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

November 5, 2009

Mr. Charles G. Pardee
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2 – RISK-INFORMED RELIEF REQUEST I3R-01 FOR CERTAIN PRESSURE RETAINING PIPING WELDS (TAC NOS. ME0225 AND ME0226)

Dear Mr. Pardee:

By letter to the Nuclear Regulatory Commission (NRC) dated December 10, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML083460590), as supplemented by letter dated July 8, 2009 (ADAMS Accession No. ML091900327), Exelon Generation Company, LLC (the licensee), submitted risk-informed inservice inspection (ISI) program Relief Request (RR) I3R-01 as an alternative to American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, ISI requirements for certain Class 1 and 2 piping welds for Braidwood Station, Units 1 and 2. The request was submitted in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), 50.55a(a)(3)(i).

The NRC staff has reviewed the licensee's submittal and determined that the alternative proposed in RR I3R-01 will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the NRC staff authorizes the use of the proposed alternative at Braidwood Station, Units 1 and 2, for the third 10-year ISI interval, which began for Unit 1 on July 29, 2008, and for Unit 2 on October 17, 2008. 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. The NRC staff's safety evaluation is enclosed.

Please contact Mr. Marshall David at (301) 415-1547 if you have any questions on this action.

Sincerely,

Stephen J. Campbell

Stephen J. Campbell, Chief
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-456 and STN 50-457

Enclosure:
Safety Evaluation

cc w/encl: Distribution via Listserv

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST NO. I3R-01

EXELON GENERATION COMPANY, LLC.

BRAIDWOOD STATION, UNITS 1 AND 2

DOCKET NOS. STN 50-456 AND STN 50-457

1.0 INTRODUCTION

By letter dated December 10, 2008, (Agencywide Document Access and Management System (ADAMS) Accession No. ML083460590), with supplemental letter dated July 8, 2009, (ADAMS Accession No. ML091900327), Exelon Generating Company, LLC (the licensee), submitted Relief Request I3R-01 as an alternative to the inservice inspection (ISI) program for Braidwood Station, Units 1 and 2 (Braidwood). Specifically, the licensee proposed a risk-informed ISI (RI-ISI) program as an alternative to the requirements of American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, for Class 1 and 2 piping welds, Categories B-F, B-J, C-F-1, and C-F-2.

The licensee proposes to use a RI-ISI program that was developed in accordance with the methodology contained in Electric Power Research Institute (EPRI) Topical Report (EPRI-TR) 112657, "Revised Risk-Informed Inservice Inspection Evaluation Procedure," Revision B-A, for the third 10-year ISI interval. The EPRI-TR was previously reviewed and approved by the Nuclear Regulatory Commission (NRC) staff (ADAMS Accession No. ML013470102). The licensee's December 10, 2008, submittal requested authorization to implement the proposed RI-ISI program for Braidwood for the third 10-year ISI interval, which began on July 29, 2008, for Unit 1, and on October 17, 2008, for Unit 2.

The Braidwood RI-ISI program for the second 10-year ISI interval was submitted to the NRC by letters dated October 16, 2000, September 5, 2001, October 16, 2001, and November 9, 2001 (ADAMS Accession Nos. ML003761986, ML012570412, ML020160273, and ML041670283, respectively). This initial RI-ISI program was developed in accordance with the methodology contained in the EPRI-TR. The NRC staff authorized Braidwood to implement this RI-ISI program during the second 10-year ISI interval by letter dated February 20, 2002 (ADAMS Accession No. ML020350153). The licensee stated that the proposed third 10-year ISI interval RI-ISI program will be a continuation of the current application and will continue to be a living program.

Enclosure

2.0 REGULATORY REQUIREMENTS

Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), paragraph 50.55a(g)(4), ASME Code Class 1, 2, and 3 components must 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 (ISI) 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 120-month interval, subject to the limitations and modifications listed therein.

Pursuant to 10 CFR 50.55a(a)(3), alternatives to requirements may be authorized by the NRC staff if the licensee demonstrates that: (i) the proposed alternatives 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.

All risk-informed applications are assessed against Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis." RG 1.174 states that a probabilistic risk assessment (PRA) used in risk-informed licensing action should be performed in a manner that is consistent with accepted practices. In Regulatory Information Summary (RIS) 2007-06, "Regulatory Guide 1.200 Implementation," the NRC staff clarified that, for all risk-informed applications received after December 2007, the NRC staff will use RG 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," to determine whether the technical adequacy of the PRA used to support a submittal is consistent with accepted practices. The NRC staff also assessed the licensee's proposed RI-ISI program against the guidance in RG 1.178, "An Approach for Plant-Specific Risk-Informed Decisionmaking for Inservice Inspection of Piping," and Standard Review Plan (SRP) 3.9.8, "Risk-Informed Inservice Inspection of Piping."

3.0 LICENSEE'S PROPOSED ALTERNATIVE

3.1 ASME Code Components Affected

Code Class:	1 and 2
Examination Category:	B-F, B-J, C-F-1, and C-F-2
Item Numbers:	B5.10, B5.40, B5.70, B9.11, B9.21, B9.22, B9.31, B9.32, B9.40, C5.11, C5.21, C5.30, C5.41, C5.51, C5.61, C5 .70, and C5.81
Description:	Alternate Risk-Informed Selection and Examination Criteria for Examination Category B-F, B-J, C-F-1, and C-F-2 Pressure Retaining Piping Welds

Components: Pressure Retaining Piping Welds

3.2 Applicable Code Edition and Addenda

The applicable code of record for the third 10-year ISI interval for Braidwood is the ASME Code, Section XI, 2001 Edition through the 2003 Addenda.

3.3 Applicable Code Requirements

Per ASME Code, Section XI, Table IWB-2500-1, Examination Category B-F, requires volumetric and surface examinations on all welds for Item Numbers B5.10, B5.40, and B5.70. Table IWB-2500-1, Examination Category B-J, requires volumetric and surface examinations on a sample of welds for Item Numbers B9.11 and B9.31, volumetric examinations on a sample of welds for Item Number B9.22, and surface examinations on a sample of welds for Item Numbers B9.21, B9.32, and B9.40. The weld population selected for inspection includes the following:

1. All terminal ends in each pipe or branch run connected to vessels.

2. All terminal ends and joints in each pipe or branch run connected to other components where the stress levels exceed either of the following limits under loads associated with specific seismic events and operational conditions:

   a. Primary plus secondary stress intensity range of $2.4S_m$ (membrane stress) for ferritic steel and austenitic steel.

   b. Cumulative usage factor of 0.4.

3. All dissimilar metal welds not covered under Examination Category B-F.

4. Additional piping welds so that the total number of circumferential butt welds, branch connections, or socket welds selected for examination equals 25 percent of the circumferential butt welds, branch connection, or socket welds in the reactor coolant piping system. This total does not include welds exempted by IWB-1220 or welds in Item Number B9.22.

5. A 10 percent sample of pressurized-water reactor (PWR) high-pressure safety injection system circumferential welds in piping ≥ nominal pipe size (NPS) 1½ and < NPS 4 shall be selected for examination. This sample shall be selected from locations determined by the Owner as most likely to be subject to thermal fatigue.

Table IWC-2500-1, Examination Categories C-F-1 and C-F-2, require volumetric and surface examinations on a sample of welds for Item Numbers C5.11, C5.21, C5.51, and C5.61 and surface examinations on a sample of welds for Item Numbers C5.30, C5.41, C5.70, and C5.81. The weld population selected for inspection includes the following:

1. Welds selected for examination shall include 7.5 percent, but not less than 28 welds, of all dissimilar metal, austenitic stainless steel or high alloy welds (Examination Category C-F-1) or of all carbon and low alloy steel welds (Examination Category C-F-2) not exempted by IWC-1220. (Some welds not exempted by IWC-1220 are not required to be

nondestructively examined per Examination Categories C-F-1 and C-F-2. These welds, however, shall be included in the total weld count to which the 7.5 percent sampling rate is applied.) The examinations shall be distributed as follows:

a. The examinations shall be distributed among the Class 2 systems prorated, to the degree practicable, on the number of nonexempt dissimilar metal, austenitic stainless steel or high alloy welds (Examination Category C-F-1) or nonexempt carbon and low alloy steel welds (Examination Category C-F-2) in each system;

b. Within a system, per the applicable Examination Category, the examinations shall be distributed among terminal ends, dissimilar metal welds, and structural discontinuities prorated, to the degree practicable, on the number of nonexempt terminal ends, dissimilar metal welds, and structural discontinuities in that system; and,

c. Within each system, examinations shall be distributed between line sizes prorated to the degree practicable.

3.4 Proposed Alternative

The licensee stated that the proposed third 10-year ISI Interval RI-ISI Program will be a continuation of the current application and will continue to be a living program. No changes to the evaluation methodology as currently implemented under the EPRI-TR are required as part of this interval update. The following two enhancements will continue to be implemented:

1. In lieu of the evaluation and sample expansion requirements in EPRI-TR Section 3.6.6.2, "RI-ISI Selected Examinations," Braidwood will utilize the requirements of Code Case N-578-1, "Risk-Informed Requirements for Class 1, 2, or 3 Piping, Method B," Subarticle-2430, "Additional Examinations." The alternative criteria for additional examinations contained in Code Case N-578-1 provide a more refined methodology for implementing necessary additional examinations.

2. To supplement the requirements listed in EPRI-TR Table 4-1, "Summary of Degradation-Specific Inspection Requirements and Examination Methods," Braidwood will utilize the provisions listed in Code Case N-578-1, Table 1, Examination Category R-A, "Risk-Informed Piping Examinations." To implement Note 10 of Table 1, paragraphs and figures from the 2001 Edition through the 2003 Addenda of ASME Section XI (the Braidwood code of record for the third 10-year ISI Interval) will be utilized, which parallel those referenced in the Code Case for the 1989 Edition. Table 1 of Code Case N-578-1 will be used because it provides a detailed breakdown for the examination method and categorization of the parts to be examined.

In addition to this risk-informed evaluation, selection, and examination procedure, all ASME Section XI piping components, regardless of risk classification, will continue to receive Code-required pressure testing as part of the current ASME Section XI program. VT-2 visual examinations are scheduled in accordance with the Braidwood pressure testing program, which remains unaffected by the RI-ISI program.

The licensee stated that the RI-ISI program in the present relief request is a continuation of the RI-ISI methodology, which was approved by the NRC staff for the second 10-year ISI interval

(ADAMS Accession No. ML020350153). The licensee further stated that the third 10-year ISI interval request utilizes an identical RI-ISI methodology as was previously approved.

3.5 Duration Of Proposed Alternative

Relief is requested for the third 10-year ISI interval, which, for Unit 1, began on July 29, 2008, and will end on July 28, 2018, and, for Unit 2, began on October 17, 2008, and will end on October 16, 2018.

4.0 TECHNICAL EVALUATION

The licensee has proposed to use a RI-ISI program that was developed using the RI-ISI methodology described in the EPRI-TR as an alternative to the ASME Code, Section XI requirements. The NRC staff's safety evaluation approving the methodology described in the EPRI-TR concluded that the methodology conforms to guidance provided in RGs 1.174 and RG 1.178, and that no significant risk increase should be expected from the changes to the ISI program resulting from applying the methodology.

The Braidwood RI-ISI program for the second 10-year ISI interval was authorized by the NRC staff. In its related safety evaluation, the NRC staff concluded that the original RI-ISI program is consistent with the NRC staff's approved RI-ISI process and methodology delineated in the EPRI-TR. The NRC staff also concluded that the ISI program retains the fundamental requirements of the ASME Code, such as, inspection methods, acceptance guidelines, pressure testing, corrective measures, documentation requirements and quality control requirements.

The licensee stated that only one augmented inspection program, the break exclusion region (BER) augmented inspection program for welds in the main steam and feedwater systems, has been subsumed into RI-ISI program since it was initially implemented, and that the other augmented programs continue to be maintained outside the RI-ISI program. The BER augmented inspection program has been subsumed using the methodology developed under EPRI Technical Report 1006937, "Extension of the EPRI Risk-Informed Inservice Inspection (RI-ISI) Methodology to Break Exclusion Region (BER) Programs, Rev 0-A" (ADAMS Accession No. ML020950600). Since the methodology developed in this EPRI report has been accepted by the NRC staff (ADAMS Accession No. ML021790518), the NRC staff finds that it is acceptable to subsume the BER augmented inspection program into the RI-ISI program.

In an NRC staff request for additional information (RAI) (ADAMS Accession No. ML091260242), the licensee was asked to describe substantive changes made in the RI-ISI program since the second 10-year ISI interval as the result of industry and plant operating experience. In its July 8, 2009, response, the licensee stated that the overall scope of the proposed program for the third 10-year ISI interval is similar to the second 10-year ISI interval. No new systems were added, and no changes to the application of the evaluation methodology were made that affected the program scoping process. As part of the third 10-year ISI interval update process, the consequence and degradation assignments have been adjusted, and the risk assessment has been revised.

For the proposed RI-ISI program, the NRC staff RAI asked the licensee to address whether the welds selected for examination in the proposed RI-ISI program are different from those selected for the second 10-year ISI interval, and to summarize the changes between the risk rank categories subject to the EPRI-TR methodology. In response, the licensee presented the following tables, which summarize the changes for Braidwood:

Braidwood, Unit 1, Selection Comparison					
Risk Category	RI-ISI Element Populations	Minimum Elements to Select for Interval 3	RI-ISI Elements Selected for Interval 3 (RI-ISI Rev 5)	RI-ISI Elements Selected for Interval 2 (RI-ISI Rev 0)	Section XI Welds Selected for Interval 2 (Pre RI-ISI)
1	128	32	32	0	49
2	218	54.5	109	49	145
3	0	0	0	32	0
4	1144	114.4	118	85	435
5	418	41.8	42	33	77
Totals	1908	242.7	301	199	706

Braidwood, Unit 2, Selection Comparison					
Risk Category	RI-ISI Element Populations	Minimum Elements to Select for Interval 3	RI-ISI Elements Selected for Interval 3 (RI-ISI Rev 5)	RI-ISI Elements Selected for Interval 2 (RI-ISI Rev 0)	Section XI Welds Selected for Interval 2 (Pre RI-ISI)
1	236	59	59	0	37
2	218	54.5	79	50	111
3	0	0	0	59	0
4	1154	115.4	119	89	429
5	404	40.4	41	30	118
Totals	2012	269.3	298	228	695

The licensee stated that the changes that occurred between the second and the third 10-year ISI intervals were due to:

1. Limited Exam Coverage - The welds selected for examination were changed in some cases to optimize examination code coverage.

2. Plant Modifications - Various plant modifications were installed for both units throughout the interval. These modifications were evaluated for impact to the RI-ISI program, and when applicable, changes to the RI-ISI scope and element selections were made.

3. PRA Model Revisions - The Braidwood PRA model has been revised since the prior revision of the Braidwood RI-ISI program. Model Revision 6C was issued in May 2008, and is the latest revision used in the analysis underpinning the proposed revision to the

RI-ISI program. Major changes include:

a. Changes to Auxiliary Feedwater (AFW) system success criteria, based on revised best estimate analyses.

b. Changes to Auxiliary Building flood isolation capability.

c. Data update (e.g., initiating event, failure, and maintenance data) based on recent plant experience.

4. New Scope due to ASME Code - For ASME Class 2 components, the IWC-1220 exemption criteria was revised in the code edition applicable to the third 10-year ISI interval (i.e., 2001 Edition through the 2003 Addenda). The third interval ASME Code requires the examination of smaller size piping in the AFW system. As such, the Braidwood RI-ISI program scope was revised to include this new piping. The applicable AFW lines were evaluated for degradation and consequence, and risk rankings were assigned. Based on the risk ranking, element selections were made for the high and medium categories.

5. Addition of BER Scope - In Revision 4 of the RI-ISI evaluation, the augmented BER inspection program was added to the RI-ISI program scope. Evaluation, ranking, and selection requirements were made in accordance with the previously-mentioned EPRI Technical Report 1006937 and the associated NRC staff safety evaluation,

The NRC staff finds the reasons for the changes between the second and third 10-year ISI intervals to be consistent with the RI-ISI methodology, comply with the change in the code of record, and reflect that a living program has been implemented.

The NRC staff has examined the values for the elements selected in the tables and finds that the number of elements selected for each of the risk categories is at least the minimum required for that category, and the total number of elements to be examined for the EPRI "High" risk categories (Categories 1, 2 and 3) and for the EPRI "Medium" risk categories (Categories 4 and 5) have increased over that for the second 10-year ISI interval. As a result, the NRC staff finds that the changes are consistent with the RI-ISI methodology and provide an acceptable level of quality and safety.

In the relief request, the licensee proposed two enhancements to the RI-ISI program. Both enhancements are related to the use of alternative criteria for additional examinations contained in Code Case N-578-1, and both were implemented in the RI-ISI program for the second 10-year ISI interval. The enhancements are to use ASME Code, Section XI, Subarticle IWB-2430, "Additional Examinations," and Table 1, Examination Category R-A, from Code Case N-578-1.

The NRC staff notes that it has not approved the generic use of Code Case N-578-1 in the current RG 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," Revision 15. The NRC staff notes that the licensee is not requesting to implement the Code Case but, rather, to use the Code Case to clarify the extent and disposition of the elements to be examined. This approach was accepted by the NRC staff in the relief request for the second 10-year ISI interval, and is similar to several relief requests recently submitted by other licensees and approved by the NRC staff on the basis that the proposed alternative provides an acceptable level of quality and safety.

The NRC staff has reviewed the relevant sections of the EPRI-TR and Code Case N-578-1, as well as the ASME Code, Section XI, IWB-2430, and finds that the application of the Code Case N-578-1 sample expansion process is comparable to that in the ASME Code, Section XI and is acceptable, provided that the sample expansion will occur during the same outage as the relevant conditions are identified.

The second enhancement proposed by the licensee is to use Code Case N-578-1 Table 1, Examination Category R-A, as an alternative to the requirements listed in Table 4-1 of the EPRI-TR. The licensee stated that Table 1 of the Code Case will be used because it provides a detailed breakdown for the examination method and categorization of the parts to be examined. The code categories, item numbers, and exam methods are based on the specific degradation mechanisms defined in accordance with the EPRI-TR. No alternatives are needed or requested to the degradation mechanism assessment process, and thus will remain in accordance with the EPRI-TR. The NRC staff finds that Table 1 of Code Case N-578-1 provides a more detailed and complete breakdown of examination categories than Table 4.1 of the EPRI-TR, and, therefore, finds the use of Table 1 of Code Case N-578-1 acceptable.

In light of industry experience with primary water stress-corrosion cracking (PWSCC) in the dissimilar metal welds that are made of Alloy 82/182, the NRC staff RAI asked the licensee to identify all Alloy 82/182 dissimilar metal butt welds. In its RAI response, the licensee reported that there are a total of 28 Alloy 82/182 dissimilar metal welds (i.e., 14 per unit) subject to ASME Code Section XI, Category B-F or B-J inspection requirements. These welds consist of four reactor pressure vessel (RPV) nozzle-to-safe-end hot-leg welds, four RPV nozzle-to-safe-end cold-leg welds, and six pressurizer nozzle-to-safe-end welds. The six pressurizer nozzle-to-safe-end welds have been mitigated through application of full structural weld overlays. The licensee provided the following weld inspection table. As noted in the table, Braidwood maintains an inspection program implementing the requirements of EPRI Materials Reliability Program (MRP)-139, "Primary System Piping Butt Weld Inspection and Evaluation Guideline."

Braidwood Alloy 82/182 Weld Inspection				
Weld Type	**Bare Visual Examination**	**Volumetric Examination**	**Governing Requirement**	**Notes**
RPV Hot-Leg Nozzle-To-Safe-End	Every Outage Until Mitigated	Every Five Years Until Mitigated	Code Case N-722 (Visual) MRP-139 (UT)	Eddy Current Also Performed On Inside Diameter Surface
RPV Cold-Leg Nozzle-To-Safe-End	Once Per Interval Until Mitigated	Every Six Years Until Mitigated	Code Case N-722 (Visual) MRP-139 (UT)	Eddy Current Also Performed On Inside Diameter Surface
Pressurizer Nozzle-To-Safe-End	Not Required (Mitigated)	Examine All Within Next Two Outages	ASME XI Nonmandatory Appendix Q	None

Accordingly, The NRC staff finds that the licensee has addressed the potential for PWSCC of the Alloy 82/182 welds by augmented inspections and that these inspections provide an acceptable level of quality and safety.

The NRC staff has reviewed and evaluated the licensee's proposed RI-ISI program, including those portions related to the applicable methodology and processes, based on guidance and acceptance criteria provided in RGs 1.174 and 1.178, in SRP 3.9.8, and in the EPRI-TR. An acceptable RI-ISI program plan is expected to meet the five key principles discussed in RGs 1.74 and 1.178, SRP 3.9.8, and the EPRI-TR, as stated below:

1. The proposed change meets the current regulations unless it is explicitly related to a requested exemption or rule change.

2. The proposed change is consistent with the defense-in-depth philosophy.

3. The proposed change maintains sufficient safety margins.

4. When proposed changes result in an increase in Core Damage Frequency (CDF) or risk, the increases should be small and consistent with the intent of the Commission's Safety Goal Policy Statement.

5. The impact of the proposed change should be monitored by using performance measurement strategies.

The first principle is met because an alternative ISI program may be authorized pursuant to 10 CFR 50.55a(a)(3)(i); therefore, an exemption request is not required. The second and third principles require assurance that the alternative program is consistent with the defense-in-depth philosophy and that sufficient safety margins are maintained, respectively. Assurance that the second and third principles are met is based on the application of the approved methodology and not on the particular inspection locations selected. The licensee stated that no changes to the evaluation methodology, as currently implemented under the EPRI-TR, are required as part of this interval update. In its RAI response, the licensee stated that the methodology of the calculation of the risk impact assessment for the third 10-year ISI interval has not changed, and the calculation remains part of the living program. Because the methodology used to develop the RI-ISI program for the third 10-year ISI interval is unchanged from the methodology approved by the NRC staff for development of the RI-ISI program used in the second 10-year ISI interval, the second and third principles are met.

The fourth principle, that any increase in CDF and risk are small and consistent with the Commission's Safety Goal Policy Statement, requires an estimate of the change in risk. The change in risk estimate is dependent on the location of inspections in the proposed ISI program compared to the location of inspections that would be performed using the requirements of ASME Code, Section XI. The fourth principle also requires demonstration of the technical adequacy of the PRA.

The licensee stated that, for Braidwood, Unit 1, the change in CDF is 9.64E-08/yr and the change in large early release frequency (LERF) is 2.07E-09/yr, and that, for Braidwood, Unit 2, the change in CDF is 7.99E-08/yr and the change in LERF is 1.52E-09/yr. These values meet the RG 1.174 acceptance guidelines for change in CDF of <1.00E-06/yr and change in LERF of <1.00E-07/yr. The licensee also stated that the change-in-risk analysis was done at a system level, and that the system acceptance criteria in the EPRI-TR were not exceeded for any individual system within the RI-ISI program.

As discussed in RGs 1.178 and 1.200, an acceptable change in risk evaluation (and risk-ranking evaluation used to identify the most risk significant locations) requires the use of a PRA of appropriate technical quality that models the as-built and as-operated plant. In the present relief request, the licensee reported that an independent assessment was performed in 1999, by Scientech, Inc., and that all significant comments from this assessment have been addressed. An independent PRA peer review was conducted under the auspices of the PWR Owners Group in 1999 for Braidwood and in 2000 for the Byron Station (Byron and Braidwood use a combined model). The licensee stated that all significant level A and B facts and observations for the 1999 and 2000 peer reviews were addressed with the aforementioned May 2008 update of the PRA model to Revision 6C. Following the PRA model update to Revision 6C, a self-assessment was performed against the ASME PRA Standard, RA-Sb-2005, "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications," December 2005, and the criteria in RG 1.200. The licensee evaluated the gaps found through this assessment and reported that they are not significant to the RI-ISI submittal.

The NRC staff has reviewed the information provided by the licensee and concludes that, because the reported change in risk values are less than the acceptance guidelines and because the PRA has been assessed according to criteria in RG 1.200, the fourth principle has been met.

The fifth principle of risk-informed decision-making requires that the impact of the proposed change be monitored by using performance measurement strategies. As described in the submittals, the RI-ISI program is a living program that requires periodic updating and that, as a minimum, will include reviews of risk ranking of piping segments on an ASME period basis. In its submittals, the licensee provided a summary of the changes that have occurred after the original implementation of the RI-ISI program. These include:

1. Transition from the 1989 Edition to the 2001 Edition through the 2003 Addenda of the ASME Code, Section XI.

2. Limited examination coverage, which resulted in modifications in some cases to optimize examination code coverage.

3. PRA model revisions, which occurred twice before the changes were incorporated into this update of the RI-ISI Program.

4. As described in Section 3.2.1 of the EPRI-TR, the RI-ISI program scope is determined by the ASME Code inspection program scope. For ASME Class 2 components, the IWC-1220 exemption criteria were revised in the Code edition applicable to the Braidwood third 10-year ISI interval (i.e., Section XI, 2001 Edition through 2003 Addenda). The third 10-year interval ASME Code requires examination of smaller size piping in the AFW system.

As a result of these changes, for the third 10-year ISI interval, the number of EPRI "High" risk category weld examinations at Braidwood, Unit 1, increased from 81 to 141, and the number of

EPRI "Medium" risk examinations increased from 118 to 160 with the total count of welds to be examined in the third 10-year ISI interval increasing from 199 to 301 welds. For Braidwood, Unit 2, the number of EPRI "High" risk category weld examinations increased from 109 to 138, and the number of EPRI "Medium" risk examinations increased from 119 to160 with the total count of welds to be examined in the third 10-year ISI interval increasing from 228 to 298 welds. The analyses and changes reported by the licensee in its submittals demonstrate that the RI-ISI program is a living program that is being periodically updated. Therefore, the NRC staff concludes that the fifth key principle is met.

Based on the above discussion, the NRC staff finds that the five key principles of risk-informed decision-making are ensured by the licensee's proposed third 10-year interval RI-ISI program plan; therefore, the proposed program for the third 10-year ISI interval is acceptable.

5.0 CONCLUSIONS

Based on the information provided in the licensee's submittals, the NRC staff has determined that the proposed alternative, as described in I3R-01, provides an acceptable level of quality and safety, and, therefore, it is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third 10-year ISI interval at Braidwood.

All other ASME Code 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 Contributors: J. Patel, NRR
J. Wallace, NRR

Date: November 5, 2009

Mr. Charles G. Pardee
President and Chief Nuclear Officer
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Warrenville, IL 60555

November 5, 2009

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2 – RISK-INFORMED RELIEF REQUEST I3R-01 FOR CERTAIN PRESSURE RETAINING PIPING WELDS (TAC NOS. ME0225 AND ME0226)

Dear Mr. Pardee:

By letter to the Nuclear Regulatory Commission (NRC) dated December 10, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML083460590), as supplemented by letter dated July 8, 2009 (ADAMS Accession No. ML091900327), Exelon Generation Company, LLC (the licensee), submitted risk-informed inservice inspection (ISI) program Relief Request (RR) I3R-01 as an alternative to American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, ISI requirements for certain Class 1 and 2 piping welds for Braidwood Station, Units 1 and 2. The request was submitted in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), 50.55a(a)(3)(i).

The NRC staff has reviewed the licensee's submittal and determined that the alternative proposed in RR I3R-01 will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the NRC staff authorizes the use of the proposed alternative at Braidwood Station, Units 1 and 2, for the third 10-year ISI interval, which began for Unit 1 on July 29, 2008, and for Unit 2 on October 17, 2008. 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. The NRC staff's safety evaluation is enclosed.

Please contact Mr. Marshall David at (301) 415-1547 if you have any questions on this action.

Sincerely,
/RA/
Stephen J. Campbell, Chief
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-456 and STN 50-457

Enclosure:
Safety Evaluation

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