NMC
Committed to Nuclear Excellence

Palisades Nuclear Plant
Operated by Nuclear Management Company, LLC

July 22, 2005

10 CFR 50.55a

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

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

Request for Relief from ASME Section XI Code Requirements for Repair of Pressurizer Nozzle Penetrations

Pursuant to 10 CFR 50.55a, Nuclear Management Company, LLC (NMC) is requesting relief from certain sections of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 1989 Edition, as described in the attached enclosure.

Enclosure 1 contains a request for relief from the ASME Code, Section XI, IWA-4120, "Rules and Requirements." As an alternative, NMC proposes to use Code Case N-638, "Similar and Dissimilar Metal Welding Using Ambient Temperature Machine [Gas Tungsten Arc Welding] GTAW Temper Bead Technique." Code Case N-638 has been accepted and approved for use by the Nuclear Regulatory Commission (NRC) per Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability – ASME Section XI Division 1," Revision 13. NMC is proposing three exceptions to the Code Case. The three exceptions describe alternatives that provide an acceptable level of quality and safety, pursuant to 10 CFR 50.55a(a)(3)(i). Attachment 1 describes the proposed repair and inspection plan.

NMC plans to implement a Welding Services Incorporated/Structural Integrity Associates outer diameter pad plug design if a repair is necessary for the Palisades Nuclear Plant. Therefore, in support of the proposed repair design, NMC is requesting relief from the applicable ASME Code requirements.

Relief is requested for the remainder of the current ten-year inspection interval, which will conclude on or before December 12, 2006.

NMC requests approval of the proposed relief requests by March 1, 2006, to support Palisades Nuclear Plant's next refueling outage.

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Summary of Commitments

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

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Nuclear Management Company, LLC

Enclosure (1)
Attachment (1)

CC Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC

ENCLOSURE 1
RELIEF REQUEST #1: WELD PAD AREA
PRESSURIZER VESSEL PENETRATIONS

1. ASME Code Component Affected

The affected components are the Palisades Nuclear Plant pressurizer vessel heater sleeves. The Palisades Nuclear Plant has 120 pressurizer heater sleeves penetrating the bottom head. The pressurizer assembly was fabricated in accordance with the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section III, Class A components.

2. Applicable Code Edition and Addenda

The applicable code edition and addenda for the pressurizer vessel heater sleeve repair is the ASME B&PV Code, Section XI, 1989 Edition with no addenda. Palisades is currently in the third ten-year inservice inspection interval.

The original construction code of record for the Palisades Nuclear Plant pressurizer vessel is ASME Section III, Class A, 1965 Edition, including addenda through winter 1965.

3. Applicable Code Requirements

The applicable code requirement for the pressurizer lower head penetrations is ASME Section XI, IWA 4120, "Rules and Requirements," as follows:

(a) Repairs shall be performed in accordance with the owner's design specification and the original construction code of the component or system. Later edition and addenda of the construction code or of Section III, either in their entirety or portions thereof, and code cases may be used. If repair welding cannot be performed in accordance with these requirements, the applicable alternative requirements of IWA-4500 and the following may be used:
  (1) IWB-4000 for Class 1 components;
  (2) IWC-4000 for Class 2 components;
  (3) IWD-4000 for Class 3 components;
  (4) IWE-4000 for Class MC components; or
  (5) IWF-4000 for component supports.

(b) The edition and addenda of Section XI used for the repair program shall correspond with the edition and addenda identified in the inservice inspection program applicable to the inspection interval.

(c) Later editions and addenda of Section XI, either in their entirety or portions thereof, may be used for the repair program, provided these editions and addenda of Section XI at the time of the planned repair have been incorporated by reference in amended regulations of the regulatory authority having jurisdiction at the plant site.

4. Reason for Request

Nuclear Management Company, LLC (NMC) is developing a repair plan that does not involve postweld heat treatment. Therefore, NMC is requesting relief from ASME Section XI, IWA-4120, because repairs made in accordance with the original construction code (ASME Section III), as allowed per IWA-4120, or in accordance with Section XI, IWA-4500, require postweld heat treatment at elevated temperatures. ASME Section III, Article 5, would require an 1100°F minimum postweld heat treatment. ASME Section XI, IWA-4530, eliminates the high temperature postweld heat treatment, but still requires a 300°F preheat and a 450°F to 550°F postweld heat treatment. Postweld heat treatment of the pressurizer is unreasonable due to the size and location.

5. Proposed Alternative and Basis for Use

NMC requests to use ASME Section XI, Code Case N-638, "Similar and Dissimilar Metal Welding Using Ambient Temperature Machine [Gas Tungsten Arc Welding] GTAW Temper Bead Technique," as a proposed alternative. Code Case N-638 has been accepted and approved for use by the NRC per Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability – ASME Section XI Division 1," Revision 13. ASME Code Case N-638 permits the use of the ambient temperature machine GTAW temper bead technique for pressurizer heater sleeve nozzle repairs. This technique does not require postweld heat treatment. The proposed repair method is described in Attachment 1. The proposed repair method takes three exceptions to the Code Case. The three exceptions are described below.

Exception #1: Code Case N-638 Reply Section

The "Reply" section of Code Case N-638 did not clearly state the application for the Code Case. The reply section was clarified in Code Case N-638-1. Although the NRC has not approved Code Case N-638-1, it is identical to Code Case N-638 with the exception of the changes made to the reply section.

Code Case N-638 states, "... may be made by the automatic or machine GTAW temper bead technique without the specified preheat or postweld heat treatment of the Construction Code, when it is impractical, for operational or radiological reasons, to drain the component, and without the nondestructive examination requirements..."

Code Case N-638-1 states, "...may be made by the automatic or machine GTAW temper bead technique without the specified preheat or postweld heat treatment of the Construction Code, when it is impractical to drain the component or impractical for radiological reasons. The nondestructive examination requirements..."

NMC will use Code Case N-638 with the pressurizer drained below the repair location.

Exception #2: Code Case N-638 Examination Volume

Code Case N-638, section 4.0(b), requires that the final weld, and the band around the area defined in paragraph 1.0(d), shall be examined using surface and ultrasonic methods when the completed weld has been at ambient temperature for at least 48 hours. Code Case N-638, section 1.0(d), defines this inspection requirement as the area to be welded, and a band around the area, of at least 1½ times the component thickness, or five inches, whichever is less. The vessel thickness at the lower head is nominally 4⅛-inch. Application of this Code Case requirement would require an examination area including the weld pad area and an area extending five inches around the weld pad area. The weld pad has square dimensions of approximately 3¼ inches on a side. Adding the examination area of five additional inches around provides a total area defined by a square of dimensions of approximately 13¼ inches x 13¼ inches. Other pressurizer penetrations would interfere with the Code Case defined area.

As an alternative to the Code Case requirement, NMC proposes to use the examination area defined by ASME Section III, 1989 Edition, NB-5244, "Weld Buildup Deposits at Openings for Nozzles, Branch, and Piping Connections." This area consists of the weld metal buildup, the fusion zone and the parent metal beneath the weld metal buildup. NMC will examine the entire weld buildup pad area using liquid penetrant and ultrasonic examinations. A complete description of the inspection plan, including the acceptance criteria, is provided in Attachment 1.

Exception #3: Code Case N-638 Ultrasonic Acceptance Criteria

Code Case N-638, section 4.0(e), requires the use of the acceptance criteria of ASME Section XI, IWB-3000, for the ultrasonic examination. ASME Section XI, IWB-3000, refers to Table IWB-3410-1, for the acceptance standards to be applied for each examination category. The examination category for the pressurizer heater sleeves is category B-E, in accordance with Table IWB-3410-1. The only acceptance standard given for examination category B-E items is for a visual examination (VT-2) during the pressure test. There is no acceptance criterion for ultrasonic examination of Category B-E items specifically provided for in the ASME Section XI code.

Code Case N-638, section 4.0(e), allows for additional acceptance criteria to be specified by the owner to account for differences in weld configuration. Due to the configuration of the weld pad repair, guidance is taken from the 1992 Edition of ASME Section III, Article NB-5244, "Weld

Metal Buildup at Openings for Nozzles, Branch, and Piping Connections," which states, "(a) When weld metal buildup is made to a surface as shown in Step 1 of Fig. NB-4244(c)-1, the weld metal buildup, the fusion zone, and the parent metal beneath the weld metal buildup shall be ultrasonically examined to ensure freedom from lack of fusion and laminar defects." Therefore, to meet the Code Case N-638 requirement, NMC will perform ultrasonic examination of the Category B-E repair welds performed per Code Case N-638, and will use an acceptance standard of the 1992 Edition of ASME Section III, NB-5244(a).

NMC requests the use of ASME Section XI, Code Case N-638, as a proposed alternative to the requirements of ASME Section XI, IWA-4120. Code Case N-638 will permit the use of the ambient temperature machine GTAW temper bead technique for the pressurizer heater sleeve nozzle repairs. The three exceptions noted above describe alternatives that provide an acceptable level of quality and safety, pursuant to 10 CFR 50.55a(a)(3)(i).

6. Duration of Proposed Alternative

NMC requests approval of the proposed alternative for the remainder of the third ten-year interval of the Inservice Inspection Program for the Palisades Nuclear Plant, which will conclude on or before December 12, 2006.

7. Precedent

Southern California Edison submitted relief request ISI-3-11, for San Onofre Nuclear Generating Station (SONGS), Units 2 and 3, dated October 15, 2004 (ADAMS Accession #ML042930286), as supplemented by letters dated October 25, 2004 (ADAMS Accession #ML043010481) and December 2, 2004 (ADAMS Accession #ML043410125). The relief requested approval to perform repair welding using the ambient temperature machine GTAW temper bead technique without the pre and postweld heat treatment. The NRC approved this relief request by letter March 2, 2005 (ADAMS Accession #ML050680054). The SONGS relief request is similar to the Palisades Nuclear Plant relief request in that the request involved similar pressurizer locations and materials. In addition, the SONGS relief requests involved the use of Code Case N-638-1, and also requested an alternative to the ultrasonic acceptance criteria.

ATTACHMENT 1
PRESSURIZER HEATER SLEEVE NOZZLE PROPOSED REPAIR AND INSPECTION PLAN

Nuclear Management Company, LLC (NMC) is developing a repair plan based on the use of an outer diameter pad plug. NMC is planning to design the repair in accordance with the requirements of ASME Section III. The need for this ASME Section III design analysis is contingent on the results of the pressurizer inspection. If a repair is necessary, NMC plans to perform the ASME Section III design analysis. NMC is not requesting relief from any Section III requirements. Therefore, the structural and leakage integrity of the primary system pressure boundary would be maintained by the repaired heater sleeve design.

The repair approach consists of the following steps:

Step 1 - Cutting the existing Alloy 600 nozzle outboard of the J-groove weld.

The designed cut location of the heater sleeves is between three to four inches from the pressurizer outside surface. The lengths of the sleeves are relatively the same. The basis of the removal length is to maximize the workspace. Figure 1 below shows the pressurizer heater sleeve penetration configuration.

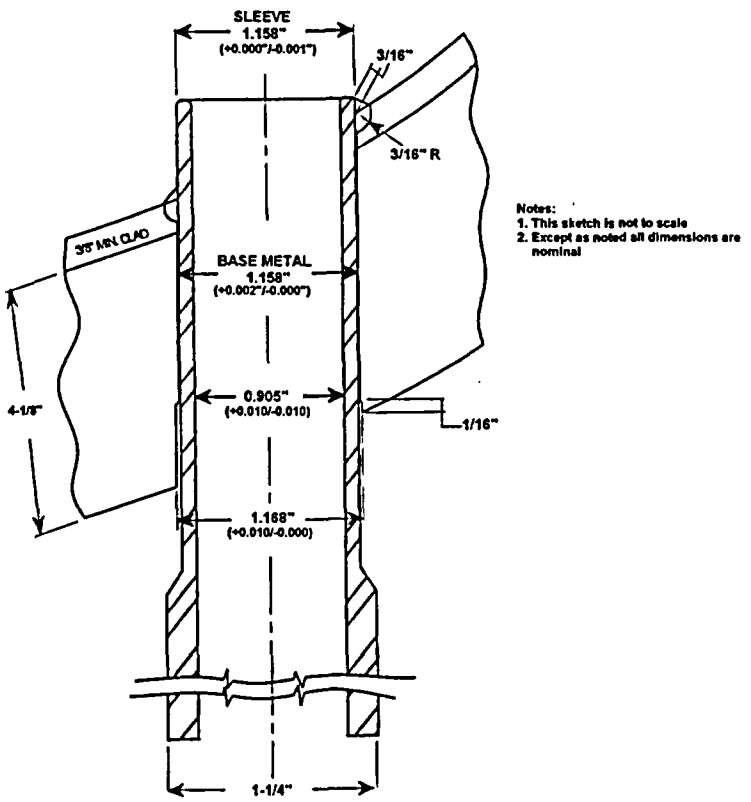

Figure 1
Sketch of Pressurizer Heater Sleeve Penetration Configuration

Cutting and removing a length of the heater sleeve does not cause cracking in the nozzle or in the J-groove weld. The cut location of the heater sleeve is below the J-groove weld. The heater sleeve has a tight fit with the sleeve penetration hole, with the upper end welded to the inside surface of the pressurizer bottom head. By cutting the heater sleeve below the J-groove weld, the sleeve would be separate from the pressurizer. Removal of the severed sleeve is expected without applying force.

Step 2 – Perform examination of Pressurizer Base material

Perform surface examination of the base material prior to weld buildup. The surface examination would be evaluated to the 1992 Edition of ASME Section III, NB-5350.

Perform ultrasonic examination of the base material prior to weld buildup. The ultrasonic examination would be evaluated in accordance with the 1992 Edition of ASME Section III, NB-2532.1(b)(1).

Step 3 - Replace the removed nozzle portion with an Alloy 690 backing plug.

The backing plug has a nominal diameter of 1.158 inches, same as the smaller diameter of the heater penetration hole. The height of the plug varies from about one-inch at its deepest engagement, to greater than 0.25 inches at its shallowest engagement in the penetration hole. The plug material is Alloy 690. The plug is designed to fit snug into the penetration hole. Field machining may be necessary to shape the plug outside surface to the spherical contour of the pressurizer bottom head. Tack weld is to be applied to hold the plug in place prior to installing the weld pad over the plug. The potential contact between the plug and the penetration hole due to thermal expansion is not a concern. The plug is installed in a plenum of fluid. Its temperature is fairly close to the pressurizer shell temperature. The shell material of alloy steel has a higher coefficient of thermal expansion similar to that of the plug material of Alloy 690. The acceptance of the plug material is to be demonstrated in an ASME Section III compliance analysis.

Step 4 - Install a welded pad of weld metal over the nozzle opening and backing plug.

A welded pad of Alloy 52/152 would be deposited over the nozzle opening and backing plug using the ambient temper bead method of Code Case N-638. The weld buildup pad has a minimum thickness of 0.25 inches, and is a square pad with a half width of 1.584 inches minimum, excluding the taper transition area to the pressurizer surface. The proposed weld pad configuration is shown in Figure 2.

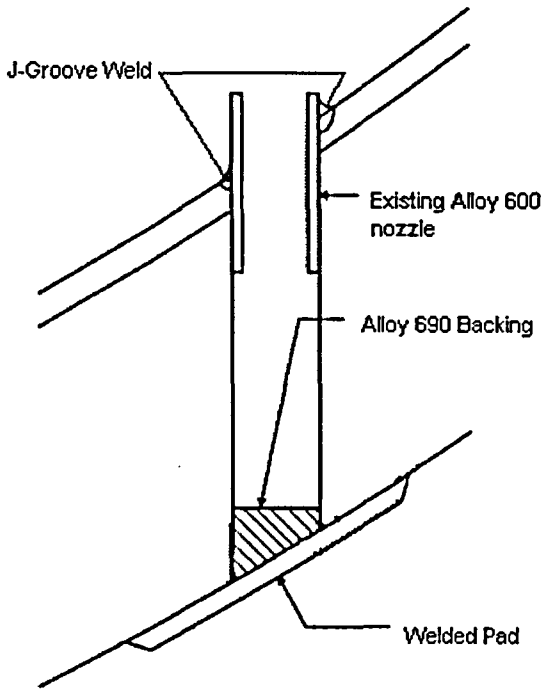

FIGURE 2

Step 5 – Perform nondestructive examination of welded pad

Pre-service inspection would be performed using liquid penetrant and ultrasonic examination techniques after the completed weld has been at ambient temperature for at least 48 hours. The examination area is defined in ASME Section III, 1992 Edition, NB-5244, which consists of the weld buildup surface for liquid penetrant and the weld buildup fusion zone to parent metal to ensure freedom from lack of fusion and laminar defects for ultrasonic.

The acceptance standards for the welded pad are ASME Section III, 1992 Edition, NB-5350, for the liquid penetrant examination, and ASME Section III, 1992 Edition, NB-5244, for the ultrasonic examination. These examinations are performed in accordance with the 1992 Edition of ASME Section III, to comply with the requirements of Code Case N-416-1, "Alternative Pressure Test Requirement for Welded Repairs or Installation of Replacement Items by Welding, Class 1, 2 and 3."

Future inservice inspection of the welded pad would be performed each refueling outage using the VT-2 examination technique. Acceptance criteria will be ASME Section XI, 1989 Edition, IWB-3522.