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John A Ventosa
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NL-14-044

April 7, 2014

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

SUBJECT: Response to Request for Additional Information Regarding Relief Request IP3-
ISI-RR-06, Reactor Vessel Weld Examination (TAC NO. MF3345)
Indian Point Unit Number 3
Docket No. 50-286
License No. DPR-64

REFERENCES: 1. NRC Letter to Entergy, Request for Additional Information Regarding
Relief Request IP3-ISI-RR-06, Reactor Vessel Weld Examination (TAC
NO. MF3345), dated March 21, 2014
2. Entergy Letter NL-14-004 to NRC, Relief Request IP3-ISI-RR-06 for
Reactor Vessel Weld Examination, Indian Point Unit Number 3, dated
January 13, 2014

Dear Sir or Madam:

Entergy Nuclear Operations, Inc., (Entergy) is hereby providing the attached responses to the NRC request for additional information, Reference 1, associated with Relief Request IP3-ISI-RR-06, Reference 2. The responses to the request for additional information are provided in Attachment 1. In response to RAI-2 of Reference 1, a revised Relief Request IP3-ISI-RR-06 is provided in Attachment 2. The revised Relief Request changes "fourth interval" to "third interval". It should be noted that the third ISI interval began on July 21, 2000.

A copy of this response and the associated attachments is being submitted to the designated New York State official in accordance with 10 CFR 50.91.

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There are no new commitments being made in this submittal. If you have any questions or require additional information, please contact Mr. Robert Walpole, Manager, Regulatory Assurance at (914) 254-6710.

I declare under penalty of perjury that the foregoing is true and correct. Executed on April 7, 2014.

Sincerely,

A handwritten signature in black ink, appearing to be 'JAV/ai', written in a cursive style.

JAV/ai

- Attachments:
1. Response to Request for Additional Information Regarding Relief Request IP3-ISI-RR-06, Reactor Vessel Weld Examination
 2. Revised Relief Request IP3-ISI-RR-06: Extend the Inservice Inspection Interval for the Reactor Vessel Weld Examination

cc: Mr. Douglas Pickett, Senior Project Manager, NRC NRR DORL
Mr. William Dean, Regional Administrator, NRC Region 1
NRC Resident Inspectors Office
Mr. John B. Rhodes, President and CEO, NYSERDA
Ms. Bridget Frymire, New York State Dept. of Public Service

ATTACHMENT 1 TO NL-14-044

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
REGARDING RELIEF REQUEST IP3-ISI-RR-06
REACTOR VESSEL WELD EXAMINATION**

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

RAI-1

The original safety evaluation (SE) in WCAP-16168-NP-A, Rev. 2, "Risk-Informed Extension of the Reactor Vessel In-Service Inspection Interval," that was issued in 2008 was superseded by the July 26, 2011, SE (ML111600303) to address the Pressurized Water Reactor Owners Group's (PWROG's) request for clarification of the information needed in applications utilizing WCAP-16168-NP-A, Rev. 2. The July 26, 2011, SE concludes that the licensee's application must provide, among other plant-specific information, the years in which future inspections will be performed. The dates provided must be within plus or minus one refueling cycle of the dates identified in the implementation plan provided to the NRC in PWROG letter OG-10-238 (ML11153A033). Your proposed dates are not consistent with the PWROG letter. Please assess the impact of your proposed date on the inspection schedule in the OG-10-238 letter to demonstrate that the idea of having approximately equal number of reactor pressure vessel (RPV) inspections per year will still be maintained so that your proposed date change won't challenge (1) the industry's ability to provide ISI services and (2) the NRC's monitoring of any unexpected phenomenon of neutron embrittlement when more RPVs are experiencing high fluences in the next 20 years. Separately, please discuss your proposed date and the impact assessment with the PWROG.

Response to RAI-1

The dates of future inspections provided to the NRC in PWROG letter OG-10-238 had six plants listed for inspection in 2015 and four for inspection in 2019 as shown below:

2015	2019
Indian Point Unit 3	D. C. Cook Unit 2
Waterford Unit 3	Calvert Cliffs Unit 2
Three Mile Island Unit 1	North Anna Unit 1
Diablo Canyon Unit 1	Comanche Peak Unit 1
Diablo Canyon Unit 2	
Sequoyah Unit 1	

The change in inspection date for Indian Point Unit 3 from 2015 to 2019 would result in five plants being inspected in 2015 and five plants being inspected in 2019. This equalizes the number of reactor pressure vessel (RPV) inspections per year between 2015 and 2019, and will have no impact on (1) the industry's ability to provide ISI services and (2) the NRC's monitoring of any unexpected phenomenon of neutron embrittlement when more RPVs are experiencing high fluences in the next 20 years.

Separately, Entergy contacted Westinghouse to discuss the impact of re-scheduling the IP3 reactor vessel weld inspections from the 2015 refueling outage to the 2019 refueling outage on the industry inspection plan provided in PWR Owners Group letter OG-10-238. Discussions with the Westinghouse technical lead indicated that the purpose of the inspection plan described in the PWROG letter was to demonstrate that extending the vessel weld inspection frequency from 10 to 20 years would not result in an extended period of time with no vessel weld inspection data being collected by the industry. Westinghouse concurred that the proposed re-scheduling of the IP3 vessel weld inspections would not adversely impact the industry plan described in the PWROG letter and that the original intent of the plan would remain valid.

RAI-2

Relief Request IP3-ISI-RR-06 states under Section 3.0 that, "This interval was extended for the third ISI interval in Relief Request RR-3-43(I) (Reference 2) until 2015. Extension of this inspection frequency to 2019 is now being requested as relief in the fourth interval." Please note that the March 6, 2009, SE regarding RR-3-43(I) approved extension of the third ISI interval to 2015 for Indian Point, Unit 3 (IP-3), short of the additional 10 years for an ISI interval extension for other WCAP-16168 applicants. This is because the current license for IP-3 would expire in 2015. Any extension beyond 2015, due to consideration of the status of the license renewal application approval to regain the full additional 10 years in accordance with the July 26, 2011, SE, is considered by the NRC as activities still in the third ISI interval. Therefore, please revise "fourth interval" in numerous places in the relief request to "third interval."

Response to RAI-2

A revised Relief Request IP3-ISI-RR-06, which changes "fourth interval" to "third interval" is included as Attachment 2.

ATTACHMENT 2 TO NL-14-044

REVISED RELIEF REQUEST IP3-ISI-RR-06:
EXTEND THE INSERVICE INSPECTION INTERVAL FOR THE
REACTOR VESSEL WELD EXAMINATION

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

Indian Point Unit 3
Third 10-year ISI Interval
Relief Request No: IP3-ISI-RR-06
Reactor Vessel Inservice Inspection Interval Extension
Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)
-Alternative Provides Acceptable Level of Quality and Safety-

1. ASME Code Component(s) Affected

The affected component is the Indian Point Unit 3 (IP3) reactor vessel (31RV), specifically the following American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code Section XI (Reference 1) examination categories and item numbers covering examinations of the reactor vessel (RV). These examination categories and item numbers are from IWB-2500 and Table IWB-2500-1 of the ASME BPV, Code Section XI.

Examination

Category	Item No.	Description
B-A	B1.11	Circumferential Shell Welds
B-A	B1.12	Longitudinal Shell Welds
B-A	B1.21	Circumferential Head Welds
B-A	B1.22	Meridional Head Welds
B-A	B1.30	Shell-to-Flange Weld
B-A	B1.40	Head-to-Flange Weld
B-D	B3.90	Nozzle-to-Vessel Welds
B-D	B3.100	Nozzle Inside Radius Section

(Throughout this request the above examination categories are referred to as "the subject examinations" and the ASME BPV Code, Section XI, is referred to as "the Code.")

2. Applicable Code Edition and Addenda

ASME Code Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," Code 2001 Edition through 2003 Addenda.

3. Applicable Code Requirement

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 Relief Request RR-3-43(I) (Reference 2) until 2015. Extension of this inspection frequency to 2019 is now being requested as relief in the third interval.

4. Reason for Request

Relief is being requested at this time to extend the reactor vessel weld inspection until Refueling Outage 20 (3R20) scheduled for Spring 2019 to allow this inspection to co-inside with the MRP-227-A inspections. This will result in a reduction in man-rem exposure and examination costs.

Relief Request RR-3-43(I) and the corresponding SER (Reference 2) require that category B-A and B-D vessel welds be inspected during the upcoming 2015 refueling outage. Inspection of the reactor vessel welds requires removal of the lower internals including the core barrel and storing them in the lower cavity. These inspections had previously been planned to be performed concurrently with the Code Case N-770-1 weld inspection and the vessel internals inspections required by MRP-227-A during the refuel outage of 2015. A separate IP3 Relief Request IP3-ISI-RR-07 has been submitted to the NRC staff to allow deferral of the Code Case N-770-1 weld inspections from 2015 to 2019.

IP3 is currently planning to perform the MRP-227-A (i.e. Vessel Internals) inspections in 3R20 since the actual inspection scope has not yet been finalized (i.e. Entergy is still performing internals evaluations in response to NRC RAIs and these evaluations have the potential to impact the MRP-227-A inspection scope). In addition, a significant pre-outage effort will be required to finalize inspection tooling and acceptance criteria which cannot be completed prior to 3R18 which is currently scheduled to begin in March 2015.

5. Proposed Alternative and Basis for Use

10 CFR 50.55a(a)(3) states:

“Proposed alternatives to the requirements of (c), (d), (e), (f), (g), and (h) of this section or portions thereof may be used when authorized by the Director of Nuclear Reactor Regulation. The applicant shall demonstrate that:

- (i) the proposed alternatives would provide an acceptable level of quality and safety, or
- (ii) compliance with specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.”

Entergy believes that the proposed alternatives of this request provide an acceptable level of quality and safety.

Indian Point Unit 3 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 2015 refueling outage to March 2019.

There is reasonable assurance of continued structural integrity of the subject welds during the deferral of the subject examinations. In the initial Relief Request RR-3-43(I) (Reference 3), Entergy

requested a deferral of the subject RPV full penetration pressure retaining welds based on WCAP-16168-NP-A, Revision 2 "Risk-Informed Extension of Reactor Vessel In-Service Inspection Interval" (the WCAP) (Reference 4). This request identified the schedule for future inspections and a discussion of past inspection results. The request also included an evaluation of Indian Point 3 to confirm the applicability of the parameters contained in Appendix A of the WCAP. This comparison confirmed the applicability of all these parameters with the exception of the Through-Wall Cracking Frequency (TWCF) parameter. An alternative analysis to address the TWCF parameter deviation was provided in Relief Request RR-3-43(I) (Reference 3). In response to an RAI, the alternative TWCF analysis was superseded by a plant specific change-in-risk analysis (Reference 5).

The Indian Point plant specific change-in-risk analysis used the same methodology as was used for the Westinghouse pilot plant, Beaver Valley Unit 1, in the WCAP. The analysis was performed for Indian Point Unit 3. Plant specific inputs for Indian Point Unit 3, including fluence, beltline material properties, and dimensions were used as inputs to the analysis. Inputs that were developed for the NRC's re-evaluation of the Pressurized Thermal Shock (PTS) Rule, and also used in the WCAP pilot plant analyses, were also used. The basis for the use of these non-plant specific inputs was discussed in detail in the response to Question 3. In addition, the use of the Westinghouse pilot plant PTS transients, as an input to the Indian Point change-in-risk analysis was justified through a detailed comparison of plant features that contribute to the likelihood of having a PTS event. This comparison was also provided in the response to Question 4. This plant specific change-in-risk analysis was performed using fluence values at 48 Effective Full Power Years (EFPY) to bound Indian Point until the end of the potential license renewal period through 60 calendar years of operation. The basis for several plant specific inputs to the change-in-risk analysis was provided in the response to Question 6. Furthermore, in the response to Question 6, it was demonstrated through the performance of surveillance data checks that the embrittlement trend curve correlations used in the change-in-risk analysis were appropriate for predicting the embrittlement of the Indian Point reactor vessel beltline materials.

The results of the change-in-risk analysis were provided in the response to Question 1 of Reference 5. Consistent with the WCAP pilot plant evaluations, the change-in-risk analysis considered the effects of inservice inspection and fatigue crack growth from design basis transients. Two cases were considered in the analyses, 1) inspection performed every 10 years and 2) inspection performed after the first 10 years but none performed thereafter (this approach is discussed in more detail in the response to Question 2). The bounding change-in-risk between these two cases was determined to be $2.15\text{E-}08$ events per year which is about a factor of 5 below the criteria in Regulatory Guide 1.174 of $1.0\text{E-}07$ events per year for an acceptably small change in core damage frequency.

In response to an additional question, the change-in-risk results were revised to include consideration of external events (Reference 6). Consideration of external events increased the bounding change in risk to $2.66\text{E-}08$ events per year. This value is still below the criteria in Regulatory Guide 1.174 of $1.0\text{E-}07$ events per year for an acceptably small change in core damage frequency.

It was on the basis of the information provided in the original Relief Request RR-3-43(I) (Reference 3), and the plant specific change-in-risk analysis provided in Reference 5, and the amended change-

in-risk results (Reference 6), that the Staff provided their Safety Evaluation (Reference 2) dated March 6, 2009 approving the deferral of the Indian Point Unit 3 examinations to 2015. The Safety Evaluation concluded: "(a) the licensee has provided sufficient information requested in Sections 3.4 and 4.0 of the SE for the WCAP Report, (b) the licensee has provided a plant-specific Δ TWCF analysis to demonstrate that the proposed change in the IP RPV ISI program meets the RG 1.174 guidelines discussed in the SE for the WCAP Report, and (c) the licensee's proposed alternative provides an acceptable level of quality and safety." As indicated in Relief Request RR-3-43(l), the change-in-risk analysis was performed for 48 EFPY corresponding to 60 years of calendar operation but the NRC staff approval was limited to 2015. Since the inspection date of 2019 requested in this relief request is within 48 EFPY and 60 calendar years, the information provided was adequate for the full 20 year extension to 2019. Therefore, this requested change in date is bounded by the change in risk analysis and the 2019 date provides reasonable assurance of continued structural integrity of the subject welds.

6. Duration of Proposed Alternative

This request is applicable to Entergy's inservice inspection program for the third interval for Indian Point Unit 3. The proposed alternative is until March 2019.

7. References

1. ASME Boiler and Pressure Vessel Code, Section XI, 2001 Edition through 2003 Addenda, American Society of Mechanical Engineers, New York.
2. NRC Letter to Entergy, "Indian Point Nuclear Generating Units Nos. 2 and 3 – Relief Requests On Reactor Vessel Weld Examinations (TAC NOS. MD9196 AND MD9197)," dated March 6, 2009 (ML090360460)
3. Entergy Letter NL-08-096 to NRC, "Request For Relief To Extend The Unit 2 and 3 Inservice Inspection Interval For The Reactor Vessel Weld Examination And Request For License Amendment For Submittal of ISI Information and Analyses," dated July 8, 2008 (ML081980058)
4. WCAP-16168-NP-A, Revision 2, "Risk-Informed Extension of Reactor Vessel In-Service Inspection Interval," June 2008.
5. Entergy Letter NL-08-177 to NRC, "Response to Request For Additional Information on Request For Relief To Extend The Unit 2 and 3 Inservice Inspection Interval For The Reactor Vessel Weld Examination And Request For License Amendment For Submittal of ISI Information and Analyses (TAC Nos. MD9194-MD9197)" dated December 23, 2008 (ML090050020)
6. Entergy Letter NL-09-003 to NRC, "Supplemental Response to Request For Additional Information on Request For Relief To Extend The Unit 2 and 3 Inservice Inspection Interval For The Reactor Vessel Weld Examination (TAC Nos. MD9196 and MD9197)," dated January 20, 2009 (ML090400575)