



Entergy Nuclear Northeast
Indian Point Energy Center
450 Broadway, GSB
P.O. Box 249
Buchanan, NY 10511-0249
Tel 914 254 6700

Anthony Vitale
Site Vice President

NL-17-159

December 20, 2017

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

SUBJECT: Relief Request IP2-ISI-RR-05 Alternative Examination Volume Required by Code Case N-729-4
Indian Point Unit No. 2
Docket No. 50-247
License No. DPR-26

REFERENCES:

1. Indian Point Nuclear Generating Unit No. 2 – safety Evaluation For Relief Request IP2-ISI-RR-02 Alternative examination volume required by Code Case N-729-1, dated July 14, 2016 (ML16147A519)
2. Entergy letter NL-16-055, "Response to request for Additional Information Regarding Relief Request IP2-ISI-RR-02 Alternate Examination Volume Required by Code case N-279-1 dated May 6, 2016 (ML16133A036)
3. NRC Letter, Indian Point Nuclear Generating Unit No.2 – Request for Additional Information Regarding Relief Request IP2-ISI-RR-02 Alternative Examination Volume Required by Code Case N-729-1, dated April 26, 2016 (ML16112A226)
4. Entergy Letter NL-15-139, "Relief Request IP2-ISI-RR-02 Alternative Examination Volume Required by Code Case N-729-1", dated December 9, 2015 (ML15349B009)

Dear Sir or Madam:

Pursuant to 10 CFR 50.55a(z)(2) Entergy Nuclear Operations, Inc. (Entergy) is submitting the enclosed Relief Request No. 05 (IP2-ISI-RR-05) for Indian Point Unit No. 2 (IP2). This relief request is identical to IP2-ISI-RR-02, which was previously approved by the NRC (References 1-4), except that it updates the applicable revision of the Code Case from N-729-1 to N-729-4.

Entergy is submitting the enclosed Relief Request No. 05 (IP2-ISI-RR-05) for Indian Point Unit No. 2 (IP2) to use an alternative to the 2007 Edition with the 2008 Addenda of ASME Section XI as augmented by Code Case N-729-4 requirements with limitations/modifications for use stated in 10 CFR 50.55a (g)(6)(ii)(D)(2). This relief request is for the Fifth 10-year Inservice Inspection (ISI) Interval made in accordance with 10 CFR 50.55a(z)(2):

"Alternatives to codes and standards requirements. Alternatives to the requirements of paragraphs (b) through (h) of this section or portions thereof may be used when authorized

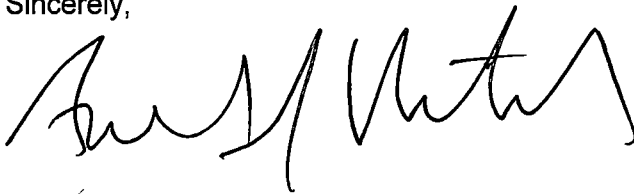
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by the Director, Office of Nuclear Reactor Regulation, or Director, Office of New Reactors, as appropriate. A proposed alternative must be submitted and authorized prior to implementation. The applicant or licensee must demonstrate that:

(2) *Hardship without a compensating increase in quality and safety.* Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety."

If you have any questions or require additional information, please contact Mr. Robert Walpole, Manager, Regulatory Assurance at (914) 254-6710.

Sincerely,



AJV/mm

Attachment: Indian Point Unit 2 Nuclear Plant - 10 CFR 50.55a Request No: IP2-ISI-RR-05
Proposed Alternative in Accordance With 10 CFR 50.55a(z)(2) - Examination
Volume Required by Code Case N-729-4

cc: Mr. David Iew, Acting Regional Administrator, NRC Region 1
Mr. Richard V. Guzman, Senior Project Manager, NRR/DORL, NRC
Ms. Alicia Burton, President and CEO, NYSERDA (w/o proprietary information)
Ms. Bridget Frymire, New York State Dept. of Public Service (w/o proprietary information)
NRC Resident Inspector's Office

ATTACHMENT TO NL-17-159

**Indian Point Unit 2 Nuclear Plant
10 CFR 50.55a Request No: IP2-ISI-RR-05
Proposed Alternative in Accordance With 10 CFR 50.55a(z)(2)
Examination Volume Required by Code Case N-729-4**

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

**Indian Point Unit 2 Nuclear Plant
10 CFR 50.55a Request No: IP2-ISI-RR-05
Proposed Alternative in Accordance With 10 CFR 50.55a(z)(2)
Examination Volume Required by Code Case N-729-4**

1. ASME COMPONENT IDENTIFICATION

Code Class:	1
References:	Code Case N-729-4
Examination Category:	Not Applicable
Item Number:	B4.20 (N-729-4 Item No.)
Description:	Code Case N-729-4 Examination Volume

2. APPLICABLE ASME CODE & 10 CFR 50.55a REQUIREMENTS

The code of record for the Indian Point Unit 2 (IP2) Inservice Inspection Fifth Interval is the ASME Section XI Code, 2007 Edition including the 2008 Addenda as augmented by Code Case N-729-4 with limitations/modifications for use stated in 10 CFR 50.55a(g)(6)(ii)(D)(2).

Code Case N-729-4, Section 2500 states that components shall be examined as specified in Table 1 of Code Case N-729-4 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)(2) states that Appendix I of ASME Code Case N-729-4 shall not be implemented without prior NRC approval.

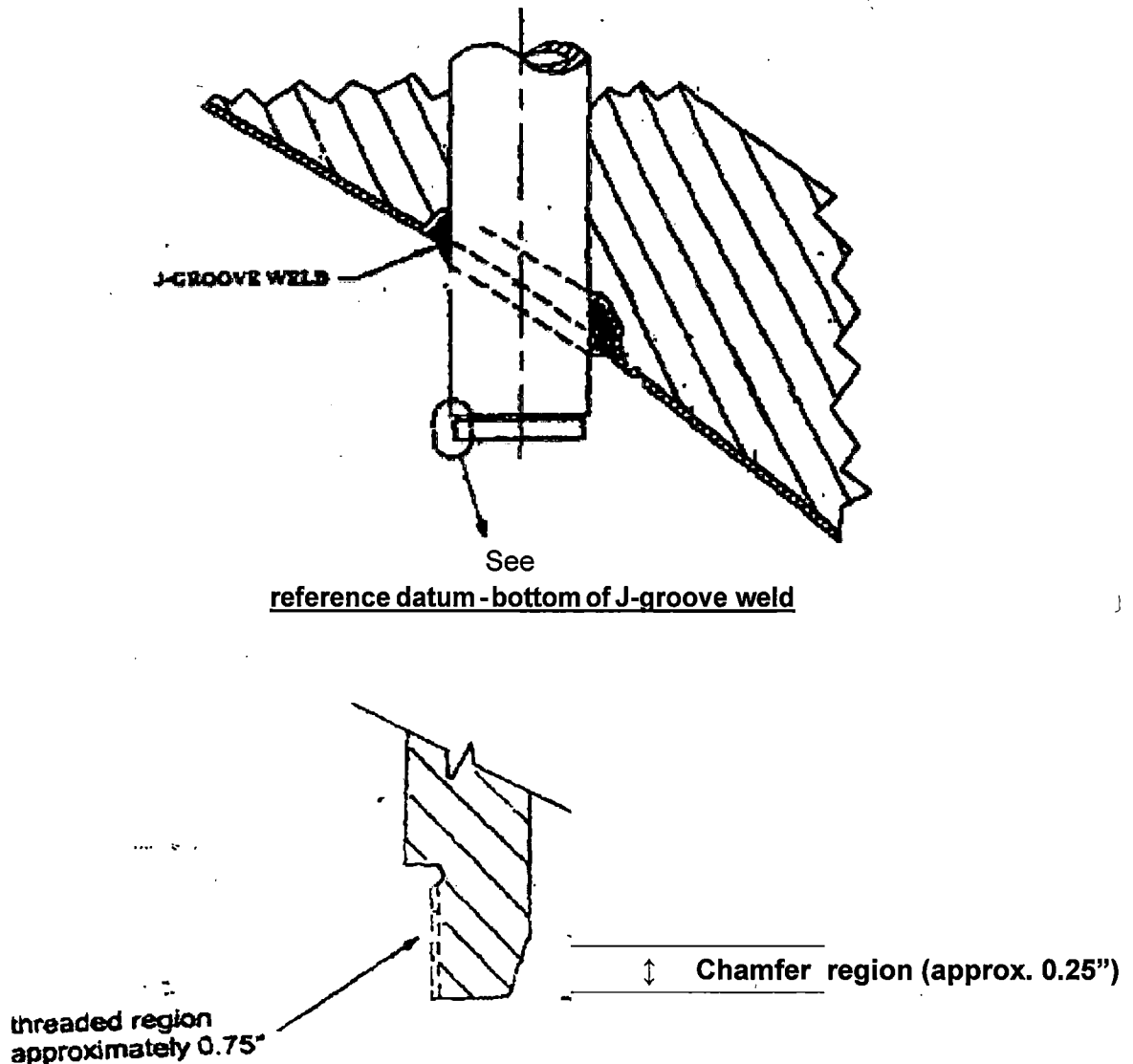
Code Case N-729-4, Figure 2, Examination Volume for Nozzle Base Metal and Examination Area for Weld and Nozzle Base Metal, identifies the examination volume or surface as "a = 1.5 in. (38 mm) for Incidence Angle, θ , ≤ 30 deg and for all nozzles ≥ 4.5 in. (115 mm) OD or 1 in. (25 mm) for Incidence Angle, θ , > 30 deg; or to the end of the tube, whichever is less."

3. REASON FOR REQUEST

The design of the RPV head penetration nozzles (see Figure 1) includes a threaded section, approximately 3/4 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 1/2 inch lower boundary limit as defined in Figure 2 of Code Case N-729-4. There is no current qualified volumetric inspection technique to interrogate the physical geometry of the threaded region at the nozzle end. Inspection by surface examination techniques is an available option to meet the current regulatory requirement; however radiation dose rates under the head near the J-groove weld areas are expected to be in the 3 to 5 Rem/hour range. Additionally, the area under the head is posted as a locked high radiation area and high contamination area. Performance of the required exam is considered a hardship as a result.

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Examination Volume Required by Code Case N-729-4**

Figure 1



The following identifies penetrations for which the requirements of Figure 2 cannot be met and for which relief is requested:

Based on Reactor Vessel head penetration examinations from 2R19 to 2R22, penetrations 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, and 37, do not meet the 1.5" examination volume criterion specified in Code Case N-729-4 for an incident angle of less than or equal to 30 degrees and penetrations 38, 39, 40, 41,

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47, 52, 53, 58, 62, 64, 65, 67, 68, 70, 71, 74, 75, 77, 78, 79, 80, 81, 82, 84, 88, 89, 90, 93, 94 and 97 do not meet the 1.0" examination volume criterion specified in Code Case N-729-4 for an incident angle of greater than 30 degrees. Relief is requested for these penetrations. Examinations performed from 2R19 to 2R22, examination volume coverage for penetrations 2, 42, 48, 50, 54, 56, 59, 60, 63, 66, 72, 76, 83, 85, 86, 87, 91, 92 and 96 were measured to be within 0.080" of the examination volume criterion. Relief is also preemptively requested for these penetrations to avoid an exigent relief request.

4. PROPOSED ALTERNATIVE AND BASIS FOR USE

Pursuant to 10 CFR 50.55a(z)(2) an alternative is requested to use Code Case N-729-4, Figure 2. An alternative examination volume to that defined in Figure 2 of the Code Case will be used. The relaxed volume based upon flaw analysis (Reference 1) is the same volume used in the fourth interval and previously approved by the NRC. The alternative examination volume provides reasonable assurance of structural integrity, and meeting the Code requirements would result in hardship without a compensating increase in level of quality and safety. The alternative examination volume and basis follows.

IP2 will perform qualified volumetric examinations (UT) in accordance with 10 CFR 50.55a for circumferential and axial flaw detection 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-729-4) 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 for a flaw in the un-inspected region to grow to the toe of the weld 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. Reference 1 provides the supporting flaw analysis information used in developing Table 1.

Note that the UT examination volume coverage to "at least the top of the threaded region" meets or exceeds the requirements listed in Table 1 for each nozzle for which relief is requested.

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Proposed Alternative in Accordance With 10 CFR 50.55a(z)(2)
Examination Volume Required by Code Case N-729-4**

**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.			

Our Ultrasonic inspection vendor has verified that their system is qualified in accordance with Section 2500 requirements of Code Case N-729-4 for circumferential and axial flaw detection below the J-groove weld extending to the distance specified in Table 1.

5. DURATION OF PROPOSED ALTERNATIVE

Relief is requested for the Fifth Inspection Interval starting June 1, 2016 and currently scheduled to end May 31, 2026.

6. PRECEDENTS

1. Entergy Letter NL-15-139, "Relief Request IP2-ISI-RR-02 Alternative Examination Volume Required by Code Case N-729-1", dated December 9, 2015 (ML15349B009)
2. NRC Letter, Indian Point Nuclear Generating Unit No.2 – Request for Additional Information Regarding Relief Request IP2-ISI-RR-02 Alternative Examination Volume Required by Code Case N-729-1, dated April 26, 2016 (ML16112A226)

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4. Indian Point Nuclear Generating Unit No. 2 – safety Evaluation For Relief Request IP2-ISI-RR-02 Alternative examination volume required by Code Case N-729-1, dated July 14, 2016 (ML16147A519)
5. Entergy Letter NL-09-163: "Relief Request, IP3-ISI-RR-04 For Four Ten-Year Inservice Inspection Interval Indian Point Unit Number 3", dated December 23, 2009, as supplemented by Entergy letter NL-10-050 dated May 13, 2010 (ML101410295) was essentially the same and approved by the NRC on October 1, 2010 (ML102590213)

7. REFERENCES

1. Entergy Letter to NRC, NL-09-130 (contains Westinghouse proprietary information), dated 9/24/09 (TAC NO. ME1658, ADAMS Accession NO. ML092800242)