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**The Under Secretary of Energy**  
Washington, DC 20585

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DNF SAFETY BOARD

July 21, 1998

The Honorable John T. Conway  
Chairman  
Defense Nuclear Facilities Safety Board  
625 Indiana Avenue, NW, Suite 700  
Washington, D.C. 20004

Dear Mr. Chairman:

This is in response to your February 25, 1998, letter. We are enclosing our corrective actions to the Defense Nuclear Facilities Safety Board onsite review of the Hanford Spent Nuclear Fuel Project.

If you have further questions, please contact me or have a member of your staff contact Brad Nelson at (301) 903-4393.

Sincerely,

Ernest J. Moniz

Enclosure

**Responses to DNFSB Staff Observations During a December 9 -11 1997, Visit to the Hanford Spent Nuclear Fuel Project**

**Battery Room Hydrogen Explosion Hazard.**

The Board's staff noted that the existing battery rooms at the K-Basins (East and West) do not comply with the codes and standards (ANSI C2, NFPA-70, and IEEE-450) applicable to battery room ventilation systems. Specifically, these rooms do not have a detection system to alarm upon the loss of the powered exhaust system that prevents hydrogen accumulation generated by the batteries. Instead, the operations staff procedurally checks the operation of the battery room exhaust fans on a monthly basis. The Board's staff evaluated one of the battery rooms and observed that the exhaust fan motor was running, but the belt was broken, resulting in the loss of flow from this room, and noted that an explosion could result if the concentration of accumulated hydrogen were to exceed the lower flammability limit (4 percent) and come in contact with an electrical spark from the batteries' interconnecting cables and connections.

**Response:** Immediate action was taken to replace the belt and restore the fan/motor assembly to operable status. Calculation of the hydrogen production rate and analysis of air exchange due to natural ventilation indicates that natural ventilation will prevent the hydrogen concentration from reaching 25 percent of the lower explosive limit. However, as of June 15, 1998, the K-Basins have installed a low-flow annunciator in each active battery room. Fan operation will be checked daily (Monday through Friday) by Power Operators. The battery in the K-West inactive battery room has been removed; planning is under way to remove the battery in the inactive K-East battery room.

**Procurement of Safety-Class Components.**

The Board's staff believes procurement of safety-class components is not being aggressively pursued for the Cold Vacuum Drying (CVD) Facility.

**Response:** Approximately 110 procurement request packages for the 130 or so safety-class components have already gone out for bid and the remainder are in progress. The Department minimizes expensive rework by procuring equipment after the design is complete, but initiates the procurement process for long lead items to ensure that a path forward has been identified. The Department has been pursuing completion of the design and safety basis of the CVD Facility, which would finalize the number and type of components which need to be designated as safety-class.

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### **Failure of Distribution Transformers.**

Two transformers (one in K-West Basin on November 27, 1997, and one in the Canister Storage Building on January 2, 1998) out of six purchased in the late 1980s from ELMA, a transformer manufacturer in California, failed after being put in service in 1996. The Board's staff believes that the SNFP is currently utilizing other transformers manufactured by ELMA. The Board suggested that the Department investigate the failures in accordance with DOE Order 5484.1.

**Response:** A review of the manufacturer's records indicated that the failed units were part of an order of six transformers procured by the Hanford Site. Five transformers were placed in service, two failed. The sixth transformer is in storage and will be excessed. None of the transformers is in a safety class function. There is no public or worker health hazard associated with a loss of power supply units at the K-Basins and the Canister Storage Building. The incidents were investigated using the occurrence reporting process as provided in DOE Orders 225.1A, Contractor Performance-Based Business Management Process and 232.1, Occurrence Reporting and Processing of Operations Information, which replaced the operative requirements of DOE Order 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements. Investigation of the failed transformer at K-West Basin identified inadequate manufacturing quality leading to winding failure as the root cause, with improper storage being a contributing cause. A second failed transformer had supplied power to contractor trailers and area lighting; it has been replaced with one from a different manufacturer.

If the ELMA transformer at K-East fails, Site Utilities is prepared to install a new one within 72 hours. On January 12, 1998, the in-service transformers were field inspected and infrared tested to check their conditions and identify any indications of pending failures. Although some small insulation cracks were observed on the central windings, infrared testing failed to identify any unusual overheating conditions.

For the DOE complex, DOE's Quality Assurance Working Group will publish a lessons-learned notice describing the transformers and the circumstances of their failures. Most sites have reported that they have no transformers of this type manufactured by this vendor.

**Calibrations of Protective Devices.**

To reduce the possibility that electric protective devices will fail, they should be maintained and calibrated at recommended intervals. During a tour of the switchgear room of K-West Basin, the Board's staff observed that the calibration date on many of the protective devices had expired. The site should perform the calibration tests on the expired relays and bring them to within allowable limits.

**Response:** All active protective devices located in the switchgear room have been calibrated. Calibration stickers were removed from protective devices that are no longer in service. In-addition, Duke Engineering Services Hanford is developing an action plan to upgrade the existing calibration program. This action plan will address the identification of instruments requiring calibration, calibration of these instruments, installation of appropriate calibration stickers, and a schedule for implementation. The plan is scheduled for implementation by July 1, 1998, at the K-Basins and by October 1, 1998, in the out-buildings.