

June 14, 2006

10 CFR 50.12

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Palisades Nuclear Power Plant
Dockets 50-255
License No. DPR-20

Supplement to 10 CFR 50.46 and 10 CFR 50 Appendix K Exemption Request
(TAC MC8576)

By letter dated October 4, 2005, Nuclear Management Company, LLC (NMC) requested Nuclear Regulatory Commission (NRC) review and approval of a proposed exemption request, pursuant to 10 CFR 50.12, for the Palisades Nuclear Plant (PNP). NMC determined that a plant specific exemption was required to support the use of M5 fuel cladding at PNP.

On March 22, 2006, a meeting was held with the NRC Staff to discuss implementing M5 fuel cladding at PNP. The proposed exemption request to support use of M5 fuel cladding was discussed. It was determined at the meeting that supplemental information was needed on the proposed exemption request. Enclosure 1 contains the supplemental information.

Summary of Commitments

This letter contains no new commitments and no revisions to existing commitments.



Paul A. Harden
Site Vice President, Palisades Nuclear Plant
Nuclear Management Company, LLC

Enclosure (1)

cc: Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC

ENCLOSURE 1
SUPPLEMENT TO EXEMPTION REQUEST
PALISADES NUCLEAR PLANT

The applicability of the criteria in 10 CFR 50.46 to M5 cladding is addressed in Section 4.2.1, and Appendix G, of the topical report BAW-10227PA, "Evaluation of Advanced Cladding and Structural Material (M5) in PWR Reactor Fuel," Revision 1. The regulation 10 CFR 50.46 requires that loss-of-coolant accident (LOCA) calculations demonstrate that the fuel design and plant systems meet five criteria. Two of these criteria, the limit on cladding temperature and local oxidation, are potentially dependent on the specific characteristics of a given alloy. To justify that these two criteria are applicable to M5 cladding, a set of accident simulation tests were conducted comparing the performance of M5 cladding to Zircaloy-4 cladding.

The purpose of the individual criteria is:

1. Peak Cladding Temperature < 2200° F

Limits cladding embrittlement and maintains margin to zirconium/water autocatalytic reaction.

2. Local Cladding Oxidation < 17 %

Limits cladding embrittlement.

The experiments included cladding oxidation kinetics tests (potential for autocatalytic effect) and cladding embrittlement tests using cold water quench. The tests demonstrated comparable accident survival capability between Zircaloy-4 and M5. At the specified criteria, neither cladding approached an autocatalytic reaction rate, nor was either cladding shown to be susceptible to clad shattering (embrittlement effect). Both retained similar and substantial margins to undesirable results. The NRC safety evaluation for the topical report BAW-10227PA states, "These FCF tests confirm that the 2200 °F PCT and 17 percent oxidation criteria are conservative for M5 cladding in order to prevent cladding embrittlement and fragmentation during a LOCA."

The applicability of the Baker Just oxidation correlation specified in 10 CFR 50, Appendix K, for Zircaloy cladding to M5 cladding is shown in Appendix D of the topical report BAW-10227PA. The series of experiments which were performed demonstrated that the high temperature oxidation of M5 is conservatively represented by the Baker Just oxidation correlation.