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Exelon Nuclear

RS-11-050

10 CFR 50.55a

April 11, 2011

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-001

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

Subject: Third 10-Year Inservice Inspection Interval Relief Request I3R-08, Alternative Requirements to ASME Section XI Appendix VIII (Supplements 2 and 10), Examinations of Class 1 Pressure Retaining Welds Conducted from the Inside Surface In Accordance with 10 CFR 50.55a(a)(3)(i)

In accordance with 10 CFR 50.55a, "Codes and standards," paragraph (a)(3)(i), 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," on the basis that the proposed alternative would provide an acceptable level of quality and safety.

Specifically, for examinations of dissimilar metal (DM) welds, EGC is requesting authorization to apply the difference between the examination vendor's achieved root mean square (RMS) error (currently 0.189-inch) and the Code Case N-695 allowed 0.125-inch RMS error to measure flaw depths when depth sizing of indications is required.

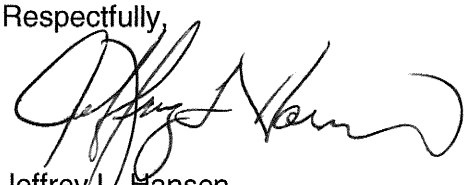
For examinations of both the DM weld and the adjacent austenitic weld, EGC is requesting authorization to apply the difference between the examination vendor's achieved RMS error (currently 0.245-inch) and the Code Case N-696 allowed 0.125-inch RMS error to measured flaw depths when depth sizing of indications is required.

The details of the 10 CFR 50.55a request are enclosed.

EGC requests approval of this request by April 11, 2012, in support of the Braidwood Unit 1 spring refueling outage (A1R16).

There are no regulatory commitments contained in this submittal. Should you have any questions concerning this letter, please contact Ms. Lisa A. Schofield at (630) 657-2815.

Respectfully,



Jeffrey L. Hansen
Manager – Licensing
Exelon Generation Company, LLC

Attachment: 10 CFR 50.55a Request Request I3R-08, Revision 0

cc: NRC Regional Administrator, Region III
NRC Senior Resident Inspector, Braidwood Station
NRR Project Manager, Braidwood Station
Illinois Emergency Management Agency – Division of Nuclear Safety

10 CFR 50.55a RELIEF REQUEST I3R-08
Revision 0
(Page 1 of 5)

Proposed Alternative Requirements to ASME Section XI Appendix VIII (Supplements 2 and 10) Examinations of Class 1 Pressure Retaining Welds Conducted from the Inside Surface In Accordance with 10 CFR 50.55a(a)(3)(i)

1. ASME CODE COMPONENT(S) AFFECTED:

Code Class:	1
Examination Categories:	See Table 1
Item Numbers:	See Table 1
Component Numbers:	See Table 1
Drawing Numbers:	See Table 1

2. APPLICABLE CODE EDITION AND ADDENDA:

The current inservice inspection program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2001 Edition with 2003 Addenda. Ultrasonic examination of applicable Class 1 and 2 components is governed by Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," of the ASME Code, Section XI, 2001 Edition in accordance with 10 CFR 50.55a(b)(2)(xv).

3. APPLICABLE CODE REQUIREMENTS:

The ultrasonic (volumetric) examination of Class 1 and 2 piping welds are required to be performed using procedures, personnel, and equipment qualified to the criteria of the ASME Code, Section XI, 2001 Edition, Appendix VIII, Supplement 10, "Qualification Requirements for Dissimilar Metal Piping Welds," and Supplement 2, "Qualification Requirements for Wrought Austenitic Piping Welds," for the examination of Reactor Pressure Vessel (RPV) nozzle-to-safe end welds and RPV austenitic safe end welds, respectively.

Paragraph 3.2, "Sizing Acceptance Criteria," subparagraph *(b)* of Supplement 10 states that the "examination procedures, equipment, and personnel are qualified for depth sizing when the RMS (root mean square) error of the flaw depth measurements, as compared to the true flaw depths, is less than or equal to 0.125-inch (3.2mm)."

Paragraph 3.2, "Sizing Acceptance Criteria," of Supplement 2 also allows an RMS error less than or equal to 0.125-inch in order for examination procedures, equipment, and personnel to be qualified for depth sizing.

Code Case N-695, "Qualification Requirements for Dissimilar Metal Piping Welds, Section XI, Division 1," provides alternative requirements to Appendix VIII, Supplement 10, and is unconditionally approved for use through Regulatory Guide 1.147, Revision 16.

Paragraph 3.3*(c)* of Code Case N-695 states "Examination procedures, equipment, and personnel are qualified for depth sizing when the RMS error of the flaw depth measurements, as compared to the true flaw depths, do not exceed 0.125 in. (3 mm)."

Code Case N-696, "Qualification Requirements for Appendix VIII Piping Examinations Conducted From the Inside Surface, Section XI, Division 1," provides alternative requirements to Appendix VIII Supplements 2, 3, and 10 examinations conducted from the inside surface.

10 CFR 50.55a RELIEF REQUEST I3R-08
Revision 0

Code Case N-696 is unconditionally approved for use through Regulatory Guide 1.147, Revision 16. Supplement 3 (Qualification Requirements for Ferritic Piping Welds) is not applicable to the welds referenced under this relief request.

Paragraph 3.3*(d)* of Code Case N-696 states, "Supplement 2 or Supplement 3 examination procedures, equipment, and personnel are qualified for depth sizing when the flaw depths estimated by ultrasonics, as compared to true depths, do not exceed 0.125 in. (3 mm) RMS, when they are combined with a successful Supplement 10 qualification."

4. REASON FOR THE REQUEST:

Exelon Generation Company, LLC, (EGC) will be performing volumetric examinations of all nozzle-to-safe end welds dissimilar metal (DM) welds and adjacent safe end-to-pipe or safe end-to-elbow welds (austenitic welds) from the inside diameter (ID) surface during the spring 2012 (A1R16) and fall 2012 (A2R16) refueling outages when all reactor vessel nozzle-to-safe end DM welds will be mitigated against primary water stress corrosion cracking (PWSCC) through application of the Mechanical Stress Improvement Process (MSIP). Upon completion of application of MSIP, additional volumetric examinations will be performed during subsequent outages as dictated by the current industry (Reference 8.1) or through future regulatory requirements. For volumetric examination of the DM welds, EGC will use the NRC approved requirements of Code Case N-695 for qualification requirements along with a proposed alternative, and for volumetric examination of the adjacent austenitic welds, EGC will use Code Case N-696 to perform a combined qualification along with a proposed alternative.

EGC proposes using an alternative RMS error depth sizing requirement as compared to the 0.125-inch RMS error value stated in Code Cases N-695 and N-696. EGC contacted the Electric Power Research Institute (EPRI) NDE Center on February 7, 2011, and confirmed that no vendor has successfully demonstrated compliance with the Code-allowed 0.125-inch RMS value for qualification tests for examinations conducted from the inside diameter surface (i.e., stand-alone Supplement 10 or combined Supplement 2 and 10 qualifications).

EGC has verified through the EPRI NDE Center that the current examination vendor selected to perform the scheduled examinations at Braidwood Station has achieved a 0.189-inch RMS error (as addressed in Code Case N-695) for the stand-alone Supplement 10 qualification and a 0.245-inch RMS error for the combined Supplement 2 and 10 qualification (as addressed in Code Case N-696).

5. PROPOSED ALTERNATIVE AND BASIS FOR USE:

Pursuant to 10 CFR 50.55a(a)(3)(i), relief is requested for an alternative requirement that will provide an acceptable level of quality and safety.

For examinations limited to DM welds (adjacent austenitic weld is not being examined), EGC proposes to apply the difference between the examination vendor's achieved RMS error (currently 0.189-inch) and the Code Case N-695 allowed 0.125-inch RMS error to measure flaw depths when depth sizing of indications is required.

For examinations of both the DM weld and the adjacent austenitic weld, EGC proposes to apply the difference between the examination vendor's achieved RMS error (currently 0.245-inch) and the Code Case N-696 allowed 0.125-inch RMS error to measured flaw depths when depth sizing of indications is required.

10 CFR 50.55a RELIEF REQUEST I3R-08
Revision 0
(Page 3 of 5)

If, through later qualification attempts, the current examination vendor (or a different vendor is selected) and the examination vendor demonstrates an improved depth sizing RMS error prior to any scheduled examinations, the excess of that improved RMS error over the allowed 0.125-inch RMS error, if any, will be added to the measured value for comparison with applicable Acceptance Standards and/or Acceptance Criteria to determine the acceptability of the indication.

Applying the difference between the allowed RMS error and the achieved RMS error to the actual flaw being sized will ensure a conservative bounding flaw depth value is used for dissimilar metal and austenitic welds examined at Braidwood Station.

In addition to performing ultrasonic examination of these welds during A1R16 and A2R16, the currently selected NDE vendor will use surface geometry profiling software (profilometry) in conjunction with a focused immersion ultrasonic transducer positioned to permit accurate profile data across the examination volume, in order to help the examiner confirm locations where the raw data indicates lack of transducer contact due to problematic surface geometry.

Eddy current examination will be used to supplement ultrasonic examination where there is sufficient surface roughness to call into question the applicability of the ultrasonic examination qualification to detect axial flaws. The ultrasonic examinations, as supplemented by eddy current examinations and profilometry, will be conducted to the maximum extent practical. EGC intends to examine all DM nozzle-to-safe end and adjacent austenitic piping welds using this process.

For A1R16 and A2R16, the following eddy current techniques will be utilized:

- Two plus point probes on each detection sled applied circumferentially on the inside surface in scan increments of 0.08 inches circumferentially (for axial flaws) and 0.25 inches axially (for circumferential flaws).
- Automated systems for data collection and analysis.

The target flaw size for the eddy current procedure is 0.28 inches long is well within the ASME Code linear flaw acceptance standards of 0.45 inches for austenitic material (Table IWB-3514-2) and 0.625 inches for ferritic material (Table IWB-3514-4).

The use of ultrasonic profilometry and eddy current examination, in conjunction with procedures and personnel qualified through the blind tests to supplement Appendix VIII qualified ultrasonic procedures and personnel will provide additional assurance that surface connected flaws (if present) will be detected in the presence of potential surface roughness.

EGC concludes that the proposed alternatives of adding the difference between the ASME Code-allowed RMS error and the demonstrated RMS error to the measured through-wall extent, in addition to the use of the appropriate acceptance standards specified in Section XI of the ASME Code, will provide additional assurance of structural integrity of the subject welds.

For planar indications, which are determined not to be connected to the inside surface, the amended through-wall depth will be compared with the appropriate IWB-3500 Acceptance Standard.

For planar indications, which are determined to be connected to the inside surface, the amended through-wall depth will be evaluated in accordance with the appropriate IWB-3600 Acceptance Criteria.

10 CFR 50.55a RELIEF REQUEST I3R-08
Revision 0
(Page 4 of 5)

This proposed alternative will ensure that there is reasonable assurance of the structural integrity of the subject welds, and thus will continue to provide an acceptable level of quality and safety.

6. DURATION OF PROPOSED ALTERNATIVE:

Relief is requested for the remainder of the Third Ten-Year ISI Interval for Braidwood Station, Units 1 and 2, which is currently scheduled to end July 28, 2018, for Unit 1, and on October 16, 2018, for Unit 2.

7. PRECEDENTS:

The NRC has authorized similar relief requests to use the same methodology and selected inspection vendor proposed by EGC for Braidwood Station as indicated below:

1) Letter from Douglas A. Broaddus (U. S. NRC) to Christopher Burton (Carolina Power & Light Company), "Shearon Harris Nuclear Power Plant, Unit 1 – Relief Request for Approval of an Alternative Inservice Inspection Method for Six Pressure Retaining Dissimilar Metal Welds in the Reactor Pressure Vessel Nozzles (TAC No. ME3894)," dated December 29, 2010 (ADAMS Accession ML102910129)

2) Letter from Gloria Kulesa (U. S. NRC) to Mark J. Anjuni (Southern Nuclear Operating Company, Inc.), "Vogtle Electric Generating Plant, Units 1 and 2, Safety Evaluation of Relief Request VEGP-ISI-ALT-03, Version 3.0, for Reactor Vessel Nozzle to Safe-End Weld Examinations (TAC Nos. ME3752 and ME3753)," dated November 16, 2010 (ADAMS Accession ML102870030)

3) Letter from Michael T. Markley (U. S. NRC) to David J. Bannister (Omaha Public Power District), "Fort Calhoun Station, Unit 1 – Relief Request for Use of an Alternate Depth-Sizing Qualification (TAC No. ME2512)," dated August 20, 2010 (ADAMS Accession ML102210133)

4) Letter from Michael T. Markley (U. S. NRC) to John T. Conway (Pacific Gas and Electric Company), "Diablo Canyon Power Plant, Unit No. 1 – Approval of Relief Request for Relief NDE-RCS-SE-1R16 from Examination Requirements of ASME Code, Section XI, Appendix VIII, Supplement 10, Root Mean Square Error (TAC No. ME3942)," dated July 23, 2010 (ADAMS Accession ML101750640)

8. REFERENCES

8.1 Materials Reliability Program: Primary System Piping Butt Weld Inspection and Evaluation Guideline (MRP-139), Revision 1

10 CFR 50.55a RELIEF REQUEST I3R-08
Revision 0
(Page 5 of 5)

TABLE 1: Applicable Components at Braidwood Station				
COMPONENT NUMBER	DESCRIPTION	DRAWING NUMBER	FORMER ASME CATEGORY B-F/B-J XI ITEM NUMBER	CURRENT RI-ISI CATEGORY R-A ITEM NUMBER (Note 1)
Unit 1				
1RV-01-022	RPV Nozzle-to-Safe End Hot Leg, Loop C	1RV-01	B5.10	R1.15
1RV-01-030	RPV Safe End-to-Pipe Hot Leg, Loop C	1RV-01	B9.11	R1.20
1RV-01-023	RPV Nozzle-to-Safe End Cold Leg, Loop C	1RV-01	B5.10	R1.15
1RV-01-031	RPV Safe End-to-Elbow Cold Leg, Loop C	1RV-01	B9.11	R1.20
1RV-01-024	RPV Nozzle-to-Safe End Cold Leg, Loop D	1RV-01	B5.10	R1.15
1RV-01-032	RPV Safe End-to-Elbow Cold Leg, Loop D	1RV-01	B9.11	R1.20
1RV-01-025	RPV Nozzle-to-Safe End Hot Leg, Loop D	1RV-01	B5.10	R1.15
1RV-01-033	RPV Safe End-to-Pipe Hot Leg, Loop D	1RV-01	B9.11	R1.20
1RV-01-026	RPV Nozzle-to-Safe End Hot Leg, Loop A	1RV-01	B5.10	R1.15
1RV-01-034	RPV Safe End-to-Pipe Hot Leg, Loop A	1RV-01	B9.11	R1.20
1RV-01-027	RPV Nozzle-to-Safe End Cold Leg, Loop A	1RV-01	B5.10	R1.15
1RV-01-035	RPV Safe End-to-Elbow Cold Leg, Loop A	1RV-01	B9.11	R1.20
1RV-01-028	RPV Nozzle-to-Safe End Cold Leg, Loop B	1RV-01	B5.10	R1.15
1RV-01-036	RPV Safe End-to-Elbow Cold Leg, Loop B	1RV-01	B9.11	R1.20
1RV-01-029	RPV Nozzle-to-Safe End Hot Leg, Loop B	1RV-01	B5.10	R1.15
1RV-01-037	RPV Safe End-to-Pipe Hot Leg, Loop B	1RV-01	B9.11	R1.20
Unit 2				
2RV-01-022	RPV Nozzle-to-Safe End Hot Leg, Loop D	2RV-01	B5.10	R1.15
2RV-01-030	RPV Safe End-to-Pipe Hot Leg, Loop D	2RV-01	B9.11	R1.20
2RV-01-023	RPV Nozzle-to-Safe End Cold Leg, Loop D	2RV-01	B5.10	R1.15
2RV-01-031	RPV Safe End-to-Elbow Cold Leg, Loop D	2RV-01	B9.11	R1.20
2RV-01-024	RPV Nozzle-to-Safe End Cold Leg, Loop C	2RV-01	B5.10	R1.15
2RV-01-032	RPV Safe End-to-Elbow Cold Leg, Loop C	2RV-01	B9.11	R1.20
2RV-01-025	RPV Nozzle-to-Safe End Hot Leg, Loop C	2RV-01	B5.10	R1.15
2RV-01-033	RPV Safe End-to-Pipe Hot Leg, Loop C	2RV-01	B9.11	R1.20
2RV-01-026	RPV Nozzle-to-Safe End Hot Leg, Loop B	2RV-01	B5.10	R1.15
2RV-01-034	RPV Safe End-to-Pipe Hot Leg, Loop B	2RV-01	B9.11	R1.20
2RV-01-027	RPV Nozzle-to-Safe End Cold Leg, Loop B	2RV-01	B5.10	R1.15
2RV-01-035	RPV Safe End-to-Elbow Cold Leg, Loop B	2RV-01	B9.11	R1.20
2RV-01-028	RPV Nozzle-to-Safe End Cold Leg, Loop A	2RV-01	B5.10	R1.15
2RV-01-036	RPV Safe End-to-Elbow Cold Leg, Loop A	2RV-01	B9.11	R1.20
2RV-01-029	RPV Nozzle-to-Safe End Hot Leg, Loop A	2RV-01	B5.10	R1.15
2RV-01-037	RPV Safe End-to-Pipe Hot Leg, Loop A	2RV-01	B9.11	R1.20

Note 1: Category and Item Numbers may change based on NRC approved alternatives or future NRC regulation(s).