DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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July 19, 2020

The Honorable Everet H. Beckner
Deputy Administrator for Defense Programs
National Nuclear Security Administration
U. S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0104

Dear Dr. Beckner:

In its December 7, 1999, letter to the Acting Assistant Secretary for Defense Programs, the Defense Nuclear Facilities Safety Board (Board) identified several areas of weakness in the preliminary design of the Tritium Extraction Facility (TEF). That letter noted that the primary confinement system for TEF, consisting of nitrogen-filled gloveboxes, modules, and double-walled piping, was designed to Performance Category 2 requirements. Thus, these systems are not designed to confine the hazardous materials during a design basis seismic event. Worker protection was to be provided through training the operators to evacuate the building immediately after an earthquake. However, since the interior walls of the facility are not designed to maintain their geometry after a seismic event, safe worker egress cannot be assured due to the possibility for door binding. The potential consequences of being trapped in a processing room include exposure to significant radiological hazards from tritium and potential asphyxiation by nitrogen. Recently, TEF project personnel performed additional analysis that showed the radiological dose to a worker trapped in a process room following a seismic event would be in excess of 100 rem.

In a December 23, 1999, letter, the Board concurred with the adequacy of the seismic design of this facility, predicated on the implementation of additional design features to resolve the safety issues raised in the December 7, 1999, letter. The Board's staff has been working with your staff during the past three years to explore effective and adequate design features aimed at protecting workers from the potential consequences of an earthquake. One proposed design feature is a seismic detection and alarm system that would provide an advance warning of up to 20 seconds to allow the workers to evacuate before the arrival of the damaging segments of an earthquake's waves (S and Rayleigh). The design contractor has proposed to install such a system at the Replacement Tritium Facility to verify its effectiveness. However, it is not yet included in the final design of TEF, and its installation at TEF is contingent upon successful

testing at Replacement Tritium Facility. The Board is concerned that if the seismic alarm is determined to be ineffective and therefore is not installed at TEF, no other safety design features have been proposed to address worker safety during and following a seismic event.

Therefore, pursuant to 42 U.S.C. § 2286b(d), the Board requests a report within 60 days of the date of this letter that describes the seismic detection and alarm system test program and identifies the safety design feature that will be incorporated in the event that the seismic detection and alarm system proves impractical or ineffective.

Sincerely,

John T. Conway
Chairman

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