately assess the degree of effort required to comply with the Radiological Control Manual, funding for implementing the Radiological Control Manual was constrained by DOE Albuquerque. The staff believes that because of this delay in funding, Pantex is in jeopardy of not achieving full implementation of the DOE Radiological Control Manual by October 1996, as committed to by the Secretary of Energy in the Implementation Plan for DNFSB Recommendation 91-6. The Pantex Radiological Control Manager stated that a detailed compliance assessment is scheduled to be completed by the end of September 1994; however, because this date does not support the DOE budget process, unless special funding arrangements are made, this schedule potentially may delay full compliance beyond October 1996. The compliance assessment has not yet been completed.
3. The site-wide committee on the As Low As Reasonably Achievable (ALARA) program is not functioning as required by Article 138 of the Radiological Control Manual. Specifically, the Committee is not chaired by a line manager and does not receive the results of all external and internal radiological reviews. In addition, the members of the Committee from the line organizations are relatively junior managers who attend to the tasks of reporting status of the ALARA program, as opposed to making important decisions, including the reduction of personnel exposure. As a result, the Committee has been ineffective.
4. The planning process for radiological work does not effectively employ the requirements of Articles 312 and 321 of the Radiological Control Manual. These articles specify requirements for using radiological work permits. Interviews of radiological workers and their supervisors, radiological control technicians and their supervisors, and other radiological protection workers, indicated that active radiological work permits were deficient. Specifically, two radiological control technicians, when asked to comment on the adequacy of a current work permit, stated that they would not allow work to continue under that permit. In addition, the site is not yet in compliance with the requirements of Article 312 regarding the completion of formal ALARA reviews. This article requires that a formal ALARA review be completed whenever certain trigger points exist (e.g., whenever a potential exists for a release of radionuclides to the environment).

- b. External Dosimetry - Since the DNFSB's July 16, 1994, letter on external dosimetry was issued, Pantex has attained DOELAP certification of the new external dosimetry system (Panasonic Model UD-809/812) in accordance with the requirements of DOE Order 5480.15. The new dosimetry system is in use for radiation workers who receive or have the potential to receive neutron exposure. The following observations were developed for those areas of DNFSB's letter that are not being addressed in an adequate manner or where progress is slow:
 1. DNFSB's report states that it would be prudent to perform a retrospective review (incorporating energy spectrum adjustments) of external doses assigned to workers to determine the extent and magnitude of errors that could have occurred in the assigned dose equivalent. The Pantex Radiological Control Manager and External Dosimetry Manager stated that they did not plan to perform such a review because of the following factors. It was not clear that DOE was involved in the decision not to perform the retrospective review.
 - a. They reportedly do not have the capability to perform side-by-side comparison measurements as the dosimetry system previously used is no longer used in the old configuration.
 - b. Significant changes have been made in the way background exposure is subtracted from gross readings. Pantex personnel stated that these changes in the algorithm make interpretation of a side-by-side comparison difficult.
 - c. Pantex did not adapt the practice of permanent retention of TLD glow curves until about 18 months ago. Therefore, this information is not available for comparison.
 - d. The manufacturer made changes in the make-up of the old TLD (UD-802) that was used during the early years to measure neutron exposure. Pantex personnel stated that the unavailability of these older TLDs would hamper a side-by-side comparison.
 - e. The cost of performing such a retrospective review would be prohibitive.
 2. DNFSB's external dosimetry report points out the need to determine the difference between the neutron energy spectrum producing the dose and the energy spectrum in which the dosimetry is calibrated. The Pantex Radiological Control Manager and External Dosimetry Manager stated they have commenced measurements to make this determination. Data have been obtained (but not analyzed) on the W48 program and is planned to commence shortly on the W68 program. While there does not appear to be a firm schedule for completion of this task, it does appear to be finally

moving forward.

5. **Future Staff Actions:** The staff intends to follow the performance of radiological protection practices at Pantex during the staff's normal reviews of weapons operations.