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Lawrence Coyle
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NL-15-139

December 9, 2015

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

**SUBJECT:** Relief Request IP2-ISI-RR-02 Alternative Examination Volume Required by Code Case N-729-1
Indian Point Unit Number 2
Docket No. 50-247
License No. DPR-26

Dear Sir or Madam:

Pursuant to 10CFR50.55a(z)(2), Entergy Nuclear Operations, Inc. (Entergy) requests relief to use an alternative to the 2007 edition with the 2008 Addenda of ASME Section XI as augmented by Code Case N-729-1 requirements with limitations/modifications for use stated in 10CFR50.55a(g)(6)(ii)(D)(3). This relief request is for the Fifth 10-year ISI Interval which is scheduled to start June 1, 2016 when IP-2 updates to the 2007 Edition/2008 Addenda of ASME Section XI for performing ISI.

Entergy is submitting, enclosed, Relief Request No. 02 (IP2-ISI-05-RR-02) for Indian Point Unit No. 2 (IP2). This relief request is for the Fifth 10-year Inservice Inspection (ISI) Interval made in accordance with 10 CFR 50.55a(z)(2). The 10 CFR 50.55a(z)(2) requirements are as follows:

> "*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 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."

A047
NRR

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

Sincerely,

D. H. Mayer for L.C.

LC/sp

Attachment: 10 CFR 50.55a Request No. IP2-ISI-RR-02 Proposed Alternative in Accordance With 10 CFR 50.55a(z)(2)

cc: Mr. Douglas Pickett, Senior Project Manager, NRC NRR DORL
Mr. Daniel H. Dorman, Regional Administrator, NRC Region 1
NRC Resident Inspectors Office
Mr. Francis J. Murray, Jr., President and CEO, NYSERDA
Ms. Bridget Frymire, New York State Dept. of Public Service

ATTACHMENT TO NL-15-139

# 10 CFR 50.55a REQUEST NO. IP2-ISI-RR-02

# PROPOSED ALTERNATIVE IN ACCORDANCE

# WITH 10 CFR 50.55a(z)(2)

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-02
# Proposed Alternative in Accordance With 10 CFR 50.55a(z)(2)
# Examination Volume Required by Code Case N-729-1

## 1. ASME COMPONENT IDENTIFICATION

| | |
|---|---|
| Code Class: | 1 |
| References: | Code Case N-729-1 |
| Examination Category: | Not Applicable |
| Item Number: | B4.20 (N-729-1 Item No.) |
| Description: | Code Case N-729-1 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-729-1 with limitations/modifications for use stated in 10 CFR 50.55a(g)(6)(ii)(D)(3).

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. 10CFR50.55a(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, $\theta$, $\leq$ 30 deg and for all nozzles $\geq$ 4.5 in. (115 mm) OD or 1 in. (25 mm) for Incidence Angle, $\theta$, > 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-729-1. 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

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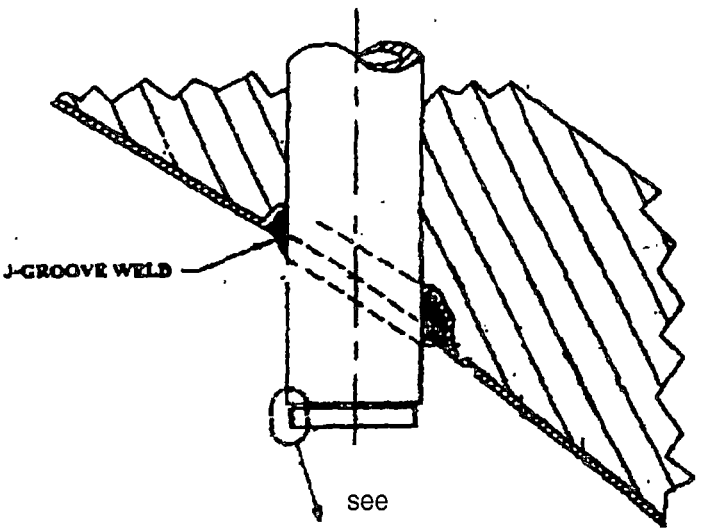
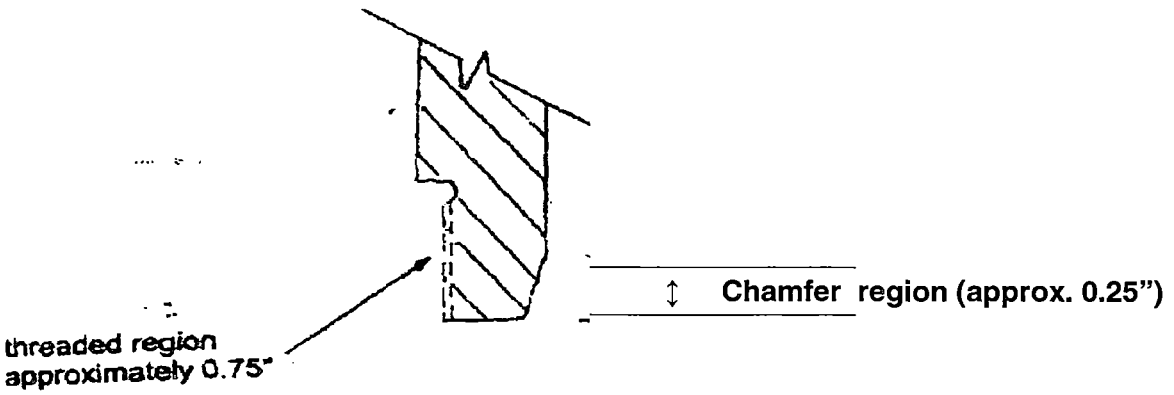
locked high radiation area and high contamination area. Performance of the required exam is considered a hardship as a result.

Figure 1




**reference datum - bottom of J-groove weld**




## 4. PROPOSED ALTERNATIVE AND BASIS FOR USE

Pursuant to 10 CFR 50.55a(z)(2) an alternative is requested to the use of Code Case N-729-1, Figure 2. An alternative examination volume to that defined in Figure 2 of the Code Case will be

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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-729-1) 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. Reference 1 provides the supporting flaw analysis information used in developing Table 1.

**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 Evaluaion (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. | | | |

# Indian Point Unit 2 Nuclear Plant
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Our ultrasonic inspection vendor has verified that their system is qualified in accordance with 10 CFR 50.55a 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. Safety Evaluation for Unit 3, "Relaxation of First Revised Order on Reactor Vessel Nozzles, Indian Point No. 2 (TAC NO. MC9230, ADAMS Accession NO. ML0600090142) dated February 27, 2006.

2. Indian Point Unit 2 Fourth Interval Relief Request, RR-09, dated July 1, 2009 was essentially the same and approved by the NRC on March 1, 2010 (TAC NO. ME1658, ADAMS Accession NO. ML100570081)

3. Indian Point Unit 3 Fourth Interval Relief Request, RR-04, dated December 23, 2009 was essentially the same and approved by the NRC on October 1, 2010 (TAC NO. ME3017).

## 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)