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**DEFENSE NUCLEAR FACILITIES
SAFETY BOARD**

Washington, DC 20004-2901



April 27, 2011

The Honorable Steven Chu
Secretary of Energy
U. S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Secretary Chu:

The Defense Nuclear Facilities Safety Board (Board) has received and carefully reviewed your February 28, 2011, response to the Board's Recommendation 2010-1, *Safety Analysis Requirements for Defining Adequate Protection for the Public and the Workers*. While there are some areas of agreement, the Board finds that the response constitutes a partial rejection of the Recommendation, under the criteria set forth in the Board's Policy Statement 1, *Criteria for Judging the Adequacy of DOE [Department of Energy] Responses and Implementation Plans for DNFSB Recommendations* (October 19, 1990).

The Atomic Energy Act obligates DOE to establish a regulatory structure, which is expected to be clear and stable, and provide adequate protection of the public during normal operations and accident conditions. The same statute requires the Board to recommend to DOE those measures that should be adopted to ensure safety under this structure. At its core, Recommendation 2010-1 is intended to strengthen DOE's regulatory structure. Therefore, the Board reaffirms the Recommendation and provides additional discussion for those aspects of the Recommendation that were revised by DOE.

Subrecommendation 1: Immediately affirm the requirement that unmitigated, bounding-type accident scenarios will be used at DOE's defense nuclear facilities to estimate dose consequences at the site boundary, and that a sufficient combination of SSCs [structures, systems, or components] must be designated safety class to prevent exposures at the site boundary from approaching 25 rem TEDE [Total Effective Dose Equivalent].

In its response, DOE indicates that it accepts Subrecommendation 1 for new facilities. However, for existing facilities, DOE indicates that preventing exposures from exceeding 25 rem TEDE is "normally utilized," but that "other means and controls" can be used where off-site exposures are not reduced below 25 rem TEDE, or where SSCs are not available.

DOE has applied the approach described in Subrecommendation 1 at the majority of defense nuclear facilities since Appendix A was added to DOE Standard 3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports* in

2000. Formalizing this approach in DOE's regulatory framework and enforcing its implementation for all future applications would ensure protection of public health and safety in a manner similar to commercial nuclear requirements. The Board envisions that this would entail formalization of the following as requirements:

- (1) The use of unmitigated, bounding-type accident scenarios to calculate radiological exposures at the site boundary for the purpose of safety system classification;
- (2) Designation as safety-class those controls (e.g., SSCs) required to prevent or mitigate accidents when unmitigated exposures at the site boundary approach 25 rem TEDE; and
- (3) Establishment of a process that should be followed when mitigated consequences exceed the Evaluation Guideline (discussed further in Subrecommendations 2 and 5).

Subrecommendation 2: For those defense nuclear facilities that have not implemented compensatory measures sufficient to reduce exposures at the site boundary below 25 rem TEDE, direct the responsible program secretarial officer to develop a plan to meet this requirement within a reasonable timeframe.

The Board understands that a small number of existing nuclear facilities may not currently comply with the regulatory structure described above. DOE's response letter states that the responsible Program Secretarial Officer has evaluated the safety measures planned or currently in place for those facilities not meeting the Evaluation Guideline at the site boundary and has determined that those measures provide adequate protection. In Subrecommendation 2, the Board seeks a formal process for performing such evaluations. This process should specify required documentation and review and approval by DOE officials with responsibility for mission needs, as well as funding provisions for remedial measures. The Board recommends that this process, and the criteria for its activation, be formalized through implementation of Subrecommendation 5 to ensure that adequate protection of the public is provided or that the appropriate officials grant proper authorization for continued operation per the process to be established. The process should then be applied to the small number of outlying existing facilities as part of their next scheduled safety basis update.

Subrecommendation 3: Revise DOE Standard 3009-94 to identify clearly and unambiguously the requirements that must be met to demonstrate that an adequate level of protection for the public and workers is provided through a DSA [Documented Safety Analysis]. This should be accomplished, at a minimum, by:...(c) Providing criteria that must be met by the safety-class SSCs to (i) mitigate the consequences to a fraction of the Evaluation Guideline, or (ii) prevent the events by demonstrating an acceptable reliability for the preventive features....

In its response, DOE indicates that it accepts Subrecommendation 3, but will not commit to implementing paragraph 3(c) as written prior to completing its revision process for DOE Standard 3009.

In Subrecommendation 3(c), the Board seeks formalization of a set of criteria that must be met by safety-class controls (e.g., SSCs) to ensure that the mitigated radiological consequences of an accident are acceptable, technically supported, and consistent with the requirements of other federal regulations. Promulgation of an acceptable end result for accidental exposure of members of the public is necessary for DOE to meet its obligation to ensure adequate protection under the Atomic Energy Act. A process for identifying facilities that do not meet these criteria is also needed, as discussed below under Subrecommendation 5. The Board understands that DOE may choose to propose and justify criteria other than a “small fraction of” or “far below” the Evaluation Guideline, as currently provided in existing DOE directives.

Subrecommendation 4: Amend 10 CFR Part 830 [Title 10 Code of Federal Regulations (CFR) Part 830, Nuclear Safety Management] by incorporating the revised version of DOE Standard 3009-94 into the text as a requirement, instead of as a safe harbor cited in Table 2.

DOE has indicated it is planning to review 10 CFR Part 830, but cannot commit to the exact language prescribed in Subrecommendation 4. Rather, DOE intends to implement this Subrecommendation through a revision to DOE Standard 3009.

The Board believes that this action does not satisfy the intent of this Subrecommendation. The Board does understand DOE’s concerns with regard to singling out this standard from the safe harbor for inclusion in the text of the rule. Other solutions may exist, but they must result in a regulatory structure that is clear and stable. The Board is willing to consider other rule amendments that DOE might propose. For example, DOE might propose an amendment to 10 CFR Part 830 that incorporates into the rule the following two items to ensure adequate protection is provided for the public and to achieve parity with commercial nuclear safety requirements:

- (1) The use of unmitigated, bounding-type accident scenarios to calculate radiological exposures at the site boundary for the purpose of safety system classification; and
- (2) Designation as safety-class those controls (e.g., SSCs) required to prevent or mitigate accidents when unmitigated exposures at the site boundary approach 25 rem TEDE.

Subrecommendation 5: Formally establish the minimum criteria and requirements that govern federal approval of a DSA, by revision to DOE Standard 1104-2009 [Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents] and other appropriate documents. The criteria

and requirements should include...(e) The criteria the approval authority must use to quantify the acceptance of risk for continued operations when offsite dose consequences approach the Evaluation Guideline.

In its letter, DOE indicated that it accepted Subrecommendation 5, with the exception of paragraph (e), which DOE interpreted as advocating the use of a quantitative risk assessment for those facilities where accident consequences exceed the Evaluation Guideline. The Board is aware that DOE currently does not have the data or a formalized process for performing a quantitative risk assessment. The Board did not intend that this recommendation address that fact. Rather, the Board recommended identification of a set of criteria that must be used to evaluate the risk of continued operation of such facilities. With this clarification, the Board will evaluate DOE's proposed methodology and its technical basis as set forth in the Implementation Plan for Recommendation 2010-1.

As for the remaining Subrecommendations not explicitly discussed above, DOE's response relies heavily on DOE activities already in progress to revise DOE Standard 3009-94. The initiative to revise the standard predates the Board's Recommendation and was not specifically chartered to address the full scope and breadth of the issues outlined in the Recommendation. Consequently, it is not clear that this ongoing effort will meet all of the necessary safety objectives of concern to the Board. Therefore, this DOE initiative must be expanded to accommodate those aspects of the Recommendation referenced in your response. The Board will review the Implementation Plan for its adequacy in this context.

Pursuant to 42 U.S.C. § 2286d, the Board finds that DOE's February 28, 2011, response partially rejects Recommendation 2010-1, and hereby reaffirms the Recommendation as detailed above. Paragraph (d) of this statutory provision requires that you now make:

...a final decision on whether to implement all or part of the Board's recommendation[s]. Subject to subsection (h), the Secretary shall publish the final decision and the reasoning for such decision in the Federal Register and shall transmit to the Committees on Armed Services and on Appropriations of the Senate and to the Speaker of the House of Representatives a written report containing that decision and reasoning.

Sincerely,



Peter S. Winokur, Ph.D.
Chairman

c: Mrs. Mari-Jo Campagnone