



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

October 12, 2011

Mr. Michael J. Pacilio  
President and Chief Nuclear Officer  
Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2 - REQUEST FOR ADDITIONAL  
INFORMATION RE: REQUEST FOR RELIEF I3R-08 (TAC NOS. ME6024 AND  
ME6025)

Dear Mr. Pacilio:

By letters to the U.S. Nuclear Regulatory Commission (NRC) dated April 11, 2011 and June 6, 2011, (Agencywide Documents Access and Management System (ADAMS) Accession Nos ML111020263 and ML111580106, respectively), Exelon Generation Company, LLC, submitted a request for relief, I3R-08, from certain examination requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) at Braidwood Station, Units 1 and 2. Specifically, the licensee proposed using root mean square error (RMSE) criteria for sizing flaws that are greater than the requirements of ASME Code Case N-695, "Qualification Requirements for Dissimilar Metal Piping Welds," and N-696, "Qualification Requirements for Appendix VIII Piping Examinations Conducted From the Inside Surface."

The NRC staff is reviewing your submittal and has determined that additional information is required to complete the review. The specific information requested is addressed in the enclosure to this letter. During a discussion with your staff on October 3, 2011, it was agreed that you would provide a response by November 2, 2011.

Please note that if you do not respond to this letter by the agreed-upon date or provide an acceptable alternate date in writing, we may reject your request for approval under the provisions of Title 10 of the *Code of Federal Regulations*, Section 2.108.

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The NRC staff considers that timely responses to requests for additional information help ensure sufficient time is available for staff review and contribute toward the NRC's goal of efficient and effective use of staff resources. If circumstances result in the need to revise the requested response date, please contact me at (301) 415-1115.

Sincerely,



Nicholas J. DiFrancesco, Project Manager  
Plant Licensing Branch III-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-456 and 50-457  
Enclosure:  
Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

BRAIDWOOD STATION, UNITS 1 AND 2

REGARDING REQUEST FOR RELIEF I3R-08

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

TAC NOS. ME6024 AND ME6025

By letters dated April 11, 2011 and June 6, 2011, (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML111020263 and ML111580106, respectively), Exelon Generation Company, LLC, (licensee) submitted a request for relief, I3R-08, from certain examination requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) at Braidwood Station, Units 1 and 2. Specifically, the licensee proposed using root mean square error (RMSE) criteria for sizing flaws that are greater than the requirements of ASME Code Case N-695, "Qualification Requirements for Dissimilar Metal Piping Welds [DMWs]," and N-696, "Qualification Requirements for Appendix VIII Piping Examinations Conducted From the Inside Surface." To complete the review, the NRC staff requests the following additional information supporting the licensee's request.

1. The large differences in RMSE between non-Appendix VIII DMWs, Appendix VIII DMWs, and Appendix VIII austenitic-to-austenitic welds are influenced by changes to the surface conditions in the test mockups used to demonstrate capability, effectiveness, and skill. Unless the surface conditions of the field welds are exactly the same as test mockups, the applicability of a specific RMSE value may not be appropriate. Correlations between the essential variable "surface preparation" and RMSE values have not been developed. Therefore, the "best effort" RMSE values assigned by the Electric Power Research Institute (EPRI) – Performance Demonstration Initiative (PDI), which are referenced in the submittal for DMW and austenitic-to-austenitic welds, may not be appropriate depending on the relationship of RMSE and actual surface preparations (conditions). In the absence of any correlation between RMSE and surface conditions, the "best effort" PDI RMSE values are questionable with respect to reliability, reproducibility, and applicability to actual depth sizing of cracks identified during an examination. Provide a discussion on the following two probe-to-component surface contact conditions:
  - a. Based on the non-Appendix VIII vendor performance demonstrations performed on surfaces that are capable of maintaining good probe-to-component surface (defined by the EPRI Performance Demonstration Initiative as 1/32-inch gap or less) contact, the vendor's RMSE data suggest a reasonable probability of reproducibility. For surface conditions similar to those associated with the non-Appendix VIII performance demonstration, discuss a conservative approach for using RMSE values that would apply to both DMWs and austenitic-to-austenitic welds, i.e., one "best effort" RMSE value.
  - b. In examinations performed during the last 10-year inservice inspection (ISI) interval, the licensee's vendor recorded no flaw (crack) indications for the subject welds. These examinations were performed with a combination of ultrasonic

Enclosure

testing (UT) and eddy current testing (ET) methods. For upcoming examinations, any cracks that are detected would have occurred between the last ISI examination and upcoming examination. The most likely cracking mechanism (identified in the licensee's risk-informed program) is primary water stress corrosion cracks (PWSCC). In the event that the UT or ET examination detected PWSCC, UT depth sizing performed on surfaces exhibiting gaps greater than 1/32-inch between probe and component surface may be less conservative than the proposed alternative in 1a, above. Because sizing accuracy is unknown for gaps greater than 1/32-inch, the application of RMSE as a tolerance to adjust crack depth is questionable. As an alternative to the adjustment approach, cracks that are depth sized on rough surfaces may be bounded by calculating crack growth from the last crack free examination. For calculating purposes, the initial (at the time of the crack free examination) crack depth should be assumed 5-percent through-wall (the smallest crack size that may be in a performance demonstration test). For PWSCC, the bounding crack depth can be calculated using the guidance provided in the EPRI - Materials Reliability Program (MRP) MRP-115, MRP-252, and/or MRP-287, as appropriate, for representative DMW and austenitic-to-austenitic welds. Provide a discussion on the disposition of cracks as determined by calculating the maximum through-wall crack depth and identify the associated assumptions, if any.

2. The vendor participated in three non-PDI performance demonstrations on mockups with smooth ID surfaces (probe-to-component surface gaps of less than or equal to 1/32-inch). Each of the demonstrations used UT procedures and equipment nearly identical to those to be applied in the upcoming Braidwood, Units 1 and 2, examinations. The personnel performing the Appendix VIII examinations are required to be qualified on the specific UT procedure that will be used for the examinations. Please provide a discussion on the participation in the non-PDI performance demonstrations of the UT ultrasonic testing personnel piping qualifications that will be performing the upcoming Braidwood, Units 1 and 2, examinations.
3. To ensure that the examination method when performed will provide reasonable assurance of structural integrity. In the June 6, 2011 letter, the response to question 1(c), starts a sentence with, "The estimated lack of coverage for these welds . . . ." Please provide the estimated numerical coverage values, if they exist.

The NRC staff considers that timely responses to requests for additional information help ensure sufficient time is available for staff review and contribute toward the NRC's goal of efficient and effective use of staff resources. If circumstances result in the need to revise the requested response date, please contact me at (301) 415-1115.

Sincerely,

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Nicholas J. DiFrancesco, Project Manager  
Plant Licensing Branch III-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-456 and 50-457  
Enclosure:  
Request for Additional Information

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**ADAMS Accession No. ML112700599**

**NRR-088**

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