DEFENSE NUCLEAR FACILITIES SAFETY BOARD

October 6, 1994

MEMORANDUM: G.W. Cunningham, Technical Director
COPIES: Board Members
FROM: Matthew B. Moury, Pantex Program Manager
SUBJECT: Pantex Site - DNFSB Staff Trip Report - W55 Case Cutting Incident

1. **Purpose:** This report documents a review by Defense Nuclear Facilities Safety Board (Board) staff member M. Moury and Outside Expert T. Quale (Systems Planning Corporation) of a trip on September 12-14, 1994, to the Pantex Site near Amarillo, Texas to review the W55 Case Cutting Occurrence, AL-AO-MHSM-PANTEX-1994-0137, attached.

2. **Summary:**

   a. The investigation conducted by the Mason & Hanger (M&H) into the incident was in general a thorough technical review. The corrective action plan, if properly carried out, will correct most of the root causes that led to this occurrence.

   b. The Board staff identified several additional concerns that showed the lack of an integrated work control program and less than adequate implementation of Department of Energy (DOE) Order 5480.19, *Conduct of Operations Requirements at DOE Facilities*, and DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*.

3. **Background:** In 1992, the W55 dismantlement operations were suspended due to sparks generated during W55 case cutting operations. A new cutting process was developed to eliminate the potential for sparking with a new cutting tool. During a W55 program review on September 1, 1994, the Board site representative became aware of an incident that occurred on July 29, 1994, while testing the new cutting process M&H conducted an experiment to verify the new cutting device would not cause an airborne contamination problem. Several personnel errors took place that led to airborne contamination. The Board staff reviewed the events that led to this occurrence and the corrective actions to prevent recurrence. The review consisted of personnel interviews, document reviews, and viewing the case cutting tooling.

4. **Discussion/Observations:**

   a. The following is a summary of the issues identified during the Mason & Hanger review of the incident:

      1. ***Conduct of Operations Issues***: Failure to follow procedures; inappropriate changes to procedures; inadequate supervision of work; work was perceived to be driven by schedule; and the Plan of the Day was not used to

control all activities in the facility.

2. ***Procedure Issues***: Work done according to an unapproved procedure; Nuclear Explosive Operating Procedure (NEOP) and Engineering Instruction (EI) were inadequate to control the work; the procedures used for the work had not been reviewed by an engineering supervisor and there was no requirement for this to be done.

3. ***Radiological Control Issues***: Failure to follow the requirements of the Radiological Work Permit; the Radiation Safety Plan used for this work had not been approved.

b. Several additional concerns were identified by the Board staff. In combination with the concerns identified above they demonstrate the lack of an integrated work control program and less than adequate progress in implementing DOE Order 5480.19 and DOE Order 5000.3B.

1. ***Procedure Preparation and Use***: The approval processes for NEOP's and EI's (Plant Standards 0143 and 0170 respectively) do not specify the process for obtaining technical concurrence from organizations such as radiation safety, industrial health, etc.; although, they do require such reviews. This has resulted in a lack formality concerning these reviews. For example, the Radiological Control Manager said that his organization does not routinely provide signature approval of such procedures.

   The Board staff reviewed the El prepared for the case cutting evaluation. The review revealed several deficiencies including incomplete instructions, incorrect sequencing of steps that would have resulted in missing steps for repetitive work, and the failure to include critical instructions in the procedure such as the method for cleaning (decontaminating) the case.

2. ***Control of Work***: Pantex has not implemented an integrated program to control work nor a Conduct of Engineering Program. Such programs have been valuable at other facilities in providing proper control of work. An Integrated Work Control Program defines the specific aspects of Conduct of Engineering, Conduct of Operations, and Conduct of Maintenance necessary to support a strong Configuration Management Program and a safe working environment. The Engineering and Design Division Manager clearly recognizes the need for, and value of, such programs and also the need for compensatory measures until they are fully implemented. However, efforts in this area are only just underway. An Integrated Work Control Program would have been valuable in preventing this occurrence. Specifically, it may have prevented the following causal aspects of this occurrence.

   a. Preparation of an inadequate procedure including failure to specify and obtain a review of the procedure by an engineering supervisor.

b. Failure to designate an overall supervisor for the evolution, to use the Plan of the Day to control the evolution, to use unapproved supporting procedures, and to make unauthorized changes to the procedure.

There are few, if any, requirements in DOE Orders supporting or requiring an Integrated Work Control Program for defense nuclear facilities. However, facilities such as the Rocky Flats Environmental Technology Site and the Savannah River Plant have found that such a program is a necessary tool in providing a safe, high-quality operating environment. Further, such a program is indispensable in the fulfillment of several of the criteria of DOE Order 5700.6C *Quality Assurance*. Specifically, Criterion 1 *Program,* Criterion 4 *Documents and Records,* and Criterion 5 *Work Processes*.

3. Radiological Controls: Conduct of radiological work using the principles of DOE Order 5480.19 as invoked by article 125 of the DOE Radiological Controls Manual (RCM) is weak. During a brief tour of one small section of one bay to observe the case cutting equipment, the Board staff observed several radiological deficiencies. These deficiencies included out-of-date and incomplete posting and personnel handling equipment without first reading the radiological posting to determine what controls were required.

In response to the generation of airborne radioactivity during the subject occurrence, the Radiation Safety Department intends to require the use of filter respirators for personnel inside the contamination area. However, personnel immediately outside the contamination area would not be required to use respirators. These two areas are only separated by a rope barrier and no studies have been performed to determine air flow patterns in the bay. Article 531.1 of the RCM states "Use of respiratory protection shall be reduced to the minimum practical by implementing engineering controls and work practices to contain radioactivity at the source." Pantex has not performed a formal engineering evaluation to determine what measures are available to eliminate the need for respiratory protection during this evolution.

Analysis of bioassay samples of exposed personnel had not been completed at the time of the review. Although these were emergent, non-routine samples, no urgency was placed on the contractor used by Pantex to expedite analysis. In fact, at the time of the review, about six weeks after the occurrence, the Radiological Control Manager had not confirmed that the contract with the analysis contractor included a clause to expedite emergent samples.

c. This event was not originally classified as an occurrence contrary to the requirements in DOE Order 5000.3B section 16 of Appendix I or the *Pantex Site Specific Criteria for* **[The copy received in EH-9 was cut off here.]**

d. Several technical issues have been raised concerning the safety of the cutting process. The first deals with the rate of the cutting operations and the potential for

generating sparks in the proximity to high explosives. The second is the potential scraping of the HE when the upper shell hemisphere is lifted from the unit. Both issues are currently being reviewed by the Board staff.

5. **Follow-up Activities: The following Board staff actions are planned:**

    a. Review the preparations being made to reperform the case cutting experiment, including all corrective actions from the first case cutting experiment occurrence. The Board site representatives will monitor the actual operations.

    b. Perform a technical review of the remaining safety issues with the cutting operation before actually dismantling the first unit.