

March 19, 2004

Mr. Michael R. Kansler, President
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

SUBJECT: RELIEF REQUEST NOS. 70 AND 3-39 REGARDING ALTERNATIVE TO
DEPTH SIZING CRITERIA, INDIAN POINT NUCLEAR GENERATING UNIT
NOS. 2 AND 3 (TAC NOS. MC1696 AND MC1697)

Dear Mr. Kansler:

In a letter dated December 30, 2003, Entergy Nuclear Operations, Inc. (Entergy), submitted Relief Request (RR) Nos. 70 and 3-39 for Indian Point Nuclear Generating Unit Nos. 2 and 3 (IP2 and 3), respectively. Relief was requested from the non-destructive examination performance demonstration requirements of Appendix VIII, Supplement 4, to Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code). Specifically, Entergy proposes to use a depth sizing error not to exceed 0.15 inch root mean square as an alternative to the requirement that the performance demonstration results satisfy the statistical parameters specified in Subparagraph 3.2(c) of Supplement 4 to Appendix VIII.

The Nuclear Regulatory Commission (NRC) staff reviewed the proposed alternative in RR 70 and RR 3-39. The results are provided in the enclosed safety evaluation.

The NRC staff has concluded that the proposed alternative to the ASME Code requirements in RRs 70 and 3-39 provides an acceptable level of quality and safety. Pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative is authorized for the remainder of the third inservice inspection interval which is until April 3, 2006, for IP2 and until July 20, 2009, for IP3.

If you should have any questions, please contact Patrick Milano at 301-415-1457. This completes the NRC staff's action on TAC Nos. MC1696 and MC1697.

Sincerely,

/RA/

Richard J. Laufer, Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-247 and 50-286

Enclosure: Safety Evaluation

cc w/encl: See next page

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Indian Point Nuclear Generating Unit Nos. 2 & 3

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF NOS. 70 AND 3-39

ENTERGY NUCLEAR OPERATIONS, INC.

INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3

DOCKET NOS. 50-247 AND 50-286

1.0 INTRODUCTION

The inservice inspection (ISI) of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Class 1, Class 2, and Class 3 components is to be performed in accordance with Section XI of the ASME Code and applicable edition and addenda as required by Section 50.55a(g) of Title 10 of the *Code of Federal Regulations* (10 CFR), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Section 50.55a(a)(3) of 10 CFR states, in part, that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the licensee demonstrates that: (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) will 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 inservice examination of components and system pressure tests conducted during the first 10-year interval and that 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 ISI code of record for the third 10-year ISI interval at Indian Point Nuclear Generating Unit Nos. 2 and 3 (IP2 and IP3) is the 1989 Edition (with no addenda) of the ASME Code.

By letter dated December 30, 2003, Entergy Nuclear Operations, Inc. (Entergy, the licensee) submitted a request for relief from certain ASME Code, Section XI requirements for ISI at IP2 and 3. Specifically, the 1995 Edition with 1996 Addenda of the ASME Code, Section XI, Appendix VIII, Supplement 4, "Qualification Requirements for the Clad/Base Metal Interface of Reactor Vessel," requires that performance demonstration results satisfy the statistical parameters specified in Subparagraph 3.2(c). In lieu of Subparagraph 3.2(c), the licensee proposed using a depth sizing error not to exceed 0.15 inch root mean square (RMS).

2.0 DISCUSSION

2.1 Components for Which Relief Is Requested

ASME Code, Section XI, Class 1, Examination Category B-A, Item No. B1.10, Circumferential and Longitudinal Shell Welds, and B1.20, Head Welds.

2.2 Code Requirements

10 CFR 50.55a(b)(2) was amended to reference Section XI of the ASME Code through the 1995 Edition, with the 1996 Addenda (64 FR 51370). The 1995 Edition with 1996 Addenda of the ASME Code, Section XI, Appendix VIII, Supplement 4 requires that performance demonstration results satisfy the statistical parameters specified in Subparagraph 3.2(c), which states that performance demonstration results reported by the candidate, when plotted on a two-dimensional plot with the depth estimated by ultrasonics plotted along the ordinate and the true depth plotted along the abscissa, satisfy the following statistical parameters: (1) the slope of the linear regression line is not less than 0.7; (2) the mean deviation of flaw depth is less than 0.25 inch; and (3) the correlation coefficient is not less than 0.70.

2.3 Proposed Alternative

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposed using the RMS value from the proposed rule of 10 CFR 50.55a(b)(2)(xv)(C)(1) (69 FR 892), which modifies the depth sizing criteria of the 1995 Edition with 1996 Addenda of the ASME Code, Section XI, Appendix VIII, Supplement 4, Subparagraph 3.2(a), in lieu of Subparagraph 3.2(c).

2.4 Licensee Basis for Use (As stated)

ASME Code, Section XI, Appendix VIII, Supplement 4, Subparagraph 3.2(c) imposes three statistical parameters for depth sizing. The first parameter, 3.2(c)(1), pertains to the slope of a linear regression line. The linear regression line is the difference between actual versus true value plotted along a through-wall thickness. For Supplement 4 performance demonstrations, a linear regression line of the data is not applicable because the performance demonstrations are performed on test specimens with flaws located in the 15 percent through-wall. The differences between the actual versus true value produce a tight grouping of results, which resemble a shotgun pattern. The slope of a regression line from such data is extremely sensitive to small variations, thus making the parameter of 3.2(c)(1), an inappropriate criterion. The second parameter, 3.2(c)(2), pertains to the mean deviation of flaw depth. The value used in the Code is too lax with respect to evaluating flaw depths within the inner 15 percent of wall thickness. Therefore, Entergy Nuclear Operations, Inc. (Entergy) proposes to use the more appropriate criterion of 0.15 inch RMS of 10CFR50.55a(b)(2)(xv)(C)(1), which modifies Subparagraph 3.2(a), as the acceptance criterion. The third parameter, 3.2(c)(3), pertains to a correction coefficient. The value of the correction coefficient in Subparagraph 3.2(c)(3) is inappropriate for this application since it is based on the linear regression from Subparagraph 3.2(c)(1).

Entergy believes the proposed alternative to use the RMS value of 10 CFR 50.55a(b)(2)(xv)(C)(1), which modifies the criterion of ASME Code, Appendix VIII, Supplement 4, Subparagraph 3.2(a), in lieu of Subparagraph 3.2(c), will provide an acceptable level of quality and safety.

3.0 EVALUATION

Supplement 4, Subparagraph 3.2(c) of Appendix VIII, requires that the ultrasonic performance demonstration results be plotted on a two-dimensional plot, with the measured depth plotted along the ordinate axis and the true depth plotted along the abscissa axis. For qualification, the plot must satisfy the following statistical parameters: (1) slope of the linear regression line is not less than 0.7; (2) the mean deviation of flaw depth is less than 0.25 inch; and (3) correlation coefficient is not less than 0.70.

The licensee proposes to eliminate the use of Supplement 4, Subparagraph 3.2(c), which imposes three statistical parameters for depth sizing. The first parameter, 3.2(c)(1), pertains to the slope of a linear regression line. The linear regression line is the difference between actual versus true value plotted along a through-wall thickness. For Supplement 4 performance demonstrations, a linear regression line of the data is not applicable because the performance demonstrations are performed on test specimens with flaws located in the inner 15 percent through-wall. The difference between actual versus true value produces a tight grouping of results which resembles a shotgun pattern. The slope of a regression line from such data is extremely sensitive to small variations, thus making the parameter of Subparagraph 3.2(c)(1) a poor and inappropriate acceptance criterion. The second parameter, 3.2(c)(2), pertains to the mean deviation of flaw depth. The value used in the Code is too lax with respect to evaluating flaw depths within the inner 15 percent of wall thickness. Therefore, the licensee proposes to use the more appropriate criterion of 0.15 inch RMS of 10 CFR 50.55a(b)(2)(xv)(C)(1), which modifies Subparagraph 3.2(a), as the acceptance criterion. The third parameter, 3.2(c)(3), pertains to a correlation coefficient. The value of the correlation coefficient in Subparagraph 3.2(c)(3) is inappropriate for this application since it is based on the linear regression from Subparagraph 3.2(c)(1).

Based on the above, the NRC staff has determined that the use of Subparagraph 3.2(c) requirements is inappropriate as a screening parameter for determining the acceptability of Supplement 4 performance demonstration results. The depth sizing requirement of 0.15 inch RMS provides a better measure of NDE performance because the test specimen flaws are not evenly distributed through the entire wall thickness and this depth sizing requirement provides a specific deviation limit for the area of concern. Therefore, the proposed alternative to use the RMS value of the proposed rule 10 CFR 50.55a(b)(2)(xv)(C)(1), which modifies the criterion of Appendix VIII, Supplement 4, Subparagraph 3.2(a), and applies the same criteria to Subparagraph 3.2(c), specifically 0.15 inch RMS, will provide an acceptable level of quality and safety.

4.0 CONCLUSION

Based on the discussion above, the staff concludes that the proposed alternative to use the depth sizing criterion of Appendix VIII, Supplement 4, Subparagraph 3.2(a) as modified by 10 CFR 50.55a(b)(2)(xv)(C)(1), in lieu of Subparagraph 3.2(c), will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative is

authorized for the third 10-year ISI interval for IP2 and 3. All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in this relief request remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: D. Votolato

Date: March 19, 2004