DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004-2901
(202) 694-7000

April 10, 2001

The Honorable Spencer Abraham
Secretary of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Secretary Abraham:

On November 1, 2000, the Defense Nuclear Facilities Safety Board (Board) wrote to the Assistant Secretary for Environment, Safety and Health (EH) concerning an accident dose calculation methodology ("95 percentile methodology") being advanced for use at the Hanford site that did not follow established Department of Energy (DOE) guidelines. In that letter, the Board acknowledged that "this proposed methodology may prove useful in certain applications" but also noted that "there is a potential for misapplication" and that "the Office of Primary Interest for nuclear safety analysis directives needs to evaluate this methodology, assess its applicability to authorization basis activities, and if appropriate, establish relevant standards and guidelines."

The Assistant Secretary responded on December 19, 2000, stating: "We have reviewed that methodology and we share the Board's concern that it may reduce the conservatism of the methodology described in DOE-STD-3009 to unacceptable levels. We have discussed this matter with individuals at the involved site and are working toward a resolution of the problem." It was the Board's understanding from this letter that use of the methodology to revise authorization basis documents would not be permitted by DOE pending completion of the EH-led review and issuance of guidelines.

Contrary to this understanding, it appears that some DOE offices and some DOE contractors are moving toward the use of this unapproved methodology to revise their authorization basis documents. The Board has identified a number of issues that need to be addressed prior to using such a methodology for identification and classification of safety controls. As summarized in the enclosure to this letter, application of the proposed methodology could lead to a downgrading of safety controls otherwise required by DOE safety orders and standards and by 10 C.F.R. Part 830, *Nuclear Safety Management Rule*. In the Board's view, this should not be permitted to occur until proper review by both DOE and the Board of any proposed guidelines and standards is completed and DOE has revised and re-issued the applicable standards per prescribed processes. See 42 U.S.C. § 2286a(a)(1).

The Board requests that you look into this issue promptly and, pursuant to 42 U.S.C. § 2286b(d), provide a report to the Board within 60 days of receipt of this letter that includes: (1) the merits and applicability of the proposed statistical methodology, (2) if appropriate, DOE's path forward for completing the EH review and issuing the necessary guidelines for application of the statistical methodology, and (3) how DOE intends to ensure that this EH guidance is in place prior to accepting authorization basis documents that incorporate the statistical methodology.

Sincerely,

by MWO FOR

John T. Conway
Chairman

c: The Honorable Carolyn L. Huntoon
Mr. Greg Rudy
Mr. Keith A. Klein
Mr. Steven V. Cary
Mr. Mark B. Whitaker, Jr.

Enclosure

ENCLOSURE

The Board and its staff have reviewed the proposed statistical methodology ("95 percentile methodology") and met with Department of Energy (DOE) and contractor representatives on several occasions. The discussions focused on the details of the technical bases and applicability of the proposed approach to dose calculations and functional classification of safety structures, systems, and components (SSCs). The proposed approach reduces the numerical value of the calculated consequences by reducing the level of conservatism in the corresponding parameters. As a result, the Board has raised the following issues which need to be addressed prior to any application of this methodology to the authorization bases of defense nuclear facilities:

- The statistical approach to accident analysis has been proposed in response to a *perceived* concern that the current bounding methodologies yield excessively conservative dose estimates, thereby requiring facilities to maintain unreasonable and burdensome functionally classified safety SSCs. A convincing case has yet to be made that current safety related controls are either unreasonable or burdensome. Similarly, it has not been demonstrated that a more conscientious application of the current methodologies (e.g., better accident progression models, improved characterization of input data) would not serve to relax potential overconservatism in existing accident analyses.

- A fundamental aspect of the proposed approach to accident analyses is the identification of statistical distributions for the various accident model input parameters (e.g., material at risk, damage ratio, aerosolized release fraction). The paucity of underlying data makes it extremely difficult to identify justifiable parameter distributions, and protocols have yet to be established with regard to how acceptable distributions are to be developed in the absence of adequate supporting data. Furthermore, use of this proposed methodology leads to statistically distributed initial conditions that the contractors may be obligated to maintain under their Technical Safety Requirements for operational safety. An acceptable way of translating a distributed parameter into a practical Technical Safety Requirement has not yet been identified.

- The proposed approach does not seem to be enveloped by the "safe harbor" methodology of the Nuclear Safety Management Rule, 10 C.F.R. Part 830. EH-53, the DOE Office of Primary Interest for the rule, has since concluded the same, and has requested a topical report be submitted for review and approval prior to use of the proposed methodology.

- In a letter to DOE dated July 8, 1999, the Board accepted the current conservative methodology for accident analysis in conjunction with the use of an evaluation guideline of 25 rem for functional classification as a coupled package that, when used together, represent an acceptable approach for the identification and classification of safety controls. In contrast, use of the existing evaluation guideline (25 rem) as the basis for interpreting dose estimates from the proposed statistical methodology is inappropriate, as it would result in the elimination or downgraded functional classification of many safety related controls, thereby reducing the safety margin of a facility or activity.

- Application of the proposed statistical methodology appears skewed toward identification of mitigative controls versus preventive controls. This is due to the fact that the statistical methodology places emphasis on how to minimize the quantitative radiological consequences of an event without first focusing on how the event can be prevented.