



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

September 15, 2009

Mr. Charles G. Pardee
President and Chief Nuclear Officer
Exelon Generation Company, LLC
200 Exelon Way
Kennett Square, PA 19348

SUBJECT: OYSTER CREEK NUCLEAR GENERATING STATION - RELIEF REQUEST
FOR ALTERNATIVE EXAMINATION FOR REACTOR PRESSURE VESSEL
CIRCUMFERENTIAL SHELL WELDS (TAC NO. ME0890)

Dear Mr. Pardee:

By letter dated February 13, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML090440230), Exelon Generation Company, LLC, submitted a relief request from the requirements of Section XI of the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code*, as augmented by Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a(g)(6)(ii)(A)(2) for the Oyster Creek Nuclear Generating Station (Oyster Creek). These requirements pertain to the inservice inspection of the reactor pressure vessel circumferential welds. The proposed alternative would eliminate the requirement to inspect the circumferential welds except for the areas of intersection with the axial welds.

The Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's analysis in support of the request for relief. The NRC staff concludes that the proposed alternative provides an acceptable level of quality and safety. The request is authorized for Oyster Creek pursuant to 10 CFR 50.55a(a)(3)(i) for the remaining life of the plant.

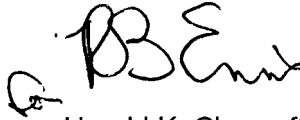
The NRC staffs' evaluation and conclusions are contained in the enclosed safety evaluation.

C. Pardee

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If you have any questions, please contact the Oyster Creek Project Manager, Mr. G. Edward Miller, at 301-415-2481.

Sincerely,

A handwritten signature in black ink, appearing to read "H. Chernoff". The signature is written in a cursive style with a small "H" and "C" at the beginning and end.

Harold K. Chernoff, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-219

Enclosure: As stated

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UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST ASSOCIATED WITH

REACTOR PRESSURE VESSEL CIRCUMFERENTIAL WELDS

EXELON GENERATION COMPANY, LLC

OYSTER CREEK NUCLEAR GENERATING STATION

DOCKET NO. 50-219

1.0 INTRODUCTION

By letter dated February 13, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML090440230), Exelon Generation Company, LLC, submitted a relief request from the requirements of Section XI of the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code*, as augmented by Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a(g)(6)(ii)(A)(2) for the Oyster Creek Nuclear Generating Station (Oyster Creek). These requirements pertain to the inservice inspection of the reactor pressure vessel (RPV) circumferential welds. The proposed alternative would eliminate the requirement to inspect the circumferential welds except for the areas of intersection with the axial welds consistent with the guidance provided in Generic Letter 98-05, "Boiling Water Reactor Licensees Use of the BWRVIP-05 Report to Request Relief from Augmented Examination Requirements on Reactor Pressure Vessel Circumferential Welds," dated November 10, 1998, and the NRC staff's safety evaluation (SE) for the report issued on July 28, 1998. The fourth 10-year interval for Oyster Creek began on October 15, 2002, and concludes on October 14, 2012. This request satisfies commitment 47 of the Oyster Creek license renewal SE.

2.0 REGULATORY EVALUATION

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 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) 12 months prior to the start of the 10-year interval, subject to the limitations and modifications listed therein.

Enclosure

10 CFR 50.55a(g)(6)(ii)(A) requires that licensees perform an augmented RPV shell weld examination as specified in the 1989 Edition of Section XI of the ASME Code. Section XI specifies that volumetric examinations of "essentially 100 percent" of the RPV pressure-retaining shell welds shall be performed during all inspection intervals.

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 alternative 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.

3.0 TECHNICAL EVALUATION

3.1 ASME Code Components Affected

The proposed alternative would be applicable to RPV Circumferential Shell Welds NR02-1-563, NR02-1-572, NR02-3-564, and NR02-3-572.

3.2 ASME Code Requirements from Which Relief is Requested

The proposed alternative is in lieu of Section XI of the 1989 Edition of the ASME Code, as applied to the RPV Circumferential Shell Welds listed in Section 3.1 of this SE.

3.3 Licensee Basis for the Alternative

Exelon cited the following excerpts from Section 4.2.4.2 NUREG-1875, Vol. 2, "Safety Evaluation Report Related to the License Renewal of Oyster Creek Generating Station," dated April, 2007 (ADAMS Accession No. ML071310246):

The staff's final SER concerning the BWRVIP-05 report, dated July 28, 1998, discusses the technical basis for relief. In this letter, the staff concludes that, since the failure frequency for circumferential welds in BWR plants is significantly below the criterion specified in RG [Regulatory Guide] 1.154, "Format and Content of Plant-Specific Pressurized Thermal Shock Safety Analysis Reports for Pressurized Water Reactors," dated January 1987, and below the core damage frequency (CDF) of any BWR plant, the continued inspection would result in a negligible decrease in an already acceptable low reactor vessel failure probability. Therefore, elimination of the inservice inspection (ISI) requirements for reactor vessel circumferential welds is justified. The staff's letter indicated that BWR applicants may request relief from the ISI requirements of 10 CFR 50.55a(g) for volumetric examination of circumferential RPV welds by demonstrating that:

- At the expiration of the license, the circumferential welds satisfy the limiting conditional failure probability for circumferential welds in the SER dated July 28, 1998, and
- The applicants have implemented operator training and established procedures that limit the frequency of cold overpressure events to the frequency specified in the staff's SER.

[. . .]

The staff finds that the applicant's evaluation for this [Time Limited Aging Analysis (TLAA)] is acceptable because the [Oyster Creek 50-Effective Full Power Years] conditional failure probability for the reactor vessel circumferential welds is bounded by the NRC analysis in the staff SER dated July 28, 1998, and the applicant will be using procedures and training to limit cold overpressure events during the period of extended operation. This analysis satisfies the evaluation requirements of the staff SER dated July 28, 1998; however, the applicant is still required to request relief for the circumferential weld examination for the extended period of operation, in accordance with 10 CFR 50.55a.

On the basis of its review, as discussed above, the staff concludes that the applicant has demonstrated, pursuant to 10 CFR 54.21(c)(1)(ii), that, for the reactor vessel circumferential weld examination relief TLAA, the analyses have been projected to the end of the period of extended operation. However, even though the analyses have been projected to the end of the period of extended operation, the applicant will still have to request an extension of the relief for circumferential welds examination for the renewal period.

Further, Exelon confirmed that the cited considerations remain valid for the extended period of operation.

3.4 NRC Staff Evaluation

By letter dated September 28, 1995, as modified and supplemented by letters dated June 24 and October 29, 1996, and May 16, June 4, June 13 and December 18, 1997, the Boiling Water Reactor Vessel and Internals Project (BWRVIP), submitted the proprietary report BWRVIP-05, "BWR Vessel and Internals Project, BWR Reactor Vessel Shell Weld Inspection Recommendations." As modified, the BWRVIP report proposed to reduce the scope of inspection of BWR RPV welds from essentially 100 percent of all RPV shell welds to examination of essentially 100 percent of the axial (i.e., longitudinal) welds and essentially zero percent of the RPV circumferential shell welds, except at the intersection of the axial and circumferential welds, thereby including approximately 2-3 percent of the circumferential welds. In addition, the report provided proposals to revise ASME Code requirements for successive and additional examinations of circumferential shell welds, provided in paragraph IWB-2420(b) of Section XI of the ASME Code.

On July 28, 1998, the NRC staff issued an SE of the BWRVIP-05 report. This evaluation concluded that the failure frequency of RPV circumferential welds in BWRs was sufficiently low to justify elimination of the ISI of these welds. In addition, the evaluation concluded that the BWRVIP proposals on successive and additional examinations of circumferential welds were acceptable. However, the evaluation indicated that examination of the circumferential welds should be performed if axial weld examinations revealed an active, mechanistic, mode of degradation.

On November 10, 1998, the NRC issued Generic Letter (GL) 98-05, "Boiling Water Reactor Licensees Use of the BWRVIP-05 Report to Request Relief from Augmented Examination

Requirements on Reactor Pressure Vessel Shell Welds.” GL 98-05 stated that BWR licensees may request permanent relief from the inservice inspection requirements of 10 CFR 50.55a(g) for the volumetric examination of RPV circumferential shell welds (ASME Code Section XI, Table IWB-2500-I, Examination Category B-A, Item 1.11, “Circumferential Shell Welds”), upon determining that:

1. At the expiration of the license, the circumferential welds will continue to satisfy the limiting conditional failure probability for circumferential welds in the NRC staff’s safety evaluation dated July 28, 1998, and
2. Licensees have implemented operator training and established procedures that limit the frequency of cold over-pressure events to the amount specified in the NRC staff’s safety evaluation dated July 28, 1998.

As described in NUREG-1875, the NRC staff found that the applicant’s evaluation for this TLAA is acceptable because the Oyster Creek 50-EFPY conditional failure probability for the RPV circumferential shell welds is bounded by the NRC analysis in the NRC staff SE dated July 28, 1998. Further, Exelon will be using procedures and training to limit cold overpressure events during the period of extended operation. As an example, Exelon described the Oyster Creek procedure 602.4.001, “Nuclear Steam Supply System (NSSS) Leak Test,” which is used for Class 1 system leakage testing, and contains controls for special management attention such as briefings, temperature controls, and pressure controls.

The NRC staff, through the authorization of Oyster Creek Relief Request R-18 (ADAMS Accession No. ML003744469), evaluated the operator training and established plant-specific procedures in place to minimize the potential for RPV cold over-pressurization events. The NRC staff concluded that the information provided regarding the Oyster Creek high-pressure injection systems, operator training, and plant-specific procedures provided a sufficient basis to support approval of the alternative examination request in R-18. The licensee stated that the same procedures and training used to limit cold overpressure events will remain in place for the current and extended period of operation. Therefore, the NRC staff’s finding regarding the licensee’s ability to control and limit cold overpressure events remains valid.

4.0 CONCLUSION

As set forth above, the NRC staff determines that the proposed alternative will continue to satisfy the failure probability and plant training/operating requirements of the NRC staff SE dated July 28, 1998, through the period of extended operations and will provide an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(a)(3)(i). Therefore, the NRC staff authorizes the proposed alternative at Oyster Creek for the remainder of the extended period of operation. All other ASME Code Section XI requirements for which relief was not specifically requested and approved remain applicable including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: H. Gonzalez

Date: September 15, 2009

C. Pardee

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If you have any questions, please contact the Oyster Creek Project Manager, Mr. G. Edward Miller, at 301-415-2481.

Sincerely,

R.B. Ennis/for
Harold K. Chernoff, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-219

Enclosure: As stated

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