

# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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October 26, 2009

The Honorable Steven Chu  
Secretary of Energy  
U. S. Department of Energy  
1000 Independence Avenue, SW  
Washington, DC 20585-1000

Dear Secretary Chu:

On October 26, 2009, the Defense Nuclear Facilities Safety Board (Board), in accordance with 42 U.S.C. § 2286a(a)(5), unanimously approved Recommendation 2009-2, *Los Alamos National Laboratory Plutonium Facility Seismic Safety*, which is enclosed for your consideration. This Recommendation identifies the need to execute both immediate and long-term actions that can reduce the risk posed by a seismic event at the Plutonium Facility at Los Alamos National Laboratory.

After you have received this Recommendation and as required by 42 U.S.C. § 2286d(a), the Board will promptly make it available to the public. The Board believes that this Recommendation contains no information that is classified or otherwise restricted. To the extent that this Recommendation does not include information restricted by the Department of Energy (DOE) under the Atomic Energy Act of 1954, 42 U.S.C. § § 2161-2168, as amended, please arrange to have it placed promptly on file in your regional public reading rooms. The Board will also publish this Recommendation in the *Federal Register*.

The Board will evaluate DOE's response to this Recommendation in accordance with the Board's Policy Statement 1, *Criteria for Judging the Adequacy of DOE Responses and Implementation Plans for DNFSB Recommendations*.

Sincerely,

A handwritten signature in black ink, appearing to read "John E. Mansfield", is written over a faint, larger version of the same signature.

John E. Mansfield, Ph.D.  
Vice Chairman

Enclosure

c: The Honorable Thomas P. D'Agostino  
Mr. Donald L. Winchell, Jr.  
Mr. Mark B. Whitaker, Jr.

**RECOMMENDATION 2009-2 TO THE SECRETARY OF ENERGY**  
***Los Alamos National Laboratory Plutonium Facility Seismic Safety***  
**Pursuant to 42 U.S.C. § 2286a(a)(5)**  
**Atomic Energy Act of 1954, As Amended**

Dated: October 26, 2009

**Background**

The Defense Nuclear Facilities Safety Board (Board) is concerned about the potential consequences of seismic events at Los Alamos National Laboratory's (LANL) Plutonium Facility and the adequacy of the safety strategy currently being pursued to address these events. In particular, the mitigated offsite consequences predicated on a seismically induced large fire at this operating nuclear facility exceed the Department of Energy's (DOE) Evaluation Guideline by more than two orders of magnitude. The Board believes this situation warrants immediate attention and action.

The Plutonium Facility has operated for more than a decade with a 1996 Final Safety Analysis Report as its safety basis. DOE issued Title 10, Code of Federal Regulations, Part 830, *Nuclear Safety Management*, in January 2001, requiring contractors for all its existing facilities to submit a Documented Safety Analysis (DSA). Ultimately, a DSA for the Plutonium Facility was submitted by LANL and approved by the National Nuclear Security Administration's (NNSA) Los Alamos Site Office (LASO) through a Safety Evaluation Report (SER) in December 2008. The DSA identifies an array of planned future upgrades to improve the safety posture of the facility. However, both the DSA and SER rely inappropriately on planned seismic upgrades to safety systems that (1) will not be implemented for many years and (2) are not sufficient to address adequately the bounding seismic accident scenarios. The only safety feature that can be credited for these accident scenarios is the passive confinement provided by the facility structure. Additionally, appropriate compensatory measures to protect public and worker health and safety have not been identified. As a result, a major deficiency in the facility's safety basis exists.

The safety strategy approved by LASO is based on the assumption that future upgrades to reinforce the support stands for a limited set of "high-risk" gloveboxes (including those containing ignition sources, such as furnaces) will prevent a large fire from occurring after a seismic event. While planned seismic upgrades to high-risk gloveboxes will provide some safety benefit in the future, the Board believes the critical NNSA assumption that these upgrades are adequate is flawed and, as a result, the current safety strategy is not defensible for the following reasons. Not all ignition sources inside high-risk gloveboxes are seismically secured to the glovebox shell; therefore, fires could still result from ignition sources toppling inside gloveboxes during a seismic event, even if the gloveboxes themselves do not topple. Additionally, ignition sources that could initiate post-seismic fires exist outside of gloveboxes targeted for seismic upgrades. DOE must take steps to develop a defensible seismic safety strategy for the Plutonium Facility.

Near-term actions and compensatory measures to reduce significantly the consequences of seismically induced events will likely involve operating the facility with restrictions on material-at-risk, removing inventory from susceptible locations or storing material in robust containers, and reducing the likelihood of a fire following a seismic event by identifying and implementing appropriate safety measures. Consistent with the Board's Recommendation 2004-2, *Active Confinement Systems*, one long-term strategy that could provide effective mitigation for seismic events involves upgrading the facility's confinement ventilation system to meet seismic performance category 3 criteria. This strategy would allow the confinement ventilation system to reduce reliably the consequences of a seismically induced event by many orders of magnitude to acceptably low values.

In a letter to the Board dated June 16, 2009, the NNSA Administrator rejected the implementation of some upgrades identified to address performance gaps uncovered during execution of the Implementation Plan for Recommendation 2004-2 for the Plutonium Facility's confinement ventilation system on the grounds that these upgrades were not required under the current DSA/SER strategy. LASO's present position is that upgrades to ensure post-seismic operability for active confinement ventilation may be desirable, but LASO does not expect to develop the information necessary to make a decision (e.g., cost, scope, and mitigation benefits) until mid-fiscal year 2011. The Board believes that NNSA's current safety strategy is flawed and does not obviate the need for a seismically qualified safety class active confinement ventilation system at its Plutonium Facility.

Given the magnitude of the potential consequences to the public, the Board believes DOE must develop expeditiously a defensible safety strategy for seismically induced events at the Plutonium Facility and a credible plan for implementing this strategy. *DOE's response must include definite, measurable, and immediate means to substantially reduce the potential consequences at the site boundary.* Implementation of a sound safety strategy must be pursued on an urgent basis.

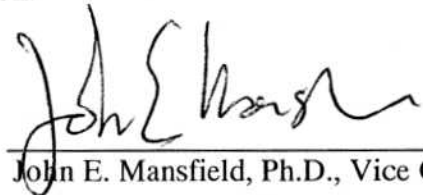
## **Recommendation**

In this context, and in recognition of the fact that LANL's Plutonium Facility has been designated as the center for plutonium operations in the complex, which includes the manufacture of pits for weapon assemblies, the Board recommends that DOE:

1. Implement near-term actions and compensatory measures to reduce significantly the consequences of seismically induced events, including clear identification of consequence reduction targets/goals, schedule, and implementation methods. In planning for and completing these actions and compensatory measures, DOE should be guided by the need for immediate actions and mindful of the provisions of 42 U.S.C. § 2286d(f)(1) regarding implementation timelines.

2. Develop and implement an acceptable safety strategy for seismically induced events that includes the following elements:
  - a. A technically justifiable decision logic and criteria for evaluating and selecting safety-class structures, systems, and components that can effectively prevent or mitigate the consequences of seismic events to acceptably low values.
  - b. The seismic analysis approach for structures, systems, and components required to implement the seismic safety strategy.
  - c. A prioritized plan and schedule, including quarterly briefs to the Board for the next 12 months, for seismic analyses, necessary upgrades, and other actions to implement the seismic safety strategy.

The severity of the problems that are the subject of this Recommendation and the urgency to remediate them argue forcefully for the Secretary to avail himself of the authority under the Atomic Energy Act (U.S.C. § 2286d(e)) to “implement any such recommendation (or part of any such recommendation) before, on, or after the date on which the Secretary transmits the implementation plan to the Board under this subsection.”



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John E. Mansfield, Ph.D., Vice Chairman