DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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August 24, 2004

Mr. Paul M. Golan
Acting Assistant Secretary for
Environmental Management
U.S. Department of Energy
1000 Independence Avenue, S W
Washington, DC 20585-0113

Dear Mr. Golan:

The Defense Nuclear Facilities Safety Board (Board) has received your letter of August 3, 2004, forwarding a report entitled *Office of River Protection, Waste Treatment Plant (WTP) Low Activity Waste (LAW) Facility—Independent Structural Design Peer Review.* This report was one of three requested by the Board during a May 22–23, 2002, review, as reiterated in its letter of November 14, 2002.

The Board has completed its initial review of the report and concluded that it satisfies the requirements of the original request. The Board is pleased with the effort of the Office of River Protection Peer Review Team, a team of structural experts empaneled by the project to review the structural design of the WTP buildings. The Board believes the team's involvement and rigorous review have resulted in significant design improvements to the LAW building. Given that this summary structural report is envisioned as providing a historical basis for design, the Board believes it should be updated to reflect resolution of the Peer Review Team's comments after they have reviewed the completed building design.

Since the Board made its original request for these summary structural reports, significant effort has been expended on reviewing and resolving issues regarding the design adequacy of the High-Level Waste Facility structure. The layout of the building is highly complex, which makes the design challenging and underscores the need for the summary structural report for this facility to describe the structure's behavior to validate overall design adequacy. Several significant issues remain to be resolved to facilitate completion of the report and confirm that the building is adequately designed. These issues are described in the enclosure to this letter. The Board believes these issues are sufficiently significant that they could result in

the need to modify the building design. Given the close-coupled design and construction process being employed by the project and the fact that the building basemat and most of the walls to grade have already been constructed, these issues need to be resolved as expeditiously as practicable.

Sincerely,

John T. Conway
Chairman

c: Mr. Mark B. Whitaker, Jr.
Mr. Roy J. Schepens

Enclosure

ENCLOSURE

Waste Treatment Plant High-Level Waste Facility: Issues Unresolved in Summary Structural Report

- **Effect of Finite Element Mesh Size on Wall and Slab Design.** Force and moment analysis results are used directly by the project to select reinforcing steel areas. Given the complexity of the building wall and slab arrangement, the finite element spacing used in analyzing the building may not be sufficiently refined to produce analysis results representative of actual behavior. The result could be failure to provide sufficient reinforcing steel to safely resist the applied loads.

- **Redistribution of Loads Associated with Concrete Cracking.** Given the unique arrangement of walls used to resist east-west seismic load, the stiffness reduction and resulting load redistribution associated with concrete cracking may be significant. The project needs to determine whether this phenomenon is significant enough to warrant inclusion in the building analysis.

- **Determination of the Potential Impact of Ground Motion Attenuation.** This issue is outlined in the Defense Nuclear Facilities Safety Board's letter of July 29, 2004.

- **Description of East-West Load Distribution Mechanisms.** Based on analysis results, a significant percentage of the inertial load in the east-west direction is resisted by building elements that are somewhat removed from the origin of the load. Load transfer occurs through the connecting floor slabs. An explanation, on the basis of relative stiffness of the affected building elements, needs to be provided to confirm the computational results.