



Department of Energy
National Nuclear Security Administration
Washington, DC 20585



August 3, 2011

The Honorable Peter S. Winokur
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, DC 20004

Dear Mr. Chairman:

Thank you for your letter of April 5, 2011, and the staff report which documented concerns with the implementation of DOE-NA-STD-3016-2006, *Hazard Analysis Reports for Nuclear Explosive Operations*, by the nuclear weapon design agencies (DAs).

I share your view that it is important to ensure proper implementation of DOE-NA-STD-3016-2006 to support safe nuclear explosive operations. The safety of those operations is achieved primarily through the comprehensive identification of hazards and the development and implementation of robust controls. That principle is clearly conveyed in Department of Energy (DOE) rule 10CFR830, Subpart B, through its safe harbor methodologies of DOE-STD-3009, Change Notice 3, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Safety Analysis*, and STD-3016. Its practice is evidenced through the execution of our Seamless Safety for the 21st Century (SS-21) nuclear weapon process improvement efforts that identify and eliminate or substantially reduce hazards. Those improvement efforts remain an ongoing activity, each building on previous work to improve safety.

The concerns expressed in your staff's report dealt primarily with the development and documentation of weapon response information and the attendant DA processes. I share your conviction that the National Nuclear Security Administration (NNSA) should ensure weapons response development activities at the DAs are adequately captured by existing NNSA oversight programs and processes. We intend to accomplish these objectives using the process that was recently approved in the NNSA Policy Letter NAP-21, *Transformational Governance and Oversight*, dated February 28, 2011. In accordance with this process, NNSA will review of the DAs' processes for implementation of DOE-NA-STD-3016-2006 to ensure their effectiveness and adequacy.



Further discussion and responses to the issues raised in your staff report are provided in the attached enclosure. The Office of the Assistant Deputy Administrator for Stockpile Management will schedule a briefing within 60 days to discuss the responses in more detail including completed or planned actions. NNSA and design agency personnel will be present.

If you have any questions or comments, please contact me or Steve Goodrum, Assistant Deputy Administrator for Stockpile Management, at (202) 586-4879.

Sincerely,



DONALD L. COOK
Deputy Administrator
for Defense Programs

Enclosure

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NATIONAL NUCLEAR SECURITY ADMINISTRATION

Office of Defense Programs

**Report
August 2011**

**Response to the Defense Nuclear Facilities Safety Board Letter
Regarding the
Implementation of DOE-NA-STD-3016, *Hazard Analysis
Reports for Nuclear Explosive Operations***

INTRODUCTION

The National Nuclear Security Administration (NNSA) received a letter from the Defense Nuclear Facilities Safety Board (Board) dated April 5, 2011. This letter documented Board concerns associated with the implementation of DOE-NA-STD-3016-2006, *Hazard Analysis Reports for Nuclear Explosive Operations* by the nuclear weapon design agencies (DAs). Attached to the letter was a Board staff report identifying several issues with the DAs' implementation of DOE-NA-STD-3016-2006 (STD-3016).

NNSA requested the DAs to provide responses to the Board issues to include corrective actions, if any. As requested in the Board letter, this report is being submitted to document NNSA's response to these issues. During FY 2012, NNSA will conduct assessments of the processes used by DAs to develop and document weapon response (WR) information to ensure the requirements and intent of STD-3016 is met and to evaluate the implementation of the improvements discussed below. Additionally, these reviews will include a follow up of the concerns expressed in the Board staff report.

In response to all of the issues below, it should be noted that NNSA incorporates multiple and diverse mechanisms in order to ensure the highest levels of safety in its nuclear explosive operations. These include:

- The coverage of DAs' WR generation processes under the Quality Assurance requirements of 10 CFR 830,
- The multiple check/review opportunities afforded by the Hazard Analysis Reports (HAR) development, review, and approval processes by the DAs, the Production Plant Contractor (PPC), and the Pantex Site Office,
- Various readiness assessment reviews, and,
- The highly detailed and expert-based operational reviews outside of the 10 CFR 830 requirements referred to as the Nuclear Explosive Safety Studies and Nuclear Explosive Safety Master Studies.

RESPONSE

Issue: *Documentation of Technical Bases for WR*

The staff report identified technical and procedural concerns with WR information from Lawrence Livermore National Laboratory (LLNL) for the W84 program and from Los Alamos National Laboratory (LANL) for the B53 program.

NNSA notes that in the case of both these programs the DAs used available component performance information combined with the judgment of subject matter experts to draw conclusions about the state of a component and its performance or response to a threat (or hazard). This approach, using available performance information and judgment, is consistent

with the criteria in section 6.2 of STD-3016. This is also consistent with the criteria in section 8.a of the Standard which reflects that probability estimates for WRs are expected to be reasonably approximate, order-of-magnitude point-estimates commensurate with the secondary role that overall accident probability estimates play in the safety basis.

Both LLNL and LANL have reviewed the WR information discussed in the Board staff report and the process used to develop and document that information. Both concluded that appropriate information, including reference material is documented to meet the criteria of section 6.2.3 of STD-3016 and that their internal processes were followed appropriately.

Issue: *Expert Judgment/Elicitation*

The Standard presents expert elicitation as an option for developing WR information when expert judgment is employed. However, the use of expert elicitation is not required. With the exception of some select information for the B53 dismantlement activity, none of the DAs are currently utilizing the expert elicitation process. As discussed above, the design agencies typically use a combination of component performance data and expert judgment to develop WR information. This approach is consistent with the criterion in section 6.2 and in section 8.a of the Standard.

The Board staff report identified concerns with the conduct of the expert elicitation process for the B53 program. LANL has reviewed those concerns and considers that the process they employed was correctly planned, executed and documented.

Issue: *Technical Peer Reviews*

Section 6.2.4 of STD-3016 defines the criteria for peer review processes. DAs must develop their own procedures for conducting peer reviews in accordance with the DAs' approved quality assurance plan as specified by the Standard. The DAs' procedures must ensure that the criteria of section 6.2.4 are addressed. There is no expectation that these procedures will be standardized between DAs. Additionally, section 6.2.4 of STD-3016 states "The level of rigor employed in DA expert elicitation and peer review processes must be commensurate with the secondary role all probabilities play within the HAR."

Given the relatively small community of experts in the various aspects of weapon design at any one DA, NNSA acknowledges it may not be practical to execute a peer review process using personnel completely independent from the development of the data used as part of the basis for a WR. In such instances, NNSA expects the DA procedure to describe a process for identifying and acknowledging potential conflicts (i.e., conflicts with complete independence) for the peer review. NNSA has recently provided this information (Memorandum from Goodrum to Site Office Managers, *Responses to Questions Regarding the Implementation of DOE-NA-STD-3016-2006, Hazard Analysis Reports for Nuclear Explosive Operations*, dated June 28, 2011) to each DA to review and incorporate into their procedures as appropriate.

The Board staff report contained several comments regarding the documentation of the results of peer review processes. The primary purpose of the WR peer review process is to help ensure the completeness and technical accuracy of the responses. Detailed documentation of peer review comments and the resolution of those comments are not necessarily required as long as the process was conducted in accordance with the criteria in the Standard and the DA local procedure and those conducting the peer review provide formal concurrence with the final WR information. However, both LANL and LLNL have acknowledged their WR development processes would be improved by including information relative to issues identified during the peer reviews. As a result, in February 2010, LLNL added additional requirements for documenting the results of peer reviews. LANL acknowledged that in the next revision of their process document additional guidance will be added for technical reviewers in regard to conducting the peer review process.

The Board staff also raised questions with regard to the technical qualifications of peer reviewers at LANL and had specific comments about inconsistencies they identified in the LANL B53 WR documents. Each DA is responsible to ensure peer reviewers have the requisite technical knowledge, training and qualification as required by STD-3016. LANL relies on the line manager of the appropriate technical organization to select qualified reviewers based on a set of base qualification criteria. LANL acknowledged there were a few anomalies that occurred in some of the B53 WR documents and has reviewed the anomalies and concluded the overall quality of the WR information was not affected.

Issue: Incorporation of WR Information into Pantex HARs

The staff report had concerns that the DAs do not confirm the appropriate use of the WR information in the Pantex HARs. STD-3016 specifies that "...to preclude extensive, last-minute reviews, the DAs shall work with the PPC to ensure appropriate use of the WR information." The DAs actively participate in the development of the weapon operations and associated procedures and in the development of the HAR as project team members. In this capacity (i.e., as the Hazard Analysis Task Team members), and also by participating on the Pantex Site Office safety basis review teams that review HARs for NNSA approval, the DAs have multiple opportunities to ensure appropriate use of the WR information. To date, there have been no significant issues identified with respect to the improper use of WR information in the HAR subsequent to the review and approval of a HAR.

It should also be noted that the DAs will assign WRs directly into the HAR accident scenarios with the full implementation of the Collaborative Authorization for the Safety-basis Total Lifecycle Environment (CASTLE) process in the future.

Issue: Characterization of Probabilities and Uncertainties

Section 8 of the Standard describes characteristics of point estimates for probabilities developed for WRs, safety function failures and the occurrence of intermediate events in accident sequences. The associated provisions are generally described with "should" statements implying that the methods are suggestions and provide selected paths among

many that can satisfy meeting NNSA requirements. Other approaches can be equally valid as long as they satisfy the quality assurance requirements discussed in section 6.2.3 of the Standard. All probabilities, including WRs, play a secondary role in the development of a HAR. The primary function of a HAR is to identify controls and to qualitatively ensure the adequacy of identified controls.

Issue: *Software Tools for WR*

The Staff report indicated a concern that the WR development software created and maintained by Sandia National Laboratories (SNL) was not developed using software quality assurance controls. The Staff report also noted that this deficiency is being corrected in the next revision. SNL is upgrading its WR Bases (WRB) software to fully meet software quality requirements and will release the resulting Weapon Response Code (WRC) software later this calendar year. The WRC software will have configuration control, documented requirements and features, and independent evaluation of test results prior to its release. The software application will implement consistency checks, controls and validations designed by subject matter experts to ensure the accuracy of the resulting information in the Bases and Summary Documents. In addition, both LANL and LLNL manually validate the information used in WR summary document.

Issue: *NNSA Oversight of WR*

The Pantex Site Office performs routine oversight of the use of WR information in the development of the HARs. However, there are no current NNSA processes for ongoing oversight of the DAs' proper implementation of STD-3016. In order to address the STD-3016 oversight issue, NNSA will use an integrated assessment process involving Headquarters and field elements to ensure adequate oversight of the implementation of STD-3016 at the DAs. NNSA will conduct an initial review of the DAs' processes for implementation of STD-3016 beginning in FY 2012 to include appropriate follow-up of the above issues. The criteria for conducting the reviews will be provided to Site Offices in advance and the results of the reviews will be provided to the applicable Site Office Managers for their use. In addition, as part of their Contract Assurance Systems, the DAs will incorporate self-assessments to ensure proper implementation of STD-3016. These assessments will be used by NNSA to determine the appropriate schedule and scope for future NNSA oversight activities.