December 15, 2006

Mr. Paul A. Harden
Site Vice President
Nuclear Management Company, LLC
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: PALISADES PLANT — REQUEST FOR ADDITIONAL INFORMATION RELATED TO THE PROPOSED C* LICENSE AMENDMENT REQUEST FOR STEAM GENERATOR TUBE REPAIR IN THE TUBESHEET (TAC NO. MD2125)

Dear Mr. Harden:

Your letter of May 30, 2006, submitted an application to change the Palisades Nuclear Plant (Palisades) technical specifications related to steam generator tube repair. The changes would revise the repair criteria for the portion of the tubes within the hot-leg region of the tubesheet.

We are reviewing your requests, and find that additional information is needed as shown in the enclosed request for additional information (RAI). I discussed the enclosed RAI with Ms. Amy Hazelhoff of your organization on December 13, 2006, and she agreed to respond within 60 days of receipt of this RAI. Please contact me at (301) 415-1423 if you have questions.

Sincerely,

/RA/

Mahesh L. Chawla, Project Manager
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-255

Enclosure:
RAI

cc w/encl: See next page

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Palisades Plant

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REQUEST FOR ADDITIONAL INFORMATION (RAI)

LICENSE AMENDMENT REQUEST FOR REVISED STEAM GENERATOR

REPAIR CRITERIA (C* CRITERIA)

PALISADES NUCLEAR PLANT

NUCLEAR MANAGEMENT COMPANY, LLC

DOCKET NO. 50-255

1. The proposed amendment is intended to allow tubes with flaws to remain in service if the flaws are located below a certain depth in the hot-leg region of the tubesheet. This will require proposing an alternative to the 40-percent, through-wall depth criteria in the Palisades' Technical Specifications (TSs). Please discuss your plans to revise TS 5.5.8.c as follows:

   A. Indicate there is an alternative to the 40-percent repair criteria.

   B. Define the repair criteria in the hot-leg tubesheet region (i.e., depth below which flaws may remain in service, and the starting point for the depth measurement).

   C. Define the repair criteria for the region of the hot-leg tubesheet in which neither the alternate repair criteria nor the 40-percent through-wall criteria apply (i.e., tubes with flaws within the C* distance will be plugged on detection).

   D. State that all flaws located below this depth may remain in service, regardless of size.

2. Proposed TS 5.5.8.d defines the portion of tube that must be inspected, "from 12.5 inches below the tube-to-tubesheet expansion transition inlet to the tube-to-tubesheet weld at the tube outlet . . . ." Since the C* criteria is an alternate repair criteria rather than an inspection criteria, it does not change the objective in the current TS 5.5.8.d to detect flaws from the inlet tube-to-tubesheet weld to the outlet tube-to-tubesheet weld. If the C* criteria is properly defined as an alternate repair criteria (as discussed in #1 above), then inspection below the C* distance in the hot-leg region would no longer be required because of the phrase, ". . . and that may satisfy the applicable tube repair criteria" in TS 5.5.8.d. Please discuss your plans to modify proposed TS 5.5.8.d to remove the reference to the C* distance and restore the wording approved in the Technical Specifications Task Force 449 amendment (i.e., ". . . from the tube-to-tubesheet weld at the tube inlet to the tube-to-tubesheet weld at the tube outlet, and that may satisfy. . . ."). In addition, the staff notes that the 12.5-inch C* distance is measured from the top of the tubesheeet or the bottom of the expansion transition, whichever is lower.

3. The basic premise of the C* amendment is that there is a 12.5-inch, non-flawed portion of the tube fully expanded into the tubesheet. To ensure the region remains free of flaws, an

ENCLOSURE

inspection of 100 percent of the inservice tubes in the upper region of the tubesheet will need to be performed every 24 effective full-power months, or one refueling outage interval, whichever is less. As a result, please discuss your plans to revise your proposed TS 5.5.8.d to add this inspection requirement (e.g., by adding a paragraph 5.5.8.d.4). The staff notes that if an additional paragraph 5.5.8.d.4 is added, it will need to be referenced in 5.5.8.d (i.e., "In addition to meeting the requirements of d.1, d.2, d.3, and d.4 below . . . .").

4. Please confirm that structural and leakage integrity will be assessed if significant indications are found within the inspected region of the tubesheet. The staff recognizes that the current approach of plugging flaws on detection within the C* distance should provide a high level of confidence that no potential leaking or structurally significant flaws are identified in this region. However, such an approach can not ensure it with certainty.

5. The calculation of the inspection distance for the hot-leg tubesheet region used the lower 95-percent prediction bound for the measured and projected smooth-bore, "first-slip" pullout values plotted in Figure 3 of Enclosure 4 to your May 30, 2006, letter. As discussed in the RAI responses to previous C* reviews (i.e., Section 2.1.4 in Enclosure 6 of your May 30, 2006, letter), use of the load at "first slip" assumes that the "first move" results from gripper slippage or other movement besides movement of the tube within the tubesheet. Since this assumption about the "first move" was not verified, and given that all tubes should resist pullout from the tubesheet, confirm that if the force-per-unit-length for the most limiting specimen, based on load at "first move," were used to determine the required length of expanded tubed needed to resist pullout, this length would still be less than the proposed inspection distance (12.5 inches).

   The staff notes that in Section 2.4.3 of Enclosure 6 (which addresses the first-slip criteria for smooth-bore samples), the final two paragraphs explain that even if there were no explansion residual contact pressure between a tube and tubesheet in the Palisades steam generators, a length of 6.75 inches is enough to resist the three-times normal operating differential pressure. The discussion identifies differential thermal expansion and expansion from the tube internal pressure as the sources of the resistance to tube pullout. Although this was referred to as the "most extreme case," it is not clear if the effect of tubesheet bow was included. Please discuss whether your evaluation considered the effect of tubesheet bow.

6. For the Ringhals test data, the first-slip pullout values plotted in Figure 3 of Enclosure 4 were projected from the measured, maximum-load values. Please discuss the effect on Figure 3 and your leakage analyses if a conservative bound (i.e., 95-percent prediction interval) were used to project the first-slip load values for the Ringhals data.

7. The staff notes that the page numbers listed on the cover sheets of Enclosures 2 and 3 (pages 5.5.8-11 and 5.5.8-12) do not match the page numbers on the bottom of the enclosed TS pages (pages 5.0-11 and 5.0-12). Please clarify which are the correct page numbers for these TS pages. In addition, the staff notes that proposed TS page 5.0-12 should identify the "Provisions for SG tube inspections. (continued)" as item "d" rather than item "e."

8. According to Section 2.5 of Enclosure 4, the proposed inspection distance of 12.5 inches is based on adding the 0.28-inch non-destructive examination axial-position uncertainty to the

values of “Joint Length that Meets Leakage Criteria,” (12.24 and 12.25 inches). However, since 12.25 + 0.28 = 12.53, it would be conservative to use a value of 12.6 inches rather than 12.5 inches. Please discuss your plans to modify your proposal to use 12.6 inches as the proposed distance for the alternate repair criteria (and inspection) in the hot-leg region of the tubesheet.