

A.J. Eggenberger, Chairman  
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# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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September 7, 2006

The Honorable James A. Rispoli  
Assistant Secretary for Environmental Management  
U.S. Department of Energy  
1000 Independence Avenue, SW  
Washington, DC 20585-0113

Dear Mr. Rispoli:

The Defense Nuclear Facilities Safety Board (Board) received a letter from the Department of Energy's Office of River Protection (DOE-ORP) dated June 28, 2006, regarding the ability of the design of the facilities at the Waste Treatment and Immobilization Plant (WTP) to withstand potential earthquakes. The letter requested that the Board acknowledge that issuance of the WTP Structural Design Criteria, Revision 10, warranted closure of the ground motion criteria and structural engineering issues raised by the Board.

In its October 17, 2005, letter to the Secretary of Energy, the Board stated that the interim criteria (now referred to in WTP design documentation as the Revised Ground Motion [RGM] criteria) provide a reasonably conservative basis for validating the existing design and construction of the plant. This conclusion was based on a detailed technical review of the material provided in a report prepared by Pacific Northwest National Laboratory, *Site-Specific Seismic Site Response Model for the Waste Treatment Plant, Hanford, Washington* (PNNL-15089, February 2005). This report provided ground motion estimates considering a wide range of soil and rock properties under the WTP site, including an assessment of ground motion uncertainties. As noted in the PNNL report, these ground motion uncertainties are significant. The Board's conclusion that the RGM criteria provide a reasonably conservative basis for validating the design was predicated on a conservative selection of soil and rock properties to address those recognized uncertainties. The Board's conclusion was consistent with DOE's decision to endorse the revised ground motion spectra.

It is important to recognize that design basis ground motions based on a probabilistic seismic hazard analysis (PSHA), consistent with DOE standards, must explicitly address legitimate differences of scientific opinion on many of the key inputs, such as seismic sources, rates of earthquake occurrence, and ground motion models. These legitimate differences of scientific opinion translate into important uncertainties in the numerical PSHA results. This inevitable fact, recognized by DOE in the 1996 PSHA for the Hanford Site, remains true today, and is one key reason that the RGM criteria were conservatively defined. A substantial further increase in the ground motion at WTP (recognizing that the RGM currently is up to 38 percent

larger than that previously assumed) would imply that ground motions for Hanford approach those associated with higher seismic hazard environments, such as California. Given current PSHA information and geology of the Hanford Site, such a conclusion should be strongly challenged.

The Board reiterates its belief that the RGM criteria provide a reasonably conservative basis for validating the design of WTP and believes that the RGM criteria should be used to complete the design.

The current project Structural Design Criteria, Revision 11, provide requirements and guidance that address the structural issues raised by the Board. However, the details of the application of the Structural Design Criteria in the structural analysis and the structure's predicted response to the RGM are still being developed by the contractor. Thus the Board has not reviewed these details, but will do so as soon as they are available. The details and results of these structural analyses should also be provided in updates to the Summary Structural Reports for the High Level Waste and Pretreatment facilities. The Board expects that its review of this information should be reasonably straightforward. The structural engineering issues raised by the Board will remain open until DOE-ORP submits the Summary Structural Reports and the Board can evaluate their adequacy.

Sincerely,



A. J. Eggenberger  
Chairman

c: Mr. Roy Schepens  
Mr. Mark B. Whitaker, Jr.