Entergy

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10 CFR 50.55a
First Revised NRC Order EA-03-009

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

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

Request for NRC Relief from Code Case N-729-1 as Conditioned by 10 CFR 50.55a(g)(6)(ii)(D)(3) Regarding Demonstrated Leak Path Assessment of Reactor Head Penetration Nozzles

Dear Sir or Madam:

Pursuant to 10 CFR 50.55a(a)(3)(ii), Entergy Nuclear Operations, Inc. (ENO) hereby requests NRC approval for Inservice Inspection (ISI) Relief Request for the Demonstrated Leak Path Assessment Examination for the Palisades Nuclear Plant (PNP).

This request for relief proposes an alternative to the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Code Case N-729-1 as conditioned by 10 CFR 50.55a(g)(6)(ii)(D)(3) for "demonstrated volumetric or surface leak path assessment through the reactor pressure vessel head penetration J-groove welds". The proposed alternative is for the continued use of the volumetric leak path assessment techniques used to satisfy the requirements of the First Revised NRC Order EA-03-009. The duration of the proposed alternative applies only to the reactor pressure vessel (RPV) head control rod drive and incore instrument penetration nozzle examinations being performed in the PNP 2009 Refueling Outage, scheduled to begin in March 2009. ENO requests approval of this relief request by March 20, 2009.

Enclosure 1 provides ENO's request for relief to the ASME Code including the basis for the proposed alternative examination. Enclosure 2 describes two new commitments.

Summary of Commitments

In lieu of implementing the "demonstrated volumetric or surface leak path assessment through all J-groove welds" as required by ASME Code Case N-729-1 as conditioned by 10 CFR 50.55a(g)(6)(ii)(D)(3), ENO will perform a volumetric leak path assessment in the 2009 PNP refueling outage that meets the requirements of the First Revised NRC Order EA-03-009, IV.C.(5)(b)(i). The proposed volumetric leak path examination area will include the length and circumference of the nozzle annulus sufficient to assess a potential leakage path.

Christopher J. Schwarz
Site Vice President
Palisades Nuclear Plant

Enclosures (2)

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

ENCLOSURE 1

RELIEF REQUEST FOR ALTERNATIVE TO CODE CASE N-729-1 REGARDING DEMONSTRATED LEAK PATH ASSESSMENT OF REACTOR HEAD PENETRATION NOZZLES

1. ASME Code Component Affected

Code Class:	1
References:	Code Case N-729-1, Table 1
Item Number	B4.20
Parts Examined:	Control Rod Drive (CRD) Nozzles (45) and Incore Instrument (ICI) Nozzles (8)
Description:	Reactor Pressure Vessel (RPV) Head Penetration Nozzles

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineering (ASME) Boiler and Pressure Vessel Code, Section XI, 2001 Edition through 2003 Addenda as augmented by Code Case N-729-1 with conditions for use stated in 10 CFR 50.55a(g)(6)(ii)(D)(3). Palisades Nuclear Plant (PNP) is currently in the fourth 10-year inservice inspection interval.

3. Applicable Code Requirement

Code Case N-729-1, Section 2500, states that "Components shall be examined as specified in Table 1". Item B4.20 of Table 1 of Code Case N-729-1 requires volumetric and surface examinations in accordance with Note 6.

10 CFR 50.55a(g)(6)(ii)(D)(3) states in part, "Instead of the specified 'examination method' requirements for volumetric and surface examinations in Note 6 of Table 1 of Code Case N-729-1, the licensee shall perform volumetric and/or surface examination of essentially 100 percent of the required volume or equivalent surfaces of the nozzle tube, as identified by Figure 2 of ASME Code Case N-729-1. As conditioned per 10 CFR 50.55a(g)(6)(ii)(D)(3), a demonstrated volumetric or surface leak path assessment through all J-groove welds shall be performed."

4. Reason for Request

Although the industry has initiated efforts to accomplish a volumetric leak path demonstration, the extent of remaining tasks will likely preclude successful completion in time to support the 2009 PNP refueling outage commencement date. Hence, a demonstrated leak path inspection is not available. Therefore, only a surface examination is possible but presents an extreme hardship.

The complicated geometry of the J-groove weld surface, particularly on penetrations toward the periphery of the reactor head, poses a greater difficulty in performing remote surface inspections. Additionally, the CRD guide tubes and funnels extend to the plane of the RPV flange and are surrounded by a lattice structure inside the dome. The ICI guide tubes and funnels also penetrate well into the RPV dome at the periphery of the RPV head. This configuration creates obstructions which do not allow ready access to the J-groove weld surface. AREVA-ANP, who performs the RPV head inspections at PNP, does not have a remote technology for performing surface examinations under the head.

Therefore, under head surface examinations would need to be conducted by manual entries to comply with Code Case N 729-1. Based on previous survey data, the dose rates under the RPV head at the funnels are nearly 3 Rem/hour and the contact dose rates at the J-groove welds approach 5 Rem/hour.

The requirement to perform a "demonstrated volumetric leak path assessment through all J-groove welds" during the PNP 2009 refueling outage, scheduled to begin in March 2009, poses a hardship due to the expedited implementation requirement for a demonstrated volumetric leak path or surface assessment. The option of performing a surface examination per Code Case N-729-1 would be restricted based on difficult RPV head examination access. This configuration coupled with a challenging working environment would lead to excessive (undue) personnel exposure and potential contamination. Therefore, compliance with Code Case N-729-1 as conditioned by 10 CFR 50.55a(g)(6)(ii)(D)(3), results in a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

5. Proposed Alternative and Basis for Use

The Nuclear Regulatory Commission (NRC) First Revised Order EA-03-009, Section IV.C(5)(b)(i) required ultrasonic techniques to be used to meet the inspection requirements of the Order which included an assessment to determine if leakage has occurred into the annulus between the RPV head penetration nozzle and the RPV head low-alloy steel.

In lieu of implementing the "demonstrated volumetric or surface leak path assessment through all J-groove welds" as required by ASME Code Case N-729-1 and conditioned by 10 CFR 50.55a(g)(6)(ii)(D)(3) during the 2009 PNP refueling outage, Entergy (ENO) proposes that a volumetric leak path assessment be performed consistent with that used to meet the requirements of the First Revised NRC Order EA-03-009, Section IV.C.(5)(b)(i). In accordance with Code Case N-729-1, Item B4.10, ENO will perform a bare metal visual examination of the entire outer surface of the RPV head in the 2009 PNP refueling outage. The combination of volumetric leak path assessment and bare metal visual examination of the reactor closure head outside surface provides a comprehensive approach for detection of reactor coolant system leakage past the J-groove weld.

Bare Metal Visual Inspections

The effectiveness of the bare metal visual examination for detecting boric acid leakage past the J-groove weld is addressed in MRP 117, "Materials Reliability Program Inspection Plan for Reactor Vessel Closure Head Penetrations in U.S. PWR Plants", Section 3.4, which states:

> *Section 7 of the top-level safety assessment report (MRP-110 [5]) describes the evaluations that verify that protection against boric acid wastage is provided by the bare metal visual examinations for evidence of leakage required by Sections 5 and 6*

of this document. This conclusion is supported by the experience with over 50 leaking CRDM nozzles, including the observation that the large wastage cavity at one plant would have been detected relatively early in the wastage progression had bare metal visual examinations been performed at each refueling outage, and likely even if performed less frequently, with appropriate corrective action. In addition, the wastage modeling presented in MRP-110 supports the adequacy of bare metal visual examination performed according to the sensitivity and coverage requirements of Section 5.1 and at the frequency defined in Section 6.

Therefore, there is a high confidence that leakage resulting in boric acid wastage or steam cutting would be detectable by a bare metal visual examination from boric acid flow at the RPV head surface of the nozzle annulus.

ENO has performed bare metal visual inspections of essentially 100 percent of the outer surface of the RPV head during refueling outages 2003, 2004, 2006, and 2007. The results of these inspections have revealed no visible signs of leakage at the CRD and ICI nozzles.

Ultrasonic Leak Path Assessment Examinations

The PNP RPV head was fabricated by Combustion Engineering. The reactor head contains 45 3.5 inch CRD and eight 4.5 inch ICI nominal outside diameter (OD) nozzle penetrations and a single vent line penetration. These 54 nozzles are installed with an interference fit to ensure nozzle retention with the RPV head.

Volumetric (ultrasonic) leak path assessment technology has been used on the CRD and ICI nozzles at PNP to satisfy the First Revised NRC Order EA-03-009 requirements. This technology introduces an ultrasonic signal from the tube inside diameter (ID) where changes in acoustic impedance at the tube backwall are detected in the interference fit region. Because the tube OD is secured to the reactor head base material as a result of the interference fit, a portion of the ultrasonic energy is transmitted through this interface. In the case where leakage into the annulus area between the tube and head base material results in boric acid wastage or steam cutting, the interference fit is reduced in a localized area of the nozzle annulus. This condition is detected by distinguishing variation in tube OD response signal amplitude in the reduced contact area as compared to the surrounding areas.

Ultrasonic leak path assessments using techniques developed over the last six years have been employed extensively in RPV head inspections and have been substantiated to be an effective process. Taken concurrent with the bare metal visual inspection, the current ultrasonic leak path assessment techniques provides a diverse means to confirm nozzle J-groove weld integrity consistent with First Revised NRC Order EA-03-009. A summary of industry leak path assessment techniques and proven results were presented to the NRC during a presentation by Nuclear Entergy Institute and MRP Engineering representatives on November 24, 2008. At that meeting, it was shown that a high degree of confidence exits in the ability of current assessment techniques using ultrasonic leak

path detection methods to detect boric acid leakage or steam cutting in the interference fit region of the nozzle. The leak path examination techniques being used by AREVA-ANP have been demonstrated from both laboratory testing and tests results during examinations in the field. These techniques are representative of the approaches presented in the November 24, 2008 meeting. Moreover, it is not envisioned that the existing technology used to perform the volumetric leak path assessment in accordance with the First Revised NRC Order EA-03-009 will need to be altered to meet the new demonstration obligation.

ENO has previously completed three volumetric leak path examinations in accordance with the NRC Order for the 53 PNP CRD and ICI penetration nozzles. The examination results from those examinations will provide a baseline for comparison with the 2009 PNP refueling outage examinations.

Conclusion

Performing a "demonstrated volumetric or surface leak path assessment through all J-groove welds" as required by ASME Code Case N-729-1 as conditioned by 10 CFR 50.55a(g)(6)(ii)(D)(3), would result in hardship without a compensating increase in the level of quality and safety.

The proposed alternative for a volumetric leak path assessment performed in accordance with the First Revised NRC Order EA-03-009, when combined with a bare metal visual examination, provides confidence that leakage past the J-groove weld into the annulus region would be detected during the 2009 refueling outage. These examinations and inspection techniques provide a defense-in-depth leak path assessment that assures the structural integrity of the RPV head.

6, Duration of Proposed Alternative

The duration of the proposed alternative applies only to the CRD and ICI reactor head penetration nozzle examinations scheduled to be performed in the 2009 refueling outage in accordance with Code Case N-729-1 as conditioned by 10 CFR 50.55a(g)(6)(ii)(D)(3).

7. Precedent

Leak path assessment is addressed by the First Revised NRC Order EA-03-009, Section IV.C.(5)(b)(i), which states "In addition, an assessment shall be made to determine if leakage has occurred into the annulus between the RPV head penetration nozzle and the RPV head low-alloy steel."

In addition, there are three pending relief requests with the NRC staff regarding an alternative to performing a demonstrated leak path assessment associated with examinations performed per Code Case N-729-1:

ENCLOSURE 1

RELIEF REQUEST FOR ALTERNATIVE TO CODE CASE N-729-1 REGARDING DEMONSTRATED LEAK PATH ASSESSMENT OF REACTOR HEAD PENETRATION NOZZLES

1. Pacific Gas & Electric letter DCL-08-103 to the NRC dated December 4, 2008, "ASME Section XI Inservice Inspection Program Relief Request NDE-Leak Path for the Unit 1, Fifteenth Refueling Outage, Third Ten-Year Inservice Inspection Interval to Allow Use of the Rules of the NRC First Revised Order, EA-03-009 for Performance of Volumetric Leak Path Assessment of Reactor Head Penetration Nozzles" for Diablo Canyon Power Plant, Unit 1.

2. ENO letter NL-09-011 to the NRC dated January 22, 2009, "Requests for Relief 3-45, 3-46, 3-47(I), and 3-48 to Support the Unit 3 Refuel Outage 15 Inservice Inspection Program" for Indian Point Energy Center, Unit 3.

3. APS letter 102-05951-DCM/RJR to the NRC dated January 20, 2009, "Relief Request 42 - Proposed Alternative to the Demonstrated Leak Path Assessment Required by 10 CFR 50.55a(g)(6)(ii)(D)(3)" for Palo Verde Nuclear Generating Station.

ENCLOSURE 2
LIST OF COMMITMENTS

This table identifies actions discussed in this letter for which ENO commits to perform. Any other actions discussed in this submittal are described for information only and are not commitments.

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE (If Required)
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
In lieu of implementing the "demonstrated volumetric or surface leak path assessment through all J-groove welds" as required by ASME Code Case N-729-1 as conditioned by 10 CFR 50.55a(g)(6)(ii)(D)(3), ENO will perform a volumetric leak path assessment in the 2009 PNP refueling outage that meets the requirements of the First Revised NRC Order EA-03-009, IV.C.(5)(b)(i). The proposed volumetric leak path examination area will include the length and circumference of the nozzle annulus sufficient to assess a potential leakage path.	X		2009 Refueling Outage