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Robert Walpole
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January 22, 2009

Re: Indian Point Unit 3
Docket No. 50-286

NL-09-011

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

SUBJECT: Requests For Relief 3-45, 3-46, 3-47(I) and 3-48 to Support the Unit 3 Refuel Outage 15 Inservice Inspection Program

Dear Sir or Madam:

Entergy Nuclear Operations, Inc. (Entergy) is submitting Relief Request No. 3-45 (RR-3-45) (Enclosure 1), Relief Request No. 3-46 (RR-3-46) (Enclosure 2), Relief Request No. 3-47 (RR-3-47(I)) (Enclosure 3), and Relief Request No. 3-48 (RR-3-48) (Enclosure 4) for Indian Point Unit No. 3 (IP3). These relief requests are for the Third 10-year Inservice Inspection (ISI) Interval.

The enclosed relief requests evaluate the proposed alternatives and concludes 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, 2009, to support the IP3 Refueling Outage (RFO) – 3R15. The relief requests 3-45, 3-46 and 3-48 result from the recent rule change to 10 CFR 50.55a and the efforts of Industry, NEI and NRC to define required relief requests for those plants scheduled for refuel outages in the spring of 2009.

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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,

Robert Walpole
Licensing Manager
Indian Point Energy Center

Attachments
1. Relief Request 3-45 Proposed Alternative Examination Area
2. Relief Request 3-46 Proposed Alternative For Demonstrated Leak Path Assessment
3. Relief Request 3-47 (I) Proposed Alternative To Use of PDI Qualified Procedures, Personnel, and Equipment for Non-Appendix VIII Reactor Vessel Shell to Flange Weld Inspection
4. Relief Request 3-48 Proposed Alternative for Use Of Performance Demonstrated Qualified Procedures And Equipment For RPV Bottom Mounted Instrument Penetration Exams

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

ATTACHMENT 1 TO NL-09-011

RELIEF REQUEST 3-45

PROPOSED ALTERNATIVE EXAMINATION AREA

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3
DOCKET NO. 50-286

Relief Request 3-45
Proposed Alternative Examination Area in Accordance with 10 CFR 50.55a(a)(3)(i)
Alternative Provides an Acceptable Level of Quality and Safety

1. ASME Code Components Affected

Code Class:	1
References:	Code Case N729-1, Table 1
Item Number:	B4.20
Parts Examined:	Control Rod Drive Nozzles
Description:	Reactor Pressure Vessel (RPV) Head Penetration Nozzles (78 Locations)

2. Applicability Code Additions and Addenda

The Code of Record for Indian Point Unit 3 Inservice Inspection Third Ten-Year Interval is the ASME Section XI Code, 1989 Edition, No Addenda as augmented by Code Case N-729-1 with limitations/modifications for use stated in 10 CFR 50.55a(g)(6)(ii)(D). Code Case N-729-1 was approved September 8, 2008 and upon implementation superseded the First Revised NRC Order EA–03–009.

3. Applicable Code Requirement

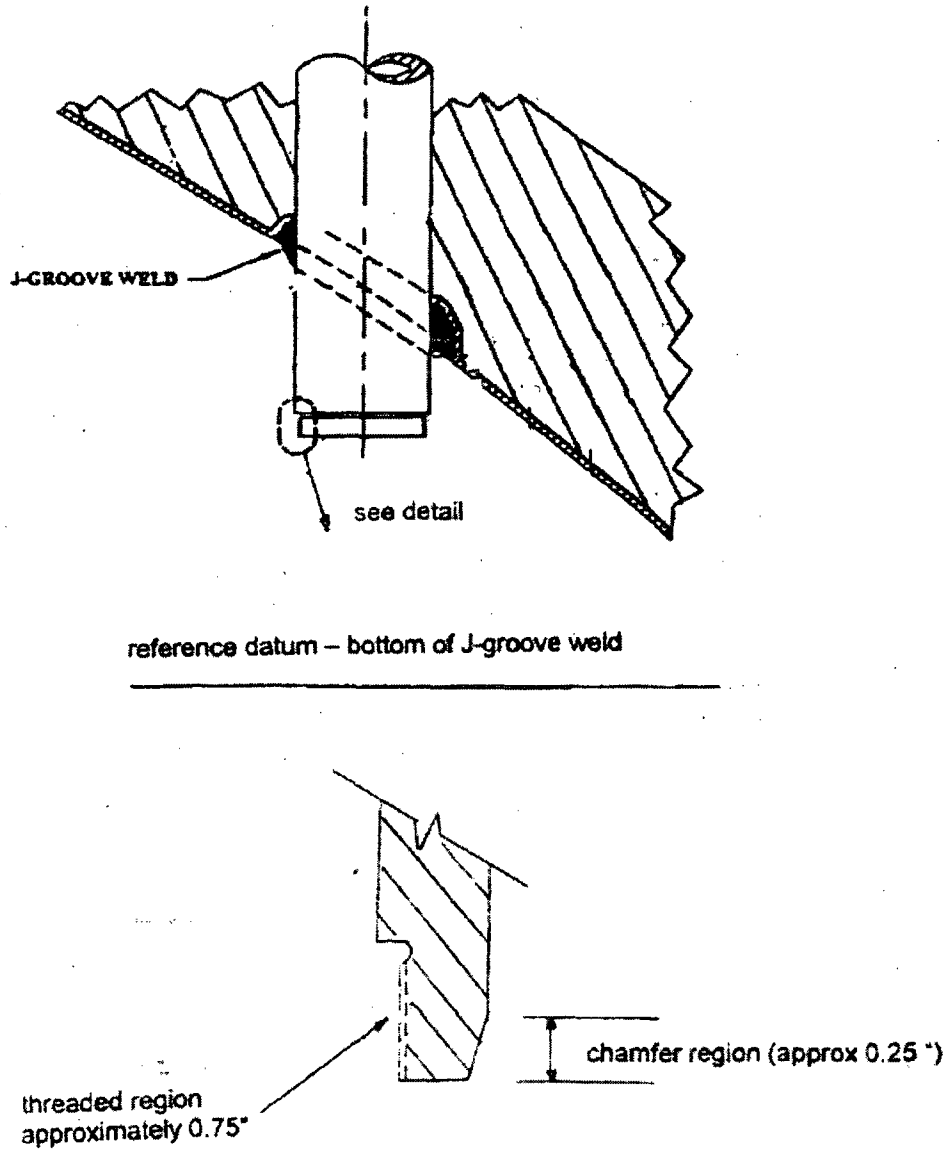
Code Case N-729-1, Section 2500 states that components shall be examined as specified in Table 1 and if obstructions or limitations prevent examination of the volume or surface required by Figure 2 for one or more nozzles, the analysis of Appendix I shall be used to demonstrate the adequacy of the examination 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, $\leq$ 30 deg and for all nozzles $\geq$ 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, as applicable, (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 region 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 toe of the weld and assure that operation between refueling outages can be accomplished without pressure boundary leakage from the examined nozzles.

TABLE 1

IP3 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 29	0 to 24.8	0.4	3.0
30 through 37	26.2	0.4	2.7
38 through 69	30.2 to 38.6	0.4	2.7
70 through 73	44.3	0.3	3.0
74 through 78	48.7	0.3	4.2
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 29; 0.50 inches at nozzles 30 through 69; 0.35 inches at nozzles 70 through 73 and 0.35 inches at nozzles 74 through 78.			

6. **Duration of Propose Alternative**

Relief is requested for the third ten-year interval of the Inservice Inspection Program for Indian Point Unit 3, which began July 21, 2000 and concludes July 21, 2009.

7. **Precedents**

Safety Evaluation for Unit 3, "Relaxation of First Revised Order on Reactor Vessel Nozzles, Indian Point No. 3 (TAC No. 3195) dated March 18, 2005.

ATTACHMENT 2 TO NL-09-011

RELIEF REQUEST 3-46

PROPOSED ALTERNATIVE FOR DEMONSTRATED

LEAK PATH ASSESSMENT

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3
DOCKET NO. 50-286

Relief Request 3-46
Proposed Alternative For Demonstrated Leak Path Assessment In Accordance with 10 CFR 50.55a(a)(3)(ii) Alternative Due to Hardship or Unusual Difficulty Without a Compensating Increase in Level of Safety or Quality

1. ASME Code Component(s) Affected

Code Class:	1
References:	Code Case N729-1, Table 1
Item Number:	B4.20
Parts Examined:	Control Rod Drive Nozzles
Description:	Reactor Pressure Vessel (RPV) Head Penetration Nozzles (78 Locations)

2. Applicable Code Edition and Addenda

The Code of Record for Indian Point Unit 3 Inservice Inspection Third Ten-Year Interval is the ASME Section XI Code, 1989 Edition, No Addenda as augmented by Code Case N-729-1 with limitations/modifications for use stated in 10 CFR 50.55a(g)(6)(ii)(D). 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 bare-metal visual examination of the outer surface of the head as shown in Figure 1 and volumetric/surface examination as shown in Figure 2. Alternatively, 10 CFR 50.55a(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 3 fifteenth refueling outage (3R15) scheduled to start in March 2009 poses a 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 will likely preclude successful completion in time to support the spring 2009 outage.

The optional surface examination of the J-groove welds poses a hardship due to the greatly increased personnel radiation exposure associated with this examination technique. 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-groove 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-groove weld surface.

Dose rates under the head near the J-groove weld areas are expected to be in the range of 2 - 3 Rem/hour 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 78 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 and/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 through the CRDM penetrations 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 and/or steam cutting condition. The mockup consists of a low carbon alloy steel sleeve with machined ID grooves and holes that is installed over a section of Alloy 600 penetration tube with a 2 mil 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 78 CRDM nozzles. The digitally recorded examination results from those examinations provide an excellent baseline for comparison with the pending 3R15 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-groove welds for the CRDM nozzles.

6. Duration of Proposed Alternative

Relief is requested for the third ten-year interval of the Inservice Inspection Program for Indian Point Unit 3, which began July 21, 2000 and concludes July 21, 2009.

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**

Safety Evaluation for Unit 3, "Relaxation of First Revised Order on Reactor Vessel Nozzles, Indian Point No. 3 (TAC No. 3195) dated March 18, 2005.

ATTACHMENT 3 TO NL-09-011

RELIEF REQUEST 3-47(I)

PROPOSED ALTERNATIVE TO USE OF PDI QUALIFIED PROCEDURES, PERSONNEL, AND EQUIPMENT FOR NON-APPENDIX VIII REACTOR VESSEL SHELL TO FLANGE WELD INSPECTION

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3
DOCKET NO. 50-286

Relief Request 3-47(I)
Proposed Alternative To Use of PDI Qualified Procedures, Personnel, and Equipment for Non-Appendix VIII Reactor Vessel Shell to Flange Weld Inspection In Accordance with 10 CFR 50.55a(a)(3)(i) Alternative Provides Acceptable Level of Quality and Safety

1. ASME Code Component(s) Affected

Code Class:	1
References:	IWB-2500-1
Examination Category:	B-A
Item Number:	B1.30
Description:	Alternative Requirements for Examination of the Reactor Vessel Shell-to-Flange Weld

2. Applicable Code Edition and Addenda

The code of record for the Indian Point Unit 3 Inservice Inspection Third Interval is the ASME Section XI Code, 1989 Edition, no Addenda.

3. Applicable Code Requirement

ASME Section XI, Category B-A, Item B1.30, Pressure Retaining Welds in Reactor Vessel specifies that a volumetric examination must be performed once per each 10 year interval. The 1989 Edition of ASME Section XI, Subsection IWA-2232, requires UT examination of the RPV shell-to-flange weld to be in accordance with ASME Code, Article 4 of Section V, as supplemented by Appendix I of Section XI.

4. Reason for Request

Pursuant to 10CFR50.55a(a)(3)(i), relief is requested from the requirements of Subsection IWA-2232 since the vendor performing the inspection has qualified their equipment, procedures and personnel to the requirements of ASME Section XI, 1995 Edition with 1996 Addenda, Appendix VIII, Supplements 4 and 6 as amended by 10 CFR 50.55a. Performing the inspection in accordance with the requirements of IWA-2232 would require the inspection vendor to qualify their equipment, procedures and personnel to the requirements of Article 4 of Section V, as supplemented by Appendix I of ASME XI. Since the inspection methods provided in Appendix VIII have been proven to be more effective in detecting and sizing flaws, the use of Section V techniques would require additional resources and result in a less effective inspection.

5. Proposed Alternative and Basis for Use

Pursuant to 10CFR50.55a(a)(3)(i), Entergy requests authorization to utilize the alternative requirements in ASME Section XI, 1995 Edition with 1996 Addenda, Appendix VIII, Supplements 4 and 6 as amended by 10 CFR 50.55a in lieu of the requirements of IWA-2232, that requires UT examination of the RPV shell-to-flange weld to be in accordance with ASME Code, Article 4 of Section V, as supplemented by Appendix I of Section XI.

Appendix VIII requirements were developed and adopted to ensure the effectiveness of ultrasonic examinations within the nuclear industry by means of a rigorous, item specific performance demonstration containing flaws of various sizes, locations, and orientations. The performance demonstration process has established with a high degree of confidence, the capability of personnel, procedures, and equipment to detect and characterize flaws that could be detrimental to the structural integrity of the RPV. The PDI approach has demonstrated that for detection and characterization of flaws in the RPV the ultrasonic examination techniques are equal to or better than the requirements of the ASME Section V, Article 4 ultrasonic examination requirements.

Though Appendix VIII is not required for the RPV shell-to-flange weld examination, the use of Appendix VIII, Supplements 4 and 6 criteria for detection and sizing of flaws in this weld will be equal to or exceed the requirements of ASME Section V, Article 4. Therefore, the use of the proposed alternative will continue to provide an acceptable level of quality and safety, and approval is requested pursuant to 10 CFR 50.55a(a)(3)(i).

6. Duration of Proposed Alternative

Relief is requested for the third ten-year interval of the Inservice Inspection Program for Indian Point Unit 3, which began July 21, 2000 and concludes July 21, 2009.

7. Precedents

Similar relief requests have been previously approved for:

(1) Union Electric Company for its Callaway Plant, Unit 1 on April 7, 2004 (ADAMS Accession Nos. ML032340608 and ML041000516).

(2) V.C. Summer Station in an NRC letter, dated February 3, 2004 (ADAMS Accession No. ML040340450)

(3) Diablo Canyon, Units 1 and 2 in an NRC letter dated October 26, 2005 (ADAMS Accession No. ML052660331)

ATTACHMENT 4 TO NL-09-011

RELIEF REQUEST 3-48

PROPOSED ALTERNATIVE FOR USE OF PERFORMANCE DEMONSTRATED QUALIFIED PROCEDURES AND EQUIPMENT FOR RPV BOTTOM MOUNTED INSTRUMENT PENETRATION EXAMS

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3
DOCKET NO. 50-286

Relief Request No: 3-48
Proposed Alternative for
Use Of Performance Demonstrated Qualified Procedures And Equipment For RPV Bottom Mounted Instrument Penetration Exams
In Accordance with 10 CFR 50.55a(a)(3)(i)
Alternative Provides Acceptable Level of Quality and Safety

1. **ASME Code Component(s) Affected**

Code Class:	1
References:	Code Case N722, Table 1
Item Number:	B15.80
Parts Examined:	Instrument Penetrations
Description:	Reactor Pressure Vessel (RPV) Bottom Mounted instrument Penetration Nozzles (58 Locations)

2. **Applicable Code Edition and Addenda**

The Code of Record for Indian Point Unit 3 Inservice Inspection Third Ten-Year Interval is the ASME Section XI Code, 1989 Edition, No Addenda as augmented by Code Case N-722 with limitations/modifications for use stated in 10 CFR 50.55a(g)(6)(ii)(E).

3. **Applicable Code Requirement**

Code Case N-722 requires visual examinations of all 58 BMI penetrations as specified in Table 1. Footnote (5) in Table 1 states that an ultrasonic examination from the component inside or outside surface may be performed in lieu of the visual examination provided that the requirements of Table IWB-2500-1 and Appendix VIII (1995 Edition with the 1996 Addenda or later) are satisfied.

4. **Reason for Request**

Relief is requested on the basis that the process to implement the requirements of ASME, Appendix VIII is currently not available for the BMI penetrations. The proposed alternative of performing automated ultrasonic examinations of the RPV bottom-mounted instrument penetrations (58 locations) from the inside surface using procedures, personnel, and equipment that have been demonstrated and qualified in accordance with MRP-166, *Materials Reliability Program: Demonstration of Equipment and Procedures for the Inspection of Alloy 600 Bottom Mounted Instrumentation (BMI) Head Penetrations,* as supplemented by technical justification WDI-TJ-1014 would provide an acceptable level of quality and safety.

The BMI penetration nozzle internal inspection planned for the 3R15 refuel outage uses ultrasonic (volumetric) and eddy current (surface) techniques which is a preferred alternative to

the bare metal visual examination of the outer surface of the RPV bottom-mounted instrument penetrations (58 locations).

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

In lieu of qualifying an ultrasonic examination technique in accordance with the requirements of ASME Section XI Appendix VIII (1995 Edition with the 1996 Addenda or later), Entergy proposes to use ultrasonic (volumetric) and eddy current (surface) techniques demonstrated by the examination vendor (WesDyne) at the EPRI NDE Center. These techniques have been qualified in accordance with MRP-166, *Materials Reliability Program: Demonstration of Equipment and Procedures for the Inspection of Alloy 600 Bottom Mounted Instrumentation (BMI) Head Penetrations,* as supplemented by technical justification WDI-TJ-1014. The proposed alternative for the RPV bottom-mounted instrument penetrations (58 locations) was demonstrated to detect and size flaws at the EPRI Non-destructive Examination Center in 2004. The ultrasonic techniques were demonstrated to effectively detect and size BMI tube ID and OD initiated flaws as well as locating the flaws with respect to the weld profile. The eddy current techniques were demonstrated to effectively detect and size ID connected axial and circumferential flaws as well as establishing the location and orientation of those flaws. Technical justification WDI-TJ-1014, *"BMI Examination of Indian Point Penetrations,"* concludes that the equipment, techniques, and procedures to be used on the Indian Point BMI tube geometry will result in examinations that meet the MRP demonstration requirements.

6. **Duration of Proposed Alternative**

Relief is requested for the third ten-year interval of the Inservice Inspection Program for Indian Point Unit 3, which began July 21, 2000 and concludes July 21, 2009.

7. **Precedents**

None.