Exelon Generation 4300 Winfield Road Warrenville, IL 60555 www.exeloncorp.com

10 CFR 50.55a

Exel<sup>4</sup>n<sub>°</sub>

Nuclear

RS-08-039 March 31, 2008

United States Nuclear Regulatory Commission ATTN: Document Control Desk Washington, DC 20555-0001

> Braidwood Station, Units 1 and 2 Facility Operating License Nos. NPF-72 and NPF-77 NRC Docket Nos. 50-456 and 50-457

- Subject: Third 10-Year Inservice Inspection Interval, Relief Request I3R-01, "Request for Relief for 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"
- Reference: Letter from A. J. Mendiola (U. S. Nuclear Regulatory Commission) to O. D. Kingsley (Exelon Generation Company, LLC), "Braidwood Station, Units 1 and 2 - Interval 2 Inservice Inspection Program - Relief Request I2R-39, Alternative to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI Requirements for Class 1 and Class 2 Piping Welds," dated February 20, 2002

In accordance with 10 CFR 50.55a(a)(3)(i), Exelon Generation Company, LLC (EGC), is requesting authorization to use a risk-informed inservice inspection (RI-ISI) program as an alternative to the examination program of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, 2001 Edition through the 2003 Addenda for examination category B-F, B-J, C-F-1, and C-F-2 pressure retaining piping welds.

The RI-ISI program was developed in accordance with Electric Power Research Institute (EPRI) Topical Report (TR) 112657 Revision B-A, "Revised Risk-Informed Inservice Inspection Evaluation Procedure," December 1999, and was previously approved for use in Braidwood Station's Second Inservice Inspection Interval (Reference).

The attached Braidwood Station relief request, I3R-01, provides justification that the use of the RI-ISI program provides an acceptable level of quality and safety.

March 31, 2008 U. S. Nuclear Regulatory Commission Page 2

This letter contains no regulatory commitments. EGC requests authorization of this relief request by April 1, 2009. If you have any questions regarding this letter, please contact David Gullott at (815) 417-2800.

Respectfully,

Patrick R. Simpson Manager – Licensing

Attachment: Braidwood Station Relief Request I3R-01

10 CFR 50.55a RELIEF REQUEST: I3R-01 Revision 0 (Page 1 of 7)

# Request for Relief for 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 In Accordance with 10 CFR 50.55a(a)(3)(i)

#### 1.0 ASME CODE COMPONENTS AFFECTED:

Code Class:	1 and 2
Examination Category:	B-F, B-J, C-F-1, and C-F-2
Item Number:	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
Component Number:	Pressure Retaining Piping

#### 2.0 APPLICABLE CODE EDITION AND ADDENDA:

The Inservice Inspection program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2001 Edition through the 2003 Addenda.

#### 3.0 APPLICABLE CODE REQUIREMENT:

The following Code requirements are paraphrased from the 2001 Edition through the 2003 Addenda of ASME 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/or surface examinations on a sample of welds for Item Numbers B9.11, B9.21, B9.22, B9.31, B9.32, and B9.40. The weld population selected for inspection includes the following:

## 10 CFR 50.55a RELIEF REQUEST: I3R-01 Revision 0 (Page 2 of 7)

- 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<sub>m</sub> for ferritic steel and austenitic steel.
  - b. cumulative usage factor *U* 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% 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% sample of PWR high pressure safety injection system circumferential welds in piping ≥ 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/or surface examinations on a sample of welds for Item Numbers C5.11, C5.21, C5.30, C5.41, C5.51, C5.61, C5.70, and C5.81. The weld population selected for inspection includes the following:

- Welds selected for examination shall include 7.5%, but not less than 28 welds, of all dissimilar metal, austenitic stainless steel and 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% 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 and high alloy welds (Examination Category C-F-1) or carbon and low alloy welds (Examination Category C-F-2) in each system;

## 10 CFR 50.55a RELIEF REQUEST: I3R-01 Revision 0 (Page 3 of 7)

- b. within a system, 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 the system; and
- c. within each system, examinations shall be distributed between line sizes prorated to the degree practicable.

## 4.0 **REASON FOR REQUEST:**

Pursuant to 10 CFR 50.55a(a)(3)(i), relief is requested on the basis that the proposed alternative utilizing Reference 1 along with two enhancements from Reference 4 will provide an acceptable level of quality and safety.

As stated in "Safety Evaluation Report Related to EPRI Risk-Informed Inservice Inspection Evaluation Procedure (EPRI TR-112657, Revision B, July 1999)" (Reference 2):

> The staff concludes that the proposed RISI program as described in EPRI TR-112657, Revision B, is a sound technical approach and will provide an acceptable level of quality and safety pursuant to 10 CFR 50.55a for the proposed alternative to the piping ISI requirements with regard to the number of locations, locations of inspections, and methods of inspection.

The initial Braidwood Station Risk Informed Inservice Inspection Program (RI-ISI) was submitted during the First Period of the Second Inspection Interval. This initial RI-ISI program was developed in accordance with EPRI TR-112657, Revision B-A, as supplemented by Code Case N-578-1. The program was approved for use in Reference 5.

The transition from the 1989 Edition to the 2001 Edition through the 2003 Addenda of ASME Section XI for Braidwood Station's Third Inspection Interval does not impact the currently approved RI-ISI evaluation process used in the Second Inspection Interval, and the requirements of the new Code edition/addenda will be implemented as detailed in the Braidwood Station ISI Program Plan.

The Risk Impact Assessment was completed as part of the original baseline RI-ISI Program was an implementation/transition check on the initial impact of converting from a traditional ASME Section XI program to the new RI-ISI methodology. For the Third Interval ISI update, there is no transition occurring between two different methodologies, but rather, the currently approved RI-ISI methodology and evaluation will be maintained for the new interval. As such, the original risk impact assessment process is not impacted by the new interval and is not required to be continually updated.

## 10 CFR 50.55a RELIEF REQUEST: I3R-01 Revision 0 (Page 4 of 7)

As an added measure of assurance, any new systems, portions of systems, or components being included in the RI-ISI Program for the Third Inspection Interval will be added to the Risk Impact Assessment performed during the previous interval. These components will be addressed within the evaluation at the start of the new interval to assure that the new Third Inspection Interval RI-ISI element selection provides an acceptable overall change-in-risk when compared to the old ASME Section XI population of exams which existed prior to the implementation of the first RI-ISI Program.

The "actual evaluation and ranking procedure" including the Consequence Evaluation and Degradation Mechanism Assessment processes of the currently approved (Reference 5) RI-ISI Program remain unchanged and are continually applied to maintain the Risk Categorization and Element Selection methods of EPRI TR-112657, Revision B-A. These portions of the RI-ISI Program have been and will continue to be reevaluated and revised as major revisions of the site PRA occur and modifications to plant configuration are made. The Consequence Evaluation, Degradation Mechanism Assessment, Risk Ranking, and Element Selection steps encompass the complete living program process applied under the Braidwood Station RI-ISI Program.

# 5.0 PROPOSED ALTERNATIVE AND BASIS FOR USE:

The proposed alternative originally implemented in the initial RI-ISI evaluation for Braidwood Station (Reference 3), along with the two enhancements noted below, provide an acceptable level of quality and safety as required by 10 CFR 50.55a(a)(3)(i). This original program along with these same two enhancements is currently approved for the Braidwood Station Second Inspection Interval as documented in Reference 5.

The Third Inspection Interval RI-ISI Program will be a continuation of the current application and will continue to be a living program as described in the "Reason For Request" section of this relief request. No changes to the evaluation methodology as currently implemented under EPRI TR-112657, Revision B-A, are required as part of this interval update. The following two enhancements will continue to be implemented.

In lieu of the evaluation and sample expansion requirements in Section 3.6.6.2, "RISI Selected Examinations" of EPRI TR-112657, Braidwood Station will utilize the requirements of Subarticle 2430, "Additional Examinations" contained in Code Case N-578-1 (Reference 4). The alternative criteria for additional examinations contained in Code Case N-578-1 provides a more refined methodology for implementing necessary additional examinations.

## 10 CFR 50.55a RELIEF REQUEST: I3R-01 Revision 0 (Page 5 of 7)

To supplement the requirements listed in Table 4-1, "Summary of Degradation-Specific Inspection Requirements and Examination Methods" of EPRI TR-112657, Braidwood Station will utilize the provisions listed in Table 1, Examination Category R-A, "Risk-Informed Piping Examinations" contained in Code Case N-578-1 (Reference 4). To implement Note 10 of this table, paragraphs and figures from the 2001 Edition through the 2003 Addenda of ASME Section XI (Braidwood Station code of record for the Third Inspection 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 as it provides a detailed breakdown for examination method and categorization of parts to be examined.

The Braidwood Station RI-ISI Program, as developed in accordance with EPRI TR-112657, Revision B-A (Reference 1), requires that 25% of the elements that are categorized as "High" risk (i.e., Risk Category 1, 2, and 3) and 10% of the elements that are categorized as "Medium" risk (i.e., Risk Categories 4 and 5) be selected for inspection. For this application, the guidance for the examination volume for a given degradation mechanism is provided by EPRI TR-112657 while the guidance for the examination method and categorization of parts to be examined are provided by EPRI TR-112657, as supplemented by Code Case N-578-1.

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 Station pressure testing program, which remains unaffected by the RI-ISI program.

# 6.0 DURATION OF PROPOSED ALTERNATIVE:

Relief is requested for the Third Ten-Year Inspection Interval for Braidwood Station Units 1 and 2.

## 10 CFR 50.55a RELIEF REQUEST: I3R-01 **Revision 0** (Page 6 of 7)

#### 7.0 **PRECEDENTS:**

Similar relief request has been approved for Braidwood Station Second Inspection Interval Relief Request I2R-39 was authorized in Reference 5. The Third Inspection Interval Relief Request utilizes an identical RI-ISI methodology as was previously approved in the Second Inspection Interval.

#### 10 CFR 50.55a RELIEF REQUEST: I3R-01 Revision 0 (Page 7 of 7)

## 8.0 **REFERENCES**:

- Electric Power Research Institute (EPRI) Topical Report (TR) 112657 Revision B-A, "Revised Risk-Informed Inservice Inspection Evaluation Procedure," December 1999
- 2) W. H. Bateman (NRC) to G. L. Vine (EPRI) letter dated October 28, 1999 transmitting "Safety Evaluation Report Related to EPRI Risk-Informed Inservice Inspection Evaluation Procedure (EPRI TR-112657, Revision B, July 1999)"
- 3) Initial Risk-Informed Inservice Inspection Evaluation, Revision 0 Braidwood Station, Units 1 and 2, dated July 2000 (Letter BW000102 from Timothy Tulon (Commonwealth Edison Company) to the NRC, "Braidwood Station Interval 2 Inservice Inspection Program: Relief Request I2R-39, Alternative to the ASME Boiler and Pressure Vessel Code Section XI Requirements for Class 1 and Class 2 Piping Welds," dated October 16, 2000)
- 4) American Society of Mechanical Engineers (ASME) Code Case N-578-1, "Risk-Informed Requirements for Class 1, 2, or 3 Piping, Method B"
- 5) Letter from A. J. Mendiola (U. S. Nuclear Regulatory Commission) to O. D. Kingsley (Exelon Generation Company, LLC) "Braidwood Station, Units 1 and 2 - Interval 2 Inservice Inspection Program - Relief Request I2R-39, Alternative to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI Requirements for Class 1 and Class 2 Piping Welds, (TAC Nos. MB0506 and MB0507)," dated February 20, 2002"