Exelon Generation
4300 Winfield Road
Warrenville, IL 60555

www.exeloncorp.com

Exelon Nuclear

10 CFR 50.55a

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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Quad Cities Nuclear Power Station, Unit 1
Renewed Facility Operating License No. DPR-29
NRC Docket No. 50-254

References:
1. Letter from B. L. Burgess (U. S. NRC) to G. Van Middlesworth (FPL Energy Duane Arnold), "NRC Integrated Inspection Report 05000331/2007002," dated April 27, 2007
2. Letter from G. Van Middlesworth to U.S. NRC, "Request to Extend the Third 10-Year Inservice Inspection (ISI) Interval for Reactor Vessel Welds: VLA-A001, VLA-A002, VLB-A001, VLB-A002, VLC-B001, VLC-B002, VLD-B001, VLD-B002, and VCB-C005," dated February 19, 2007

Subject: Request to Extend the First Period of the Fourth 10-Year Inservice Inspection Interval for Twenty Reactor Pressure Vessel Welds

In accordance with 10 CFR 50.55a, "Codes and standards," paragraph (a)(3)(ii), Exelon Generation Company, LLC (EGC), is requesting relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," (ASME Section XI) to extend the first Inspection Period of the fourth Inservice Inspection (ISI) Interval for Quad Cities Nuclear Power Station (QCNPS) Unit 1, which began on March 10, 2003 for twenty Reactor Pressure Vessel (RPV) welds. EGC is requesting the extension of this interval until either:

- The current inspection procedures are re-qualified and re-certified through the Performance Demonstration Initiative (PDI) organization; or
- An ASME Section XI Code Inquiry is approved by ASME Section XI Subcommittee, clarifying that an equivalency demonstration of cable and connectors is within the scope of ASME Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," Supplement 1; or

- The completion of the twentieth QCNPS Unit 1 refuel outage (Q1R20), currently scheduled to begin in May 2009, to allow for the re-performance of the subject RPV welds using a PDI qualified procedure that uses PDI qualified cable configuration,

whichever occurs first.

Ultrasonic (UT) examinations of all subject welds were performed from the inside diameter of the RPV during the QCNPS Unit 1 eighteenth refueling outage in March 2005 (i.e., during the first Inspection Period of the fourth ISI Inspection Interval). Although the examinations of the inspected welds were successfully performed with no rejectable indications, EGC has identified a potential issue concerning the conformance of the inspection procedure with Appendix VIII, of ASME Section XI, and has discussed the applicability of this issue to QCNPS Unit 1 with NRC Region III inspectors, as described in the enclosed relief request.

This issue was initially identified during an NRC ISI Inspection at the Duane Arnold Energy Center (DAEC), which was conducted in February 2007 and documented in an April 27, 2007, NRC Inspection Report (Reference 1). In Reference 1, NRC Region III inspectors indicated that the DAEC ISI vendor had inappropriately applied criteria from ASME Code Section XI, Appendix VIII, Article 4110, "Pulsers, Receivers, and Search Units," to justify a cable configuration that was different than originally qualified by the vendor. The inspectors were concerned that the different cable configuration could adversely affect the flaw detection capability of the UT system.

As noted in Reference 1, although DAEC believed that the weld examinations that were performed with the alternate cable configuration were technically satisfactory, the station submitted a relief request (Reference 2) to allow deferral of the affected RPV weld examinations until the subsequent refueling outage. In addition, a Code Inquiry was submitted to the ASME for consideration during the May 2007 ASME Section XI meeting. The NRC granted verbal approval to DAEC for the requested relief.

When EGC learned of the issue at DAEC through informal industry communication, including the circumstances surrounding the submittal of the relief request by DAEC, EGC proactively entered the issue into the Corrective Action Program (CAP) on February 26, 2007. The issue report (IR) documented the pending ASME Section XI Code Inquiry, as well as the planned performance, by the ISI vendor, of a new equivalency demonstration for the alternate cable configuration. EGC also documented in the IR that the intent of the DAEC relief request was to provide sufficient time for resolution of the issue through either the ASME Code Inquiry process, or the new equivalency demonstration.

When the issue was documented in the CAP database in February 2007, EGC concluded that the initiation of a licensing action in response to the issue, prior to final regulatory disposition (i.e., as identified in Reference 1), was premature. As such, EGC did not submit an equivalent relief request for QCNPS Unit 1.

Re-performance of the examinations during the current Q1R19 refueling outage would be outside of the first Inspection Period, within which these examinations were required to be completed. In addition, re-performance of the subject RPV welds during the current Q1R19

refueling outage, using a PDI-qualified examination procedure, would present a hardship to QCNPS without a compensating increase in level of quality or safety. Based upon the current unavailability of PDI-qualified ISI examination equipment, re-performance of these examinations would unnecessarily and significantly extend the duration of the current refueling outage. Finally, re-performance of these weld examinations during Q1R19 would incur additional dose to plant workers, which, pending satisfactory resolution of the ASME Section XI Code Inquiry, would not be incurred.

Therefore, EGC requests verbal approval of this request by May 19, 2007 to enable start-up following Q1R19. If there are any questions or comments, please contact Mr. John L. Schrage at (630) 657-2821.

Respectfully,

Patrick R. Simpson

Patrick R. Simpson
Manager - Licensing

Attachment:

Quad Cities Nuclear Power Station, Unit 1 Relief Request I4R-16

Attachment

Quad Cities Station, Unit 1

Relief Request I4R-16

Attachment
Relief Request Number I4R-16

Proposed Alternative In Accordance with 10 CFR 50.55a(a)(3)(ii)
Hardship or Unusual Difficulty without Compensating
Increase in Level of Quality or Safety

1.0 ASME Code Component(s) Affected

Code Class:	1
Examination Categories:	B-A
Item Numbers:	B1.12, "Shell Welds, Longitudinal," B1.51, "Repair Welds, Beltline Region"
References:	IWA-2412(a) Table IWB-2412-1 IWB-2500(a) Table IWB-2500-1
Description:	Alternative duration for the first Inspection Period of the fourth Inservice Inspection (ISI) Interval for Quad Cities Nuclear Power Station (QCNPS), Unit 1.
Component numbers:	Reactor Pressure Vessel (RPV) Longitudinal Shell Welds and Beltline Region Repair Welds. See Table 1 for specific components.

2.0 Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 1995 Edition through 1996 Addenda (ASME Section XI)

3.0 Applicable Code Requirement

IWB-2500(a) requires components to be examined as specified in Table IWB-2500-1.

Table IWB-2500-1 Category B-A, Item B1.12 requires examination of applicable Class 1 pressure retaining welds, which includes essentially 100% of weld length once during the ten year Interval.

Table IWB-2500-1 Category B-A, Item B1.51 requires examination of all weld repair areas in the Beltline Region once during the ten year Interval.

IWA-2412(a) requires that the required percentage of examinations in each Examination Category shall be completed in accordance with Table IWB-2412-1.

Table IWB-2412-1 defines the duration of the first Inspection Period to be 3 years for the first and successive Inspection Intervals.

4.0 Reason for Request

Pursuant to 10 CFR 50.55a(a)(3)(ii), relief is requested on the basis that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

In 1995, ISwT (then Southwest Research Institute) qualified procedures ISwT-PDI-AUT1 (Revision 0, Change 0) and ISwT-PDI-AUT2 (Revision 0, Change 0) for inside surface examination of pressurized water reactor vessel shell welds at the Electric Power Institute (EPRI) under the Performance Demonstration Initiative (PDI). This qualification included the type of cabling, cable length, and number of connectors used in the actual demonstration, along with the active components, such as scanners, receivers, and search units.

In 2001, ISwT began using a scanner whose size and function were capable of accessing the inside surface of welds in a Boiling Water Reactor (BWR) vessel. Because of the small size and restricted areas of operation in a BWR vessel annulus region, the type of search unit cable used for the initial procedure qualifications for ISwT-PDI-AUT1 and ISwT-PDI-AUT2 Revision 0 in 1995 was not feasible for use with this tool.

ISwT performed a system equivalency comparison between the PDI essential variable cable configuration and the cable configuration listed in the new procedure for BWR vessels. The comparison used a "worst case" BWR cable configuration that could be necessary if the data acquisition system was physically located outside of the reactor building. This "worst case" configuration consisted of 1350 feet of RG-58 coaxial cable, plus 230 feet of RG-174 coaxial cable, plus 5 feet of "Micro Cable," and a total of 20 connectors. This equivalency demonstration was performed in accordance with ASME Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," Supplement 1, of ASME Section XI, with the exception that a steel reference block was used in lieu of the glass block recommended in Appendix VIII, Supplement 1. All aspects of the procedure were held constant and the system center frequency and bandwidth were measured for both cable configurations and each type of probe specified in the procedures. The comparison identified that the center frequency and bandwidth of the total system were within the acceptance criteria contained in ASME Section XI, Appendix VIII.

The above equivalency demonstration was viewed as a "bounding configuration" and that other alternative configurations were allowed, so long as they included the same cable types and the same or shorter cable length.

The following cable configurations was used when performing the examinations of the RPV welds at QCNPS Unit 1:

Refueling Outage Q1R18 (2005)

Cable Type RG-174 Length	Micro Cable Length	Number of Connectors
230 feet	5 feet	6

As shown in the table above, the maximum length of cable that was used in 2005 is greater than that quantified for cable type RG-174, in addition to the use of 5 feet of micro cable. However, the total cable length actually used at QCNPS Unit 1 examinations (235 feet) is significantly less than the total cable length originally qualified (1098 feet). Additionally, a system equivalency demonstration in accordance with ASME Section XI, Appendix VIII, Supplement 1, was recently

completed, including the use of a glass reference block. The resulting frequency and bandwidth measurements are within the 10% tolerance specified by Appendix VIII, Paragraph VIII, Section 4110, "Pulsers, Receivers, and Search Units," Item (h).

Upon receipt of industry information from another licensee in February 2007, Exelon Generation Company, LLC (EGC) identified and documented a potential issue with the qualification of the equipment that was used to conduct RPV weld examinations. EGC discussed this issue with NRC Region III inspectors during an NRC inspection of the QCNPS ISI Program in May 2007 (i.e., during the nineteenth QCNPS Unit 1 refueling outage (Q1R19)). These discussions addressed the applicability of the equipment qualification issue to RPV weld examinations that were conducted during the previous QCNPS Unit 1 refueling outage (Q1R18). Specifically, the discussions concerned the difference between the current equipment configuration (i.e., coaxial cable sizes, lengths, and associated number of connectors) relative to the configuration in the ISwT's documentation of the as-tested/as-qualified PDI configuration. Although an equivalency demonstration of differences is permitted by ASME Section XI, Appendix VIII, Supplement 1 (i.e., for substitution of certain active components used to conduct the examinations, such as pulsers, receivers, and search units from the PDI configuration), ASME Section XI is silent as to whether such an allowance extends to passive circuit components, such as the associated cabling, in lieu of actual testing. The existing ASME Section XI allowance to substitute active components, which are viewed as more-critical to the conduct of quality examinations, has led the industry into believing, heretofore, that use of alternative cable arrangements could be justified by evaluation in lieu of actual demonstration testing, under ASME Section XI, Appendix VIII, Supplement 1.

Re-performance of the examinations during the current Q1R19 refueling outage would be outside of the first Inspection Period, within which these examinations were required to be completed. In addition, re-performance of the subject RPV welds during the current Q1R19 refueling outage, using a PDI-qualified examination procedure, would present a hardship to QCNPS without a compensating increase in level of quality or safety. Based upon the current unavailability of PDI-qualified ISI examination equipment, re-performance of these examinations would unnecessarily and significantly extend the duration of the current refueling outage. Finally, re-performance of these weld examinations during Q1R19 would incur additional dose to plant workers, which, pending satisfactory resolution of the ASME Section XI Code Inquiry, would not be incurred.

5.0 Proposed Alternative and Basis for Use

EGC requests NRC authorization of an alternative to extend the QCNPS Unit 1 first Inspection Period of the fourth ISI Inspection Interval for the subject RPV welds until the end of the Q1R20 refueling outage. The QCNPS Unit 1 first Inspection Period of the fourth Inspection Interval started on March 10, 2003 and ended on April 17, 2006. The Q1R20 refueling outage is currently scheduled to begin in May 2009. This extension allows time for the PDI re-qualification of the examination procedure used to examine the subject RPV welds; or alternatively,

the ASME Subcommittee approval of a Code Inquiry, clarifying that an equivalency demonstration of cable and connectors is within the scope of ASME Section XI, Appendix VIII, Supplement 1; or failing the above, re-performance of the subject RPV welds using a PDI qualified procedure that uses PDI qualified cable configuration during the next Q1R20 refueling outage.

Pursuant to 10 CFR 50.55a(a)(3)(ii), EGC requests this alternative on the basis that requiring the examination of the subject RPV welds prior to the end of the first Inspection Period (April 17, 2006) presents a hardship without compensating increase in the level of quality or safety. Based upon finding of no rejectable indications in the subject RPV welds conducted in 2005, EGC has concluded that the first Inspection Period of the fourth Inspection Interval of QCNPS Unit 1 can be extended for the subject RPV welds, pending the resolution of the identified concerns with the inspection procedure, while providing an acceptable level of quality and safety.

6.0 Duration of Proposed Alternative

The first Inspection Period for examination of the subject RPV welds for QCNPS Unit 1 will be extended until either:

- The current inspection procedures are re-qualified and re-certified through the PDI organization; or
- An ASME Section XI Code Inquiry is approved by ASME Section XI Subcommittee, clarifying that an equivalency demonstration of cable and connectors is within the scope of ASME Section XI, Appendix VIII, Supplement 1; or
- The completion of the twentieth QCNPS Unit 1 refuel outage (Q1R20), currently scheduled to begin in May 2009, to allow for the re-performance of the subject RPV welds using a PDI qualified procedure that uses PDI qualified cable configuration,

whichever occurs first.

7.0 Precedents

The NRC has verbally approved a similar relief request for Duane Arnold Energy Center (i.e., extension of an ISI Inspection Interval), as requested in a letter from G. Van Middlesworth to the U.S. NRC, dated February 19, 2007

Attachment
Relief Request Number I4R-16

Table 1
Quad Cities Nuclear Power Station, Unit 1
RPV Longitudinal Shell Welds and Beltline Region Repair Welds

Weld Identifier	Exam Category	Exam Item Number	Weld Description
1/REACTOR VESSEL/RPV-VSC1-197/WELD	B-A	B1.12	RPV COURSE #1 197 DEG VERT SEAM
1/REACTOR VESSEL/RPV-VSC1-317/WELD	B-A	B1.12	RPV COURSE #1 317 DEG VERT SEAM
1/REACTOR VESSEL/RPV-VSC1-55/WELD	B-A	B1.12	RPV COURSE #1 55 DEG VERT SEAM
1/REACTOR VESSEL/RPV-VSC1-77/WELD	B-A	B1.12	RPV COURSE #1 77 DEG VERT SEAM
1/REACTOR VESSEL/RPV-VSC2-141/WELD	B-A	B1.12	RPV COURSE #2 141 DEG VERT SEAM
1/REACTOR VESSEL/RPV-VSC2-22/WELD	B-A	B1.12	RPV COURSE #2 22 DEG VERT SEAM
1/REACTOR VESSEL/RPV-VSC2-261/WELD	B-A	B1.12	RPV COURSE #2 261 DEG VERT SEAM
1/REACTOR VESSEL/RPV-VSC2-323/WELD	B-A	B1.12	RPV COURSE #2 323 DEG VERT SEAM
1/REACTOR VESSEL/RPV-VSC3-197/WELD	B-A	B1.12	RPV COURSE #3 197 DEG VERT SEAM
1/REACTOR VESSEL/RPV-VSC3-317/WELD	B-A	B1.12	RPV COURSE #3 317 DEG VERT SEAM
1/REACTOR VESSEL/RPV-VSC3-77/WELD	B-A	B1.12	RPV COURSE #3 77 DEG VERT SEAM
1/REACTOR VESSEL/RPV-VSC4-219/WELD	B-A	B1.12	RPV COURSE #4 219 DEG VERT SEAM
1/REACTOR VESSEL/RPV-VSC4-261/WELD	B-A	B1.12	RPV COURSE #4 261 DEG VERT SEAM
1/REACTOR VESSEL/RPV-VSC4-339/WELD	B-A	B1.12	RPV COURSE #4 339 DEG VERT SEAM
1/REACTOR VESSEL/RPV-VSC4-99/WELD	B-A	B1.12	RPV COURSE #4 99 DEG VERT SEAM
1/REACTOR VESSEL/BMR-167-305/WELD	B-A	B1.51	RPV WELD BELTLINE REPAIR AREA
1/REACTOR VESSEL/BMR-138-270/WELD	B-A	B1.51	RPV WELD BELTLINE REPAIR AREA
1/REACTOR VESSEL/BMR-018-310/WELD	B-A	B1.51	RPV WELD BELTLINE REPAIR AREA
1/REACTOR VESSEL/BMR-017-318/WELD	B-A	B1.51	RPV WELD BELTLINE REPAIR AREA
1/REACTOR VESSEL/BMR-016-295/WELD	B-A	B1.51	RPV WELD BELTLINE REPAIR AREA