

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

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In the Matter of  
Nuclear Management Company, LLC                      Docket No. 50-255  
Palisades Nuclear Power Station  
Regarding Renewal of Facility Operating  
License No. DPR-20 for an Additional 20  
Year Period

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**DECLARATION OF Dr. Ross Landsman,  
Retired U.S. Nuclear Regulatory Commission  
Nuclear Safety Engineer and Palisades Dry Cask Storage Inspector**

Under the penalty of perjury, I, Ross Landsman, declare that the following statements are true and correct to the best of my knowledge and belief:

1. My name is Ross Landsman. I am a retired U.S. Nuclear Regulatory Commission Region III Nuclear Safety Engineer and Palisades Dry Cask Storage Inspector. I live at 9234 North Lowell, Skokie, Illinois.
2. NRC Region III, where I formerly worked before recently retiring, has requested assistance from NRC Headquarters division of Nuclear Reactor Regulation (NRR), in coordination with the division of Nuclear Materials Safety and Safeguards (NMSS) Spent (sic) Fuel Project Office (SFPO), in order to resolve questions involving the licensing basis for the Palisades Nuclear Power Plant and the appropriateness of the licensing basis to the seismic design of the Palisades ISFSI [Independent Spent Fuel Storage Installation, also called "dry cask storage"].
3. On August 4, 2004, on behalf of the NRC, I completed an inspection of design and operational activities associated with the newly constructed Palisades ISFSI pad. The results of this inspection were documented in NRC Inspection Report No. 07200007/2004-002 (DNMS). As a result, I identified two issues, characterized as violations by me in the draft report but changed to unresolved items (URI) by my boss in the final report to allow Palisades to go ahead and load fuel instead of stopping them even though it was not safe. These two issues were associated with the licensee's translation of the safe shutdown earthquake (SSE) from the reactor site to the ISFSI pad (URI 072007/2004-002-1) and its assessment of the sub-surface bearing stability beneath the ISFSI pad (URI 0720007/2004-002-2). After the final report was issued, I wrote a Differing Professional Opinion (DPO) on this issue but the agency (the NRC) would not accept it based on the fact that there was no issue to disagree about since the NRC has not

made a decision on my issues yet because they changed them from violations to unresolved items. I informed them that they did make a decision and let Palisades load casks over my objections. They turned me down again because I was retiring and officially couldn't bother them any more, but the point is, the pad is not safe to hold any loaded casks.

4. During an inspection of the 2004 ISFSI installation, I reviewed the licensee's seismic calculations associated with the ISFSI pad and the irradiated fuel canisters. I determined that the licensee performed the ISFSI pad SSE calculations assuming a seismic horizontal acceleration of 0.2g in the free-field and at the ISFSI pad ground surface elevation of 623 feet. The licensee stated its understanding that the seismic horizontal acceleration value of 0.2g was approved by the NRC at the time of initial reactor plant licensing. The licensee further stated its understanding that the 0.2g horizontal acceleration value was applicable for SSE seismic calculations associated with any location and at any elevation on the plant site. I noted that the licensee performed a soil-structure interaction, seismic assessment for the ISFSI pad using the SSE seismic horizontal acceleration of 0.2g. The soil-structure interaction assessment results indicated that the irradiated fuel canisters would experience 0.25g horizontal acceleration during an SSE. The irradiated fuel canister seismic horizontal acceleration design limit is 0.25g.

5. While reviewing the licensee's calculations, I noted significant differences between the elevation and subsurface soil composition of the reactor plant and the 2004 ISFSI pad. Specifically, the reactor containment building was constructed, following the removal of the soil/sands overburden, at a ground surface elevation of 590 feet on compacted glacial till. The 2004 ISFSI pad was constructed, without the removal of the soils/sands overburden, at a ground surface elevation of 625 feet on sands that the licensee mechanically compacted. The licensee estimated that the compacted glacial till soil layer, at the location of the 2004 ISFSI pad, was at an elevation of 560 to 570 feet.

6. Based upon the subsurface soil composition and elevation differences between the reactor plant site and the 2004 ISFSI site, I determined that the licensee's application of the 0.2g horizontal acceleration value that the ISFSI site was non-conservative. Specifically, the inspectors noted that the calculated SSE seismic horizontal acceleration would likely be larger at the ISFSI compared to the reactor plant site due to the increased site elevation and the approximately 50 to 60 feet of mechanically compacted sands present on top of the compacted glacial till material at the ISFSI site. In addition, I concluded that the soil-structure interaction calculation results were non-conservative, which if revised to incorporate a larger horizontal acceleration value based on the increased ISFSI pad elevation and the soil profile differences, would likely result in a seismic horizontal acceleration value in excess of the irradiated fuel canister design limit.

7. Additionally, correspondence between the NRC and the licensee, dated December 1966, telephone call between R. Maccary (Atomic Energy Commission, AEC) and H. Wahl (Bechtel for the licensee), indicates that the NRC considered SSE to be defined as having a horizontal acceleration, at the bedrock, of 0.15g with an amplification factor of 1.25, producing a 0.2g ground acceleration. This demonstrates the NRC's understanding

of the need for, and an accounting of, an amplification of the horizontal acceleration at the bedrock during a seismic event and the resultant ground surface acceleration.

8. In addition, the NRC's Safety Evaluation for the Palisades Nuclear Power Plant, dated February 7, 1967, indicates that the NRC was aware of the presence of significant sand dunes on the plant site and that those sand dunes would be removed prior to construction. I quote from the document: "[The site] is overlain by a 100 foot sand dune which is being removed prior to construction. Bedrock is about 150 feet below the surface." This demonstrates that the NRC was aware of the licensee's intent to remove the overburden of sand dunes prior to construction of critical plant structures. Therefore, it is unlikely that the NRC accepted the concept of sand dunes being present between the bedrock and foundation of critical plant structures. Removal of the overburden would also be a reasonable basis for using the "ground surface" term to describe calculations referencing the 590 foot elevation, since no other "ground surface" elevation would have any safety or regulatory significance.

9. The NRC's documentation of the design and construction of the reactor plant makes use of the terms "ground surface" and "grade elevation" interchangeably. This may have been appropriate at the time since the overburden sands were removed down to the compacted glacial till level, elevation 590 feet, prior to plant construction.

10. The NRC's evaluation of the seismic design was performed by J.A. Blume and Associates, dated November 28, 1969, and was included as Appendix E to the March 6, 1970 NRC Safety Evaluation Report. The evaluation in the first few paragraphs acknowledges that the plant was built in an area of sand dunes. However, the evaluation also notes that the sand dunes were removed prior to the compacted glacial till level prior to construction. Since the sand dunes were removed prior to construction, it would appear that the only logical reference point for the ground acceleration would be that elevation at which the critical plant structures were to be built, i.e. 590 feet. The evaluation also indicates that the maximum potential earthquake was specified with a maximum horizontal ground acceleration of 0.2g. The wording included here would appear to indicate that the author was neither approving nor commenting on the maximum horizontal acceleration value, merely noting that the value had been prescribed.

11. The June 1966 Palisades Preliminary Safety Analysis Report states, and I quote: "...material above elevation 590 is the area covered by sand dunes [and] should be excavated (sic) to provide adequate foundation for all heavy structures. Such excavation will generally expose the glacial lake deposits which yield higher blow count figures. Foundations of important structures will not be placed on dune sand without special compaction." It should be noted that the licensee did not propose this option and the NRC did not approve the use of this option during the initial licensing of the reactor plant.

12. The June 1966 Palisades Preliminary Safety Analysis Report also states, and I quote: "Primary plant structures utilize the compact glacial deposits, the upper surface of which ranges from about elevation 575 to 590 [feet]..."

13. Revision 0 of the Final Safety Analysis Report indicated that a 0.2g surface acceleration was used for the SSE. Licensee calculations of the seismic adequacy of those structures housing safety-related components were all performed at the grade elevation of 590 feet. This was also the ground surface elevation since the overburden of sand dunes was removed prior to construction.

14. NRR and NMSS have been requested by NRC Region III to respond to each of the following questions:

- a. During initial licensing of the Palisades Nuclear Power Plant, did the NRC anchor the horizontal acceleration for seismic evaluations at the “ground surface” of the reactor building, elevation 590 feet and on top of the compacted glacial till, or the “ground surface” of the general plant site, any elevation and with any combination of soil structures intervening between the “ground surface” and the underlying bedrock?
- b. During Initial licensing of the Palisades Nuclear Power Plant, did the NRC consider that the seismic horizontal acceleration would be amplified from its value at the bedrock to the value used at the “ground” surface due to the type and thickness of the intervening soil between the bedrock and the “ground surface”?
- c. Does the NRC expect, based upon the regulations in 10CFR72.212(b)(2)(i)(B) and 10CFR72.212(b)(3), a licensee to incorporate new information and technology into its assessment of the continued appropriateness and re-application of the previous reactor plant seismic siting and design criteria for the design and construction of an ISFSI pad?
- d. Irrespective of the previous answers, should the NRC require the licensee to demonstrate that the irradiated fuel canister seismic design is appropriate, using ISFSI pad-specific seismic data, given that the calculated ISFSI horizontal acceleration is at the canister design limit without consideration of the increases expected due to the site-specific soil profile and elevation?

15. Regarding intra-NRC coordination on these questions, NRC Region III staff spoke with NRR staff and others on April 29, 2005. NRR agreed to accept this issue as a Task Interface Agreement and to respond to this request 30 days after receipt, but at least prior to the next dry cask loading campaign, because the pad is not safe to hold the irradiated fuel. The Task Force Agreement Number is 2005-06.

16. Upon request, I would be happy to identify the more than one dozen references referred to in the preparation of this declaration.

    /s/ Dr. Ross Landsman  
[Signature]

Date:     9-15-2005