

RS-22-096

10 CFR 50.55a

August 10, 2022

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Quad Cities Nuclear Power Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket Nos. 50-254 and 50-265

Subject: Response to Request for Additional Information Related to Relief Request I6R-01
Associated with the Sixth Inservice Inspection Interval

- References:
1. Letter from P.R. Simpson (Constellation Energy Generation, LLC) to U.S. NRC, "Submittal of Relief Request Associated with the Sixth Inservice Inspection Interval, dated March 25, 2022 (ADAMS Accession No. ML22084A597)
 2. Email from R. Kuntz (U.S. NRC) to R. Steinman (Constellation Energy Generation, LLC), "RAI RE: Quad Cities Alternative related to SBLC nozzle inspection (EPID L-2022-LLR-0036)," dated July 13, 2022 (ADAMS Accession No. ML22206A035)

In Reference 1, Constellation Energy Generation, LLC (CEG) submitted relief requests associated with the Sixth 10-Year Inservice Inspection (ISI) Program Interval for Quad Cities Nuclear Power Station (QCNPS). Alternative I6R-01 seeks relief from 2017 Edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code, Section XI, subparagraph I-2500-1 for inspection of the standby liquid control (SBLC) nozzle inner radius.

As documented in Reference 2, the NRC found that additional information was required to support its review of Reference 1. The requested information is provided in the attachment.

There are no regulatory commitments included in this letter. CEG continues to seek approval of Reference 1 by March 31, 2023.

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Should you have any questions concerning this letter, please contact Ms. Rebecca L. Steinman at 630-657-2831.

Respectfully,

A handwritten signature in black ink that reads "Patrick R. Simpson". The signature is written in a cursive style with a long horizontal flourish extending to the right.

Patrick R. Simpson
Sr. Manager Licensing
Constellation Energy Generation, LLC

Attachment: Response to NRC Request for Additional Information

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station

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REQUEST FOR ADDITIONAL INFORMATION
REQUEST FOR ALTERNATIVE
REGARDING AMERICAN SOCIETY OF MECHANICAL ENGINEERS,
BOILER AND PRESSURE VESSEL CODE, SECTION XI
EXAMINATION REQUIREMENTS FOR CLASS 1 NOZZLE INNER RADII
DOCKET NOS. 50-254, AND 50-265
QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2
EPID NO. L-2022-LLR-0036

By letter dated March 25, 2022 (Agencywide Documents Access and Management System (ADAMS) ML22084A597), Constellation Energy Generation, LLC (the licensee) requested U.S. Nuclear Regulatory Commission (NRC) approval of alternative I6R-01 pursuant to Title 10 of the Code of Federal Regulations (10 CFR) 50.55a(z)(2) to the requirements of American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) at Quad Cities Nuclear Power Station, Units 1 and 2 (Quad Cities 1 and 2). The proposed alternative would allow the licensee to forego American Society of Mechanical Engineers (ASME) Code, Section XI-required examination of the standby liquid control (SBLC) nozzle inner radius (IR) for the sixth inservice inspection interval (ISI) of the subject units.

Specifically, pursuant to Title 10 of the Code of Federal Regulations (10 CFR), Part 50, Paragraph 50.55a(z)(2), the licensee proposed to perform a VT-2 visual examination and monitor the technical specification surveillance requirement 3.4.4.1 for reactor coolant leakage instead of the required ultrasonic examination. 10 CFR 50.55a(z)(2) requires the licensee to demonstrate that conforming to the examination requirement would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety. The NRC staff (the staff) requires additional information (RAI) to complete its review of the alternative request.

RAI 1

***Issue:** The alternative request did not specify the relevant materials of the SBLC nozzle and associated nozzle-to-vessel weld pictured in Figures I6R-01.1 of the submittal. This information is relevant to the request because it allows the staff to assess potential degradation mechanisms.*

***Request:** Describe the materials of construction for the nozzle and weld at Quad Cities 1 and 2.*

Constellation Energy Generation, LLC (CEG) Response to RAI 1

In accordance with the Quad Cities Nuclear Power Station (QCNPS) Updated Final Safety Analysis Report (UFSAR), the reactor pressure vessel (RPV) materials and fabrication methods conform to American Society of Mechanical Engineers (ASME), Section III, Class A, 1963 Edition including Summer 1964 Addenda. The RPV shell plates consist of ASME SA-302

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Grade B, modified in accordance with ASME Code Case 1339, "Requirements for Plates," Paragraph 1. The standby liquid control system (SBLC) nozzle forging is fabricated of SA-336 manganese-molybdenum steel conforming to ASME Code Case 1332, "Requirements for Steel Forgings, Section 111 and VIII, Division 2," and is clad internally with weld deposited austenitic stainless steel.

RAI 2

***Issue:** The alternative request did not address the operating experience and examination history of the nozzle-to-vessel weld of the SBLC nozzles of the subject units. This information is relevant to the request because it allows the staff to understand the overall performance of the SBLC nozzles.*

***Request:** Describe the operating history and examination history of the nozzle-to-vessel weld of the SBLC nozzles, including a description of the ultrasonic examination coverage obtained, at Quad Cities 1 and 2.*

CEG Response to RAI 2

The previous four ultrasonic examinations for the QCNPS Units 1 and 2 standby liquid control system (SBLC) nozzle-to-vessel welds identified no indications. The most recently completed examinations from the 5th ISI Interval achieved coverage of 99.2% for Unit 1 and 98.2% for Unit 2. Additionally, the SBLC nozzle VT-2 examination is conducted every refueling outage as part of the ISI Class 1 end of outage System Leakage Test in accordance with IWB-5000. Relative to the SBLC nozzle, no relevant conditions or signs of leakage have been recorded or identified during VT-2 examinations conducted to date.

RAI 3

***Issue:** The alternative request described partial examination history of the SBLC nozzle inner radius of the subject units, including the NRC-approved alternative for the fifth ISI interval. However, the alternative request does not describe the examination history for the first through the fourth ISI intervals. This information is relevant to the request because it allows the staff to understand the full examination history of the SBLC nozzle inner radius.*

***Request:** Describe the full examination history of the SBLC nozzle inner radius locations at Quad Cities 1 and 2.*

CEG Response to RAI 3

Due to the configuration of the nozzle as described in the relief request submittal, the nozzle inner radius (NIR) has not been ultrasonically examined during previous inspection intervals. As stated in the response to RAI 2, a VT-2 examination has been performed during the ISI Class 1 end of outage System Leakage Test. The SBLC nozzle VT-2 examination is conducted every refueling outage as part of the ISI Class 1 end of outage System Leakage Test in accordance

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with IWB-5000. Relative to the SBLC nozzle, no relevant conditions or signs of leakage have been recorded or identified during VT-2 examinations conducted to date.

RAI 4

***Issue:** The alternative request stated that performing an ultrasonic examination of the SBLC nozzle inner radius location would constitute a hardship or unusual difficulty without a compensating increase in quality or safety. However, the 2017 Edition of ASME Code, Section XI (the applicable code edition for the sixth ISI interval of the subject units) allows a VT-1 visual examination in lieu of an ultrasonic examination, provided the nozzle meets certain geometric conditions and provided the licensee meets the conditions specified in 10 CFR 50.55a(b)(2)(xxi)(B). The alternative request did not address the potential for performing the VT-1 examination. This information is relevant to the request because the licensee should analyze the entirety of the Section XI requirement as part of requesting an alternative.*

***Request:** Describe the feasibility of performing the VT-1 examination for the SBLC nozzle inner radius specified in IWB-2500(g) in Section XI of the ASME Code, 2017 Edition, including all the relevant provisos in IWB-2500 and 10 CFR 50.55a(b)(2)(xxi)(B).*

CEG Response to RAI 4

Note 7 of Table IWB-2500-1 (B-D) and Paragraph IWB-2500(g) permit a VT-1 visual examination in lieu of volumetric examination for Item No. B3.100, provided the conditions of IWB-2500(f)(1) through (f)(7) are met. The conditions of 10 CFR 50.55a(b)(2)(xxi)(B) prohibit the use of IWB-2500(f) for plants with renewed operating licenses, and they also prohibit the use of IWB-2500(g) for plants with a Combined Operating License pursuant to 10 CFR 52 or with an operating license received after October 22, 2015. QCNPS Units 1 and 2 are currently in the period of extended operation. Regardless of these conditions on the potential use of IWB-2500(g), access to lower reactor vessel head and the SBLC nozzle from the inside diameter to perform a VT-1 of the NIR is not provided during plant refueling.

The SBLC nozzle is located in the RPV bottom head which is not typically made accessible during a refuel outage. In order to access the interior of the RPV bottom head, additional activities and hardship including removal of control rod drive blades, fuel assemblies, fuel support pieces, and control rod drive guide tubes would be required. Alternatively, and of similar hardship, disassembly and removal of jet pumps could potentially provide access to the RPV bottom head interior. These additional activities required to access the interior of the RPV bottom head would result in significant additional dose to workers, potential for component damage, and additional opportunities for the introduction of foreign material to the RPV bottom head. Based on this, CEG did not pursue implementing the code alternative VT-1 examinations due to the added hardship and that it is not a required Section XI inspection method.

The proposed alternative previously authorized in prior ISI Intervals and requested for continued use in the QCNPS, Units 1 and 2 6th ISI Interval is to perform a VT-2 examination each refueling of the SBLC nozzle-to-vessel weld for each plant unit. These examinations, in addition to the ASME, Section XI required ultrasonic examination of the SBLC nozzle-to-vessel weld each inspection interval, will provide a reasonable assurance of structural integrity.