



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 23, 2013

Vice President, Operations
Entergy Nuclear Operations, Inc.
Indian Point Energy Center
450 Broadway, GSB
P.O. Box 249
Buchanan, NY 10511-0249

SUBJECT: INDIAN POINT NUCLEAR GENERATING UNIT NO. 2 – RELIEF REQUEST
IP2-ISI-RR-16: EXTENSION OF THE INSERVICE INSPECTION INTERVAL
FOR THE REACTOR VESSEL WELD EXAMINATION (TAC NO. MF0696)

Dear Sir or Madam:

By letter dated February 20, 2013, Entergy Nuclear Operations, Inc. submitted Relief Request No. 16 (IP2-ISI-RR-16) for Indian Point Nuclear Generating Unit No. 2 (IP2) for the fourth 10-year inservice inspection (ISI) interval. The proposed relief would extend the reactor vessel weld inspection until Refueling Outage 22 scheduled for spring 2016.

The Nuclear Regulatory Commission staff has reviewed the proposed alternative to move the subject American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, Category B-A and B-D weld inspections from Refueling Outage 21 scheduled for spring 2014 to Refueling Outage 22 scheduled for spring 2016 and concludes that (1) the proposed alternative provides reasonable assurance of structure integrity for the IP2 reactor pressure vessel (RPV), and (2) to perform the ASME Code examinations of the subject welds in the 2014 refueling outage would be a hardship without a compensating increase in IP2 RPV quality and safety. Therefore, the licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) until the 2016 refueling outage.

The staff's safety evaluation is enclosed. Please contact Douglas Pickett at 301-415-1364 if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "Robert H. Beall".

Robert H. Beall, Acting Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-247

Enclosure:
Safety Evaluation

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST NO. IP2-ISI-RR-16

ENTERGY NUCLEAR OPERATIONS, INC.

INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

DOCKET NO. 50-247

1.0 INTRODUCTION

The Nuclear Regulatory Commission (NRC) staff has reviewed and evaluated the information provided by Entergy Nuclear Operations, Inc., the licensee, in its letter dated February 20, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13064A354), as supplemented by letter dated July 25, 2013 (ADAMS Accession No. ML13211A229), regarding inservice inspection (ISI) Relief Request No. 16 (RR IP2-ISI-RR-16) for Indian Point Nuclear Generating Unit No. 2 (IP2). This relief request proposes to extend the fourth 10-year ISI interval program plan to 2016, so that the reactor pressure vessel (RPV) weld inspection can be conducted in Refueling Outage 22 (2R22) in 2016 instead of 2R21 in 2014.

2.0 REGULATORY REQUIREMENTS

The ISI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Class 1, 2, and 3 components is performed in accordance with Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," of the ASME Code and applicable Addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g), except where specific relief has been granted by the NRC pursuant to 10 CFR 50.55a(g)(6)(i). Paragraph 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if: (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The ASME Code of Record

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for the IP2 fourth 10-year ISI interval program is the 2001 Edition through 2003 Addenda of Section XI of the ASME Code.

Relief request RR IP2-ISI-RR-16 for IP2 was submitted by the licensee in its letter dated February 20, 2013, in accordance with 10 CFR 50.55a(a)(3)(i) using WCAP-16168-NP-A, Revision 2, "Risk-Informed Extension of Reactor Vessel Inservice Inspection Interval," in which it proposed to defer completion of the ASME Code required volumetric examination of the RPV full penetration pressure retaining ASME Code, Section XI, Table IWB-2500-1 Category B-A and B-D welds from the 2014 refueling outage to 2016. Since the relief request is not bounded by the 20-year ISI interval assumption in WCAP-16168-NP-A, Revision 2, the July 25, 2013, supplement provided hardship justification pursuant to 10 CFR 50.55a(a)(3)(ii).

The IP2 Operating License currently expires on September 28, 2013, but an application for License Renewal was submitted to the NRC on April 23, 2007 (ADAMS Accession No. ML071210507). Under the provisions of 10 CFR 2.109(b), if the licensee of a nuclear power plant licensed under 10 CFR 50.21(b) or 50.22 files a sufficient application for renewal of either an operating license or combined license at least 5 years before the expiration of the existing license, the existing license will not be deemed to have expired until the application has been finally determined. The existing license for IP2 will not be deemed to expire in 2013 unless the application has been finally determined.

3.0 EVALUATION

RR IP2-ISI-RR-16

ASME Code Components

<u>ASME Code Category</u>	<u>ASME Code Item Number</u>	<u>Plant Component</u>
B-A	B1.11	Circumferential Shell Welds
B-A	B1.12	Longitudinal Shell Welds
B-A	B1.21	Circumferential Bottom Head Welds
B-A	B1.22	Meridional Bottom Head Welds
B-A	B1.30	Shell-to-Flange Weld
B-A	B1.50	Repair Welds
B-A	B1.51	Beltline Region
B-D	B3.90	Nozzle-to-Vessel Welds
B-D	B3.100	Nozzle Inside Radius Section

ASME Code Requirements (As stated)

Paragraph IWB-2412 of the Section XI of the ASME Boiler and Pressure Vessel Code, Inspection Program B, requires volumetric examination of essentially 100% of reactor pressure vessel pressure retaining welds identified in Table IWB-2500-1 once each ten-year interval. This interval was extended for the third ISI interval in RR

IP2-ISI-RR-13 (Reference 2¹) until 2014. Extension of this inspection frequency to 2016 is now being requested as relief in the fourth interval.

Licensee's Basis for Relief Request (As stated in the July 25, 2013 supplement)

Relief request 16 was requested by August 2013 was to allow time to shift activities in the 2R21 and 2R22 outages to minimize dose and outage schedules if the relief were not granted. The major activities to be considered are those requiring removal of the core barrel (i.e., RPV weld inspections (the subject of RR 16), cold leg nozzle inspection (the subject of RR 17), and some of the relicensing MRP-227A² inspections), the repair of the cavity liner to greatly reduce or eliminate leaks that make it difficult to maintain a high water level, and the performance of the split pin replacement. The split pin replacement planned for 2R22 will dictate the outage schedule (about 30 days) so the plan was to repair the cavity liner in 2R21 and perform the three inspections that required core barrel removal in 2R22. The relief requests were required to support that plan.

If the RPV weld inspections were to be done in 2R21 then the scope of 2R21 would be subject to re-evaluation. The likely change would be to move the reactor cavity repair to 2R22 and, move the RPV weld and cold leg nozzle inspections in 2R21. This would not change the duration of 2R22 but would increase 2R21 by about 3 days (moving the reactor cavity repair decreases 2R21 from 25 days to 23 days but adding the two inspections increases 2R21 from 23 days to 28 days since they cannot be done in parallel). The performance of the RPV and cold leg nozzle inspections would be performed so as to minimize the time the core barrel is out of the core. The inspection uses an upper and a lower inspection tool. The lower inspection tool can inspect the lower vessel welds and the BMIs [bottom-mounted instruments] while the upper tool can inspect the upper vessel welds and the nozzle welds.

The core barrel would have to [be] removed again in 2R22. The MRP-227A inspection has a preparation lead time of about one year and therefore cannot be done in 2R21. The dose consequences of core barrel removal in 2R22 are expected to be reduced when the reactor cavity liner is repaired based on the ability to maintain a higher water level.

The dose increase is due in large part to the need to remove the core barrel during both outages and to the increased outage time. The core barrel is not fully submersed in the reactor cavity so the ability to increase the water level by up to 6 inches after repair of the reactor cavity liner has a significant affect [effect] on doses. The reactor cavity water

1. This refers to Reference 2 of the licensee's February 20, 2013, submittal. Reference 2 is not included in this SE.

2. MRP-227-A, "Material Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines."

level is estimated to be 94' 2" before leak repair and 94' 8" after repair (the dose rate is 30 mr/hr versus 6 mr/hr).

Entergy has estimated that the dose change due to the revised sequence of activities would be approximately 8.132 rem. The expected increase in the 2R21 schedule would be about 3 days.

Licensee's Proposed Alternative Examination (As stated)

Indian Point Unit 2 proposes to defer completion of the ASME Code required volumetric examination of the Reactor Pressure Vessel full penetration pressure retaining Category B-A and B-D welds from the March 2014 refueling outage to March 2016.

This relief request is similar to the previously approved RR IP2-ISI-RR-13 approved under SER [safety evaluation report] dated November 21, 2011 (Reference 7³).

Duration of Proposed Alternative (As stated)

This request is applicable to Entergy's inservice inspection program for the fourth interval for Indian Point Unit 2. The proposed alternative is until March 2016.

Staff Evaluation

Relief request RR IP2-ISI-RR-16 was originally submitted pursuant to 10 CFR 50.55a(a)(3)(i), using WCAP-16168-NP-A, Revision 2 to demonstrate that the proposed alternatives would provide an acceptable level of quality and safety. After reviewing the relief request, the NRC staff determined that the 50.55a(a)(3)(i) approach is not supported by WCAP-16168-NP-A, Revision 2 because the requested ISI will exceed the 20 year interval justified by the WCAP. Consequently, the staff issued a request for additional information (RAI) requesting the licensee to provide information that would support a hardship consideration under 50.55a(a)(3)(ii). The RAI stated that the information should include any hardship associated with repairing the cavity liner and performing the required RPV weld inspection in the 2014 outage.

Relief request RR IP2-ISI-RR-13, which was approved by the NRC staff on November 21, 2011, was based on the license's plan to conduct three inspections in 2014 during Outage 2R21: RPV weld inspections, cold leg nozzle inspection, and some of the MRP-227-A inspections. All three inspections require core barrel removal, and having them performed at the same outage would avoid hardship and overall dose increase caused by the need to remove the core barrel during both outages and the increased outage time associated with the two outages.

Since the approval of RR IP2-ISI-RR-13, the NRC has not completed its review of the IP2 inspection plan based on MRP-227-A, making the execution of the MRP-227-A inspection in

3. This refers to Reference 7 of the licensee's February 20, 2013, submittal. Reference 7 is not included in this SE.

accordance with the IP2 inspection plan in 2014 impractical because the MRP-227-A inspection has a preparation lead time of about one year. If the licensee performed the MRP-227-A inspection in 2014 without an approved IP2 inspection plan, it would run the risk of conducting the inspection in a manner that could be inconsistent with the NRC staff's evaluation and conclusions in the forthcoming SE for the IP2 inspection plan, creating a possibility of requiring additional supplemental inspections or effort in the future to address any inconsistencies. Therefore, performing the MRP-227-A inspection in 2R22 instead of 2R21 is acceptable.

If the RPV weld inspections were to be performed in 2R21, then the licensee would change the scope of its 2R21 refueling outage. The licensee stated in the July 25, 2013, supplement that the likely change would be to move the reactor cavity repair to 2R22 and to move the RPV weld and cold leg nozzle inspections in 2R21. This would not change the duration of 2R22 but would increase the duration of 2R21 by about 3 days because the RPV weld inspections and the cold leg nozzle inspection cannot be performed in parallel.

If the proposed relief request is rejected, the licensee will need to perform the RPV weld and cold leg nozzle inspections in 2R21 and perform the MRP-227-A inspection in 2R22. Although the licensee stated that, under this condition, it might perform the reactor cavity repair in 2R22, this choice will not affect the key factor, i.e., the core barrel would have to be removed twice, once in 2R21 and again in 2R22. The dose increase caused by rejection of the relief request is due in large part to the need to remove the core barrel during both outages and to the increased outage time. On the other hand, if the relief request is approved, fixing the reactor cavity in 2R21 will significantly reduce the dose in 2R22 when the core barrel is removed to conduct the three inspections. This is because after repair of the reactor cavity liner, the reactor cavity water level is estimated to be 94' 8", 6" higher than before leak repair, causing the dose rate of the core barrel, which will be fully submersed in the reactor cavity, to drop from 30 mr/hr to 6 mr/hr.

Based on the above evaluation, the NRC staff determined that (1) moving the MRP-227-A inspection from 2R21 to 2R22 is acceptable, considering the preparation lead time of 1 year and the fact that the IP2 inspection plan based on MRP-227-A is not yet approved, and (2) removing the core barrel in 2R21 for RPV weld inspections and cold leg nozzle inspection and removing the core barrel again in 2R22 for the MRP-227-A inspection would be a hardship due to overall dose increase of 8.132 rem, which is not consistent with the "As Low As Reasonable Achievable" (ALARA) objectives. Also, there is a potential to increase the possibility of personnel injury and damage to the RPV and/or internals caused by lifting of heavy loads if the internal components are removed twice in a short span, further supporting the hardship pursuance.

As previously stated, the NRC staff will not consider justification based on the risk-informed approach of WCAP-16168-NP-A, Revision 2 for ISI intervals that extend beyond 20 years. Nonetheless, the licensee's supplemental response of July 25, 2013, referred to Entergy's letter NL-08-177 dated December 23, 2008 (ML090050020), that calculated Indian Point specific change in risk consistent with the approach of the WCAP. Using Indian Point plant specific input, the licensee demonstrated that if no further inspections were performed for the extended life of the plant (60 years), the change in risk compared with performing a RPV weld inspection every 10 years, would result in a factor of 5 below the risk criteria of Regulatory Guide 1.174,

"An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis."

4.0 CONCLUSION

The NRC staff has reviewed the licensee's proposed alternative to move the subject ASME Code, Section XI, Category B-A and B-D welds inspections from 2R21 in 2014 to 2R22 in 2016 and concludes that (1) the proposed alternative provides reasonable assurance of structure integrity for the IP2 RPV, and (2) to perform the ASME Code examinations of the subject welds in 2014 refueling outage would be a hardship without a compensating increase in IP2 RPV quality and safety. Therefore, the licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) until the 2016 refueling outage.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject requests for relief remain applicable, including third-party review by the authorized Nuclear Inservice Inspector.

Principal Contributor: S. Sheng

Date: August 23, 2013

August 23, 2013

Vice President, Operations
Entergy Nuclear Operations, Inc.
Indian Point Energy Center
450 Broadway, GSB
P.O. Box 249
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The staff's safety evaluation is enclosed. Please contact Douglas Pickett at 301-415-1364 if you have any questions.

Sincerely,

/ra/

Robert H. Beall, Acting Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-247

Enclosure:
Safety Evaluation

cc w/encl: Distribution via Listserv

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