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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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93-0006789



December 8, 1993

The Honorable Hazel R. O'Leary
Secretary of Energy
Washington, D.C. 20585

Dear Secretary O'Leary:

During the past several months, the Defense Nuclear Facilities Safety Board (DNFSB), its Staff, and outside experts have been reviewing the process used to ensure nuclear explosive safety at the Pantex Plant and at the Nevada Test Site (NTS). Review of this area is consistent with the Board's enabling legislation, as amended, which extended the Board's prior jurisdiction to include facilities and activities involved with the assembly, disassembly, and testing of nuclear weapons. This review has raised several important questions with respect to the nuclear explosive safety study/survey (NESS) process.

In January of this year, the DNFSB issued its Recommendation 93-1, which recommended that the Department of Energy (DOE) examine the orders and directives that apply to facilities that assemble, disassemble, and test nuclear weapons, and compare the level of safety assurance provided to that at other DOE defense nuclear facilities. In discussions with DOE personnel prior to issuance of this Recommendation and since, the NESS process was cited as an essential element in ensuring the safety of facilities where nuclear explosive operations are authorized. It is therefore of concern to the Board that ongoing reviews of this process have highlighted a number of apparent deficiencies, which are summarized below, and discussed in detail in the enclosure to this letter.

The NESS process, as currently implemented, depends extensively on the knowledge of the individuals presently involved, both at DOE Headquarters, and in the field (DOE operations office personnel chair the NESS groups (NESSGs), headquarters personnel lead the final review and approval process). This dependence on individual expertise appears to have led to a somewhat informal approach to evaluating nuclear explosive safety. Experience has demonstrated that informality is to be avoided in matters of nuclear safety. Thus, a higher degree of formalization and coordination by DOE Headquarters personnel of this effort seems needed. This need is heightened by the current trend to encourage early retirement of the most experienced personnel in the weapons complex. The need for greater formality and coordination is particularly apparent in the areas of: NESS technical input documentation, which appears to be lacking in timeliness, rigor, and comprehensiveness; consistent and adequate guidance on the implementation of the plutonium dispersal safety standard and the quantitative risk assessment requirement; and the process for selecting, training, and qualifying NESSG members and DOE Headquarters review personnel, to ensure that a fully capable pool of personnel is maintained.

In accordance with these concerns, and pursuant to 42 U.S.C. § 2286b(d), the Board requests the following:

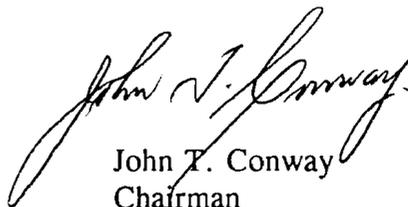
A report presenting the results of an independent review of the NESS process. The requirements for the NESS process are delineated in the Nuclear Explosive Safety Orders (DOE Order 5610.11, "Nuclear Explosive Safety," 10-10-90, and DOE Order 5610.10, "Nuclear Explosive and Weapon Safety Program," 10-10-90), and further implemented by direction from DOE's Albuquerque and Nevada Operations Offices. The review group should include several safety analysis professionals from DOE, contractor, consultant, and/or DoD organizations who have not previously been directly involved in the NESS process, in addition to persons with extensive experience in that process who have not recently served as NESSG members. Components of this independent review should address, as a minimum, the concerns listed in the attached enclosure, and should include:

- a. An appraisal of the effectiveness of the current implementation of **DOE Order 5610.11's** requirements, including, but not limited to: the NESSG's independence from the operating organizations, the adequacy of the supporting technical bases for the NESSs, the NESS update/re-validation process, and the effectiveness of the periodic DOE Headquarters' nuclear explosive safety program appraisals.
- b. A determination of whether adequate qualitative guidance and/or acceptance criteria exist to ensure that the NESS process will properly analyze and document all risks, including both detonation and plutonium dispersal safety. Such analysis and documentation of risks is required by **DOE Order 5610.10, "so that informed management decisions can be made regarding conduct of the operation and the need for implementation of any additional positive measures to reduce risk to acceptable levels."** This effort should include a review of what mechanisms exist or need to be developed to evaluate and develop positive measures to mitigate against the potential hazards of dispersal of "toxic and radioactive materials" other than plutonium.
- c. A review of the current approach and schedules for conducting Nuclear Explosive Risk Assessments (NERAs) in support of the NESS process at Pantex and NTS. This review should include an examination of the adequacy of resources provided to these efforts, including those for personnel and data development activities. Special consideration should be given to determining whether the current approach will ensure that the NERA becomes a fully integrated portion of the NESS process.

- d. A review of the NESS formal personnel selection criteria provided in the Nuclear Explosive Safety Orders and DOE-Albuquerque and DOE-Nevada Operations Offices' implementing instructions. This review should determine whether the existing criteria are adequate to ensure that present and future NESSG members are properly selected, formally trained, and qualified to perform their function; it should also review and evaluate similar requirements for DOE Headquarters personnel who review NESS reports for approval. In addition, the review should determine whether the Order requirements and implementing instructions/programs ensure that each NESSG convened will have access to issue-specific technical expertise to comprehensively evaluate the operation under review.

The Board believes it is important that the above report be completed and submitted within 90 days of receiving this letter. If you need any further information, please let me know.

Sincerely,



John T. Conway
Chairman

c: M. Whitaker, Acting DOE/EH-6
V. Reis, DP-1

Enclosure

Enclosure

Observations on the NESS Process

1. **DOE Order 5610.11** requires that NESSG members "shall be knowledgeable personnel other than those having direct design, development, or operational responsibility for the nuclear explosive and the operation or test under consideration." The Order also states that "DOE and DOE contractor organizations responsible for the design, production, transport, or security of nuclear explosives shall provide the information, data, and analyses required . . . to the NESSG." The DNFSB Staff has observed an apparent breakdown in the implementation of these requirements. The NESSG, at times, was observed to include voting members who had helped prepare technical input material for the NESS. The user organizations (i.e., the National Laboratories) at NTS have sometimes been observed to strongly resist requests by DOE Headquarters and the NESSG to improve the quality of supporting technical documentation. This documentation was observed by DNFSB Staff to be often general and narrative in nature, with limited technical detail, and provided with insufficient lead time to support evaluation prior to the scheduled NESSG meeting. It is questionable whether the NESSG can provide a truly independent technical safety review of proposed operations, given these conditions.
2. As stated above, the user organizations at NTS were often observed to produce inadequate technical documentation in support of the NESS. The problem appears to be compounded by the practice of using historical reference documentation extensively, without thorough re-validation of the applicability of the reference to the current technical review. This potential over-dependence on the acceptability of past practices may be reducing the value of the NESSG's effort, since it appears to inhibit the modification of historical operating practices to reflect changes in safety emphasis and does not encourage questioning of historical analyses.
3. **DOE Order 5610.11** requires annual appraisals of the nuclear explosive safety program, including evaluation of "the effectiveness of the implementation of applicable policies, requirements, and standards." While DOE Headquarters (DOE-HQ) periodically reviews the DOE-Albuquerque (DOE-AL) and DOE-Nevada (DOE-NV) Operations Office programs implementing **DOE Order 5610.11**, it does not appear that the effectiveness of the NESS process itself is evaluated. In addition, DOE-HQ does not appear to have evaluated the differences in the approaches to NESS implementation between DOE-AL and DOE-NV, which the DNFSB Staff has observed to be potentially significant.
4. The NESS process is outlined in Chapter V of **DOE Order 5610.11** and is implemented in DOE-AL and DOE-NV operating instructions. The 1990 revision to the DOE-HQ Order incorporated significant modifications, including the addition of a qualitative safety standard on prevention of plutonium dispersal, and the requirement

incorporate quantitative risk assessment as part of the NESS process to evaluate dispersal. As noted in a recent (August 5, 1993) memorandum from the Deputy Assistant Secretary for Military Application (DASMA), there is inconsistency in the scope of the guidance provided in the above Order, and in DOE Order 5610.10 which states that the NESS shall include consideration of "**dispersal of toxic and radioactive materials.**" The August DASMA guidance limits the scope of NESS activities to the evaluation of plutonium dispersal only, under the rationale that, "**Protection against plutonium dispersal will likely also provide sufficient protection against the dispersal of other materials. . .**" Dispersal of plutonium does represent the greatest relative health risk. However, it is unclear what mechanism is currently used by DOE, outside of the NESS process, to address the risks associated with the dispersal of other radioactive materials (e.g., highly enriched uranium and tritium) and toxic materials (beryllium, etc.) by explosive or other means.

5. The DNFSB Staff has observed a lack of common understanding among those involved in the NESS process on how the material dispersal/risk assessment requirements of the Orders are to be implemented. This lack of understanding, as well as observed resistance to participate by some experienced weapons program personnel, has resulted in limited progress being made to implement these 1990 additions to the Orders. Of particular concern is whether the approach currently being taken to conduct NERAs (some of which are not scheduled to be completed until after the associated NESSG meets to deliberate) will result in true integration of this intended enhancement into the NESS process.
6. There are few specific requirements provided in DOE Order 5610.11 on the qualifications necessary for NESSG membership. DOE-NV provides no additional formal guidance. DOE-AL specifies some additional technical training, but "grandfathers" in many individuals. Although a majority of the current NESSG members appear to be highly experienced, many are either retirement-eligible or recalled retiree contractors. Without a comprehensive, system-wide selection, training, and qualification program, it is unclear whether DOE will be able to ensure the adequacy of the next generation of NESSG members.
7. The DNFSB Staff observed occasions when a NESSG appeared to have incomplete technical expertise in a specific operation under review. The NESS process does not appear to encourage supplementing the inherent expertise of the NESSG, when needed, e.g., via the creation of focused safety sub-groups, with additional independent expertise, to address specific technical areas. As a result, some technical analyses could be accepted by the NESSG without a qualified independent review.