DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004
(202) 208-6400

March 13, 1996

The Honorable Thomas P. Grumbly
Acting Under Secretary
Department of Energy
Washington, DC 20585-0113

Dear Mr. Grumbly:

Your letter of December 29, 1995, stated that the Integrated Program Plan for Recommendation 94-3 was in preparation and would be forwarded to the Defense Nuclear Facilities Safety Board (Board). The Board understands, from your staff, that the Department of Energy (DOE) is in the process of deciding whether DOE will continue to use Building 371 or whether a new facility will be constructed to provide interim storage of special nuclear material (SNM) at the Rocky Flats Environmental Technology Site (RFETS). In the meantime, Building 371 will continue to operate.

The fundamental tenet of Recommendation 94-3 was to ensure adequate safe storage of SNM at RFETS. To achieve this principle, DOE has taken a uniquely focused approach to implementing this recommendation by determining that Building 371, including the structures, systems, and components (SSC), could be made capable of satisfying the interim storage mission and then assessing its possible use for long-term operation. Since the interim storage mission could last for more than five years, and improvements to existing storage capabilities are needed, we believe that it is important to begin promptly the building upgrades related to nuclear safety.

The Board understands that the required building upgrades are influenced by several technical factors in this graded approach application. These factors were discussed in Recommendation 94-3 and include the use or mission of the facility, the period of time until decommissioning of the facility, and the systems engineering considerations of the facility operation. It is recognized that upgrade requirements may differ from those needed for long term use, if only an interim use is to be decided on.

The Board has enclosed some observations pertaining to technical issues of Recommendation 94-3 that are unresolved and requests that DOE consider them in preparing the program plan and schedule for upgrading Building 371. If you have any questions on this subject, I would be pleased to discuss them with you. Furthermore, our staff is prepared to work with you and your staff to provide detailed clarification regarding resolution of any technical issues that might occur during preparation of the program plan for upgrading Building 371. We look forward to receiving the program plan for upgrading Building 371.

Sincerely,

John T. Conway
Chairman

c: Mr. Mark Whitaker
Mr. Mark Silverman

Enclosure

ENCLOSURE

Unresolved Technical Issues - Recommendation 94-3

The following comments pertain to specific unresolved subrecommendations of Recommendation 94-3:

Subrecommendation 1

The proposed mission of Building 371 is to store and manage large quantities of special nuclear material, and to process plutonium bearing solutions in the Caustic Waste Treatment System. To accomplish this mission, DOE plans to consolidate in this building all plutonium and plutonium-bearing residues from elsewhere on the site. The Board believes that a program plan for upgrading Building 371 should be prepared which: 1) considers the current mission of Building 371, planned future mission requirements, and the entire life cycle of the building including decontamination and decommissioning; 2) addresses pertinent safety requirements for storage of SNM; and 3) incorporates the commitments from Recommendation 94-1 for the stabilization and storage of plutonium residues, metals, oxides, and solutions.

Subrecommendation 2

The current mission for Building 371 is not properly reflected in the existing safety analysis documentation. The Board believes that the new safety analysis, being prepared by DOE's contractor, should be consistent with the present and anticipated mission of the building, and should contain the identification of facility hazards; required preventative/mitigative measures to protect the public, facility workers, collocated workers, the mission of the facility, and environment; and technical safety requirements. Identification of facility hazards should be performed using a process hazards assessment methodology. This analysis needs to be linked to the ongoing development of an Authorization Basis for the facility.

Subrecommendation 3

The Board considers that the standards used to evaluate the viability of the building are appropriate for use to determine the upgrade requirements for Building 371. These standards include American Concrete Institute (ACI) Standard 349, American Institute Steel Construction (AISC) N690, American Society of Civil Engineers (ASCE) Standard 4-86, for the building, and the use of the Seismic Qualification Utilities Group (SQUG) Generic Implementation Procedure (GIP) methodology for the mechanical and electrical components, and distribution systems. The structural analysis methodology used in assessing the viability of the structures, systems and components of Building 371 is acceptable to the Board and should be used as the basis for preparation of an analysis of record for upgrading Building 371. For mechanical and electrical components and distribution systems, applicable design and construction standards should be used.

ENCLOSURE

Subrecommendation 4, 5, and 6

Subrecommendations 4, 5, and 6 recommended that: 1) DOE use both deterministic and probabilistic methods to establish the vibratory ground motion criteria and a rationale for reconciling differences between the two methods; 2) a hazard classification be selected supported by rational technical analysis; and 3) DOE develop a safety system classification methodology consistent with the mission, life and importance of Building 371. It was anticipated that DOE would prepare an integrated program plan linking solutions to all of the above technical issues with a comprehensive integrated methodology.

Although DOE and its contractor have not, as yet, formally submitted such a response, the Board believes that certain technical approaches used in the assessment of the viability of Building 371, when considered in the aggregate, are appropriate for use in developing criteria for upgrading Building 371.

Specifically:

1. The Board considers that the Evaluation Basis Earthquake (EBE) (characterized by a 0.25g PGA at the ground surface), used as input to the process to assess compliance with the provisions of the American Concrete Institute (ACI) Standard 349-85, is appropriate as the design basis earthquake. This EBE sufficiently challenges the integrity of the structure whose primary mission will be SNM storage.

2. The Board believes that it is appropriate to consider the inherent global ductility of the structure, as technically demonstrated in the pushover analysis, together with the in-situ strength properties of concrete in the preparation of an analysis of record for Building 371. Furthermore, the use of a Collapse Prevention Earthquake (CPE) (approximated by a 0.54g PGA at the ground surface) to demonstrate that the structure can maintain its integrity when subjected to a beyond design basis event is appropriate to show that the building possesses a reasonable margin of safety. Loss of building confinement may occur under this unlikely event; however, storage of SNM in suitably robust containers would preclude release of SNM and thus provide a confinement barrier.

3. The Board believes that the approach to safety classification, developed during the first phase of the implementation of Recommendation 94-3, appears to be a reasonable basis for proceeding with the selection of the safety systems for Building 371. The applicability of the safety systems identified in building viability study should be confirmed by the new safety analysis.