

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

December 17, 1993

MEMORANDUM FOR: G. W. Cunningham Technical Director

COPIES: Board Members

FROM: Roger Zavadoski

SUBJECT: Pantex Site - DNFSB Staff Trip Report - Emergency Preparedness Exercise Review

1. **Purpose:** This report documents a review by the Defense Nuclear Facilities Safety Board (DNFSB) staff member R. W. Zavadoski, accompanied by outside expert T. Quale (Systems Planning Corporation) of a trip on August 23-26, 1993 to the Pantex site to review the Pantex annual Emergency Preparedness exercise. This report was delayed to incorporate the staff's review of the Department of Energy (DOE) and Pantex After-Action Reports provided to the DNFSB in November, 1993.
2. **Summary:** The staff identified deficiencies with the Emergency Preparedness plans and procedures and the performance of Emergency Response Organization (ERO) personnel during the annual Emergency Preparedness exercise. Deficiencies were also identified in the ability to control and evaluate the exercise, as well as in the training of ERO personnel. The following specific concerns were developed:
 - a. Deficiencies were identified with the actions taken to protect the health and safety of the public off site.
 1. The Emergency Response Organization did not adequately prepare and confirm a dose assessment for personnel off site.
 2. Default Protective Action Recommendations were used initially but their adequacy was not confirmed using dose assessments.
 - b. Deficiencies were identified with actions taken to protect the health and safety of workers on site.
 1. Evacuation of on-site personnel was delayed due to failure to comply with a DOE Order requirement to have preprepared evacuation plans.
 2. Required habitability controls, used to ensure worker protection, were not implemented in the Emergency Operations Center (EOC).
 - c. Weaknesses were noted in Pantex's and DOE's ability to evaluate the exercise.

1. During a participant's critique held immediately after the exercise, only minor deficiencies were identified and the Emergency Preparedness Manager stated that he felt performance was good. Objective application of the exercise evaluation criteria, prepared by Pantex, indicates that five significant objectives were not met.
 2. On-scene actions were simulated thus negating verification of the ability to protect on-site workers.
 3. The DNFSB staff reviewed the Pantex and Albuquerque Operations Office After-Action Reports. The reports were superficial, and did not present a critical evaluation of the exercise. Specifically, the reports did not identify the many technical issues raised by the DNFSB staff.
- d. Pantex personnel stated, during a previous DNFSB Staff review, that significant training deficiencies existed. The lack of adequate training for ERO personnel in the past year further exacerbated otherwise critical deficiencies in the planning and procedures for response to such an emergency.
3. **Background:** Deficiencies identified during a July 1993 DNFSB staff review of Emergency Preparedness at Pantex indicated that on-site evaluation of the full scale exercise was warranted. The exercise was prepared, conducted and evaluated by Mason and Hanger personnel. Personnel from the state of Texas, and local governments participated in the exercise. The exercise was also evaluated by DOE Headquarters (DOE-HQ), DOE Albuquerque Operations Office (DOE-AL) and DOE Amarillo Area Office (DOE-AAO) personnel.
4. **Discussion/Observations:**
- a. During the exercise, deficiencies were identified with the action taken to protect the health and safety of the public off site. The following specific examples are provided:
 1. Indications provided to personnel in the EOC were that an explosion had occurred in a building postulated to contain special nuclear material (SNM) and high explosives (HE). The explosion was followed by a fire which continued until one hour and fifty-one minutes into the casualty. Despite these indications, EOC personnel concluded that the release was a puff instead of a continuous release. No efforts to confirm this assumption were made until just before the exercise ended.
 2. At three hours and twenty-eight minutes into the exercise, EOC personnel still had not determined what release fraction should be used. It is common industry practice to develop beforehand release fractions for postulated emergencies.
 3. The Radiological Assistance Team (RAT) was deployed during the exercise to gather radiological data. The data obtained by the RAT Team is sent to the Radiation Safety

Officer who is on the Incident Commanders Staff. It is not clear whether or not that data is then transmitted to the Dose Assessment people in the EOC. The Dose Assessment personnel in the EOC did not use field data in preparing or modifying their estimates, or confirming the protective action recommendations given to state and local governments.

4. The Emergency Preparedness Procedures (EPP) were recently revised to require the Radiation Safety Department be responsible for all on-site radiation surveys during an emergency. During this exercise, this function was performed by the group originally responsible, the Radiological Assistance Team (RAT), because the Radiation Safety Department was unable to support the required effort.
 5. The first (correct) output from ARACS was not obtained until over one hour and thirty minutes into the exercise. At the Dose Assessment Manager's direction, these results were modified by changing the meteorology. The results with the incorrect meteorology run were not obtained until 11:06 AM. However, the second results were considered correct. Considering the exercise started at 9:00 AM, the ARACS projections were not timely.
- b. During the exercise, deficiencies were identified with actions taken to protect the health and safety of workers on site. The following specific examples are provided:
1. DOE Order 5500.3A requires that evacuation plans, including evacuation routes and transportation be predetermined. Pantex has not complied with this requirement. This resulted in the Manager of the Radiation Safety Department, a key manager in such a situation, having to divert his attention from controlling the casualty to developing the evacuation plan.
 2. There were no apparent efforts to ensure habitability of the EOC despite the existence of such requirements in the Pantex Emergency Plan and the Exercise Evaluation Objectives. These habitability controls are designed to ensure the personnel assigned to the EOC are not exposed to unnecessary hazards.
 - a. The Heating Ventilation and Air Conditioning System (HVAC) for the EOC was expected to be operated in the emergency mode. Despite this requirement, the doors to the EOC were routinely propped open potentially allowing contamination to enter the EOC.
 - b. Area and process monitors (radiation and nonradiological hazardous material) were not evident in the EOC. Also, no provision was made for checking for contamination prior to entering the EOC, and no radiation surveys were performed.

- c. Personnel monitoring devices (dosimetry) were not adequate in that no means was provided to ensure that personnel in the EOC were wearing dosimetry.
- c. Weaknesses were identified in the ability of Pantex and DOE personnel to control the exercise and evaluate performance of the ERO during and after the exercise. The exercise scenario had several identified deficiencies.
 1. Immediately following the exercise, a participant's critique was convened. With two minor exceptions, personnel who had participated in the exercise had no comment.
 2. The Exercise Director did not formally schedule a controller and evaluator critique of the exercise as part of the pre-exercise planning. When, at the request of DOE-HQ evaluators, an attempt was made to arrange a critique the day after the exercise only two Pantex evaluators were present. The Exercise Director stated that an additional critique would be scheduled. As of December 1993, a formal controller and evaluator critique of the exercise had not been held.
 3. The scenario did not provide for evaluation of the emergency response at the actual scene of the postulated casualty. The on-scene response organization was not required to activate and did not participate in the exercise. Normal operations in the affected building continued during the exercise. According to the Pantex Emergency Preparedness Procedures, portions of the scene functions are to be accomplished by the Radiation Safety Department; a recent change from the prior practice which required the RAT to perform these functions. Radiation Safety Department personnel have not demonstrated these functions under exercise conditions.
 4. The exercise scenario postulated that a predetermined wind direction and velocity existed and that a certain amount of SNM and HE were in the affected area. The exercise controls were inadequate to ensure these simulated values were used. ERO personnel initially used the actual values.
 5. It was revealed at the initial observer/evaluator critique that Pantex allows exercise participants to also serve as exercise evaluators. This practice detracts from the objectivity of the evaluators.
 6. Radiological data provided as a part of the exercise scenario was very limited. Data was provided for the Zone 12 area but not for any other area of the site. In addition, the data was provided in a format that assumed monitoring personnel would follow a certain path.
 7. The DNFSB staff reviewed the After-Action Reports prepared by the Pantex Plant and the Albuquerque Field Office. A report was not prepared by the DOE-HQ personnel who observed the exercise on site. The staff found the reports were

superficial and did not present a critical assessment of the exercise. The following comments are provided:

- a. The Pantex Plant Emergency Management Department After-Action Report dated October 29, 1993, identified eleven findings and eight improvement items or observations. Most of the issues raised focused on the need to upgrade the occurrence reporting system, the failure of all emergency response organization members to participate in a drill on an annual basis, and the need to upgrade drill and exercise documentation. An observation of the Pantex report was "One topic of concern that was brought up by all the evaluators and players concerned training. Everyone agreed that more training was needed in all aspects of the Emergency Response Organization." However, the report did not identify any findings directly related to the lack of training, or the impact the lack of training had on the ability of the ERO to respond to the emergency, indicating a less than critical evaluation.
- b. The Albuquerque Field Office After-Action Report dated September 21, 1993, contained four findings and three improvement items. The findings were similar to those in the Pantex report. Albuquerque gave the exercise an "overall rating of 'satisfactory' based on the requirements contained in the DOE 5500 Series Orders," and stated "Pantex's emergency management program is one of the best programs within AL."
- c. The Texas Department of Public Safety prepared an After-Action Report dated November 3, 1993. Forty-one draft issues were identified as requiring some sort of corrective action. Many of the reports' issues corroborated the DNFSB staff's concerns about the failure of the EOC to provide timely radiological hazards assessments to ensure protection of the general public and on-site workers. The State provided the following specific issues:
 - (i) The State EOC staff and the Emergency Management Council lacked the experience necessary to assess the hazard related to a radiological accident at Pantex.
 - (ii) Plume projections were not received by local jurisdictions nor the State EOC, in time to make timely decisions.
 - (iii) The use of the Emergency Information System (EIS) to provide information on a radiological release is not fully utilized.
 - (iv) The "safety margin" around the radiological footprint produced by the ARAC or HOTSPOT programs remains undefined.

- (v) Once the radiological deposition level was determined, provisions to review resuspension were not made.
 - (vi) Although this was not an exercise objective, the issue was raised about ingestion pathway concerns. The degree of contamination of crops and livestock were not addressed.
- d. Pantex personnel are aware that training of personnel assigned to the ERO is inadequate. Pantex management characterized this as the biggest problem in emergency preparedness. The Exercise Objectives required the ERO staff to demonstrate knowledge of the tasks they are expected to perform. Contrary to these expectations, the Emergency Preparedness Manager, serving as the EOC Manager, was observed on numerous occasions to be directly instructing individuals on their duties and responsibilities. It should be noted that while training is considered a significant problem, it has only contributed to the severity of overall problems, such as those discussed above, in emergency preparedness at Pantex.

5. Follow-up Activities:

- a. Observe additional exercises performed to evaluate the effectiveness of corrective action.
- b. Review the implementation of corrective actions for and evaluate the adequacy of emergency preparedness training.