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**DEFENSE NUCLEAR FACILITIES
SAFETY BOARD**

Washington, DC 20004-2901



October 27, 2017

The Honorable Frank G. Klotz
Administrator
National Nuclear Security Administration
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0701

Dear Administrator Klotz:

The Defense Nuclear Facilities Safety Board reviewed Lawrence Livermore National Laboratory's weapon response technical basis (WRTB) documentation for the W80 weapon program. The W80 WRTB documentation provides a solid technical foundation for the development of the W80 weapon response summary document, and ultimately, development of the Pantex Plant W80 safety basis.

The enclosed staff report identifies opportunities for improvement and is provided for your information.

Yours truly,

Sean Sullivan
Chairman

Enclosure

c: Mr. Joe Olencz

Enclosure

Review of the W80 Weapon Response Technical Basis

In 2016, the Defense Nuclear Facilities Safety Board (Board) directed its staff to develop a plan to review the weapon response technical basis (WRTB) documentation process at the design agencies. For its first review under this initiative, the staff reviewed the W80 WRTB documentation at Lawrence Livermore National Laboratory (LLNL) from March 7–9, 2017.

The staff found that the W80 WRTB documentation was thorough, well documented, and provided a solid technical foundation for development of the W80 weapon response summary document. The staff conducted an initial out-brief with applicable LLNL weapon response staff on March 9, 2017, and a follow-on closeout brief with LLNL and NNSA's Livermore Field Office personnel on April 18, 2017.

The staff found no deficient safety conclusions in the WRTB or the summary document. Based on a focused review of documents, primarily pertaining to the W80 weapon response, the staff found that the LLNL *Weapon Response Process*¹ effectively implemented the requirements of DOE Standard 3016-2006, *Hazard Analysis Reports for Nuclear Explosive Operations*, and that the W80 weapon response appropriately adhered to these requirements.

Opportunities for improvement in the LLNL *Weapon Response Process* include:

- The LLNL *Weapon Response Process* includes guidance to weapon response personnel to include all design agencies on distribution for new weapon response information so that they can evaluate the potential applicability to other systems/components. However, the guidance is limited, does not discuss the process LLNL should use to evaluate other design agency weapon responses for applicability to LLNL systems/components, and does not explicitly include guidance on how LLNL should evaluate applicability of LLNL weapon response to other LLNL systems/components (i.e., extent of condition).
- While the LLNL *Weapon Response Process* includes guidance on the treatment of safety-related new information developed by LLNL, it does not include guidance on how weapon response personnel and LLNL management should evaluate the maturity of new information or criteria for determining when new information is actionable. DOE Standard 3016-2006 is very clear about the Design Agency (LLNL in this case) formally transmitting mature new information to the Pantex Plant, and the LLNL document specifies how this should be accomplished. However, the overall process is subjective because neither the DOE standard nor the LLNL *Weapon Response Process* contain criteria for determining when new information is mature. Without clear guidance to Laboratory personnel, it is possible for the Pantex Plant to be operating with additional risk while weapon response determinations are made.

¹ Weapon and Complex Integration Quality Implementing Procedure, *Weapon Response Process*, ELM-U-1000857325-AA, March 2016.

During the review, the staff also identified the following opportunities for improvement in the WRTB documentation and encouraged LLNL personnel to consider them during their next revision, or when implementing the recently updated DOE Standard 3016–2016, scheduled to occur later in 2017.

- In one instance, the electrical WRTB documentation identified a potential high explosive heating accident scenario, but did not fully develop the scenario or carry it over to the mechanical and thermal WRTB documentation.
- One WRTB document contained several inappropriate references, including a draft manuscript that was used to justify fundamental conclusions. LLNL personnel previously had identified this deficiency and entered it into the appropriate local issues tracking system for resolution.
- The peer-review process can be improved by elaborating on the disposition of comments in the review comment record, further strengthening the peer-review process to focus on technical inconsistencies as well as errors, and modifying the peer-review checklist.
- Further elaboration and development could improve a number of expert judgments (e.g., additional support and reasoning for the judgment, such as the use of safety factors, and inclusion of this data in the technical basis rather than just addressing it in the review comment record).
- The Board's staff found inconsistencies in the WRTB documentation including assumptions pertaining to falling man analysis, use of the Pantex revised electrostatic discharge (ESD) distribution during ESD calculations, and a finite element analysis that was inconsistently referenced. However, the staff did not find instances where these inconsistencies would result in changes to the technical conclusion.