

August 6, 2007

Mr. Christopher M. Crane
President and Chief Nuclear Officer
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNIT 1 - RELIEF REQUEST
I4R-16 TO EXTEND THE FIRST PERIOD OF THE FOURTH 10-YEAR
INSERVICE INSPECTION INTERVAL FOR TWENTY REACTOR PRESSURE
VESSEL WELDS (TAC NO. MD5530)

Dear Mr. Crane:

By letter dated May 11, 2007 (Agencywide Document Access and Management System (ADAMS) Accession No. ML071340063), as supplemented by letter dated May 17, 2007 (ADAMS Accession No. ML071380439), Exelon Generation Company, LCC (the licensee), submitted Relief Request I4R-16, which requested relief from certain requirements in the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) for the Quad Cities Nuclear Power Station (QCNPS), Unit 1. The licensee proposed to extend the first inspection period of the fourth 10-year inservice inspection (ISI) interval for 20 reactor pressure vessel (RPV) welds.

Based on the enclosed safety evaluation, the Nuclear Regulatory Commission (NRC) staff concludes that compliance with the specified requirements would result in hardship or unusual difficulty without a compensatory increase in the level of quality and safety. The NRC staff authorizes the implementation of Relief Request I4R-16, as modified by the May 17, 2007, letter, to extend the first period of the fourth 10-year ISI interval for the subject RPV welds either to the end of 20th refueling outage (Q1R20), which is scheduled to end on May 30, 2009, or until completion of one of the three previously stated provisions:

- (1) The current inspection procedures are re-qualified by the EPRI through the Performance Demonstration Initiative (PDI) organization;
- (2) The ASME Code, Section XI is revised to allow equivalence evaluation of cables and connectors as "essential variables" in accordance with ASME Code, Section XI, Appendix VIII, Supplement 1; the NRC approves this ASME Code, Section XI revision; and the NRC approves the adoption of this later edition and addenda of the ASME Code, Section XI for QCNPS, Unit 1; or
- (3) Re-examine the subject RPV welds using a PDI qualified procedure that uses a PDI qualified cable configuration during the 20th refueling outage (Q1R20), currently scheduled to complete on May 30, 2009;

whichever provision occurs first.

C.Crane

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On May 18, 2007, the NRC staff granted a verbal authorization for Relief Request I4R-16, as modified by the licensee's May 17, 2007, letter. Enclosed is the NRC staff's evaluation of Relief Request I4R-16, and the bases for the previously granted verbal relief.

Sincerely,

/RA/

Russell Gibbs, Chief
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-254

Enclosure: Safety Evaluation

cc w/encl: See next page

C.Crane

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO RELIEF REQUEST I4R-16 TO EXTEND
THE FIRST PERIOD OF FOURTH 10-YEAR INSERVICE INSPECTION INTERVAL
EXELON GENERATION COMPANY, LLC
QUAD CITIES NUCLEAR POWER STATION UNIT 1
DOCKET NO. 50-254

1.0 INTRODUCTION

By letter dated May 11, 2007 (Agencywide Document Access and Management System (ADAMS) Accession No. ML071340063, as supplemented by letter dated May 17, 2007 (ADAMS Accession No. ML071380439), Exelon Generating Company, LLC (the licensee), requested relief (Relief Request I4R-16) from certain requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) at Quad Cities Nuclear Power Station (QCNPS), Unit 1. The licensee proposed to extend the first inspection period of the fourth 10-year inservice inspection (ISI) interval for 20 reactor pressure vessel (RPV) welds.

2.0 REGULATORY EVALUATION

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(g)(4), ASME Code Class 1, 2, and 3 components must meet the requirements set forth in ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plants Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. 10 CFR 50.55(g)(4)(i) requires that inservice examinations of components and system pressure tests conducted during the initial 10-year inspection interval 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) on the date 12 months before the issuance of the operating license. The regulation at 10 CFR 50.55a(g)(4)(ii) requires that inservice examinations and system pressure tests during successive 10-year inspection intervals comply with the requirements of the latest edition and Addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months before the start of the 10-year inspection interval, subject to the limitations and modifications listed therein. The code of record for the fourth 10-year ISI interval at QCNPS, Unit 1 is the 1995 Edition through the 1996 Addenda of Section XI of the ASME Code.

Alternatives to requirements may be authorized or relief granted by the NRC pursuant to 10 CFR 50.55a(a)(3)(i) or 10 CFR 50.55a(a)(3)(ii). In proposing alternatives or requesting relief, the applicant must demonstrate that:

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- (i) The proposed alternatives would provide an acceptable level of quality and safety; or
- (ii) Compliance with the specified requirements of this section 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)(iv), ISI items may meet the requirements set forth in subsequent editions and addenda of the ASME Code that are incorporated by reference in 10 CFR 50.55a(b), subject to the limitations and modifications listed therein, and subject to Commission approval. Portions of editions and addenda may be used, provided that all related requirements of the respective editions and addenda are met.

3.0 TECHNICAL EVALUATION

3.1 Affected Components

Code Class: 1

Examination Categories: B-A

Item Numbers: B1.12, "Shell Welds, Longitudinal," and B1.51, "Repair Welds, Beltline Region"

Description: Alternative duration for the first inspection period of the fourth ISI interval for QCNPS, Unit 1.

Component Nos: RPV Longitudinal Shell Welds and Beltline Region Repair Welds. See Table below for specific components.

Reactor Vessel Weld Identifier (1/Reactor Vessel)	Exam Categ	Item No.	Weld Description
RPV-VSC1-197 weld	B-A	B1.12	RPV Course #1 197 Deg Vertical Seam
RPV-VSC1-317 weld	B-A	B1.12	RPV Course #1 317 Deg Vertical Seam
RPV-VSC1-55 weld	B-A	B1.12	RPV Course #1 55 Deg Vertical Seam
RPV-VSC1-77 weld	B-A	B1.12	RPV Course #1 77 Deg Vertical Seam
RPV-VSC2-141 weld	B-A	B1.12	RPV Course #2 141 Deg Vertical Seam
RPV-VSC2-22 weld	B-A	B1.12	RPV Course #2 22 Deg Vertical Seam
RPV-VSC2-261 weld	B-A	B1.12	RPV Course #2 261 Deg Vertical Seam
RPV-VSC2-323 weld	B-A	B1.12	RPV Course #2 323 Deg Vertical Seam
RPV-VSC3-197 weld	B-A	B1.12	RPV Course #3 197 Deg Vertical Seam
RPV-VSC3-317 weld	B-A	B1.12	RPV Course #3 317 Deg Vertical Seam

RPV-VSC3-77 weld	B-A	B1.12	RPV Course #3 77 Deg Vertical Seam
RPV-VSC4-219 weld	B-A	B1.12	RPV Course #4 219 Deg Vertical Seam
RPV-VSC4-261 weld	B-A	B1.12	RPV Course #4 261 Deg Vertical Seam
RPV-VSC4-339 weld	B-A	B1.12	RPV Course #4 339 Deg Vertical Seam
RPV-VSC4-99 weld	B-A	B1.12	RPV Course #4 99 Deg Vertical Seam
BMR-167-305 weld	B-A	B1.51	RPV Weld Beltline Repair Area
BMR-138-270 weld	B-A	B1.51	RPV Weld Beltline Repair Area
BMR-018-310 weld	B-A	B1.51	RPV Weld Beltline Repair Area
BMR-017-318 weld	B-A	B1.51	RPV Weld Beltline Repair Area
BMR-016-295 weld	B-A	B1.51	RPV Weld Beltline Repair Area

3.2 Applicable Code

The applicable code is the ASME Code, Section XI, 1995 Edition through 1996 Addenda.

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 percent 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 reactor vessel beltline region once during the 10-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.

3.3 Proposed Alternative

The licensee requests NRC authorization of an alternative to extend the QCNPS, Unit 1 first inspection period of the fourth ISI interval for the subject RPV welds until the end of the 20th refueling outage (Q1R20). The QCNPS, Unit 1 first inspection period of the fourth ISI 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 Performance Demonstration Initiative (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 Code, Section XI, Appendix VIII, Supplement 1; or failing the above, re-examination of the subject RPV welds using a PDI-qualified procedure that uses PDI-qualified cable configuration during the Q1R20 refueling outage.

Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee 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 a compensating increase in the level of quality or safety. Based upon findings of no rejectable indications in the subject RPV welds conducted in 2005, the licensee has concluded that the first inspection period of the fourth ISI 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.

3.4 Licensee Basis for the Alternative

The licensee stated that in 1995, ISwT (then Southwest Research Institute) qualified ultrasonic testing 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 Research Institute (EPRI) under the 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 in the BWR vessel.

The licensee further stated that 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 radio grade (RG) RG-58 coaxial cable, 230 feet of RG-174 coaxial cable, 5 feet of "micro cable," and a total of 20 connectors. This equivalency demonstration was performed in accordance with ASME Code, Section XI, Appendix VIII, Supplement 1, with the exception that a steel reference block was used in lieu of the glass block recommended in ASME Code, Section XI, 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 of ASME Section XI, Appendix VIII.

The above equivalency demonstration was viewed as a "bounding configuration" and that other alternative configurations were allowed, as long as they included the same cable types and the same or shorter cable length. The licensee used 230 feet of RG-174 cable, 5 feet of micro cable and 6 connectors during the 2005 examination at QCNPS, Unit 1.

According to the licensee, the maximum length of cable that was used at QCNPS, Unit 1 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 as clarified to be 1058 feet). Additionally, a system equivalency demonstration in accordance with ASME Code, 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 percent tolerance specified by Appendix VIII, Paragraph VIII, Section 4110, Item (h).

Upon receipt of industry information from another licensee in February 2007, the licensee identified and documented a potential issue with the qualification of the equipment that was used to conduct RPV weld examinations. The licensee discussed this issue with NRC Region III inspectors during an NRC inspection of the QCNPS ISI Program in May 2007 (i.e., during the 19th 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 Code, 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), the ASME Code, 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 Code, 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 Code, Section XI, Appendix VIII, Supplement 1.

The licensee stated that re-examination of the subject welds 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-examination 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 the 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 Q1R19 refueling outage. Finally, re-examination of these welds during Q1R19 would incur additional dose to plant workers, which, pending satisfactory resolution of the ASME Code, Section XI Code Inquiry, would not be incurred.

3.5 Duration of Relief

As modified by the May 17, 2007, supplemental letter, the licensee requested to extend the first period of the fourth 10-year ISI interval for the subject RPV to the end of 20th refueling outage (Q1R20), which is scheduled to end on May 30, 2009, or until completion of one of the three provisions:

- (1) The current inspection procedures are re-qualified by the EPRI through the PDI organization;
- (2) The ASME Code, Section XI is revised to allow equivalence evaluation of cables and connectors as "essential variables" in accordance with ASME Code, Section XI, Appendix VIII, Supplement 1; the NRC approves this ASME Code, Section XI revision; and the NRC approves the adoption of this later edition and addenda of the ASME Code, Section XI for QCNPS, Unit 1; or

(3) Re-examine the subject RPV welds using a PDI qualified procedure that uses a PDI qualified cable configuration during the 20th refueling outage (Q1R20), currently scheduled to complete on May 30, 2009;

whichever provision occurs first.

4.0 STAFF EVALUATION

In February 2007, a NRC Region III inspector questioned a change to the essential variables for the cable lengths and number of cable connectors that were used in 2001, in the ultrasonic testing (UT) examination of the reactor vessel welds at the Duane Arnold Energy Center (DAEC) (ADAMS Accession No. ML070930079). As a result of the NRC's findings at DAEC, the NRC inspector also discussed the issue with the licensee regarding the RPV weld examination at QCNPS, Unit 1 in May 2007. Subsequently, the licensee submitted Relief Request I4R-16 for QCNPS, Unit 1 to address the cable configuration issue.

The licensee conducted UT examinations of the subject 20 RPV welds during the 14th refueling outage in 1996 and during the 18th refueling outage in 2005. The results of these inspections were submitted to the NRC by letters dated November 22, 1996 and July 18, 2005. The examination results for the 20 RPV welds showed that there were no rejectable indications during both the 1996 and 2005 examinations.

4.1 Current Ultrasonic Examination Procedures

As discussed above, in 1995, UT examination procedures used by ISwT for the inside surface examination of reactor vessel shell welds were qualified at the EPRI under the 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 (see Table 1). The licensee stated further that in order to utilize these UT examination procedures for RPV welds in BWRs, the vendor performed a system equivalency demonstration in 2001 between the essential variable cable configuration that was previously qualified by PDI and the cable configuration listed in the UT examination procedure for BWR RPVs (see Table 1). This equivalency demonstration used the "worst case" BWR cable configuration that could be necessary if the data acquisition system was physically located outside of the reactor building. The equivalency demonstration was performed in accordance with ASME Code, Section XI, Appendix VIII, Supplement 1. The variable 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 the ASME Code, Section XI, Appendix VIII.

According to the licensee, the UT examination procedures that were used at QCNPS, Unit 1 in 2005 to perform RPV weld examinations utilized a cable configuration that was bounded by the cable configuration that was used during the 2001 equivalency demonstration. Based upon the successful equivalency demonstration in 2001 of the worst case cable configuration to the original PDI qualification, in conjunction with a less limiting cable configuration for the actual UT examination procedure, the licensee concluded that the 2005 UT examination procedures used for the QCNPS, Unit 1 RPV welds provide results that are consistent with the procedures that were originally qualified by PDI in 1995. As such, these procedures provide confidence that the

2005 UT examinations of the QCNPS, Unit 1 RPV welds have confirmed the structural integrity of the RPV welds.

In the May 17, 2007, supplemental letter, the licensee provided a comparison of the exact cable type and length and number of connector that were used in the 1995 PDI qualification, 2001 and 2007 equivalency determination, and 2005 QCNPS, Unit 1 examination (see the table below).

Table 1

Cable Length (feet)				
Cable Type/ Connectors	1995 PDI Qualification	2001 Equivalency Determination	2007 Equivalency Determination	2005 QCNPS-1 UT Exam
RG-58	1018	1350	1350	0
RG-174	40	230	230	230
Micro Cable	0	5	5	5
Total Cable	1058	1585	1585	235
Connectors	13	20	20	6

The licensee stated that the resulting frequency and bandwidth measurements during the 2007 equivalency demonstrations were within the 10 percent tolerance specified by ASME Code, Section XI, Appendix VIII, Paragraph VIII-4110 (h). The alternate cable configuration that was utilized in 2005 had no discernible effect on the detection capability of the system, relative to the cable configuration that was qualified by PDI in 1995, and demonstrated as equivalent in 2001 and 2007.

The licensee stated that the configuration of shorter cable lengths and fewer number of the connectors is bounded by the "worst-case" configuration of longer cable lengths and more connectors. The licensee's argument is that shorter cable lengths and fewer number of connectors will cause less noise and distortion to the signals from the UT examination than the longer cable length and greater number of connectors.

Although the performance of UT system configurations with shorter cables and fewer connectors may be bounded by the performance of configurations used in the equivalency determinations, the NRC staff will only accept system configurations that are consistent with those for which the procedure is qualified, and consistent with ASME Code requirements. However, based on results of the 2001 and 2007 equivalency determinations, the NRC staff recognizes that it is unlikely that a flaw exists undetected in the subject welds that could significantly affect the structural integrity of the RPV during the proposed duration of this relief request.

The licensee proposed the three provisions (listed in Section 3.5 of this safety evaluation) that limit the duration of the proposed relief request.

4.2 Provision Number 1

The licensee stated that implementation of the first provision (i.e., re-qualification of the inspection procedure) would be conducted by the EPRI through the PDI. This re-qualification would be performed in accordance with the requirements of ASME Code, Section XI, Appendix VIII, Supplement 1, the PDI program, and 10 CFR 50.55a. The re-qualification would be comprised of a demonstration of the current QCNPS procedure, in accordance with the PDI processes and procedures, using the current essential variables. The NRC staff finds that a successful performance demonstration would validate the examinations that have already been performed on the subject welds and thus, would satisfy the ASME Code required inspection for the first period of the fourth 10-year ISI interval.

4.3 Provision Number 2

The NRC staff had concerns regarding the second provision of Relief Request I4R-16 as stated in the licensee's May 11, 2007 letter because the provision does not specify the NRC's approval of equivalency demonstration of the cable configuration. By letter dated May 17, 2007, the licensee revised Provision No. 2 to read as follows:

"The ASME Section XI Code is revised to allow equivalence evaluation of cables and connectors as "essential variables" in accordance with ASME Section XI, Appendix VIII, Supplement 1; the NRC approves this ASME Section XI Code revision; and the NRC approves the adoption of this later edition and addenda of the ASME Section XI Code for QCNPS, Unit 1."

The NRC staff finds that the revised Provision No. 2 is acceptable because the licensee would request the NRC's approval to use the revised ASME Code with regard to the qualification of the cable configuration in the UT examination of the subject RPV welds.

4.4 Provision Number 3

Provision No. 3 will become effective if Provisions No. 1 and No. 2 are not accomplished earlier. Under Provision No. 3, the licensee will re-examine the subject RPV welds using a PDI qualified procedure that uses a PDI qualified cable configuration during the 20th refueling outage (Q1R20), which is scheduled to begin in May 2009 and scheduled to end on May 30, 2009.

The NRC staff's concern regarding the proposed extension of the UT examination for the subject RPV welds is that without use of a qualified UT procedure, flaw(s) in the subject RPV welds may not have been detected during the 1996 and 2005 examinations. The structural integrity of the subject RPV welds may not be verified until May 2009. In the May 17, 2007, supplemental letter, the licensee responded that the probability of flaws that may not have been detected due to a change in cabling configuration is negligible. This conclusion is based on the successful equivalency demonstrations of the UT examination procedures and equipment that were conducted in 2001 and 2007 as discussed above.

The licensee stated that although the change to the essential variables potentially calls into question the effectiveness and validity of the UT examinations of the subject welds, the UT procedure still had to satisfy the calibration process for detecting a reflector located on the RPV inside diameter. The ability to detect the calibration reflector indicates that the UT procedure is

capable of finding flaws. Therefore, there is reasonable assurance that any detrimental flaw, if present, would likely have been detected when the subject welds were examined during the Q1R18 refueling outage in 2005. The possibility of a flaw growing to a detrimental size during the proposed extension is small because of the slow crack growth rates in RPV material.

The licensee stated further that the UT examination technique that was used in 2005 exceeds the inspection requirements specified by BWR Vessel and Internals Project (BWRVIP)-05, "BWR Reactor Pressure Vessel Shell Weld Inspection Recommendations," which was endorsed by the NRC on July 28, 1998 (ADAMS Accession No. ML9808120118). BWRVIP-05 concluded that the results of inservice inspections that had been performed up to that time, support the conclusion that vessel seam welds are free from unacceptable fabrication defects, and that no flaws had developed during operation.

The NRC staff finds that Provision No. 3 is acceptable even though performance of a PDI-qualified UT examination of the subject welds would not occur until Q1R20, because the licensee has shown that reasonable assurance of the structural integrity of the subject welds has been verified and maintained based on the results of the UT examinations performed on QCNPS, Unit 1 RPV welds in 2005, the original PDI qualification and subsequent equivalency demonstrations of the UT examination procedures, and the conclusions of BWRVIP-05.

4.5 Hardship Evaluation

The licensee requested this alternative on the basis that reexamination of the subject RPV welds during the current Q1R19 refueling outage would present a hardship to QCNPS without a compensating increase in quality and safety. The licensee stated that re-performance of these examinations would unnecessarily and significantly extend the duration of the current Q1R19 refueling outage based upon the current unavailability of PDI-qualified ISI examination equipment. In addition, reexamination of the subject RPV welds during Q1R19 would result in additional dose to plant workers. However, the licensee stated that although the change to the essential variables potentially calls into question the effectiveness and validity of the UT examinations of the subject welds, the UT procedure still had to satisfy the calibration process for detecting a reflector located on the RPV inside diameter. The ability to detect the calibration reflector indicates that the UT procedure is capable of finding flaws.

Therefore, the NRC staff concludes that there is reasonable assurance that a detrimental flaw, if present, would likely have been detected when the subject welds were examined during the Q1R18 refueling outage in 2005, and that requiring the licensee to re-perform the examination of the subject welds using qualified equipment in lieu of implementing the provision of this relief request would result in hardship without a compensating increase in the level of quality or safety.

5.0 CONCLUSION

Based on its review of the information submitted, the NRC staff concludes that compliance with the specified ASME Code requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality or safety. Furthermore, the NRC staff concludes that the examinations performed during Q1R14 and Q1R18 refueling outages on the subject RPV welds provide reasonable assurance of the structural integrity of the subject welds until the end of 20th refueling outage, which is scheduled to be completed by May 30, 2009.

Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the NRC staff authorizes the implementation of Relief Request I4R-16, as modified by the May 17, 2007, letter, to extend the first period of the fourth 10-year ISI interval for the subject RPV welds either to the end of the 20th refueling outage (Q1R20), which is scheduled to end on May 30, 2009, or until completion of one of the three previously stated provisions:

- (1) The current inspection procedures are re-qualified by the EPRI through the PDI organization;
- (2) The ASME Code, Section XI is revised to allow equivalence evaluation of cables and connectors as "essential variables" in accordance with ASME Code, Section XI, Appendix VIII, Supplement 1; the NRC approves this ASME Code, Section XI revision; and the NRC approves the adoption of this later edition and addenda of the ASME Code, Section XI for QCNPS, Unit 1; or
- (3) Re-examine the subject RPV welds using a PDI qualified procedure that uses a PDI qualified cable configuration during the 20th refueling outage (Q1R20), currently scheduled to complete on May 30, 2009;

whichever provision occurs first.

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: J. Tsao

Date: August 6, 2007