

NRR-DMPSPeM Resource

From: Venkataraman, Booma
Sent: Friday, February 02, 2018 10:04 AM
To: Loomis, Thomas R:(GenCo-Nuc); Williams, Christian D:(GenCo-Nuc)
Cc: Danna, James
Subject: FitzPatrick- REQUEST FOR ADDITIONAL INFORMATION Re: Relief Request: JAF-15R-05R, JAF-15R-05 Concerning Nozzle-to-Vessel Weld and Inner Radii Examinations (Use of Code Case N-702)(EPID: L-2017-LLR-0093)
Attachments: FitzPatrick Relief JAF-15R-05_Code Case N-702 RAIs.docx
Expires: Tuesday, April 03, 2018 12:00 AM

Mr. Loomis and Mr. Williams,

By letter dated September 29, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17275A208), Exelon Generation Company, LLC (Exelon or the licensee), in accordance with 10 CFR 50.55a(z)(1), submitted the fifth 10-year inservice inspection program plan for the James A. FitzPatrick Nuclear Power Plant (FitzPatrick) for the NRC staff's review and approval. The submittal requests relief from certain requirements of the American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel Code requirements. Specifically, Relief Request JAF-I5R-05 proposes the use of ASME Code Case N 702, "Alternative Requirements for Boiling Water Reactor (BWR) Nozzle Inner Radius and Nozzle to Shell Welds," for inspection of reactor pressure vessel nozzle inner radius and nozzle-to-shell welds at FitzPatrick.

A draft request for information (RAI) was sent to you on January 29, 2018. You indicated on February 1, 2018 that a clarification call is not needed. The final RAI version is attached to this e-mail. It was agreed that Exelon will respond to the attached RAI with a supplement by March 5, 2018.

Please treat this e-mail as transmittal of formal RAIs. If circumstances result in the need to revise the requested response date, please contact me at (301) 415-2934 or via email at Booma.Venkataraman@nrc.gov.

Sincerely, Booma

Booma Venkataraman, P.E.

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Hearing Identifier: NRR_DMPS
Email Number: 143

Mail Envelope Properties (Booma.Venkataraman@nrc.gov20180202100400)

Subject: FitzPatrick- REQUEST FOR ADDITIONAL INFORMATION Re: Relief Request:
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Code Case N-702)(EPID: L-2017-LLR-0093)

Sent Date: 2/2/2018 10:04:05 AM

Received Date: 2/2/2018 10:04:00 AM

From: Venkataraman, Booma

Created By: Booma.Venkataraman@nrc.gov

Recipients:

"Danna, James" <James.Danna@nrc.gov>

Tracking Status: None

"Loomis, Thomas R:(GenCo-Nuc)" <thomas.loomis@exeloncorp.com>

Tracking Status: None

"Williams, Christian D:(GenCo-Nuc)" <Christian.Williams@exeloncorp.com>

Tracking Status: None

Post Office:

Files	Size	Date & Time
MESSAGE	1593	2/2/2018 10:04:00 AM
FitzPatrick Relief JAF-15R-05_Code Case N-702 RAls.docx		27369

Options

Priority: Standard

Return Notification: No

Reply Requested: No

Sensitivity: Normal

Expiration Date: 4/3/2018

Recipients Received:

REQUEST FOR ADDITIONAL INFORMATION
REQUEST FOR ALTERNATIVE NO. JAF-I5R-05
REACTOR PRESSURE VESSEL NOZZLE-TO-SHELL WELDS AND
NOZZLE INNER RADIUS EXAMINATIONS
EXELON GENERATION COMPANY, LLC
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
DOCKET NO. 50-333

By letter dated September 29, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17275A208), Exelon Generation Company, LLC (or the licensee), in accordance with Title 10 of the *Code of Federal Regulations* Section 50.55a(z)(1), submitted the fifth 10-year inservice inspection program plan for the James A. FitzPatrick Nuclear Power Plant (FitzPatrick) for the U.S. Nuclear Regulatory Commission (NRC) staff's review and approval. The submittal requests relief from certain requirements of the American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel Code requirements. Specifically, Relief Request JAF-I5R-05 proposes the use of ASME Code Case N-702, "Alternative Requirements for Boiling Water Reactor (BWR) Nozzle Inner Radius and Nozzle-to-Shell Welds," for inspection of reactor pressure vessel nozzle inner radius and nozzle-to-shell welds at FitzPatrick.

The NRC staff has reviewed the submittal and determined that additional information is needed to complete its review.

RAI-1

In the September 29, 2017, submittal, the licensee proposed an alternative based on ASME Code Case N-702 for the reactor pressure vessel nozzle inspection during the fifth inservice inspection interval through the remaining term of the renewed operating period. ASME Code Case N-702 was conditionally approved in Regulatory Guide 1.147, Revision 17, "Inservice Inspection Code Case Acceptability, Section XI, Division 1," dated August 2014, requiring the applicants to address the evaluation criteria in the safety evaluation for BWRVIP-108, "Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Inner Radii," dated December 19, 2007 (ADAMS Accession No. ML073600374), or BWRVIP-241, "Probabilistic Fracture Mechanics Evaluation for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Blend Radii," dated April 19, 2013 (ADAMS Accession No. ML13071A240). Both reports are applicable to 40 years of operation. On April 26, 2017, the safety evaluation for BWRVIP-241, Appendix A (ADAMS Accession No. ML17114A096), for the period of extended operation was issued, which extends the application of BWRVIP-108 and BWRVIP-241, and therefore, ASME Code Case N-702, from 40 years to 60 years.

Section 5, "Proposed Alternative and Basis for Use," of the attachment to the licensee's submittal dated September 29, 2017, states, in part:

The analyses in BWRVIP-108 and BWRVIP-241 were based on predicted fatigue crack growth over the initial licensed operating period and assumed additional

fatigue cycles in evaluating fatigue crack growth. The probability of failure per reactor year for the nozzle-to-shell-weld and nozzle blend radii in JAFNPP's N2 nozzles are below the acceptance criterion of 5×10^{-6} per year. An evaluation was performed, which showed that, after consideration of the additional thermal cycles and fluence at the end of the period of extended operation, the N2 nozzles (and thus any other applicable nozzle), are qualified for reduced inspection using ASME Code Case N-702 through the end of the period of extended operation.

Based on the two analyses (BWRVIP-108 and BWRVIP-241), the failure probabilities due to a low temperature overpressure event at the nozzle blend radius region and the nozzle-to-vessel shell weld for JAFNPP recirculation inlet and outlet nozzles, and all other nozzles listed in Table 1, are very low and meet the NRC safety goal of 5×10^{-6} .

One of the technical basis reports for ASME Code Case N-702 is BWR Vessel and Internals Project (BWRVIP)-108, "Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Blend Radii," EPRI Technical Report 1003557, dated October 2002. In its safety evaluation of BWRVIP-108 dated December 19, 2007, the NRC staff documented the BWRVIP's supplemental probabilistic fracture mechanics evaluation, which showed that the limiting probability of failure (PoF) is 1.98×10^{-6} per year for normal operation, compared to 1.19×10^{-7} per year for a low temperature over-pressure (LTOP) event. The submittal explicitly states that an evaluation was performed for LTOP and results remained below the NRC safety goal, but evaluation of the PoF for normal operation is not mentioned.

The NRC staff requests the licensee to report the PoF values for LTOP and normal operation or discuss how the PoF values for LTOP are more limiting than those for normal operation.