



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

March 6, 2009

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 NOS. 2 AND 3 - RELIEF
REQUESTS ON REACTOR VESSEL WELD EXAMINATIONS
(TAC NOS. MD9196 AND MD9197)

Dear Sir or Madam:

By letter dated July 8, 2008, as supplemented by letters dated December 23, 2008, and January 20, 2009, Entergy Nuclear Operations, Inc. (Entergy), the licensee for Indian Point Nuclear Generating Unit Nos. 2 and 3 (IP2 and IP3), submitted relief requests RR-76 for IP2 and RR-3-43(I) for IP3, requesting use of an alternative instead of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI inservice inspection (ISI) requirements to conduct examinations of certain reactor pressure vessel welds. The alternative, which proposes to extend the ISI interval for the subject welds for up to 20 years, is based on a methodology consistent with that in the Topical Report WCAP-16168-NP, Revision 2, "Risk-Informed Extension of Reactor Vessel In-Service Inspection Interval," October 2007.

The Nuclear Regulatory Commission (NRC) staff has concluded that the licensee provided adequate information to support the proposed alternative during the current license period, and the proposed alternative provides an acceptable level of quality and safety. Therefore, Relief Requests RR-76 for IP2 and RR-3-43(I) for IP3 are approved during the current license period pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.55a(a)(3)(i) on the basis that the proposed alternative provides an acceptable level of quality and safety. The NRC safety evaluation is provided in the enclosure. For IP2, the reactor vessel weld inspections were last performed in 1995 and will now be due in 2012. For IP3, the inspections were last performed in 1999 and will now be due in 2015. These inspections fall within the current operating license period. Any future request for relief from the reactor pressure vessel ISI 10-year inspection period requirements beyond the term of the current licenses will be considered if and when such relief requests are submitted, if the licensee's pending license renewal application is granted.

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If you have any questions regarding this approval, please contact the Indian Point Project Manager, John Boska, at (301) 415-2901.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark G. Kowal", followed by a horizontal line and the letters "for,".

Mark G. Kowal, Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-247 and 50-286

Enclosure:
Safety Evaluation

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF NOS. RR-76 AND RR-3-43(I)

ENTERGY NUCLEAR OPERATIONS, INC.

INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3

DOCKET NOS. 50-247 AND 50-286

1.0 INTRODUCTION

By letter dated July 8, 2008, Agencywide Documents Access and Management System (ADAMS) Accession No. ML081980058, as supplemented by letters dated December 23, 2008, and January 20, 2009, ADAMS Accession Nos. ML090050020 and ML090400575, Entergy Nuclear Operations, Inc. (Entergy), the licensee for Indian Point Nuclear Generating Unit Nos. 2 and 3 (IP2 and IP3), submitted Relief Requests RR-76 for IP2 and RR-3-43(I) for IP3, requesting use of an alternative instead of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI inservice inspection (ISI) requirements to conduct examinations of certain reactor pressure vessel (RPV) welds. The alternative, which proposes to extend the ISI interval for the subject welds up to 20 years, is based on a methodology consistent with that in the Topical Report WCAP-16168-NP-A, Revision 2, "Risk-Informed Extension of Reactor Vessel In-Service Inspection Interval," June 2008, ADAMS Accession No. ML082820046 (hereinafter referred to as the WCAP Report). The NRC staff's safety evaluation (SE) for the WCAP Report was issued on May 8, 2008, and is included in the approved version of the WCAP Report referenced above.

2.0 REGULATORY EVALUATION

As specified in Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g), ISI of nuclear power plant components shall be performed in accordance with the requirements of ASME Code, Section XI, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Pursuant to 10 CFR 50.55a(a)(3), 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. As stated in 10 CFR 50.55a(g)(5)(iii), if the licensee has determined that conformance with certain Code requirements is impractical for its facility, the licensee shall notify the Commission and submit information to support the determinations.

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 preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that ISI of components and system pressure tests conducted during the first

Enclosure

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 in paragraph (b) of that section. The ISI Code of Record for the third 10-year ISI interval for IP2 and IP3 is the 1989 Edition of the ASME Code, Section XI. The third 10-year ISI interval for IP2 started on July 1, 1994, and ended on March 1, 2008, except that the NRC authorized an extension of the third ISI interval for reactor vessel weld examinations to the end of the spring 2010 refueling outage. See the NRC relief dated October 29, 2007, ADAMS Accession No. ML072480249. The third 10-year ISI interval for IP3 started on July 21, 2000, and is scheduled to end on July 21, 2009.

ASME Code, Section XI, Article IWB-2000 establishes an ISI interval of 10 years for the inspection of pressure-retaining RPV welds. The basis for an alternative ISI interval of 20 years for the inspection of Category B-A pressure retaining RPV welds and Category B-D full penetration RPV nozzle welds for pressurized-water reactor (PWR) plants was documented in the WCAP Report.

The NRC SE for the WCAP Report listed conditions and limitations that plant-specific requests referencing the WCAP Report must address:

- (1) Each licensee shall identify the years in which future inspections will be performed.
- (2) For licensees that do not implement 10 CFR 50.61a:

Within one year of completing each of the ASME Code, Section XI, Category B-A and B-D RPV weld inspections required in the proposed ISI interval, the licensee must provide the information and analyses requested in Section (e) of the final 10 CFR 50.61a.... Licensees that do not implement 10 CFR 50.61a must amend their licenses to require that the information and analyses requested in Section (e) of the final 10 CFR 50.61a...will be submitted for NRC staff review and approval. The amendment to the license shall be submitted at the same time as the request for alternative.

- (3) For licensees that implement 10 CFR 50.61a:

Licensees that implement 10 CFR 50.61a must perform the ISIs required in Section (e) of the rule and must submit the required information for review and approval to the Director, Office of Nuclear Reactor Regulation, in accordance with Section (c) of the rule, at least three years before the limiting RT_{PTS} value [(reference temperature for the pressurized thermal shock (PTS) evaluation)] calculated under 10 CFR 50.61 is projected to exceed the PTS screening criteria in 10 CFR 50.61....

- (4) The methodology in the TR [(the WCAP Report)] is applicable to all operating PWR plants by confirming the applicability of the parameters in Appendix A of the TR on a plant-specific basis. Licensees must submit a request for an alternative that contains all the information in Section 3.4 of this SE....

As explained in the NRC staff's evaluation below, since the current relief requests for IP2 and IP3 are not bounded by the WCAP Report results, this SE discusses issues beyond the conditions and limitations listed in the SE for the WCAP Report.

3.0 TECHNICAL EVALUATION

3.1 Licensee Evaluation

ASME Code Requirement for which Relief is Requested

The licensee requested relief from the following requirements of ASME Code, Section XI, 1989 Edition:

ASME Code, Section XI, IWB-2412, Inspection Program B, requires volumetric examination of essentially 100% of RPV pressure-retaining welds identified in Table IWB-2500-1 once each 10-year ISI interval. The third ISI interval for IP2 RPV welds was previously extended to spring 2010, while the third ISI interval for IP3 will end on or before July 21, 2009.

Component(s) for which Relief is Requested

<u>Examination Category</u>	<u>Item No</u>	<u>Description</u>
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 Shell Welds
B-A	B1.30	Shell-to-Flange Weld
B-A	B1.40	Head-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 Inner Radius Areas

Licensee's Proposed Alternative to the ASME Code

For IP2, the licensee proposed to defer completion of the ASME Code required volumetric examination of the RPV full penetration pressure-retaining Category B-A and B-D welds for the third ISI interval until 2012 and to perform the fourth interval ISI of the RPV welds on a 20-year inspection interval, instead of the currently required 10-year inspection interval. Therefore, the fourth interval ISI is proposed to be completed by 2032.

For IP3, the licensee proposed to defer the completion of ASME Code required volumetric examination of the RPV full penetration pressure-retaining Category B-A and B-D welds for the third ISI interval until 2015 and to perform the fourth interval ISI of the RPV welds on a 20-year inspection interval, instead of the currently required 10-year inspection interval. Therefore, the fourth interval ISI is proposed to be completed by 2035.

Licensee's Bases for Alternative

The bases for the alternative in the original submittal are no longer applicable. The revised bases for the alternative are contained in the licensee's letter dated December 23, 2008, submitted in response to the NRC staff's request for information (RAI). The licensee stated that:

The results of the Indian Point specific change-in-risk estimate evaluation are shown in Table 1^[1]. As will be discussed in the response to RAI 2, this change-in-risk estimate was calculated consistent with the approach approved in WCAP-16168-NP-A, Revision 2, but with Indian Point specific inputs. This evaluation was performed for Indian Point Unit 3 since, as shown in Table 3^[2] of the requests for relief, it was determined to have the more limiting through-wall cracking frequency [(TWCF)]. The evaluation was performed for 60,000 vessel simulations with version 06.1 of the FAVOR Code [(Fracture Analysis of Vessels - Oak Ridge)]. As shown by Figure 1^[3], the solution was converged for this number of simulations. As shown in Table 1, the bounding difference in risk estimated for Indian Point Unit 3 is 2.15E-08 events per year, which is about a factor of 5 below the criteria in Regulatory Guide [(RG)] 1.174 ["An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis,"] for an acceptably small change in large early release frequency [(LERF)].

...Two cases were evaluated using the FAVOR probabilistic fracture mechanics [(PFM)] code. One of these cases considered inservice inspection performed on a 10 year interval while the second case considered elimination of inservice inspection following the first 10-year inservice inspection...Two executions of the FAVOR Code were then performed, one utilizing the "ISI Every 10 Years" surface breaking flaw distribution file and the other utilizing the "10-Year ISI Only" surface breaking flaw distribution file. For each FAVOR execution, a mean value of through-wall cracking frequency was obtained along with values of standard error.

Consistent with the approach in the WCAP [report], to calculate a change-in-risk, a change in failure frequency was conservatively calculated based on the difference between the "Upper Bound" and "Lower Bound" values. The Lower Bound value was determined by subtracting 2 times the standard error as output by the FAVOR Code from the mean value of the "ISI Every 10 Years" case. The Upper Bound value was determined by adding 2 times the standard error as output from the FAVOR Code to the mean value of the "10-Year ISI Only" case. The difference between the upper and lower bound values was then compared against the risk criteria of Regulatory Guide 1.174 to determine the acceptability of the extension in inspection interval.

1 "Table 1" refers to Table 1 from the licensee's December 23, 2008, letter (ADAMS Accession No. ML090050020). Table 1 is not reproduced in this safety evaluation.

2 "Table 3" refers to Table 3 from the licensee's December 23, 2008, letter (ADAMS Accession No. ML090050020). Table 3 is not reproduced in this safety evaluation.

3 "Figure 1" refers to Figure 1 from the licensee's December 23, 2008, letter (ADAMS Accession No. ML090050020). Figure 1 is not reproduced in this safety evaluation.

Additional technical basis was provided in the licensee's letter dated January 20, 2009, submitted in response to the staff's RAI. The licensee stated that:

...The results of the change-in-risk estimate, considering external events, are included in Table A. As shown in Table A, the bounding difference in risk estimated for Indian Point Unit 3, considering both internal and external events, is $2.66\text{E-}08$ events per year, which is about a factor of 4 below the criteria in Regulatory Guide 1.174 for an acceptable small change in large early release frequency.

3.2 NRC Staff Evaluation

Applicability of the WCAP-16168-NP, Revision 2 to this Relief Request

The first step for an applicant requesting alternatives and referencing the WCAP Report is to confirm the applicability of the parameters in Appendix A of the WCAP Report on a plant-specific basis. This is also an item (quoted as Item (4) in Section 2.0 of this SE) under "Conditions and Limitations" in the SE for the WCAP Report that must be addressed by the applicant. In the current relief request, the licensee calculated the parameters in accordance with Appendix A of the WCAP Report using IP2 and IP3 information and determined that the calculated TWCFs for IP2 and IP3 exceeded the applicable pilot plant's (Beaver Valley, Unit 1) TWCF value in the WCAP Report. Consequently, this relief request is not bounded by the WCAP Report. To address this situation, the NRC staff focused on the evaluation of the calculated plant-specific TWCF difference (ΔTWCF), which was provided in the licensee's December 23, 2008, and January 20, 2009, responses to the staff's RAIs. The licensee has met other requirements (quoted as Items (1) and (2) in Section 2.0 of this SE) under "Conditions and Limitations" in the SE for the WCAP Report by (1) stating that the future RPV inspection is scheduled in 2012 for IP2 and in 2015 for IP3, and (2) submitting a license amendment application along with this relief request to require that the information and analyses specified in the SE for the WCAP Report will be provided for NRC staff review and approval following completion of each ASME Code, Section XI, Category B-A and B-D RPV weld inspection. The NRC staff is continuing to review the license amendment application, which pertains to any future relief which the licensee may seek; approval of the relief request considered here is not dependent upon the separate license amendment application.

IP2 and IP3 Plant-Specific Material and Neutron Fluence Information

The licensee selected IP3 with its RPV material at neutron fluence corresponding to 48 effective-full-power years (EFPY) of operation in the plant-specific ΔTWCF analysis. This corresponds to 60 years of plant operation, due to the fact that the plant is not always at full power. This is a conservative selection, as the NRC staff is only considering this relief request for the first 40 years of plant operation, which is the current license period. The NRC staff agrees, based on the TWCFs reported in Table 3 for each RPV in the licensee's relief request dated July 8, 2008, that the IP3 RPV contains the most limiting material. Therefore, the licensee's IP3 ΔTWCF analysis bounds IP2.

Probabilistic Fracture Mechanics (PFM) Methodology

The NRC staff has considered the PFM issues discussed in the SE for the WCAP Report as they apply to the IP3-specific analysis. Regarding the limiting location for RPV failure, the NRC staff determined that the licensee's approach of considering only beltline materials in this relief request remains valid for IP3. Regarding distributions and uncertainties in flaw number and size, the NRC staff determined that the licensee's approach in this relief request remains valid for IP3. This is supported by the licensee's use of the flaw distributions and uncertainties employed in the NRC PTS Risk Study (the underlying technical basis for the proposed 10 CFR 50.61a change), which is considered a standard assumption for PFM analyses for a variety of applications, including the ISI interval extension as approved in the SE for the WCAP Report. Regarding the fatigue crack growth analysis, the NRC staff determined that the licensee's approach in this relief request remains valid for IP3 because the licensee used the ASME Code, Section XI fatigue crack growth rate, which is appropriate, and used the limiting design basis transient with the number of cycles from the WCAP Report, which bounds IP3 in this relief request. Regarding the effectiveness of ISI, the NRC staff determined that the licensee's approach in this relief request remains valid for IP3 because the licensee used probability of detection (POD) values (accepted in the SE for the WCAP Report) which produce bounding $\Delta TWCF$ results.

Engineering parameters that were evaluated in the SE for the WCAP Report also included weld residual stress distribution and the cladding stress and its stress-free temperature. They are consistent with the NRC PTS Risk Study and remain acceptable to the staff for generic and plant-specific PFM analyses for RPVs for various applications. Based on the above discussion, the NRC staff accepts the PFM methodology used in this plant-specific relief request and determines that the plant-specific $\Delta TWCF$ results from this effort can be used for risk assessment.

Evaluation of Compliance with Regulatory Guide (RG) 1.174

RG 1.174 provides guidelines for evaluating essential issues in making a risk-informed decision about proposed alternatives. These guidelines include five key principles that risk-informed plant changes are expected to meet. These principles are:

- (1) The proposed change meets the current regulations unless it is explicitly related to a requested exemption or rule change, i.e., a "specific exemption" under 10 CFR 50.12 or a "petition for rulemaking" under 10 CFR 2.802.
- (2) The proposed change is consistent with the defense-in-depth philosophy.
- (3) The proposed change maintains sufficient safety margins.
- (4) When proposed changes result in an increase in core damage frequency (CDF) or risk, the increase should be small and consistent with the intent of the Commission's Safety Goal Policy Statement.
- (5) The impact of the proposed change should be monitored using performance measurement strategies.

The NRC's SE for the WCAP Report concludes that proper application of the methodology described in the WCAP Report provides confidence that principles 1, 2, and 3 are met. As discussed below, the licensee was unable to utilize the pilot plant correlations to demonstrate compliance with the bounding criteria in the WCAP Report but, instead, applied the methodology used in the WCAP Report to directly estimate plant-specific TWCF values. The NRC staff concludes that principles 1, 2, and 3 are met because the licensee used the methodology described in the WCAP Report.

As discussed above, the licensee reported that its calculations for IP2 and IP3 resulted in TWCF values that exceeded the applicable WCAP pilot plant's value. Appendix A in the WCAP Report states that if any plant-specific parameter is not bounded by the pilot plant analysis, additional evaluations may be required. The licensee provided, in its December 23, 2008, and January 20, 2009, responses to the NRC staff's RAI, an estimate of the TWCF values at IP3 that was calculated using the methodology employed to develop the Beaver Valley, Unit 1 TWCF values.

In addition, the licensee used many of the input values that were used to estimate the TWCF values caused by internal event initiators at Beaver Valley, Unit 1. For example, the licensee used the PTS transient frequencies and pressure, temperature, and heat transfer versus time definitions that were developed for Beaver Valley, Unit 1 to estimate the plant-specific TWCF values for IP3. The licensee estimated the TWCF values at 48 EFPY instead of using the 60 EFPY in the WCAP Report. The 48 EFPY value bounds the IP2 and IP3 neutron fluence up to 20 years following the current license period.

To support the use of the Beaver Valley, Unit 1 input values in its plant-specific TWCF estimates for IP3, the licensee in its December 23, 2008, response referred to a 2004 NRC letter report, "Generalization of Plant-Specific Pressurized Thermal Shock (PTS) Risk Results to Additional Plants," hereinafter referred to as the generalization study, to evaluate the applicability of these input values to IP2 and IP3. The generalization study identified potentially important design and operational features in order to evaluate the applicability of the three detailed PTS pilot plant analyses for internal event initiators, for five additional reactors. The generalization study concluded that the five additional reactors are representative of or bounded by the detailed analysis plants. The licensee concluded, based on information in Table 3 from its December 23, 2008, RAI response, that the relevant features of IP2 and IP3 are consistent with, comparable to, or bounded by, those of the Westinghouse 4-loop units in the NRC generalization study. The NRC staff finds that the licensee's evaluation demonstrates that IP2 and IP3 are generally consistent with the important design and operational features reflected in the detailed inputs for the PTS internal initiating event evaluations. Therefore, the use of the applicable pilot plant internal events results as inputs to the plant-specific TWCF calculation for IP3 is reasonable and acceptable.

In order to estimate the contribution to the TWCF values caused by external event initiators that could cause a PTS event, the licensee, in its January 20, 2009, response, referred to another 2004 NRC letter report, "Estimate of External Events Contribution to Pressurized Thermal Shock (PTS) Risk," hereinafter referred to as the external events study. The licensee stated in its response that, consistent with the conclusion in the NRC external events study, the licensee assumed that the contribution to the TWCF frequency from external events is equal to the contribution from internal events. The NRC external events study postulated ways that external events could cause the same general types of overcooling scenarios as those modeled in the internal event analysis and then used conservative assumptions to estimate the TWCF values from these external events. According to the NRC external events study, the dominant external

event/PTS events are seismic-induced small loss-of-coolant accident (LOCA) and fire-induced stuck-open power-operated relief valve (PORV) events. The contribution of both types of events to the TWCF values are on the same order of magnitude as those from the equivalent internal event initiated scenario.

In the NRC external events study, the seismic contribution to TWCF values for eastern plants was based on the seismic hazard from the H. B. Robinson site because it has the largest estimated seismic hazard of any eastern PWR. Therefore, these results should be bounding for IP2 and IP3. The stuck open PORV scenario is caused by a fire which causes hot shorts that, in turn, cause the PORVs to open and remain open. The frequency of this scenario is based on generic fire initiating frequencies and hot short probabilities, which the NRC staff considers appropriate for use in a plant-specific analysis. Therefore, any potential difference between the WCAP pilot plant and the IP units would arise from differences in the design or operating characteristics of the PORV system. Table 3 in the licensee's December 23, 2008, response states that both IP2 and IP3 have two PORVs, each with a capacity of 179 thousand pounds per hour (klb/hr), and describes the multiple indications that are available to indicate whether the valves are open or closed. The generalization study indicates that for Beaver Valley, Unit 1: each of the three PORVs has a capacity of 210 klb/hr, multiple indications are available to indicate whether the valves are open or closed, and the block valves are normally open. The licensee concludes in Table 3 of its December 23, 2008, response that IP2 and IP3 are consistent with the Westinghouse 4-loop units in the generalization study. The NRC staff finds that the presence of fewer PORVs in the IP units indicates that the likelihood of multiple valves opening would be equal to or less than for Beaver Valley, Unit 1, and concurs that the design and operation of the IP units' PORVs is consistent with, or bounded by Beaver Valley, Unit 1. Therefore, the NRC staff concurs with the licensee's view, that the general conclusion from the NRC's external events study, that the contribution of external events to the TWCF frequency is equal to, or less than, the contribution from internal events, is applicable to IP2 and IP3.

The licensee estimated that the bounding Δ TWCF value caused by extending the RPV weld inspection interval from 10 to 20 years is $2.66\text{E-}8$ per year. This estimate exceeds the applicable WCAP pilot plant's Δ TWCF value of $9.37\text{E-}10$ per year. As described above, the NRC staff concurs that the input values from the WCAP pilot plant are reasonable for use in the IP plant-specific evaluations. The estimated Δ TWCF value for IP2 and IP3 is significantly greater than the Δ TWCF value for the applicable WCAP pilot plant, and is slightly above the highest pilot plant value of $1.81\text{E-}8$ per year for Palisades. The estimated Δ TWCF value is also below the generally acceptable LERF increase of $1\text{E-}7$ per year in RG 1.174. The NRC staff concludes that the estimated increase in the TWCF value indicates that any increase in CDF and LERF caused by implementing the proposed alternative is expected to be less than the acceptance guideline for very small changes in LERF and, therefore, the proposed action satisfies Principle 4 of RG 1.174.

Principle 5 of RG 1.174 states that the impact of the proposed change should be monitored using performance measurement strategies. The licensee's application for license renewal for IP2 and IP3 (submitted to the NRC under oath or affirmation), dated April 23, 2007, Section 4.3, "Metal Fatigue," indicates that the licensee has been able to monitor the number of cycles of transients that could affect the RPV fatigue crack growth analysis (through the fatigue monitoring program) and the fracture toughness of the limiting RPV material (through the reactor vessel surveillance program). As indicated in the licensee's December 23, 2008, response to the staff's RAs, future RPV examinations, in 2012 for IP2 and 2015 for IP3, will be conducted in

accordance with ASME Code, Section XI, Appendix VIII. The licensee's proposed examinations conform to the NRC staff's SE for the WCAP Report, in that the proposed monitoring program provides confidence that no adverse safety degradation will occur after the change has been implemented, with respect to any future operation following the next examination. Therefore, Principle 5 of RG 1.174 is met.

Since the change in RPV failure frequency is less than $1\text{E-}07$ and the licensee has provided sufficient information to determine that the proposed change in the IP2 and IP3 RPV ISI program has been evaluated according to the methodology approved in the WCAP Report, the NRC staff concludes that the proposal meets the RG 1.174 guidelines discussed in the SE for the WCAP Report.

Approved Period of Relief

This relief extends the third 10-year ISI interval RPV weld inspections to 2012 for IP2 and 2015 for IP3. For IP2, the reactor vessel weld inspections were last performed in 1995. For IP3, the inspections were last performed in 1999. The NRC previously approved an extension for IP2 to 2010. See relief dated October 29, 2007, ADAMS Accession No. ML072480249. Since the licensee's application for license renewal has not been approved by the NRC at this time, the NRC staff only considers extending the current RPV ISI interval with respect to the inspection of the subject welds within the current license period for IP2 and IP3. The current license period for IP2 ends on September 28, 2013, and the current license period for IP3 ends on December 12, 2015. The NRC staff will consider any future request for relief, to extend the RPV ISI interval for IP2 and IP3 during the extended period of operation, if the license renewal application is approved and a further request for relief is submitted.

4.0 CONCLUSION

Based upon the above evaluation, the NRC staff concludes that: (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 ΔTWCF 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. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the NRC staff authorizes the extension of the third 10-year interval RPV ISI during the current license period for IP2 and IP3, with the next inspection for IP2 due in 2012 and the next inspection for IP3 due in 2015, for the ASME Code, Section XI Category B-A welds and Category B-D nozzle-to-vessel welds and nozzle inner radius areas.

All other requirements of the ASME Code, Sections III and XI, for which relief has not been specifically requested and approved remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributors: Simon Sheng
Stephen Dinsmore

Date: March 6, 2009

If you have any questions regarding this approval, please contact the Indian Point Project Manager, John Boska, at (301) 415-2901.

Sincerely,

/RA/

Mark G. Kowal, Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-247 and 50-286

Enclosure:
Safety Evaluation

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