From:	Ballard, Brent
To:	McCreary, Dave M
Cc:	Lashley, Phil H; Danna, James
Subject:	Request for Additional Information for Beaver Valley Unit 2 Steam Generator Inspection Report - Fall 2021 Refueling Outage (EPID L-2022-LRO-0014)
Date:	Friday, June 24, 2022 2:15:00 PM
Attachments:	Final RAIs for BVPS U2 2R22 ARC and F Star Reports.docx

Good afternoon Dave,

By letter dated February 10, 2022, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML22041B540), Energy Harbor Nuclear Corp. (the licensee) submitted the Beaver Valley Unit 2 Refueling Outage 22 Generic Letter 95-05 Voltage Based Alternate Repair Criteria Final Report, Revision 1, and the Unit 2 – 2R22 Steam Generator F* (F Star) Report, in accordance with Technical Specifications 5.6.6.2.2 and 5.6.6.2.4. The reports provide information required by the technical specifications that was obtain during the Fall 2021 refueling outage inspections.

The NRC staff has determined that additional information is needed to complete its review of the reports. Attached is the NRC staff's request for additional information (RAI).

As discussed with you via phone call on June 24, 2022, the NRC is requesting the licensee respond to the RAI by August 23, 2022. Please let me know if you have any questions.

Thank you,
Brent

Brent Ballard
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BEAVER VALLEY POWER STATION, UNIT 2

REQUEST FOR ADDITIONAL INFORMATION

REFUELING OUTAGE 22 GENERIC LETTER 95-05 VOLTAGE-BASED ALTERNATE REPAIR CRITERIA AND STEAM GENERATOR F STAR REPORTS

DOCKET NO. 50-412

1.0 BACKGROUND

By letter dated February 10, 2022 (ML22041B540), Energy Harbor Nuclear Corp. submitted the Refueling Outage 22 (2R22) Generic Letter (GL) 95-05 Voltage-Based Alternate Repair Criteria (ARC) and Steam Generator (SG) F Star (F*) Reports for Beaver Valley Power Station, Unit 2. The SG tube inspections were performed during the Fall 2021 refueling outage. When the voltage-based alternate repair criteria and the F* methodology have been applied, Technical Specification (TS) Sections 5.6.6.2.2 and 5.6.6.2.4 require that a report be submitted within 90 days after the initial entry into hot shutdown (MODE 4) following completion of an inspection of the SGs performed in accordance with TS Section 5.5.5.2.

2.0 REGULATORY BASIS

The tubing of the steam generator constitutes more than half of the reactor coolant pressure boundary (RCPB). Design of the RCPB for purposes of structural and leakage integrity is a requirement under Title 10 of the *Code of Federal Regulations* Part 50 (10 CFR Part 50), Appendix A. Requirements governing the maintenance of steam generator tube integrity are in plant TS and in Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (ASME Code). Specifically, Beaver Valley TS 5.5.5 requires a SG program be established and implemented to ensure that SG tube integrity is maintained. The SG program for Unit 2 shall include the provisions of TS 5.5.5.2, and SG tube inspection reports shall be submitted in accordance with TS 5.6.6.2. The TS 5.5.5.2 repair limits ensure that tubes accepted for continued service will retain adequate structural and leakage integrity during normal operating, transient, and postulated accident conditions, consistent with General Design Criteria (GDCs) 14, 15, 30, 31, and 32 of 10 CFR Part 50, Appendix A.

3.0 REQUEST FOR ADDITIONAL INFORMATION

To complete its review of the inspection, the U.S. Nuclear Regulatory Commission (NRC) staff requests the following additional information:

1. Clarify the following potential discrepancies in the 2R22 GL 95-05 Voltage-Based ARC Report:

    a. Section 2, states, “SG-C is predicted to be the limiting SG for leakage while SG-A is predicted to be the limiting SG for probability of burst.” However, Section 1 and Table 7-2 appear to indicate that SG-C is the limiting SG for leakage and burst probability for Cycle 23. Please confirm which SG is the limiting SG for burst probability for Cycle 23.

b. Table 3-4 states there are 432 distorted support indications (DSIs) in SG-C and that all 432 DSIs were returned to service. However, the rows for the 0.3, 0.6, and 1.1 voltage bins sum to 92, 46, and 4, respectively, rather than 91, 45, and 3, as indicated in the table. Therefore, the total number of DSIs in SG-C, and the number of DSIs returned to service, is unclear. The staff notes that Tables 3-5, 6-1, and 7-1 also refer to 432 DSIs in SG-C. Please confirm the total number of DSIs in SG-C, the total number of DSIs returned to service in SG-C, and the total DSIs in the 0.3, 0.6, and 1.1 voltage bins.

c. In Section 6.5, the section title, the first sentence, and the second-to-last sentence refer to EOC [End of Cycle]-22 and BOC [Beginning of Cycle]-22. Please confirm these instances should be referring to EOC-23 and BOC-23.

d. The title of Section 7.2 refers to Cycle 22. Please confirm this section should refer to Cycle 23.

e. The Note to Table 3-3 states, "This includes the 18 tubes in SG-B with DSIs that were deplugged. However, Table A-2 appears to indicate there are 18 DSIs in 14 tubes. Please confirm the number of deplugged tubes in SG-B that have DSIs and confirm the total number of DSIs in those tubes.

2. Section 3.1 of the 2R22 GL 95-05 Voltage-Based ARC Report states, "There were 10 indications confirmed with HAI indications by the +POINT probe on tubes that were deplugged in SG-B." Eddy current analysis code HAI is not defined in the report or the Electric Power Research Institute's Pressurized Water Reactor Steam Generator Examination Guidelines. The staff notes that HAI and HCI are Historical Axial Indication and Historical Circumferential Indication, respectively, from the 2R22 SG 180 Day Report (ML22126A089). However, a discussion of how the HAI and HCI eddy current analysis codes are used was not provided in the 2R22 SG 180 Day Report. The staff also notes that HAI and HCI were not used in the Fall 2018 (ML19087A050) or Spring 2020 (ML20287A37) SG Tube Inspection Reports. Please confirm whether Fall 2021 was the first use of the HAI and HCI eddy current analysis codes and please discuss how these codes are used.

3. Section 3.3 of the 2R22 GL 95-05 Voltage-Based ARC Report states the following:

> One DSI indication in SG-A had a measured bobbin voltage that exceeded the 1.5 volt criteria. The location that this occurred is at R7C18 02H [tube Row 7, Column 18 at the 2nd tube support plate on the hot-leg side]. This was the same location as in 2R21 (Reference 2). In that case the independent qualified data analyst (IQDA) was consulted regarding the condition of the probe that inspected SG-A tube R7C18 and detected the DSI at the 02H support plate. It was confirmed in 2R21 that the probe satisfied the wear limit criteria that would otherwise categorize it as a worn probe.

This section does not appear to address how probe wear was addressed in 2R22 for R7C18 02H. Therefore, please discuss whether the probe was determined to satisfy the wear limit criteria or whether R7C18 02H was re-tested with a new probe in 2R22.

4. The fifth paragraph of the Discussion section of the 2R22 GL 95-05 Voltage-Based ARC Report states the following:

> The projected accident induced leakage from all combined sources (sleeves, plugs, indications left inservice under Generic Letter 95-05 and other degradation within the tube bundle) remains well below the 8.2 gallons per minute (gpm) per SG allowed by the Technical Specifications. It is noted that Unit 2 License Amendment 195 was recently received, which increased this limit from 2.2 gpm to 8.2 gpm.

However, License Amendment 195 increased the accident induced primary-to-secondary SG tube leakage limit from 2.1 gpm to 8.1 gpm. The staff notes that Section 1 of the 2R22 GL 95-05 Voltage-Based ARC Report refers to 2.2 gpm and 8.1 gpm, and several other sections in the 2R22 GL 95-05 Voltage-Based ARC Report refer to 2.2 gpm. In addition, the staff notes that the Fall 2018 (ML19035A607) and the Spring 2020 (ML20211L853 and ML21026A337) GL 95-05 Voltage-Based ARC and SG F* Reports refer to 2.2 gpm. Please confirm the accident induced primary-to-secondary SG tube leakage limit. In addition, discuss how the use of 2.2 gpm versus 2.1 gpm may have impacted the results of prior reports.