

April 20, 2007

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 NUCLEAR PLANT - REQUEST FOR RELIEF FROM ASME  
BOILER AND PRESSURE VESSEL CODE, SECTION XI, SYSTEM LEAKAGE  
TEST PRIOR TO PLANT STARTUP FOLLOWING A REACTOR REFUELING  
OUTAGE, RELIEF REQUEST NO. RR 4-5 (TAC NO. MD2408)

Dear Mr. Harden:

By letter dated June 12, 2006 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML061710216), as supplemented by letter dated March 12, 2007 (ADAMS Accession No. ML070710243), Nuclear Management Company, LLC requested relief from American Society of Mechanical Engineers *Boiler and Pressure Vessel Code* (ASME Code), Section XI requirements related to the direct visual examination under the reactor vessel during the system leakage test to be conducted in accordance with IWB-5220 at Palisades Nuclear Plant (PNP). Alternatively, you proposed to monitor the primary coolant system for leakage and, in addition, perform a remote visual examination of the area under the reactor vessel to detect active leakage or evidence of leakage which may have occurred during the previous power cycle.

The Nuclear Regulatory Commission staff has reviewed your proposed alternative to the ASME Code Section XI requirements for performing the direct visual examination under the reactor vessel during the system leakage tests and determined that compliance with the Code requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Therefore, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(a)(3)(ii), the staff authorizes the inservice inspection (ISI) program alternative proposed in the relief request for the fourth 10-year ISI interval for the PNP.

Sincerely,

/RA/

L. Raghavan, Chief  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-255

Enclosure:  
Safety Evaluation

cc w/encl: See next page

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Palisades Plant

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SYSTEM LEAKAGE TEST PRIOR TO PLANT STARTUP

FOURTH 10-YEAR INSERVICE INSPECTION INTERVAL RELIEF REQUEST NO. RR 4-5

PALISADES NUCLEAR PLANT

NUCLEAR MANAGEMENT COMPANY

DOCKET NO. 50-255

1.0 INTRODUCTION

By letter dated June 12, 2006 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML061710216), as supplemented by letter dated March 12, 2007 (ADAMS Accession No. ML070710243), Nuclear Management Company, LLC (the licensee) submitted Relief Request (RR) No. RR 4-5, related to the Fourth 10-Year Interval Inservice Inspection (ISI) Program for the Palisades Nuclear Plant (PNP). The licensee requested relief from performing the direct visual examination under the reactor vessel during the system leakage test required by American Society of Mechanical Engineers *Boiler and Pressure Vessel Code* (ASME Code), Section XI required by IWB-5220. The licensee has stated that the area under the reactor vessel is extremely hazardous when the plant is at hot shutdown condition for system leakage testing due to high radiation level and ambient air temperature. Alternatively, the licensee proposed to monitor the primary coolant system for leakage and, in addition, perform a remote visual examination of the area under the reactor vessel to detect active or evidence of leakage which may have occurred during the previous power cycle. The staff has reviewed the licensee's proposed alternative pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(a)(3)(ii) that compliance with the Code requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50.55a(g) requires that ISI of ASME Code Class 1, 2, and 3 components be performed in accordance with Section XI of the ASME Code and applicable addenda, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). According to 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph 50.55a(g) may be used, when authorized by the Nuclear Regulatory Commission (NRC), if an applicant demonstrates that the proposed alternatives would provide an acceptable level of quality and safety or if the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for

Inservice Inspection (ISI) of Nuclear Power Plant Components,” to the extent practical within the limitations of design, geometry, and materials of construction of the components.

10 CFR 50.55a(g)(4)(i) requires that ISI of components and system pressure tests conducted during the initial 10-year inspection interval comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) on the date 12 months before the issuance of the operating license. The regulation at 10 CFR 50.55a(g)(4)(ii) requires that the ISI during successive 10-year inspection intervals comply with the requirements of the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months before the start of the 120-month inspection interval, subject to the limitations and modifications listed therein. The ISI Code of Record for the fourth 10-year inspection interval for the PNP is the 2001 edition through the 2003 addenda of the ASME Code, Section XI.

### 3.0 TECHNICAL EVALUATION

#### 3.1 System/Component for Which Relief is Requested

Reactor Pressure Vessel (RPV).

#### 3.2 ASME Code Requirements

The 2001 edition through the 2003 addenda of ASME Code, Section XI, Table IWB-2500-1, Examination Category B-P, Item Number B15.10 requires a visual examination during system leakage test in accordance with paragraph IWB-5220 prior to plant startup following a reactor refueling outage.

#### 3.3 Licensee's Request for Relief

Relief is requested from performing the direct visual examination under the reactor vessel during the system leakage test.

#### 3.4 Licensee's Basis for Requesting Relief

Pursuant to 10 CFR 50.55a(a)(3)(ii), relief is requested on the basis that the Code requirement would result in hardship and unusual difficulty without a compensating increase in the level of quality and safety. The area under the reactor vessel is extremely hazardous when the plant is at hot shutdown condition for system leakage testing. Radiation levels are expected to be 2.5 rem/hour (on contact), which is the maximum measured during cold shutdown. The radiation levels in the reactor cavity are expected to be 1.5 to 2.0 rem/hour. Assuming a test crew of two persons, each working for one-half hour in this area, a total dose of 1.5 to 2.0 rem would be received during the visual examination. In addition to radiation concerns, access to the area under the reactor vessel poses various industrial hazards.

Of primary concern is the confined space and resultant heat stress. Ambient air temperature with the primary coolant system pressure corresponding to 100 percent rated reactor power, is expected to be around 300 °F. The access under these conditions would require significant ventilation for cooling. The access tube to this area is only 30 inches in diameter. This size would limit the amount of ventilation possible while allowing personnel access.

### 3.5 Licensee's Proposed Alternative

PNP shall determine leakage from piping and components in the area under the reactor vessel in accordance with paragraph IWA-5244 "Buried Components" of the ASME Code, Section XI, 2001 Edition through the 2003 Addenda. This requirement will be satisfied by performance of Technical Specification (TS) Surveillance (SR) Procedure DWO-1, "Operator Daily/Weekly Items Modes 1, 2, 3, and 4," which completes the primary coolant system leakage calculation. Performance of the procedure ensures that the leakage requirements of TS SR 3.4.13.1 are met. Additionally, if the unidentified leakage determined by the performance of DWO-1 is greater than 0.15 gpm from a 3 hour leakage at stable plant conditions, Off Normal Procedure ONP-23.1, "Primary Coolant Leak," is required to be entered to determine the source of the leakage and to take appropriate actions.

Additionally, PNP performs a remote visual examination of the area under the reactor vessel once per refueling outage. This examination documents active leakage or evidence of leakage which may have occurred during the previous power cycle.

### 4.0 STAFF EVALUATION

The licensee requested relief from performing a VT-2 visual examination (as defined by Article IWA-2000 of the ASME Code) of the reactor vessel during a system leakage test due to high radiation and the hazardous environment during the test. To perform the visual examination, examiners would be required to enter the reactor cavity area under the vessel via the 30 inch diameter access tube. Considering that this area could be categorized as a confined space, additional personnel would be required to support this activity for safety purposes and for monitoring radiation exposure. The radiation levels in the reactor cavity are expected to be 1.5 to 2.0 rem per hour. Assuming two examiners are required to enter this area for one-half hour to perform the examination, they are likely to receive a total dose of 1.5 to 2.0 rem during the subject examination. In addition, while performing the system leakage test at a pressure corresponding to 100 percent rated reactor power, the reactor coolant system would be at an elevated temperature (approximately 300 °F). This is likely to cause heat stress to the personnel examining the area. As a result of the harsh environment and the high radiation field in which the examiners would be required to work, the NRC staff believes that the attention to detail necessary to perform a quality examination may be compromised.

As an alternative to the VT-2 visual examination, the licensee has proposed to monitor the primary coolant system for leakage from piping and components in the area under the reactor vessel in accordance with ASME Section XI, IWA-5244, "Buried Components." The licensee has proposed to satisfy this requirement by performing TS SR Procedure DWO-1 and by performing the primary coolant system leakage calculation. Performance of the procedure ensures that the leakage requirements of TS SR 3.4.13.1 are met. Additionally, if the unidentified leakage determined by the performance of DWO-1 is greater than 0.15 gpm from a three hour leakage at stable plant conditions, Off Normal Procedure ONP-23.1, "Primary Coolant Leak," is required to be entered to determine the source of the leakage and to take appropriate actions.

Additionally, PNP will perform a remote visual examination of the area under the reactor vessel once per refueling outage. This examination will document active leakage or evidence of leakage which may have occurred during the previous power cycle.

The staff believes that imposing the Code requirement on the licensee during pressure tests will result in hardship without a compensating increase in the level of quality and safety. The licensee has made the unidentified leakage monitoring requirement more stringent by decreasing the leakage detection limit from 0.6 gpm to 0.15 gpm, which would result in earlier detection of the leakage. Moreover, the remote visual examination to detect the past leakages for boric acid deposition also provides the added assurance. The licensee's proposed alternative to monitor the primary coolant system leakage, in conjunction with a remote visual examination during the refueling outage following a power cycle, would ensure leak-tight integrity and, therefore, provide reasonable assurance of operational readiness.

## 5.0 CONCLUSION

The staff concludes that performance of the Code-required VT-2 visual examination of the reactor vessel during a system leakage test would result in hardship to the licensee due to high radiation levels and harsh environment in the area without a compensating increase in the level of quality and safety. The licensee's proposed alternative to monitor the primary coolant system leakage, in conjunction with a remote visual examination during the refueling outage following a power cycle, would ensure leak-tight integrity and, therefore, provide reasonable assurance of operational readiness. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternative in Relief Request No. RR 4-5 is authorized for the fourth 10-year ISI interval of PNP. All other requirements of the ASME Code, Section XI for which relief has not been specifically requested remain applicable, including a third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: Pat Patnaik

Date: April 20, 2007