

**[DNFSB LETTERHEAD]**

April 19, 1996

The Honorable Victor H. Reis  
Assistant Secretary for Defense Programs  
Department of Energy  
Washington, D.C. 20585-0104

Dear Dr. Reis:

The Defense Nuclear Facilities Safety Board's (Board) staff recently observed the first two applications of the revalidation of the Nuclear Explosive Safety Study (NESS) process for Pantex operations. In the Board's view, this process does not appear to provide sufficient assurance that the nuclear explosive operation, as it currently exists, can be executed safely. Revalidation, as presently implemented, does not provide a technical review of the potential impact of changes that have occurred since the last NESS and does not appear to consistently require resolution of potential safety issues before operations are authorized to continue.

Enclosed for your information are two Board staff trip reports. The trip reports provide observations of the revalidation studies conducted to date and may be of use at the May meeting of Department of Energy (DOE) Headquarters and DOE Albuquerque, which has been scheduled to discuss issues associated with full implementation of the NESS process corrective actions and the Seamless Safety program.

The Board would like to be informed of the actions that DOE decides are necessary to improve the NESS revalidation process. If you need any further assistance or have questions on this subject, please contact Ms. Cynthia Miller of the Board's staff at (202) 208-6580.

Sincerely,

John T. Conway  
Chairman

c:  
Mark Whitaker  
Bruce Twining

Enclosures:  
March 05, 1996 Trip Report  
March 27, 1996 Trip Report

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

March 5, 1996

**MEMORANDUM** G. W. Cunningham, Technical Director  
**FOR:**  
**COPIES:** Board Members  
**FROM:** Cynthia A. Miller  
**SUBJECT:** Report on the Revalidation for the Nuclear Explosive Safety Studies of W76 Operations at the Department of Energy (DOE) Pantex Plant

1. **Purpose:** This report documents the review made by Defense Nuclear Facilities Safety Board (Board) staff members Cynthia Miller and William White of a "revalidation" (defined below) for the 1989 W76 Nuclear Explosive Safety (NES) Study. The revalidation was conducted at the Pantex Plant from January 30 to February 1, 1996.
2. **Summary:** According to the currently approved DOE Order 5610.11, *Safety of Nuclear Explosive Operations*, the Department of Energy can extend a NES Study (NESS) up to five years. DOE incorporated into the new draft Order 5610.11A a review process called "revalidation" as a way to add a limited scope safety review to extension of expired or soon to be expired NESSs. The W76 was the first use of the NESS revalidation concept. After observing the revalidation, which included the review of several changes to the W76 operation, it was unclear to the staff how the NESS group came to the determination that the changes were insignificant and that a new NESS was not required.
3. **Background:** Draft Order 5610.11A states that "a NESS Revalidation is conducted to determine whether a nuclear explosive operation has significantly changed from the approved NES Study," and it invokes the draft standard DOE-STD-YYYY-95, *Nuclear Explosive Safety Study Process*. The standard requires that the revalidation reach one of two conclusions: either the NES Study remains valid (by unanimous agreement of NES Study group members), or a new NES Study is required. Further guidance on conduct of the revalidation was provided in an August 1995 DP20 memorandum. The direction given in the memorandum is that NESS Revalidation members are required to review the changes in nuclear explosive characteristics, tooling, and Nuclear Explosive Operating Procedures since the last NESS; the status of NESS Recommendations; and the disassembly/reassembly process flow to "ensure that the original operation as studied by the NESS has not deviated as a result of subsequent approved changes to the extent that a new NESS is required."

Revalidation was proposed as an improvement over the administrative extension of NES Studies that have no safety review. DOE Albuquerque's Seven Year NESS Plan proposes to use this revalidation process for nine of the ten weapons in the enduring stockpile surveillance program.

4. **Discussion:** The revalidation process assumes, as an initial condition, that the previous NESS was sound. Observed weaknesses in NES Studies conducted during the late 1980s and early 1990s, however, resulted in several Board actions, including Recommendation

93-1, *Standards Utilization in Defense Nuclear Facilities*, and a Board reporting requirement regarding NESSs (dated December 8, 1993). The staff reviewed the 1989 W76 NESS Report and input document (which were submitted as the input documents for the revalidation). These documents did not present the rationale used by the NESS Group in 1989 to make its determination of adherence to the nuclear safety standards (i.e., positive measures in place to meet the safety standards were not reported).

During the review by the NESS Revalidation team, potential safety issues were raised during discussion of each of the areas listed below (areas of required review per the DP-20 guidance document). It appeared, however, that these potential safety issues were not explored in enough detail to either be resolved or dismissed.

1. **Changes in Nuclear Explosive Characteristics Since 1989:** A number of changes have occurred since 1989 with respect to the W76, specifically, and weapons attributes in general. The possibility of a stuck pit at disassembly has been incorporated into the revised procedure. A number of findings have occurred regarding aging of the type of High Explosive (HE) used in this system.
2. **New Procedures Since 1989:** DOE quality assurance procedures have changed since 1989. Other procedural changes include: the inclusion of radiographic inspection of all units; modification of reservoir removal procedures to accommodate the possibility of component actuation; bonding of neutron generators (to bond or not to bond was the subject of a long internal Sandia discussion concerning whether bonding defeats the intent of electrical isolation); and the addition of new procedures such as D5 Release Assembly removal and the addition of ballast to the unit's aft shell.
3. **New Tooling Since 1989:** Numerous tooling changes have been made since the 1989 NESS. The work stand has been redesigned; a newly designed radiography cart has been put into operation and new vacuum tooling is used during separation of the HE. Electronic test equipment in use, designed by Sandia and Mason & Hanger, is of a new design; configuration control of both sets of equipment was questioned.

Per the criteria in the DP20 guidance, the sheer number of these changes should have caused serious consideration about whether the 1989 NESS was still valid. It is not the staffs intent to indicate that the changes were substantial enough to constitute a "significant deviation" from the operations in 1989, but simply that the deliberation of the NESS Revalidation group did not appear sufficient to draw a conclusion of "no significant changes."

5. **Future Staff Actions:** It is the staff assessment that the revalidation process conducted for the W76 at Pantex was an incomplete review of potential safety issues; the staff intends to follow closely the DP-20 Headquarters review of the W76 Revalidation Report. In addition, the staff plans to observe the revalidation scheduled for March 12, 1996, on the B61 Mods 3, 4, and 10.

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

March 27, 1996

**MEMORANDUM FOR:** G. W. Cunningham, Technical Director

**COPIES:** Board Members

**FROM:** William White

**SUBJECT:** Revalidation for the Nuclear Explosive Safety Studies of B61 - 3/4/10 Operations at the Department of Energy (DOE) Pantex Plant

1. **Purpose:** This report documents a review by Defense Nuclear Facilities Safety Board (Board) staff member William White of the revalidation of the 1989 B61-3/4 and the 1990 B61-10 Nuclear Explosive Safety Studies (NESS). The revalidation was conducted at Pantex from March 12-15, 1996. The revalidation continued March 19, 1996.
2. **Summary:** The B61-3/4/10 revalidation was the second revalidation conducted according to draft DOE Order 5610.11A and interim guidance from DOE/DP-20. The first revalidation was for the W76 NESS and was conducted at Pantex from January 30 to February 1, 1996. Board staff observations for this revalidation are in [Cynthia Miller's trip report dated March 5, 1996](#).

The B61 revalidation suffered some of the same problems as the W76 revalidation. Although there were improvements in the deliberations of the Nuclear Explosive Safety Study Group (NESSG), the proposed NESS Revalidation Report still did not provide rationale for the determinations made by the group. The group did not evaluate the impact on safety from the changes since the previous NESS. Therefore, it appears that the additional guidance from DOE/DP-20 did not add substance to the process.

3. **Background:** DOE draft Order 5610.11A states the purpose of a NESS revalidation is "to determine whether a nuclear explosive operation has significantly changed from the approved NES Study." The order invokes the draft DOE-STD-YYYY-95, *Nuclear Explosive Safety Study Process*, to provide guidance on the conduct of a NESS revalidation. This standard requires the NESSG to reach one of two conclusions: the NESS remains valid (requires unanimous NESSG agreement), or a new NESS is required. Additional guidance provided in an August 1995 DP-20 memorandum directed NESSG members to review changes in nuclear explosive characteristics, tooling, and nuclear explosive operating procedures since the last NESS; the status of NESS study recommendations; and the disassembly/reassembly process flow to "ensure that the original operation as studied by the NES study has not deviated as a result of subsequent approved changes to the extent that a new NES study is required."

To resolve deficiencies noted during the W76 revalidation, DOE/DP-20 provided additional guidance to DOE's Albuquerque Operations Office (DOE/AL) for conducting the B61 revalidation. This guidance required the NESSG to document suggested improvements to nuclear explosive operations, consider the results of surveillance and reliability testing reports, and provide rationale and justification to support NESSG

conclusions. The NESSG chairman for the B61-3/4/10 revalidation began the NESSG meetings with an explanation of this new guidance.

4. **Discussion:** The revalidation for the B61-3/4/10 operations was an improvement over the revalidation for W76 operations. The NESSG attempted to follow the additional DP-20 guidance that addressed several of the same concerns mentioned in the Board's staff trip report on the W76 revalidation. The report for the B61 revalidation, however, did not contain rationale for the conclusions that the NESSG made. Adherence to the new guidance was enhanced by the NESSG chairman, who conducted this NESS revalidation in a manner which promoted discussion among NESSG members. Rather than evaluate the impact of the operational changes on the safety of the operation, the group made a determination that, since the changes to the operation were considered "safety enhancements," they posed no adverse affect on nuclear explosive safety.

No recommendations were made in the report although the NESSG suggested the use of General Instructions in nuclear explosive operations and the use of trained technicians in conducting demonstrations for the NESSG. Other recommendations that were discussed but not adopted included: incorporation of results from the detonator study recommended in the B61-0/2/5 NESS, removal of special nuclear material (SNM) from the bay before conducting insensitive high explosive (IHE) depotting operations (which were not studied in the 1989 and 1990 NESSs), and mandatory attendance by design agency representatives during disassembly of command disabled units (attendance, although traditional, is not required).

1. **Changes.** As noted by the NESSG most, if not all, of the changes in B61 operations and B61 design characteristics were deemed to be "safety improvements." Examples of these include: new actuators less sensitive to electrostatic discharge, additional procedure steps for electrical bonding, additional verification of gas transfer system integrity, tester changes to provide current limiting features, and improvements in the trajectory sensing signal generator.

Although there was significantly more discussion of the safety impact of these changes than during the W76 revalidation, not all changes were discussed in detail by the NESSG members. Many changes could undoubtedly have been dismissed as insignificant by NESSG members who had considerable experience in the systems affected by the changes; however, not all NESSG members had the same level of experience in all areas. As unanimous consent is required for revalidation, it might have been beneficial to provide a level of discussion on all changes that would have allowed even the least experienced NESSG member to make an informed conclusion on the safety significance of the changes.

2. **DOE Guidance.** There were several operations (such as depotting of the IHE) that were not covered under the previous NESSs but are required to be covered under the draft DOE Order 5610.11A. These are operations involving collocated high explosive and SNM. Although these operations were mentioned during the Mason & Hanger (M&H) presentation to the NESSG, they were not discussed in any more detail than other nuclear explosive operations reviewed by the NESSG. DOE has provided no guidance to NESSG members on handling this situation.

Although the changes discussed above are considered safety enhancements, they still represent significant changes to the B61 characteristics and operations as studied in 1989 and 1990. DOE guidance does not distinguish between changes intended to improve NES and those which can negatively impact NES. This presents another possible problem with DOE guidance.

The additional guidance provided by DOE/DP-20 required additional rationale and justification supporting the conclusions of the NESSG. These are not apparent in the draft report.

3. **Presentations to the NESSG.** The design agencies (Los Alamos National Laboratory and Sandia National Laboratories) only presented changes to the NESSG which the design agencies decided might affect nuclear safety. This contrasts with the presentations by M&H that were not filtered to remove changes not considered insignificant by M&H.

In general, presentations to the NESSG during revalidations do not have the same quality and depth of information as presentations made during traditional NESSs. Since the revalidations authorize continuation of nuclear explosive operations, similar to NESSs, it is not clear why a lesser level of quality and depth is satisfactory. This potential conflict was noted by the NESSG chairman during the B61 revalidation, but was not included in the revalidation report.