

10 CFR 50.55a

RS-09-048

March 26, 2009

U. S. 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: Response to Additional Questions Regarding Braidwood I3R-04, Request for Relief from 10 CFR 50.55a(g)(6)(ii)(E), Reactor Coolant Pressure Boundary Examination Scheduling Requirements in accordance with 10 CFR 50.55a(a)(3)(i)

- References:
1. Letter from P. R. Simpson (Exelon Generation Company, LLC) to U. S. NRC, "Third 10-Year Inservice Inspection Interval, Relief Request I3R-04, Request for Relief from 10 CFR 50.55a(g)(6)(ii)(E), Reactor Coolant Pressure Boundary Examination Scheduling Requirements in accordance with 10 CFR 50.55a(a)(3)(i)," dated February 5, 2009
  2. Letter from P. R. Simpson (Exelon Generation Company, LLC) to U. S. NRC, "Supplemental Information Regarding Relief Request I3R-04 Associated with the Third 10-Year Inservice Inspection (ISI) Interval," dated February 26, 2009
  3. Letter from M. J. David (U. S. NRC) to C. G. Pardee (Exelon Generation Company, LLC) "Braidwood Station, Units 1 and 2 – Request for Additional Information Related to Relief Request I3R-04 (TAC Nos. ME0598 and ME0599)," dated March 5, 2009
  4. Letter from P. R. Simpson (Exelon Generation Company, LLC) to U. S. NRC, "Additional Information Supporting Braidwood I3R-04, Request for Relief from 10 CFR 50.55a(g)(6)(ii)(E), Reactor Coolant Pressure Boundary Examination Scheduling Requirements in accordance with 10 CFR 50.55a(a)(3)(i)," dated March 11, 2009
  5. Email from M. J. David (U. S. NRC) to L. A. Schofield (Exelon Generation Company, LLC), "Draft Additional Questions on Braidwood Relief Request 3/11/09 RAI Response," dated March 24, 2009

In Reference 1, Exelon Generation Company, LLC (EGC), requested authorization to use augmented NDE examinations performed during previous refueling outages as an alternative to the reactor vessel bottom-mounted instrument (BMI) penetrations examination program required in accordance with 10 CFR 50.55a(g)(6)(ii)(E), Footnote 1. EGC supplemented that request with Reference 2.

The NRC requested additional information to support review of the relief request in Reference 3. EGC provided that requested information in Reference 4.

In Reference 5, the NRC transmitted draft questions to EGC regarding Reference 4. The NRC clarified these questions during a teleconference between EGC and the NRC on March 25, 2009. The Attachment to this letter provides the requested information.

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

Respectfully,

A handwritten signature in black ink, appearing to read "Patrick R. Simpson", with a long, sweeping horizontal flourish extending to the right.

Patrick R. Simpson  
Manager – Licensing

Attachment: Response to Additional Questions Regarding Braidwood Relief Request I3R-04

**ATTACHMENT**  
**Response to Additional Questions Regarding Braidwood Relief Request I3R-04**

In a letter dated March 11, 2009, Exelon Generation Company, LLC, (EGC) provided supplemental information regarding the Braidwood Relief Request I3R-04 submitted February 5, 2009. After reviewing the March 2009 EGC response, the NRC has requested a response to the following questions to support their review of the relief request.

**Question 1**

The response to Question 2.c. says, "the ultrasonic notch responses have been compared to a primary water stress corrosion cracking (PWSCC) flaw at the Bugey plant, as shown in the figures below." The licensee should describe the crack signals they are presenting. For example, the licensee should describe what type of scan is being presented, what is being compared, and what conclusion is reached.

**Response**

Additional information was provided to the NRC the week of March 9, 2009, when they visited the EPRI offices in Charlotte. The flaws are made with squeezed electro-discharge-machined (EDM) notches (not implants), which have been squeezed via the cold isostatic pressing (CIP) process.

Typically, the radius of the squeezed CIP EDM notch tips used in CRDM and BMI flawed mockups are 10 microns, which is smaller than that required by ASME Section XI, Appendix VIII. When the ultrasonic test (UT) CIP squeezed EDM notch responses were compared with a PWSCC flaw from Bugey, they were found to give similar UT forward scatter time-of-flight-diffraction (TOFD) responses.

The amplitude of the ultrasonic tip responses varied only slightly. Differences when averaged over the length of the flaw did not vary more than +/- 2 dB. This was determined to be primarily due to minor variations in surface condition and ultrasonic coupling.

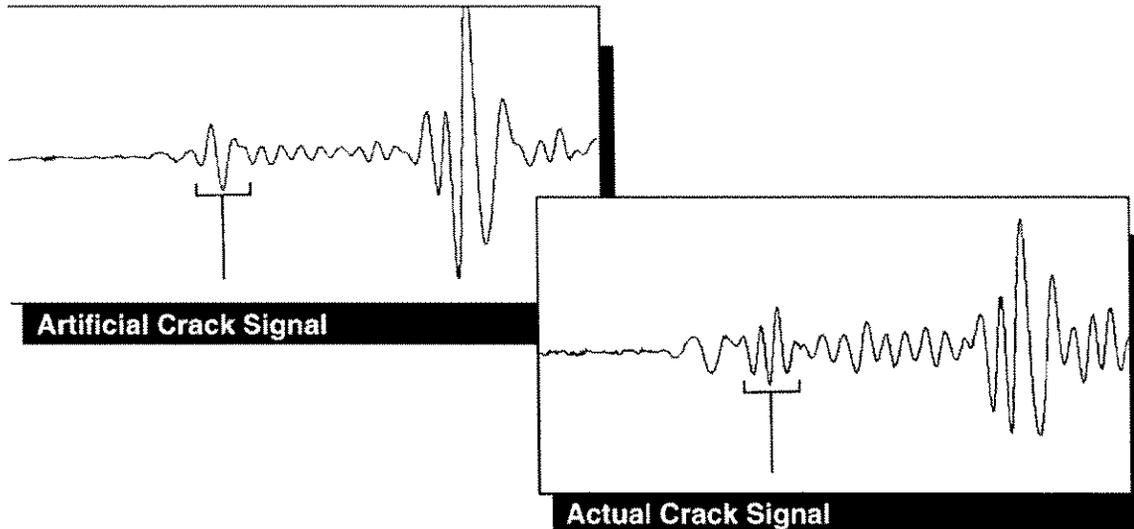
As can be seen in Figure 1 below, the signal-to-noise ratios were also very similar. The average signal-to-noise ratio observed was 3-to-1. The similarity in the phase angles of the simulated and field-removed cracks can also be seen. There was no negligible difference observed between the echodynamic characteristics of the simulated and field-removed cracks as seen in Figure 1 below and documented in a publicly available EPRI Technical Report TR-106260 (Reference 1).

Reference:

1. EPRI Technical Report TR-106260, "Demonstration of Inspection Technology for Alloy 600 CRDM Head Penetrations," October 1996

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Figure 1. Comparison of Signal-to-Noise Ratio, Actual versus Manufactured Flaws. (The ultrasonic amplitude and echo-dynamic features were similar.)



**Question 2**

The last line of the second paragraph in the response to Question 3 says, "Flaw-like indications regardless of size are reported." Please clarify whether this statement applies to UT as well as ET.

**Response**

The referenced statement, taken from the WesDyne Eddy Current (ET) examination procedure WDI-STD-133, "Paragon™ Eddy Current Procedure for the Inspection of Reactor Vessel Bottom Mounted Instrumentation Tube Penetrations," was specific to the ET data analysis.

Similar criteria for flaw indication reporting are contained in the WesDyne UT procedure WDI-STD-141, "Bottom Mounted Instrumentation UT Analysis Guidelines for Use With Paragon™." For UT, primary detection is performed using axial and circumferential TOFD. Recordable indications are considered reportable if they are service-induced flaws, typically planar in nature (i.e., detected by either axial or circumferential TOFD) and cannot be seen with the zero degree transducer. Penetrations with a recordable flaw indication are recorded on an Ultrasonic Indication Report Sheet per WesDyne UT procedure.

Indications that are characterized as fabrication flaws (including lack of fusion) are flaws that can be seen by both the axial and circumferential TOFD and the zero degree transducer. Although fabrication flaws are not considered recordable, they may be characterized and noted in the comments section of the Analysis Log Sheet for reference to support future examinations.

There were no recordable indications noted in any of the penetrations examined on either Braidwood unit during the last refueling outages at Braidwood Stations, Units 1 and 2 (A1R13 for Unit 1 (fall 2007) and A2R13 for Unit 2 (spring 2008)).

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**Question 3**

The response to Question 7 contains information on the IntraSpect system, which was not used at Braidwood and seems confusing. The response may be more clear if only the changes made to the Paragon system are discussed.

**Response**

The response to Question 6 provided in the EGC letter dated March 11, 2009, provides additional information regarding changes to the Paragon system.

The reason Vendor A seemed to out-perform Vendor B is unknown. Since a new demonstration has not been conducted since the Paragon system equipment and procedures have been implemented, it cannot be established whether one vendor can perform better than the other.

**Question 4**

In the response to Question 10, please clarify whether the discussion on Vendor A refers to WesDyne's Paragon system.

**Response**

The response to Question 10 provided in the EGC letter dated March 11, 2009, was specific to the WesDyne Paragon system, and the references to Vendor A referred to WesDyne.