John T. Conway, Chairman
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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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February 13, 2004

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

Dear Ms. Roberson:

The Defense Nuclear Facilities Safety Board (Board) received a letter from the Department of Energy (DOE) in response to the Board's letter of July 10, 2003, concerning the electrical and lightning protection systems for the K-Area Material Storage Facility, FB-Line, and Building 235-F at the Savannah River Site (SRS). The issues noted by the Board were also identified in the Board's Report to Congress dated December 1, 2003, concerning plutonium storage at SRS.

The Board has reviewed DOE's letter from the Chief Operating Officer, Office of Environmental Management, dated January 5, 2004, and finds that this response generally addresses the issues raised in the Board's July letter. However, several items in the DOE response require further clarification and consideration. Specific comments are provided in the enclosure to this letter. The Board is providing these comments now so that they may be addressed and resolved as DOE develops the corrective actions to be taken in response to the Board's Report to Congress.

Resolution of these comments does not reduce the need for DOE to expedite a decision on disposal of excess plutonium or to determine if there are better options (such as a new plutonium storage facility) for extended storage of plutonium at SRS.

Sincerely,

John T. Conway
Chairman

c: Mr. Jeffrey M. Allison
Mr. Mark B. Whitaker, Jr.

Enclosure

ENCLOSURE

The Defense Nuclear Facilities Safety Board's
Detailed Comments on Department of Energy's Letter of January 5, 2004

1. The current lightning protection system in Building 235-F (235-F) does not comply with National Fire Protection Association Standard 780, *Standard for the Installation of Lightning Protection Systems*. Department of Energy (DOE) responds that it will review the results of a new Fire Hazards Analysis (FHA) currently in preparation to determine what action is required for the lightning protection system. The need for a viable lightning protection system must be based on more than the FHA. The Documented Safety Analysis and hazards analysis must also be considered. Additionally, a lightning-induced fire in non-safety-related electrical cables is undesirable and could lead to a fire that could be a safety concern.

2. The majority of electrical cables in 235-F are approximately 50 years old and have exceeded their estimated design life. DOE responds that monitoring of the electrical cables in other facilities of similar age at Savannah River Site has not shown a pattern of cable degradation. DOE notes that a large portion of the electrical cable was replaced in the 1980s during replacement of a portion of the ventilation system. DOE plans to perform a megger test of a sample of the remaining electrical cables and to conduct routine thermography testing on electrical equipment in the facility.

   While a large portion of electrical cable for the ventilation system was replaced, this is not the case for electrical cable for other safety systems. Furthermore, the electrical cable for the ventilation system is now more than 20 years old and will exceed its estimated design life before the facility has been decommissioned. A viable preventive maintenance test to monitor the condition of electrical cable is essential to ensure continued reliability of the electrical systems. The proposed megger test and thermography test do not adequately monitor for damaged and deteriorating cables. A time-domain reflectivity test, such as that in the Electronic Characterization and Diagnostics system, is needed to monitor the condition of the electrical cables.

3. The electrical distribution system in 235-F was installed in accordance with the 1957 version of the National Electrical Code (NEC). An assessment of the existing electrical systems against current code requirements could help identify potential fire hazards and reveal latent system vulnerabilities. DOE responds that site standards require that the specifications listed in the code of record govern the design associated with existing facilities. DOE also notes that the NEC does not have a requirement to assess existing equipment against the current NEC or to update equipment.

   Building 235-F and K-Area Material Storage (KAMS) are being given a new, extended-term storage mission that could continue more than 20 years. An NEC-qualified inspector specifically trained to evaluate older systems may have insight into safety vulnerabilities that would not be apparent to facility engineers, even though they are familiar with the code

requirements. The result of such an inspection could be used to help enhance the reliability of the electrical systems in 235-F.

4. The short-circuit analysis for KAMS is based on the short-circuit currents from the original electrical calculations for K-Reactor. These currents do not reflect the existing electrical equipment configuration. DOE responds that a new analysis is being completed for the 480-volt systems.

   The new short-circuit analysis should encompass an evaluation of the 120-volt systems up to the distribution panels. These systems include the majority of the electrical equipment in the working areas. Additionally, these panels have historically been responsible for the majority of failures because of their inability to handle short-circuits.