DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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May 31, 2005

The Honorable Linton Brooks
Administrator
National Nuclear Security Administration
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0701

Dear Ambassador Brooks:

The Defense Nuclear Facilities Safety Board (Board) issued Recommendation 2004-2, *Active Confinement Systems*, on December 7, 2004, and the Department of Energy (DOE) accepted the Recommendation on March 18, 2005. The Board recommended that defense nuclear facilities not rely on passive confinement of hazardous materials released in a potential accident because this approach could result in the release of an undeterminable amount of radioactive materials with consequences that could approach those of the unmitigated scenarios, and would fail to account for post accident remediation activities such as monitoring and response. The Board recommended that active confinement systems be identified for Hazard Category 2 and 3 defense nuclear facilities, and classified in accordance with requirements of the relevant DOE directives. In the same Recommendation, the Board encouraged DOE to consider taking action to ensure that an active confinement strategy is implemented at priority defense nuclear facilities in parallel with the development of the Implementation Plan for the Recommendation. The Plutonium Facility (PF-4) at Technical Area 55 of Los Alamos National Laboratory (LANL) exemplifies facilities needing an alternative to passive confinement during an accident.

PF-4 is a high-hazard facility with a long expected operating life. Several postulated accident scenarios for PF-4 have unmitigated consequences that exceed the 25 rem off-site evaluation guideline and therefore require safety-class controls. The current safety basis for PF-4 credits a passive confinement strategy as a safety-class mitigative control to address these scenarios. The Board previously questioned the capability of passive confinement strategies to adequately limit potential releases from PF-4, and now considers, consistent with Recommendation 2004-2, that an active confinement ventilation system is a preferable safety-class control.

In response to the Board's concerns, LANL analysts performed a comprehensive set of air-flow calculations to estimate potential releases from PF-4 under accident conditions both with and without active ventilation. The results of these analyses indicate that, even under advantageous assumptions, the passive confinement approach is not capable of providing

sufficient protection and is thus inadequate as a safety-class control. The results also indicate that, absent unobstructed wind flow through the main PF-4 corridors, the active confinement ventilation system is capable of providing adequate protection and would nominally limit facility releases to several orders of magnitude below the best estimates for passive confinement. Some modifications may be necessary to prevent unobstructed wind flow; however, these appear practicable given the current facility configuration.

To address the identified weaknesses with the current passive confinement strategy, the National Nuclear Security Administration (NNSA) has approved and LANL has implemented a set of compensatory measures. These measures comprise primarily process-specific design features and administrative controls focused on minimizing the likelihood of accident initiation and limiting material-at-risk. Though this disparate collection of controls provides sufficient protection to justify continuation of operations in the near term, their overall reliability does not appear sufficient to justify their use over the longer term for a safety-class protective function.

The need for a viable safety-class control strategy to support long term PF-4 operations is clear. Given the potential performance capability of the existing active confinement ventilation system, upgrading this system appears to be the most appropriate option. The Board recognizes that the requirements for an upgrade to safety-class service need to be established for proper qualification of this system, and believes that this can be done in a reasonable manner through application of the *Safety System Design Adequacy* standard prepared by the Energy Facility Contractors Group. At the direction of NNSA, LANL has already commenced an analysis of the active confinement ventilation system in PF-4 to assess the potential viability of this system to serve a safety-class function.

Therefore, pursuant to 42 U.S.C. § 2286b(d), the Board requests a report within 60 days of receipt of this letter that outlines NNSA's plan and schedule for implementation of an effective safety-class system that would protect the public from the unmitigated consequences of a potential event at LANL's plutonium facility.

Sincerely,

A. J. Eggenberger
Acting Chairman

c: Mr. Edwin L. Wilmot
Mr. Thomas P. D'Agostino
Mr. Mark B. Whitaker, Jr.