

March 22, 2004

Mr. Michael R. Kansler, President
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Entergy Nuclear Operations, Inc.
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SUBJECT: RELIEF REQUEST NOS. RR-68, RR 3-37, AND PRR-34, INDIAN POINT
NUCLEAR GENERATING UNIT NOS. 2 AND NO. 3 AND PILGRIM NUCLEAR
POWER STATION (TAC NOS. MC1559, MC1560, AND MC1561)

Dear Mr. Kansler:

By letter dated December 4, 2003, Entergy Nuclear Operations, Inc. (the licensee), requested relief from the inservice inspection (ISI) requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, 1989 Edition, for Class 2, Examination Categories C-F-1 and C-F-2 welds for the Indian Point Nuclear Generating Unit Nos. 2 and 3 (IP2 and 3) and the Pilgrim Nuclear Power Station (Pilgrim). Specifically, the licensee proposed to use the alternative requirements in ASME Code Case N-663, "Alternative Requirements for Class 1 and 2 Surface Examinations."

The Nuclear Regulatory Commission (NRC) has reviewed the proposed alternative in the subject relief requests. The results are provided in the enclosed safety evaluation.

The NRC staff has concluded that the proposed alternative to the ASME Code requirements in RR Nos. RR-68, RR 3-37, and PRR-34 provides an acceptable level of quality and safety and is acceptable. Pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative is authorized for the remainder of the third 10-year ISI interval, which is until April 3, 2006, for IP2, until July 20, 2009, for IP3, and until June 30, 2005, for Pilgrim, unless during those intervals Code Case N-663 is published in a future version of Regulatory Guide (RG) 1.147, "Inservice Inspection Code Case Acceptability--ASME Section XI, Division 1." At that time, if the licensee intends to continue implementing this code case, it must follow all provisions of Code Case N-663 with limitations or conditions specified in RG 1.147, if any.

M. Kansler

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If you have any questions regarding this approval, please contact the IP2 and IP3 Project Manager, Patrick Milano, at 301-415-1457 or the Pilgrim Project Manager, Travis Tate, at 301-415-8474.

Sincerely,

/RA by P. Tam Acting for/

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

Docket Nos. 50-247, 50-286, and 50-293

Enclosure: Safety Evaluation

cc w/encl: See next page

M. Kansler

- 2 -

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cc w/encl: See next page

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*No substantive changes made

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUESTS FROM IWC-2500 REQUIREMENTS

AND THE USE OF CODE CASE N-663

INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3 (IP2 AND 3)

PILGRIM NUCLEAR POWER STATION (PILGRIM)

DOCKET NUMBERS 50-247, 50-286, AND 50-293

1.0 INTRODUCTION

By letter dated December 4, 2003, Entergy Nuclear Operations, Inc. (the licensee), submitted a relief request from certain inspection requirements of American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, for Indian Point Nuclear Generating Unit Nos. 2 and 3 (IP2 and 3) and Pilgrim Nuclear Power Station (Pilgrim). Specifically, the licensee proposed using ASME Code Case N-663, "Alternative Requirements for Class 1 and 2 Surface Examinations," as an alternative to the requirements in Subsection IWC-2500 of ASME Code, Section XI for Class 2, Examination Categories C-F-1 (pressure retaining welds in austenitic stainless steel or high alloy piping) and C-F-2 (pressure retaining welds in carbon or low alloy steel piping) welds. The request is for the remainder of the third 10-year inservice inspection (ISI) interval.

2.0 REGULATORY EVALUATION

The ISI of the ASME Code Class 1, 2, and 3 components is to be performed in accordance with Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," and applicable edition and 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 Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i). As stated in 10 CFR 50.55a(a)(3), 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 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 Code of Record for the third ISI interval is ASME Code, Section XI, 1989 Edition, with no Addenda.

3.0 TECHNICAL EVALUATION

3.1 System/Component(s) for Which Relief is Requested:

This relief request applies to ASME Code, Section XI Class 2 piping welds, Examination Categories CF-1 and C-F-2, item numbers C5.10 through C5.42 and C5.50 through C5.82.

3.2 Code Requirements for which Relief is Requested:

The 1989 Edition of the ASME Code, Section XI, Subsection IWC-2500 requires components be examined as specified in Table IWC-2500-1. These tables require a sampling of piping welds (as well as other components) be subjected to various types of non-destructive examinations (NDE, i.e. volumetric and/or surface examinations). For the total population of non-exempt Category C-F-1 and C-F-2 piping welds, 7.5%, but not less than 28 welds, require surface examination.

3.3 Licensee's Proposed Alternative:

The licensee proposed to use Code Case N-663 in its entirety as an alternative to the surface examination requirements for Table IWC-2500-1, Examination Categories C-F-1 and C-F-2. All areas of the subject welds identified as susceptible to outside surface attack shall be surface examined during the third 10-year ISI interval in accordance with Code Case N-663.

3.4 Basis for Use of Proposed Alternative (as stated by the licensee)

The ASME Section XI Task Group on ISI Optimization, Report No. 92-01-01, "Evaluation of Inservice Inspection Requirements for Class 1, Category B-J Pressure Retaining Welds in Piping", dated July 1995, concluded (with 50 units responding with a total of 9333 welds inspected) only 2 welds (0.02%) were found to have flaws detected by Section XI surface examinations. These flaws were determined to be fabrication-induced. In parallel with the above, several risk-informed Code cases have been developed for use on piping welds (e.g., ASME Code Cases N-560, N-577, and N-578). One of the methods for risk-informing piping examinations is via use of EPRI [Electric Power Research Institute] TR-112657, Rev[ision] B-A, "Revised Risk-informed Inservice Inspection Evaluation Procedure" (NRC SER [Safety Evaluation Report] dated 10/28/99). Table 4-1, "Summary of Degradation-Specific Inspection Requirements and Examination Methods," of the EPRI report lists the required degradation mechanisms to be evaluated in Class 1, 2, and 3 piping. It also identifies the risk-informed examination method required for each of these degradation mechanisms. The only degradation mechanism that requires a surface examination is O.D. [outside diameter] chloride cracking. These two initiatives led ASME to investigate the value of surface examinations.

Code Case N-663 incorporates lessons learned from the risk-informed initiatives and industry examination experience into Section XI by requiring that an evaluation be conducted to identify locations, if any, where a surface examination would be of benefit from a generic piping degradation perspective. The results of this evaluation identify where O.D. degradation is most likely to occur by reviewing plant-specific programs and practices, and operating experience. If the potential for degradation is identified, Code Case N-663 defines examination techniques, volumes, and frequencies. As such, implementing Code Case N-663 will identify appropriate locations for surface examination, if any, and eliminate unnecessary examinations[...]

3.5 Staff Evaluation

The proposed use of Code Case N-663 by the licensee to replace the ASME Code, Section XI, required surface examinations for piping welds of Examination Categories C-F-1 and C-F-2 is consistent with the approved underlying EPRI and Westinghouse methodologies on risk informed ISI contained in TR-112657, Revision B-A, and WCAP-14572, Revision 1-NP-A, "Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report." Although the two topical reports use different approaches, both have reached their objectives of identifying the risk-important areas of the piping systems and defining the appropriate examination methods, examination volumes, procedures, and evaluation standards necessary to address the degradation mechanisms of concern and the ones most likely to occur at each location to be inspected. Risk-informed ISI analyzes specific pipe segments for probability of failure and operational safety significance.

With regard to the current issue of surface examinations for piping welds of Examination Categories C-F-1 and C-F-2, all plants that performed risk-informed ISI of their Class 2 piping systems in accordance with the topical reports referenced above resulted in the conclusion that the only degradation mechanism that required surface examination is O.D. chloride cracking. Consequently, within these plants, surface examination would be considered only when O.D. chloride cracking is identified to be the degradation mechanism affecting the structural integrity of the subject piping welds.

Code Case N-663 provides that "...in lieu of the surface examination requirements for piping welds of Examination Category ... C-F-1, and C-F-2, surface examinations may be limited to areas identified by the Owner [the licensee] as susceptible to outside surface attack." The susceptibility criteria are listed in Table 1 of Code Case N-663 for two types of degradation mechanisms: (1) O.D. chloride stress corrosion cracking and (2) other outside surface initiated mechanisms. These other outside surface initiated mechanisms include thermal fatigue, boric acid corrosion, and any other owner identified mechanisms. The NRC staff determined that the surface inspection requirements of Code Case N-663 are acceptable because the inspection requirements defined in the code case are comparable to the corresponding inspection requirements approved by the NRC and adopted by using risk-informed ISI programs. Further, the code case requires that licensees conduct a plant-specific service history review to identify other mechanisms which can result in outside surface attack, and to include plant-specific processes and programs that minimize chlorides and other contaminants. Hence, the alternative provides reasonable assurance that the proposed inspections will not lead to degraded piping performance when compared to the existing performance levels.

4.0 CONCLUSION

Based upon review of the information provided by the licensee in support of its request for relief, the NRC staff concludes that use of ASME Code Case N-663 for surface examinations, in lieu of the Table IWC-2500-1, Class 2, Examination Categories C-F-1 and C-F-2 requirements, provide an acceptable level of quality and safety. The staff based its conclusion on the fact that inspection requirements defined in Code Case N-663 are comparable to the inspection requirements adopted by plants employing risk-informed ISI programs, and because the licensee will be required to conduct a plant-specific service history review to identify other possible mechanisms besides chloride-induced mechanisms that will cause outside surface attack upon subject plant components. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the licensee's proposal to use Code Case N-663 for ASME Class 2, Examination Categories C-F-1 and C-F-2, Item Nos. C5.10 through C5.42 and C5.50 through C5.82, piping welds is authorized for the third 10-year ISI intervals at IP2 and 3 and Pilgrim, or until such time that Code Case N-663 is referenced in a future revision of RG 1.147, "Inservice Inspection Code Case Acceptability -- ASME Section XI, Division 1." At that time, if the licensee intends to continue to implement Code Case N-663, the licensee must follow all provisions of Code Case N-663 with limitations or conditions specified in RG 1.147, if any. All other requirements of the ASME Code, Section XI, for which relief has not been specifically requested remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: D. Votolato

Date: March 22, 2004