September 12, 2007

Mr. Michael Balduzzi
Sr. Vice President, Regional Operations NE
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

SUBJECT: PALISADES NUCLEAR PLANT - RELIEF REQUEST 2 FOR ASME SECTION XI CODE REQUIREMENTS FOR REPAIR OF REACTOR PRESSURE VESSEL HEAD PENETRATIONS (TAC NO. MD3082)

Dear Mr. Balduzzi:

By letter dated September 15, 2006 (Agencywide Documents Access and Management System (ADAMS), Accession No. ML062580396), as supplemented by letter dated March 21, 2007 (ADAMS Accession No. ML070850057), Nuclear Management Company, LLC (NMC, the licensee, at the time of submittal) requested relief from certain sections of the 2001 Edition with addenda through 2003 of American Society of Mechanical Engineers *Boiler and Pressure Vessel Code* (ASME Code), Section XI for Palisades Nuclear Plant (PNP). Relief Request No. 2 pertains to the repair of the control rod drive and incore instrumentation nozzle penetrations on the reactor vessel head (RVH). Relief Request No. 1 pertains to code applicability, and will be addressed by a separate correspondence. Entergy Nuclear Operations, Inc (ENO), has since become the current licensee, following a license transfer that occurred on April 11, 2007.

The Nuclear Regulatory Commission (NRC) staff has reviewed your proposal and concludes that Relief Request No. 2 is acceptable as discussed in the enclosed safety evaluation. The fracture mechanics analyses for Palisades showed that for the incore instrumentation nozzle repair, the RVH meets the requirements of ASME Code Section XI, Subarticle IWB-3612, for a duration of 5 years. If an incore instrumentation nozzle is repaired, the licensee is required to submit to the NRC for review and approval additional analyses or plans for corrective actions to demonstrate that the RVH satisfies the requirements of Subarticle IWB-3612 beyond the 5-year period.

The NRC staff finds that compliance with the ASME Code requirements regarding flaw characterization and successive examinations of the remnant J-groove welds is impractical for PNP. We also conclude that the proposed alternatives provide reasonable assurance of structural integrity. Therefore, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(6)(i), Relief Request No. 2 is granted through the end of the fourth 10-year inservice inspection interval.

The NRC staff has determined that granting relief pursuant to 10 CFR section 50.55a(g)(6)(i) is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

All other requirements of the ASME Code, Sections III and XI, for which relief has not been specifically requested and approved remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Sincerely,

/RA/

Travis Tate, Acting 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

September 12, 2007

All other requirements of the ASME Code, Sections III and XI, for which relief has not been specifically requested and approved remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Sincerely,

/RA/

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Docket No. 50-255

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Palisades Plant

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REACTOR VESSEL HEAD NOZZLE PENETRATION REPAIR

FOURTH TEN-YEAR INSERVICE INSPECTION INTERVAL

RELIEF REQUEST NO. 2

PALISADES NUCLEAR PLANT

ENTERGY NUCLEAR OPERATION, INC.

DOCKET NUMBER 50-255

1.0 INTRODUCTION

By letter dated September 15, 2006 (Agencywide Documents Access and Management System (ADAMS), Accession No. ML062580396), as supplemented by letter dated March 21, 2007 (ADAMS Accession No. ML070850057), Nuclear Management Company, LLC (NMC, the licensee, at the time of submittal) requested relief from certain sections of the 2001 Edition of American Society of Mechanical Engineers *Boiler and Pressure Vessel Code* (ASME Code), Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," with addenda through 2003. Entergy Nuclear Operations, Inc (ENO), has since become the current licensee, following a license transfer that occurred on April 11, 2007.

The submittal contains two relief requests: Relief Request No. 1 is related to the welding procedures of the repair of the control rod drive (CRD) and incore instrumentation (ICI) nozzle penetrations on the reactor vessel head (RVH) at Palisades Nuclear Plant (PNP). Relief Request No. 2 is related to the evaluation of potential flaws in the remnant J-groove weld, which originally connected penetrations to the RVH, and successive examinations of the weld. This Safety Evaluation (SE) is for Relief Request No. 2 which addresses the fourth 10-year Inservice Inspection Interval (ISI), and differs from the third 10-year ISI which was approved on April 3, 2006 (ADAMS Accession Nos. ML060800319 for Relief Request No. 1 and ML060790061 for Relief Request No. 2), by using an evaluation in accordance with the 2001 Edition of the ASME Code with addenda through 2003, instead of the 1989 Edition.

The licensee will inspect the RVH, CRD nozzle penetrations, and ICI nozzle penetrations during the 2007 refueling outage at PNP, in accordance with the NRC Order, EA-03-009, "Issuance of First Revised NRC Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors," dated February 20, 2004 (ML040220181). The licensee submitted this request in the event that a RVH nozzle penetration requires repair at the PNP.

ENCLOSURE

The CRD and ICI nozzle penetrations are attached to the interior surface of the RVH by J-groove welds. The J-groove welds are fabricated with Alloy 82/182 material. The CRD and ICI nozzles are fabricated with Alloy 600 material. Both of these alloys have been found to be susceptible to primary water stress-corrosion cracking (PWSCC). The licensee has developed the inside diameter temper bead (IDTB) method to repair degraded nozzle(s). During a repair, the degraded nozzle is cut a few inches above the J-groove weld inside the RVH penetration and the lower degraded part of the nozzle is removed from the penetration.

The upper part of the nozzle will remain in service. A replacement nozzle is inserted into the RVH penetration, rolled, and joined with the remnant nozzle by a new weld inside the RVH penetration. The replacement nozzle is fabricated with Alloy 690 material, and the new weld is fabricated with Alloy 52/152 material. Both materials are considered resistant to PWSCC. The original J-groove weld will not be removed nor examined in the future.

2.0 REGULATORY EVALUATION

The inservice inspection of ASME Code Class 1, Class 2, and Class 3 components is to be performed in accordance with the ASME Code, Section XI, and applicable edition and addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Paragraph 10 CFR 50.55a(g)(6)(i) states that "...The Commission will evaluate determinations... that [ASME] code requirements are impractical. The Commission may grant such relief and may impose such alternative requirements as it determines is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility..."

Pursuant to 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the applicant demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements 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) will meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code Section XI to the extent practical within the limitations of design, geometry, and materials of construction of the components. Paragraph 10 CFR 50.55a(g)(4) requires that inservice examination of components and system pressure tests conducted during the first 10-year inspection interval and subsequent inspection intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code. The latest edition and addenda of Section XI of the ASME Code is incorporated by reference in Paragraph 10 CFR 50.55a(b), 12 months prior to the start of the 10-year inspection interval.

The original construction code for PNP is ASME Code, Section III, 1965 Edition with addenda through winter 1965. The inservice inspection code of record for the fourth 10-year interval is ASME Code, Section XI, 2001 Edition with addenda through 2003.

3.0 RELIEF REQUEST NUMBER 2 - ALTERNATE REPAIR TECHNIQUE FOR REACTOR PRESSURE VESSEL (RPV) PENETRATIONS

3.1 Components for Which Relief Is Requested

The components for which relief is requested are the 45 CRD and 8 ICI nozzle penetrations attached to the RVH.

3.2 Applicable ASME Code Edition and Addenda

The applicable code edition and addenda for the RVH penetration is the 2001 Edition of ASME Code, Section XI with addenda through 2003.

3.3 Applicable ASME Code Requirement

The applicable ASME Code requirements for the RVH penetration repair are identified by the licensee as the following:

1. Subarticle IWA-3300(b) contains a requirement for flaw characterization.

2. Subarticle IWB-3142.4 allows for an analytical evaluation to demonstrate that a component is acceptable for continued service. It also requires that components found acceptable for continued service by analytical evaluation be subsequently examined in accordance with Subarticles IWB-2420(b) and (c).

3. Subarticle IWB-3420 requires the characterization of flaws in accordance with the rules of Subarticle IWA-3300.

4. Subarticle IWB-3613(a) requires that, for conditions < 20 percent of the design pressure and the temperature is not less than RT_{NDT} + 60°F (nil-ductility transition reference temperature), the maximum applied stress intensity factor (K_I) be less than $K_{Ia}/\sqrt{2}$, where K_{Ia} is the available fracture toughness based on crack arrest for the corresponding crack tip temperature.

5. Subarticle IWB-3613(b) requires that, for normal conditions, K_I be less than $K_{Ia}/\sqrt{10}$.

3.4 Proposed Alternative

1. In lieu of ASME Code, Section XI, Subarticle IWA-3300(b), the licensee assumed that a conservative, worst-case flaw existed in the remnant J-groove weld that extends from the weld surface to the RVH low alloy steel base material interface. An appropriate fatigue crack growth analysis has been performed for this flaw to establish the minimum remaining service life of the RVH.

2. In lieu of ASME Code, Section XI, Subarticle IWB-3142.4, successive examinations will not be performed because analytical evaluation of the worst-case flaw has been performed to demonstrate the acceptability of continued operation and the impracticality of performing any subsequent inspections.

3. In lieu of ASME Code, Section XI, Subarticle IWB-3420, a conservative worst-case flaw was assumed to exist and appropriate fatigue crack growth analyses were performed.

4. In lieu of ASME Code, Section XI, Subarticle IWB-3613(a), the licensee proposes to use $K_I < K_{IC}/\sqrt{2}$ as the requirement at pressures below 20 percent of the design pressure and a temperatures greater than or equal to RT_{NDT}. K_{IC} is plane strain fracture toughness of the subject material.

5. In lieu of ASME Code, Section XI, Subarticle IWB-3613(b), the licensee proposes to use elastic plastic fracture mechanics (EPFM) acceptance criteria to evaluate flaw stability with structural factors (SFs) of 3 on primary (pressure) stresses and 1.5 on secondary (residual plus thermal) stresses.

3.5 Basis for the Proposed Alternative

The licensee's proposed alternative is based on fracture mechanics evaluations performed by Framatome Advanced Nuclear Products, AREVA in Document 51-5047343-006, "Palisades CRDM & ICI Nozzle IDTB Repair - Life Assessment Summary", dated August 2006. This document is part of the September 15, 2006, submittal. The fracture mechanics evaluations assess the structural integrity of the RVH with a potential flaw in the remnant J-groove weld of a penetration to justify continued operation and the elimination of successive examinations for the flaw.

The remaining non-chamfered J-groove weld in the CRD nozzles was analyzed by postulating a radial crack in the J-groove weld and butter, and by evaluating fatigue crack growth into the low alloy steel head. Since a flaw in the J-groove weld cannot be sized by currently available nondestructive examination techniques, the licensee assumed that the flaw extended through the entire J-groove weld and Alloy 182 butter material. The licensee further postulated that a small fatigue-initiated flaw forms in the low alloy steel head and combines with the PWSCC induced crack in the weld to form a large radial corner flaw, which propagates into the vessel closure head by fatigue crack growth.

The licensee also performed an analysis of the ICI nozzle which demonstrated that a postulated radial crack in the remnants of the original J-groove weld and butter would satisfy Subsection IWB-3612 requirements of the 2001 Edition of the ASME Code with addenda through 2003 for a duration of 5 years of operation.

3.6 Duration of Proposed Alternative

The licensee requested approval of the proposed alternative for the fourth 10-year interval of the inservice inspection which will conclude on or before December 13, 2015.

3.7 NRC Staff Evaluation

3.7.1 Impracticality Findings

The April 3, 2006, SE accepts the licensee's justification on the difficulty of applying ultrasonic (UT) examination to flaws in the original J-groove weld region. Since the basis for acceptance is not time-dependent, it still applies to the current evaluation. Hence, the NRC staff concludes that the alternative to Subarticles IWA-3300(b), IWB-3142.4, and IWB-3420 is acceptable because the assumed worst-case flaw is bounding and successive UT examinations could not provide meaningful information on flaw geometries. This approach of flaw characterization based on the worst flaw geometry has been approved by the NRC staff for RVH penetration evaluations since 2001.

3.7.2 Alternative to Subarticle IWB-3613(a)

ASME Code, Section XI, Subarticle IWB-3613(a) requires that, for conditions of bolt-up and pressurization not exceeding 20 percent of the design pressure and the minimum temperature is not less than RT_{NDT} + 60 °F, the K_{Ia}/K_I ratio be greater than $\sqrt{2}$. As indicated in the March 21, 2007, supplement, the licensee proposed to use K_{IC} instead of K_{Ia} to satisfy this requirement. This alternative applies only to the CRD J-groove linear elastic fracture mechanics (LEFM) evaluation.

In its March 21, 2007, supplement, the licensee provided justification for its alternative LEFM evaluations:

1. The Change from RT_{NDT} + 60 °F to RT_{NDT}.

   This alternative is consistent with current pressure-temperature limit criteria in the 1989 Edition of ASME Code, Section XI, Appendix G, Article G-2222(c) for shell regions near geometric discontinuities, and in 10 CFR Part 50, Appendix G, Table 1, Item 2.a, for the closure flange region, prior to core criticality.

2. The Change from $K < K_{Ia}/\sqrt{2}$ to $K < K_{IC}/\sqrt{2}$.

   The crack arrest toughness, K_{Ia} (or K_{IR}), was originally used in the 1974 Edition of the ASME Code, Section XI, to provide additional margin thought to be necessary to cover uncertainties, as well as a number of postulated (but un-quantified) effects. The use of K_{Ia} for determining the condition for fracture initiation was a conservative assumption to address the possibility of local areas of low fracture toughness in weldments. The philosophy of using K_{Ia} conservatively assumes that the fracture event is one of arresting a dynamic running crack from an area of local embrittlement.

   In addition, for nuclear plants, transient conditions are generally slow, so that stress conditions are quasi-static for a stationary flaw. For these transient conditions, the rate of change of pressure and temperature are several orders of magnitude lower than those associated with dynamic conditions associated with crack arrest testing. The only time when dynamic loading can occur and where K_{Ia} should be used is when a crack is propagating. Whereas dynamic loading may be postulated during accident conditions for assessing the potential for crack arrest, it is not a credible scenario for crack initiation. Therefore, use of the static lower bound fracture toughness, K_{IC}, is more technically correct for evaluating the potential for crack initiation.

   Since the original formulation of the K_{Ia} and K_{IC} fracture toughness curves in 1972, the fracture toughness database has increased by more than an order of magnitude, and both K_{Ia} and K_{IC} remain as lower bound curves. In addition, the temperature range over which the data have been obtained has been extended to include both higher and lower temperatures than the original database. Only a few data points fall slightly below the K_{IC}

curve, providing a high degree of confidence that K_{IC} can be used to predict crack initiation.

The concern that there could be a small, local zone in a weld or heat affected zone of the base material that could develop pop-in and produce a dynamically moving cleavage crack is not supported by test data. After over 30 years of research on RPV steels fabricated under tight controls, the initiation of micro-cleavage pop-in has not been found to be significant. Researchers have not been able to produce a catastrophic failure of a vessel, component, or even a fracture toughness test specimen in the transition temperature region. Thus, it is overly conservative to use the K_{Ia} curve to address the effect of this postulated condition on crack initiation.

The change from K_{Ia} to K_{IC} has already been implemented in the 2001 Edition of ASME Code, Section XI, Appendix G, for determining pressure-temperature limits for the reactor coolant system. The proposed use of K_{IC} in the flaw acceptance criteria of Subarticle IWB-3613(a) is consistent with the fracture toughness requirement in the 2001 Edition of the ASME Code, Section XI, Appendix G. Therefore, applied stress intensity factors are limited to $K_{IC}/\sqrt{2}$ for low temperature conditions when the pressure is less than 500 pounds per square inch atmosphere (psia) and the temperature is at least 72 °F (which is the RT_{NDT} of the RVH base metal).

The above justification for using K_{IC} instead of K_{Ia} in this application is consistent with the technical bases that the NRC staff relied on in its approval of the similar change in the RPV pressure-temperature limit applications, and therefore, is acceptable. This change has been implemented in the 2001 Edition of ASME Code, Section XI, Appendix G. Further, since the K_{IC} is approximately the lower bound curve, with only a few data points fall slightly below the curve, the degree of confidence that K_{IC} can be used to predict crack initiation is high. Consequently, the NRC staff determined that it is not necessary to impose an arbitrary conservatism (i.e., RT_{NDT} + 60 °F) to account for the uncertainty in converting from reference temperature to fracture toughness. The use of RT_{NDT} has been accepted in the 1989 Edition of ASME Code, Section XI, Appendix G, for shell regions near geometric discontinuities, and in 10 CFR Part 50, Appendix G, Table 1, Item 2.a, for the closure flange region.

In summary, the NRC staff concludes that the proposed alternative would not significantly affect the structural integrity of the CRD nozzle or RVH. The NRC staff's conclusion is based on (1) using K_{IC} instead of K_{Ia} in the LEFM analysis is supported by test data and operating experience, and (2) a fracture mechanics evaluation assumes conservatively that the entire remnant J-groove weld is cracked and that the crack propagates into the RVH.

3.7.3 Alternative to IWB-3613(b)

In lieu of the LEFM acceptance criteria in Subarticle IWB-3613(b) of the 2001 Edition of ASME Code, Section XI, the licensee proposed to use the EPFM acceptance criteria to evaluate flaw stability with SFs of 3 on primary (pressure) stresses and 1.5 on secondary (residual plus thermal) stresses.

The proposed EPFM approach was approved in the April 3, 2006, SE, for a similar relief request regarding the same RVH nozzle penetrations by the licensee. The basis for this approval is that the SF for primary stresses is comparable to the SF of √10 required by the LEFM analysis requirement specified in Subarticle IWB-3613(b).

3.7.4 Specific LEFM and EPFM analyses

The licensee's LEFM and EPFM analyses include consideration of a flaw in the nozzle J-groove weld; postulated flaws in the repair weld triple point at the joint of the Alloy 600 CRD/ICI nozzle, the new Alloy 52/52M weld, and the alloy steel head; and a postulated flaw in the un-removed Alloy 600 CRD/ICI nozzle wall.

3.7.4.1 Nozzle J-groove Weld

The licensee assumed, in its LEFM and EPFM analyses, a worst-case initial flaw occurring in the CRD remnant J-groove weld (not chamfered), i.e., the entire remnant J-groove weld and butter are cracked. The tip of the initial crack is located on the boundary between the butter and the RVH base metal. The flaw was assumed to grow into the RVH base metal by fatigue. The licensee calculated the K_I for the crack using three-dimensional finite element analysis and applying both residual and operating stresses for each of eight analyzed transients. For each increment of crack growth, stress intensity factors were increased by the square root of the ratio of the postulated flaw sizes. This is a conservative approximation since both the residual stresses and the thermal gradient stresses decrease in the direction of crack propagation. The licensee's analyses included crack face pressure and a plastic zone correction. Flaw growth into the RVH base metal was calculated to be 0.610 inch on the uphill side of the CRD nozzle and 0.324 inch on the downhill side of the CRD nozzle for 27 years of operation. The RVH thickness in the nozzle region is 8.875 inches, including cladding.

At operating temperatures for which EPFM is the appropriate analysis method, a J-integral/tearing modulus (J-T) approach was used to evaluate flaw stability with SFs of 3 on primary stresses and 1.5 secondary stresses. The licensee found that for the CRD J-groove weld, the highest crack tip K_I occur during cooldown when the pressure is 2085 pounds per square inch gage (psig) and the temperature decreases to 400 °F. At these conditions, the licensee showed that the applied J-integral (applied J) is less than the J-integral for the material (J_{mat}). The licensee also demonstrated flaw stability by showing that the applied tearing modulus is below the tearing modulus for the material. As a final check on the EPFM analysis, the applied J for SFs of 1.5 on pressure and 1.0 on residual and thermal loads are compared to the J_{mat} at a crack extension of 0.1 inch. For this case, the licensee determined that the applied J values on the uphill side and downhill side of the CRD nozzle are both less than the required J_{mat}.

At low temperature conditions near the end of cooldown, LEFM is the appropriate method for this application. To address the concern that the residual stresses in the J-groove weld might be significant under this condition, the licensee performed additional analyses for larger flaws in the uphill and downhill locations to demonstrate that the ASME Code specified fracture toughness margin is maintained while still considering residual stresses. The licensee determined these new crack sizes by selecting cracks with their crack fronts in regions of compressive residual stress. On the uphill side, the selected crack is 1.25 inches beyond the butter; on the downhill side, the selected crack is 2.5 inches beyond the butter. The limiting condition occurs at the end of cooldown (about 70 °F and 295 psig). The K_{IC} at this temperature is 53.1 Kilo pounds per square inch times square root inch (ksi√in), and the applied K is 29.5 ksi√in on the uphill side and 28.5 ksi√in on the downhill side. Both of these values are less than the $K_{IC}/\sqrt{2}$ acceptance criterion of 37.5 ksi$\sqrt{in}$. The licensee's LEFM and EPFM analyses showed that postulated flaws in the CRD J-grooved weld and butter are acceptable for 27 years of operation, which is from present to the end of the license renewal period.

Similarly, the licensee performed an LEFM analysis for RVH ICI nozzles, which assumed that a radial flaw in the Alloy 182 weld metal would propagate by PWSCC through the J-groove weld and butter to the interface with the low alloy steel head. The NRC staff finds that the results of the licensee's analysis for the ICI nozzle demonstrate that the postulated crack would satisfy IWB-3612 of the 2001 Edition of the ASME Code Section XI for 5 years of operation. Consequently, if an ICI nozzle is repaired, the licensee is required to submit additional analyses or plans to take corrective actions to demonstrate that the RVH satisfies the requirements of Subarticle IWB-3612 beyond the 5-year period.

3.7.4.2 Repair Weld Triple Point

The licensee performed LEFM and limit load analyses for the repair weld at the triple point which is the intersection of the repair weld, replacement and remnant nozzles, and the RVH (see Figure 4 of Enclosure 2 of the September 15, 2006 submittal). This analysis assumed a 0.1-inch weld anomaly at the triple point and used the flaw acceptance criteria in Section XI of the 2001 Edition through 2003 Addenda of the ASME Code. Several possible flaw propagation paths have been considered and the margins associated with them calculated. The minimum margin for LEFM is 3.58 for the CRD nozzle and 4.41 for the ICI nozzle, exceeding the ASME code required margin of $\sqrt{10}$. The margin for limit load analysis is 7.96 for the CRD nozzle and 7.19 for the ICI nozzle, exceeding the ASME code required margin of 2.7. Therefore, the results are acceptable to the NRC staff. The calculations are based on the fatigue crack analysis for 27 years of plant operation, considering the transient frequencies of the applicable transients.

3.7.4.3 Un-removed Nozzles

The licensee also performed LEFM analyses for the remaining portion of the CRD and ICI nozzles, considering immediate PWSCC induced crack initiation, weld residual and operating stress distributions, ASME Code Section XI acceptance criteria, and Material Reliability Program Section 55 (MRP-55), Revision 1 crack growth rate for Alloy 600 materials. The results are 5.04 effective full power year (EFPY) of operation for the CRD nozzle and 5.13 EFPY for an ICI nozzle for the non-abrasive water-jet machine conditioned IDTB repair. These analyses and results are identical to those being evaluated and accepted in the April, 3, 2006, SE. The basis for the acceptance, "there is sufficient time between periodic inspections to detect any potential flaws occurring in the repaired nozzle before the crack reaches the limit of 75 percent through-wall," remains unchanged. Therefore, the analyses and results are acceptable for the current application.

On the basis of the fracture mechanics analyses, the NRC staff concludes that (1) successive examinations of the remnant J-groove weld are not needed because the worst-case flaw in the remnant J-groove weld is demonstrated, by analysis, to be acceptable, (2) the removal of the chamfer grinding for the remnant J-groove weld at the CRD nozzle is acceptable, and (3) according to NRC Order EA-03-009, PNP falls into the high susceptible plant due to the indications found in the CRD nozzles. As a high susceptible plant, the Order requires all CRD and ICI nozzles at PNP be inspected in every refueling outage, even after the nozzles have been repaired.

4.0 CONCLUSION

The NRC staff has reviewed the submittal and finds that compliance with the ASME Code requirements regarding flaw characterization and successive examinations of the remnant J-groove welds is impractical for PNP. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), Relief Request No. 2 is granted from the requirements of Subarticles IWA-3300, IWB-3142.4, IWB-3420, IWB-3613(a), and IWB-3613(b) of ASME Code, Section XI, pertaining to the remnant J-groove welds of the CRD nozzles and ICI nozzles in the RVH at PNP through the end of the fourth 10-year ISI.

The fracture mechanics analyses showed that for the ICI nozzle repair, the RVH meets the ASME Code Section XI, Subarticle IWB-3612, for 5 years. If an ICI nozzle is repaired, the licensee is required to submit to the NRC for review and approval additional analyses or plans for corrective actions to demonstrate that the RVH satisfies the requirements of Subarticle IWB-3612 beyond the 5-year period.

Granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility

All other requirements of the ASME Code, Sections III and XI, for which relief has not been specifically requested and approved remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

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