

From: Purnell, Blake
Sent: Thursday, January 13, 2022 2:17 PM
To: Loomis, Thomas R:(GenCo-Nuc) (thomas.loomis@exeloncorp.com)
Cc: Salgado, Nancy; Gudger, David T:(GenCo-Nuc)
Subject: Exelon Generation Company, LLC - Request for Additional Information Regarding Proposed Fleet Alternative for Repair of Water Level Instrumentation Partial Penetration Nozzles
Attachments: RAI - Exelon RR Half Nozzle Repair.pdf

Mr. Loomis,

By application dated August 12, 2021 (Agencywide Documents Access and Management System Accession No. ML21224A123), Exelon Generation Company, LLC submitted a request in accordance with paragraph 50.55a(z)(2) of Title 10 of the *Code of Federal Regulations* (10 CFR) for a proposed alternative to certain requirements of 10 CFR 50.55a, "Codes and standards," for Clinton Power Station, Unit No. 1; Dresden Nuclear Power Station, Units 2 and 3; James A. FitzPatrick Nuclear Power Plant; LaSalle County Station, Units 1 and 2; Limerick Generating Station, Units 1 and 2; Nine Mile Point Nuclear Station, Units 1 and 2; Peach Bottom Atomic Power Station, Units 2 and 3; and Quad Cities Nuclear Power Station, Units 1 and 2. Specifically, the application requests U.S. Nuclear Regulatory Commission (NRC) approval to use a half nozzle repair technique for water level instrumentation partial penetration nozzles on the reactor pressure vessel as an alternative to the repair requirements in Section XI of the American Society for Mechanical Engineers Boiler and Pressure Vessel Code.

The NRC staff is reviewing the application and has determined that additional information is needed to complete the review. The NRC staff discussed the need for this information with you on January 10, 2022. A response to the attached request for additional information is requested to be provided by February 18, 2022. If you have any questions, please contact me by email or phone at (301) 415-1380.

Sincerely,

Blake Purnell, Project Manager
 Plant Licensing Branch III
 Division of Operating Reactor Licensing
 Office of Nuclear Reactor Regulation
 U.S. Nuclear Regulatory Commission

Docket Nos. 50-461, 50-237, 50-249, 50-333, 50-373, 50-374, 50-352, 50-353, 50-220, 50-410, 50-277, 50-278, 50-254, and 50-265

EPIDs L-2021-LLR-0057 and -0058

OFFICE	NRR/DORL/LPL3/PM	NRR/DNRL/NVIB/BC	NRR/DNRL/NPHP/BC	NRR/DORL/LPL3/BC
NAME	BPurnell	ABuford	MMitchell (ABuford for)	NSalgado (RKuntz for)
DATE	1/13/22	12/13/21	12/13/21	12/21/21

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Regarding Proposed Fleet Alternative for Repair of Water Level Instrumentation Partial Penetration
Nozzles

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From: Purnell, Blake

Created By: Blake.Purnell@nrc.gov

Recipients:

"Salgado, Nancy" <Nancy.Salgado@nrc.gov>

Tracking Status: None

"Gudger, David T:(GenCo-Nuc)" <David.Gudger@exeloncorp.com>

Tracking Status: None

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

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Options

Priority: Normal

Return Notification: No

Reply Requested: No

Sensitivity: Normal

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REQUEST FOR ADDITIONAL INFORMATION

EXELON GENERATION COMPANY, LLC

PROPOSED ALTERNATIVE REQUEST

REPAIR OF WATER LEVEL INSTRUMENTATION PARTIAL PENETRATION NOZZLES

DOCKET NOS. 50-461, 50-237, 50-249, 50-333, 50-373, 50-374, 50-352, 50-353,

50-220, 50-410, 50-277, 50-278, 50-254, AND 50-265

By application dated August 12, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21224A123), Exelon Generation Company, LLC (Exelon, the licensee) submitted a request in accordance with paragraph 50.55a(z)(2) of Title 10 of the *Code of Federal Regulations* (10 CFR) for a proposed alternative to certain requirements of 10 CFR 50.55a, "Codes and standards," for Clinton Power Station, Unit No. 1; Dresden Nuclear Power Station, Units 2 and 3; James A. FitzPatrick Nuclear Power Plant; LaSalle County Station, Units 1 and 2; Limerick Generating Station, Units 1 and 2; Nine Mile Point Nuclear Station, Units 1 and 2; Peach Bottom Atomic Power Station, Units 2 and 3; and Quad Cities Nuclear Power Station, Units 1 and 2 (collectively, the facilities). Specifically, the application requests U.S. Nuclear Regulatory Commission (NRC) approval to use a half nozzle repair technique for water level instrumentation (WLI) partial penetration nozzles on the reactor pressure vessel (RPV) as an alternative to the repair requirements in Section XI of the American Society for Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (ASME Code).

The regulations in 10 CFR 50.55a(z) state, in part, that alternatives to the requirements in paragraphs (b) through (h) of 10 CFR 50.55a may be authorized by the NRC if the licensee demonstrates that: (1) the proposed alternative provides an acceptable level of quality and safety, or (2) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The U.S. Nuclear Regulatory Commission (NRC) has reviewed the application and determined that the information below is needed to complete its review.

Request for Additional Information (RAI) 1

Section 4 of the proposed alternative states, in part, that: "The original partial penetration J-groove weld and a remnant of the original nozzle will remain in place. A flaw evaluation will demonstrate the acceptability of leaving the original partial penetration J-groove weld and remnant nozzle, with a maximum postulated flaw, in place for one cycle...." Section 5.C of the proposed alternative states, in part, that: "This evaluation will be used to demonstrate compliance with a combination of Subarticle IWB-3610 [of the ASME Code, Section XI,] and ASME Code Case N-749-x or similar code case ..., as applicable." The NRC staff understands that this evaluation will confirm qualitative information provided in this alternative request. However, the application does not provide detailed information on how this flaw evaluation will be performed.

Discuss in detail how the confirmatory flaw evaluation will be performed. Specifically, discuss the scope, assumptions, input parameters, methodology, and acceptance criteria. For example, the scope of the flaw evaluation may include the components such as the existing J-groove

weld and the new attachment welds. The input parameters may include flaw size, flaw locations, and crack growth rates. The methodology may include growth due to fatigue and stress corrosion cracking, weld residual stresses, the analytical model, and applied loadings.

RAI-2

Section 5.E of the proposed alternative states, in part, that: "A corrosion evaluation will be performed to consider potential material degradation due to the repair of the RPV WLI partial penetration nozzle. The repair will result in the RPV [low alloy steel] being exposed to the reactor coolant." However, the application does not provide detailed information on how this corrosion evaluation will be performed.

Describe in detail how the corrosion evaluation will be performed. Specifically, discuss the scope, assumptions, input parameters, methodology, and acceptance criteria.

RAI-3

Section 5.F of the proposed alternative states that a lost parts evaluation will be performed to assess the potential for nozzle segments to enter the RPV during power operation. However, the application does not provide detailed information on how this evaluation will be performed.

Describe in detail how the lost parts evaluation will be performed. Specifically, discuss the scope, assumptions, input parameters, methodology, and acceptance criteria. Confirm that this evaluation would also assess the potential for the original J-groove weld material to enter the RPV during power operation.

RAI-4

Section 7 of the proposed alternative discusses precedents for the repair of reactor vessel head penetration and J-groove welds. In the half-nozzle repair of a reactor vessel head penetration nozzle for a control rod drive mechanism, a corner location (called a triple point) exists where the Alloy 52M weld metal is in contact with low alloy steel of the RPV closure head and the Alloy 600 of the original nozzle or Alloy 690 of the replacement nozzle. In the triple point location, a welding anomaly (e.g., lack of fusion) could exist. For similar precedents, licensees have performed a flaw evaluation to demonstrate that the anomaly at the triple point location will not affect the structural integrity of the repair. The proposed alternative does not discuss whether a triple point location will exist after the repair.

Discuss whether a triple point location will exist in the repair of a WLI nozzle. If a triple point exists, confirm that the flaw evaluation described in Section 5.C of the proposed alternative will demonstrate that the welding anomaly does not affect structural integrity of the WLI nozzle for one cycle.

RAI-5

The configuration of a typical repaired WLI nozzle, a discussion of the repair process, and the specific nondestructive examinations that will be performed (on the pad or the replacement J-groove weld) are not described in the proposed alternative.

- A. Provide a diagram of a typical installed replacement WLI nozzle, including the new weld(s), original J-groove weld, the remnant nozzle, and the replacement nozzle. The

installed new WLI nozzle diagram should show how the new nozzle is attached to the new weld pad (i.e., whether the new nozzle is inserted into the bore of the RPV wall). If a portion of the new nozzle is inserted into the bore of the RPV wall, discuss whether a weld is installed at the junction of the new nozzle and the bore of the RPV wall.

- B. Provide a diagram showing the examination coverage of the installed replacement WLI nozzle, the new weld pad, and the new partial penetration weld that attached the new nozzle to the new weld pad. Discuss the nondestructive examination and associated acceptance criteria for the new welds and the replacement WLI nozzle.
- C. Discuss and/or list the step-by-step repair process.

RAI-6

The proposed alternative does not discuss whether an extent of condition evaluation will be performed prior to the repair of a WLI nozzle.

Discuss the extent of condition evaluation that will be performed on the reactor vessel's remaining WLI nozzles before a WLI nozzle is repaired using the proposed alternative.