

DNFSB Staff Issue Report
on
Electrical Safety Program
At the
Pantex Plant

DNFSB staff conducted an evaluation of the Pantex Plant Electrical Safety Program in March 2000 as part of a review of the Department's of Energy's Electrical Safety Program at multiple sites. In June 21, 2001, the DNFSB issued a letter to the Secretary of Energy forwarding the Staff Issue Report dated April 16, 2001 containing the specific observations from the site reviews. These observations were focused in the areas of Electrical Safety during Excavation, Authority Having Jurisdiction (AHJ), and the Electrical Safety Committee. The following paragraphs provide the status of actions being taken at the Pantex Plant to address the concerns documented in the DNFSB Staff Issue Report.

Issue 1- Electrical Safety during Excavation

The report identified the following:

“The staff has observed numerous examples of electrical cables/conduits being struck or cut during excavation activities at DOE sites. A search of DOE occurrence reports revealed multiple such occurrences at sites in the defense nuclear complex, including SRS, the Hanford Site, the **Pantex Plant** (emphasis added)...”. “The Board's staff believes such accidents could be minimized or avoided by the detection of underground utilities immediately before excavations are performed and by the conduct of thorough work planning. Locations of underground utilities need to be adequately identified using as-built drawings, subsurface radar, and a magnetometer.” “At Pantex, in particular, existing detection equipment is not capable of adequately detecting the location of underground utilities. The Board's staff encouraged Pantex to evaluate alternate detection equipment (such as subsurface radar detection systems) and to adhere strictly to the recommendations of DOE Safety Notice 96-06.”

Response:

Responsible managers from the Pantex Plant concur with the statement that electrical safety during excavations can be enhanced by the “detection of underground utilities immediately before excavations are performed and by the conduct of thorough work planning.” Therefore, Pantex uses these approaches to ensure this type of work is performed safely. For example, Pantex uses detection equipment that utilizes radio frequency to detect underground utilities. Experience with this equipment indicates that it has the capability to reliably detect underground utilities. Further, work planning for excavations at the Pantex Plant is performed in a thorough manner that includes referencing as-built drawings, identifying underground utilities with detection equipment, and marking utilities prior to the performance of work. These evolutions are done in a

- controlled manner using documented work control processes and procedures to ensure the work is done safely.

Operating experience at Pantex confirms the adequacy of existing processes for electrical safety during excavation and compliance with the guidance in DOE Safety Notice 96-06, "Underground Utilities Detection and Excavation." During the time period of January 1998 through November 1, 2001, Pantex utility locators have detected and located 7,700 utilities. The number of cut utilities was 16; however, only two of these cut utilities were unmarked. The remaining 14 cut utilities were marked but were encountered during hand excavation with picks and a shovel. The number of hazardous lines encountered was 23 of .0003 percent of the total lines detected. More recent experience indicates zero cut utilities from the time period of January 2000 through November 2001. Therefore, operating experience indicates that utilities are adequately detected but are sometimes encountered during uncovering the utility.

In response to discussions with DNFSB Staff on subsurface radar detection systems, Pantex personnel performed an evaluation of the potential application ground penetrating radar (GPR) at the site. This evaluation included detailed conversations with manufactures of this type of equipment and demonstrations of this type of equipment at the Pantex Plant. The results of this evaluation indicated that GPR does not have the ability to penetrate the soils at the Pantex Plant to the depth necessary to reliably detect underground utilities. This type of technology does not perform well with the soil conditions at the Pantex Plant that consists of lean to heavy clays. In these types of conditions, GPR can only detect to shallow distances (a couple of inches). Although GPR does not appear to be applicable for use at the Pantex Plant, BWXT Pantex personnel will continue to search for improvements in detection equipment.

Issue 2 – Authority Having Jurisdiction

The report indicated the following:

“... The AHJ is responsible for interpreting codes as well as regulations and standards, and for approving electrical equipment, site assembled electrical equipment, and materials. At Pantex, the program for the contractor’s electrical AHJ has not been fully implemented. Issues associated with this program include the lack of appropriate resources to fulfill AHJ responsibilities and a multiyear delay in addressing DOE’s findings related to the program. The staff is concerned that the lack of an adequate AHJ function has impacted Pantex’s ability to address existing electrical equipment that is nonlisted or not in compliance with NFPA 70. A preliminary review of approximately 20 facilities by Pantex personnel revealed more than 506 instances of noncompliant or nonlisted equipment. Included are such items as emergency lights, transformers, switches, heater elements, and power supplies...”

Response:

Responsible personnel at the Pantex Plant have taken positive steps to fully implement the Electrical Authority Having Jurisdiction (EAHJ) program. A plant standard has been developed and approved to institutionalize the scope of the program as well as the roles and responsibilities for its full execution. Also, a procedure has been established with shipping and receiving to evaluate and label all new electrical equipment prior to releasing it to the Plant. In addition, a Performance Based Incentive (PBI) has been established to have BWXT Pantex complete EAHJ surveys of in all outstanding facilities to identify all Nationally Recognized Testing Laboratory (NRTL) and non-NRTL items, and to label these electrical components or log them into a non-NRTL data base as appropriate. The scope of the PBI also includes the disposition of the backlog non-NRTL equipment. Full incentive fee is earned if BWXT Pantex completes all identify facility surveys (300 buildings) and dispositions 1000 items. It is anticipated that Performance Based Contracting tools will continue to be pursued until the identified non-NRTL backlog is fully addressed. These actions will ensure that electrical components in Pantex Plant facilities are listed or accepted by the EAHJ, and that future electrical components being introduced into facilities are listed or accepted.

Issue 3 – Electrical Safety Committee

The report indicated the following:

“The Board’s staff has observed that the ESCs at Pantex, Y-12, LLNL, and SRS are involved primarily in the development of procedures and portions of the safety manual and are not performing all the duties and responsibilities set forth in Appendix A of the *Electrical Safety* handbook. Weaknesses in electrical safety can potentially impact any activity or facility function, as virtually everyone is exposed to electrical hazards. The staff believes the role of the ESC at DOE sites needs to be strengthened.”

Response:

The scope of the Electrical Safety Committee (ESC) at the Pantex Plant has been expanded to include functions that are recommended by the Electrical Safety Handbook. For example, the Pantex Plant ESC performs the following functions: (1) develops and maintains the electrical safety manual, (2) provides interpretations of electrical requirements and maintains a copy of each interpretation given, (3) publishes electrical safety bulletins, (4) serves as an advisory group to the EAHJ, (5) provides feedback and improvement on the Electrical Safety Program, and (6) publishes electrical safety article in various plant periodicals.

Electrical safety requirements are specified in the Occupational Safety & Health Section of the Hazards Control Standards / Requirements Identification Document (S/RID). This S/RID is incorporated into the Management and Operating (M&O) Contractor contract for the Pantex Plant to form a binding, contractual agreement on the standards based

criteria (e.g., NFPA 70, 29 CFR 1910.303) that will be instituted to effectively control electrical hazards. The intent of the specified criteria is to define what is expected to achieve the desired result for the electrical safety program. The application and use of the Electrical Safety Committee as defined in the Electrical Safety Handbook defines a recommended approach of how to help achieve the desired results for the program. The existing requirements electrical safety are adequate because they define the desired result rather than the performance based actions to achieve this result which are under the purview of the Contractor and are obtained through Performance Based Contracting.