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NL-09-090

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

SUBJECT: Relief Request 08 and 09 For Fourth Ten-Year Inservice Inspection Interval
Indian Point Unit Number 2
Docket No. 50-247
License No. DPR-29

Dear Sir or Madam:

Entergy Nuclear Operations, Inc. (Entergy) is submitting Relief Request No. 08 (RR-08) (Enclosure 1), and Relief Request No. 09 (RR-09) (Enclosure 2) for Indian Point Unit No. 2 (IP2). These relief requests are for the Fourth 10-year Inservice Inspection (ISI) Interval.

The enclosed relief requests each evaluate the proposed alternatives and conclude they provide an acceptable level of quality and safety or that the specified Code requirements would result in unnecessary hardship without a compensating increase in the level of quality and safety. The relief requests are requested under the provisions of 10CFR 50.55a(a)(3)(i) and 10 CFR 50.55a(a)(3)(ii).

Entergy requests approval of the relief requests by March 9, 2010, to support the IP2 Refueling Outage (RFO) – 2R19. The relief requests 08 and 09 result from the recent rule change to 10 CFR 50.55a. The first relief request is to ask for an alternative to use a demonstrated leak path assessment as compliance with Code Case N-729-1. The demonstration of a volumetric leak path assessment is an industry effort that is still uncertain as to the schedule. This relief request allows the NRC ample time to review the relief request and, if the industry is successful, the relief request can be withdrawn. The second relief request is due to the elimination of the rule for reactor head inspections which requires a relief request to be submitted to replace the prior rule relaxation.

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There are no new commitments identified in this submittal. If you have any questions or require additional information, please contact Mr. Robert Walpole, Licensing Manager at 914-734-6710.

Very truly yours,

RW/sp

Enclosures: 1. Relief Request 08 Proposed Alternative For Demonstrated Leak Path Assessment

2. Relief Request 09 Proposed Alternative Examination Area

cc: Mr. John P. Boska, Senior Project Manager, NRC NRR DORL
Mr. Samuel J. Collins, Regional Administrator, NRC Region I
NRC Resident Inspector's Office Indian Point
Mr. Paul Eddy, New York State Department of Public Service
Mr. Robert Callender, Vice President NYSERDA

Enclosure 2 To NL-09-090

RELIEF REQUEST 08

PROPOSED ALTERNATIVE FOR DEMONSTRATED LEAK PATH ASSESSMENT

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
DOCKET NO. 50-247

Proposed Alternative in Accordance with 10 CFR 50.55a(a)(3)(ii)
- Hardship or Unusual Difficulty Without a Compensating Increase in Level of Safety or Quality -

1. ASME Code Component(s) Affected

Component Number: B4.20 (Per Code Case N-729-1 Table 1)

Description: Reactor Pressure Vessel (RPV) Head Penetration Nozzles (97 locations)

Code Class: 1

2. Applicable Code Edition and Addenda

The Code of Record for Indian Point Unit 2 Inservice Inspection Fourth Ten-Year Interval is the ASME Section XI Code, 2001 Edition, 2003 Addenda as augmented by Code Case N-729-1 with limitations/modifications for use stated in 10 CFR 50.55a(g)(6)(ii)(D)(3). Code Case N-729-1 was approved September 8, 2008 and upon implementation supersedes the First Revised NRC Order EA–03–009.

3. Applicable Code Requirement

Code Case N-729-1, Section 2500 states that components shall be examined as specified in Table 1. The inspections required in Table 1 consist of a visual examination of the bare-metal surface of the outer surface of the head as shown in Figure 1 and volumetric/surface examination as shown in Figure 2. Alternatively, 10CFR50.55a(g)(6)(ii)(D)(3) allows a demonstrated volumetric or surface leak path assessment to be performed in lieu of the examination requirements of Table 1.

4. Reason for Request

The wording of 10CFR50.55a(g)(6)(ii)(D)(3) to perform a demonstrated volumetric or surface leak path assessment through all J-groove welds during the upcoming Indian Point Unit 2 nineteenth refueling outage (2R19) scheduled to start in March 2010 poses a potential hardship due to the expedited implementation of the requirement to perform a demonstrated volumetric leak path assessment and the personnel exposure associated with alternative surface examinations.

The industry has initiated efforts to accomplish a volumetric leak path assessment. However, the extent of remaining tasks may preclude successful completion in time to support the spring 2010 outage.

The optional surface examination of the J-welds poses a hardship due to the greatly increased personnel radiation exposure associated with this examination technique and the additional risk of heat stress to inspection personnel. The supplementary scans and additional robotic tool reconfigurations required to accomplish surface examinations result in a significant extension to the examination duration and the accompanying increase in the total dose received. More importantly, the complicated geometry of the J-weld surface, particularly on penetrations other than those very close to the reactor head center, poses an extremely difficult challenge for remote inspection. Furthermore, the guide funnels attached to the outside diameter (OD) of the nozzles obstruct access to the J-weld surface

Dose rates under the head near the J-weld areas are expected to be in the order of 3-5 Rem/hour range based on previous survey data. In addition, the area under the head is posted as a Locked High Radiation Area and a High Contamination Area.

The performance of additional manual volumetric and/or surface exams under these hazardous radiological conditions creates a hardship without a compensating increase in the level of quality and safety.

5. Proposed Alternative and Basis For Use

The First Revised NRC Order, EA-03-009, Section IV.C(5) contained techniques to be used to meet the inspection requirements of Order Section IV.C and included an assessment to determine if leakage has occurred into the annulus between the reactor pressure vessel head (RPV) 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 imposed by 10 CFR 50.55a(g)(6)(ii)(D)(3), Entergy proposes to perform the same volumetric leak path assessment previously used to meet the requirement of the First Revised NRC Order EA-03-009, Section IV.C.(5). The proposed alternative for the 97 control rod drive mechanism (CRDM) nozzles is a volumetric leak path assessment to determine if leakage has occurred into the annulus between the CRDM nozzle and the RPV head low-alloy steel. The examination region will extend from the bottom of the J-groove weld to a minimum of 1 inch above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) on each of the CRDM penetrations.

The volumetric (ultrasonic) leak path assessment technology used on the CRDM nozzles to satisfy the First Revised NRC Order EA-03-009 requirements employs a zero degree incidence longitudinal wave introduced from the tube inside diameter (ID). The response from the tube outside diameter (OD) in the interference fit region is monitored for changes in amplitude due to variations in reflected vs. transmitted energy. Because the tube OD is in contact with 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 corrosion or steam cutting, the contact is lost in a localized area and a groove is formed. This condition is detected by looking for variations in tube OD response signal amplitude in the reduced contact area as compared to the surrounding areas. In addition, leakage resulting in steam cutting would also be detected by the bare metal visual examination performed on the outer surface of the reactor head.

Entergy's inspection vendor, WesDyne International, manufactured a mockup for leak path technique development that simulates the corrosion or steam cutting condition. The mockup consists of a low alloy carbon steel sleeve with machined ID grooves and holes that is installed over a section of Alloy 600 penetration tube with a 2 millimeter interference fit. Test results demonstrated that the machined grooves and holes in the sleeve are readily detectable using the zero degree amplitude discrimination methodology described above when imaged by the analysis software. The presence of water in these grooves and holes had no effect on the ability of the inspection to detect the grooves and holes.

In conjunction with the volumetric leak path assessment, Entergy will also conduct a bare metal visual examination of the outside surface of the head as required by the Code Case.

The efficacy of the bare metal visual examination is addressed in MRP 117 "Materials Reliability Program Inspection Plan for Reactor Vessel Closure Head Penetrations in U.S. PWR Plants" section 3.4, "Protection Against Significant Boric Acid Wastage of the Low Alloy Steel Head" which states in part: "Section 7 of the top-level safety assessment report (MRP-110) 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.

Entergy has previously completed volumetric leak path examinations in accordance with the NRC Order on all of the 97 CRDM nozzles. The digitally recorded examination results from those examinations provide an excellent baseline for comparison with the pending 2R19 inspections. Moreover, current appraisals indicate that the existing technology used to perform the volumetric leak path assessment in accordance with the First Revised NRC Order EA-03-009 will not need to be significantly altered to meet the new demonstration obligation.

The combination of a volumetric leak path assessment and bare metal visual examination of the reactor closure head outside surface provides a comprehensive approach for detection of leakage past the J-weld for the CRDM nozzles.

6. **Duration of Proposed Alternative**

Relief is requested for the fourth ten-year interval of the Inservice Inspection Program for Indian Point Unit 2, which began March 1, 2007 and concludes April 3, 2016 or until such time that a volumetric leak path assessment is satisfactorily demonstrated.

7. **Precedents**

The combination of a volumetric leak path assessment and bare metal visual examination of the reactor closure head outside surface (in addition to the volumetric examination of the nozzle base material) was previously accepted for meeting the requirements of 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."

8. **References**

None

Enclosure 2 To NL-09-090

RELIEF REQUEST 09

PROPOSED ALTERNATIVE EXAMINATION AREA

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
DOCKET NO. 50-247

Proposed Alternative in Accordance with 10 CFR 50.55a(a)(3)(i)
-Alternative Provides an Acceptable Level of Quality and Safety-

1. ASME Code Components Affected

Examination Category: B-E
Item Number: B4.12

Description: Control Rod Drive Nozzles
Code Class: 1

2. Applicability Code Additions and Addenda

The Code of Record for Indian Point Unit 2 Inservice Inspection Fourth Ten-Year Interval is the ASME Section XI Code, 2001 Edition, 2003 Addenda as augmented by Code Case N-729-1 with limitations/modifications for use stated in 10 CFR 50.55a(g)(6)(ii)(D)(3). Code Case N-729-1 was approved September 8, 2008 and upon implementation supersedes the First Revised NRC Order EA–03–009.

3. Applicable Code Requirement

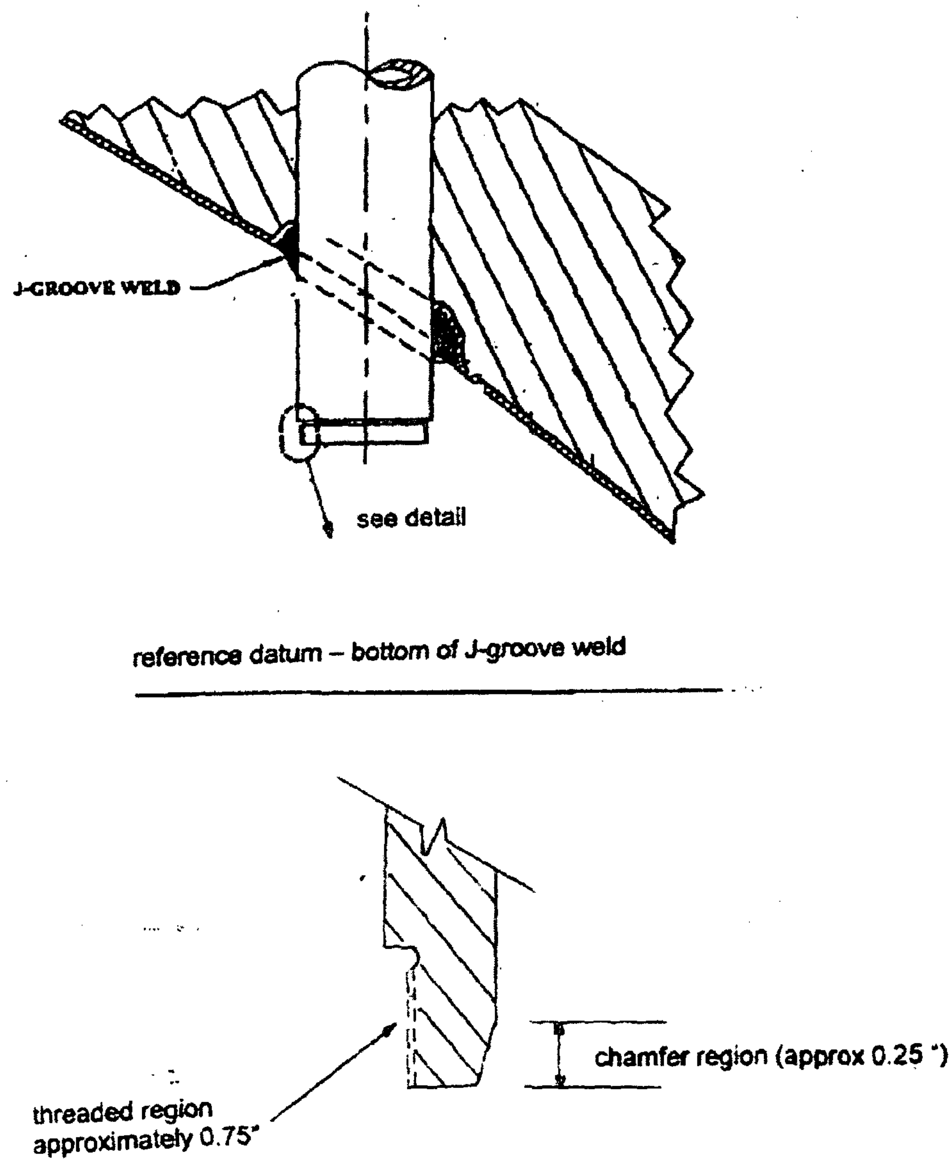
Code Case N-729-1, Section 2500 states that components shall be examined as specified in Table 1 of Code Case N-729-1 and if obstructions or limitations prevent examination of the volume or surface required by Figure 2 for one or more nozzles, the analysis of Appendix I shall be used to demonstrate the adequacy of the examination volume or surface of each nozzle. 10 CFR 50.55a(g)(6)(ii)(D)(6) states that Appendix I of ASME Code Case N-729-1 shall not be implemented without prior NRC approval.

Code Case N-729-1, Figure 2, Examination Volume for Nozzle Base Metal and Examination Area for Weld and Nozzle Base Metal, identifies the examination volume or surface as "a = 1.5 in. (38 mm) for Incidence Angle, Θ, ≤ 30 deg and for all nozzles ≥ 4.5 in. (115 mm) OD or 1 in. (25 mm) for Incidence Angle, Θ, > 30 deg; or to the end of the tube, whichever is less."

4. Reason for Request

The design of the RPV head penetration nozzles (see Figure 1) includes a threaded section, approximately ¾ inches long, at the bottom of the nozzles. The dimensional configuration at some nozzles is such that the inspectable distance from the lowest point of the toe of the J-groove weld to the bottom of the scanned region is less than the 1-inch and 1 ½ inch lower boundary limit as defined in Figure 2 of Code Case N-729-1.

Figure 1



5. **Proposed Alternative and Basis For Relief**

Use Appendix I of Code Case N-729-1 to define an alternative examination area/volume to that defined in Figure 2 of the Code Case.

Perform UT from the inside surface of each RPV head penetration nozzle from 1-inch and 1 ½ inch above the J-groove weld (i.e., the upper boundary limit defined in Figure 2 of Code Case N-729-1) and extending down the nozzle to at least the top of the threaded region. Table 1 provides the minimum inspection coverage required to ensure that a postulated axial through-wall flaw in the un-inspected area of the CRDM penetration nozzle will not propagate into the pressure boundary formed by the J-groove weld prior to a subsequent inspection (i.e. 2 Effective Full Power Years, EFPY). The time estimates are more than the time between successive inspections. This exam provides reasonable assurance that structurally significant flaws will not exist at or above the weld root and assure that operation between refueling outages can be accomplished without pressure boundary leakage from the examined nozzles.

TABLE 1

IP2 RPV Head Penetrations – Minimum Inspection Coverage Requirements Below the J-Groove Weld to ensure structural integrity and leak tightness between inspections

Nozzle Penetration No.	Angle of Incidence (Degrees)	(1) Minimum Required UT Coverage Below J-Groove Weld with > 2 EFPY by Crack Growth Evaluation (Inches)	Time (EFPY) to Reach the Lowest Point of the Toe of the J-Groove Weld
1 through 25	0 to 23.3	0.55	4.6
26 through 69	24.8 to 38.6	0.45	4.4
70 through 81	44.3	0.25	8.4
82 through 89	45.4	0.25	6.8
90 through 97	48.7	0.18	5.0
Note:			
(1) Length below the lowest point at the toe of the J-groove weld (downhill side) that has an operating stress level of 20 ksi: 0.86 inches at nozzles 1 through 25; 0.40 inches at nozzles 26 through 69; 0.32 inches at nozzles 70 through 81 0.34 inches at nozzles 82 through 89, and 0.32 inches at nozzles 90 through 97.			

6. Duration of Propose Alternative

Relief is requested for the fourth ten-year interval of the Inservice Inspection Program for Indian Point Unit 2, which began March 1, 2007 and concludes April 3, 2016.

7. Precedents

1. Safety Evaluation for Unit 3, "Relaxation of First Revised Order on Reactor Vessel Nozzles, Indian Point No. 2 (TAC MC9230) dated February 27, 2006.

8. References

None