DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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March 22, 2002

The Honorable Jessie Hill Roberson
Assistant Secretary for Environmental Management
Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0113

Dear Ms. Roberson:

The Department of Energy's (DOE) Implementation Plan for the Defense Nuclear Facilities Safety Board's (Board) Recommendation 2001-1, *High Level Waste Management at the Savannah River Site*, calls for a revision to the high-level waste tank inspection program (Commitment 1.3). The primary purpose of the inspection program is to ensure tank integrity. Because of the hazards of high-level waste, it is imperative that double-shell tanks be maintained structurally sound and leak-free throughout their service lives. However, tank integrity can be degraded in time by corrosion of the tank walls. Currently, controls used to mitigate corrosion of the tank walls include chemistry controls of the liquid phase and ventilation of the annulus vapor space.

The Board is pleased to note that the contractors at both the Hanford Site and the Savannah River Site (SRS) have, with only a few exceptions, maintained chemistry controls that have minimized the corrosion of the tank wall below the surface of the waste. However, a recent review by the Board's staff indicates a potential for accelerated corrosion in the vapor space region of the tanks despite controlling the chemistry of the waste.

At Hanford, evidence of vapor-phase corrosion was detected by ultrasonic testing of tanks AN-105 and AY-101. The testing found approximately 20 percent wall thinning in isolated sections of the tank walls. This finding was attributed to repeated wetting by liquid waste and/or water condensation on tank walls in the vapor space region. In addition, visual inspections of the interior of tanks AP-107 and AP-104 showed shallow pitting on the walls in the vapor space region.

At SRS, the existence of vapor-phase corrosion is documented by coupon tests performed in tank 50. There is evidence that indicates that the recent leaks in the old-style tanks 5 and 6 may have been a result of vapor-phase corrosion. Additionally, the continued growth of the apparent stress corrosion crack found in tank 15 is occurring in the vapor-phase region.

The Board believes there is evidence of vapor-phase corrosion in double-shell tanks despite the existing waste chemistry controls. However, the evidence is not conclusive, and the phenomenon is not well understood. Understanding the phenomenon is necessary to ensure

adequate controls. The Board is aware that DOE is holding a vapor-phase corrosion workshop on March 26–27, 2002. The Board encourages DOE to maintain a high priority for this important concern. The Board would also like to be briefed by DOE on the findings from this workshop.

Sincerely,

John T. Conway
Chairman

c: Mr. Mark B. Whitaker, Jr.