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

June 9, 2011

Mr. David A. Heacock
President and Chief Nuclear Officer
Virginia Electric and Power Company
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

SUBJECT: NORTH ANNA POWER STATION, UNIT NO. 1 - REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING USE OF WELD OVERLAYS AS AN ALTERNATIVE REPAIR TECHNIQUE FOR STEAM GENERATOR HOT LEG NOZZLES (TAC NO. ME5965)

Dear Mr. Heacock:

By letter to the Nuclear Regulatory Commission (NRC) dated March 30, 2011, Virginia Electric and Power Company submitted a request for NRC approval of the use of a full structural weld overlay as an alternative repair technique for steam generator hot leg nozzles, for the North Anna Power Station, Unit No. 1.

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 June 1, 2011, it was agreed that you would provide a response by July 1, 2011.

The NRC staff considers that timely responses to RAIs 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) 415-6606.

Sincerely,

Joel S. Wiebe, Senior Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-338

Enclosure:
RAI

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

NORTH ANNA POWER STATION, UNIT NO. 1

DOCKET NO. 50-338

By letter dated March 30, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML110900566), Virginia Electric and Power Company, (the licensee), submitted relief request (RR) N1-I4-CMP-001 for the U.S. Nuclear Regulatory Commission's (NRC's) review and approval. The licensee proposed alternatives to the American Society of Mechanical Engineers, *Boiler and Pressure Vessel Code* (ASME Code), Section XI, requirements associated with dissimilar metal (DM) welds repairs. RR N1-I4-CMP-001 pertains to the use of full structural weld overlays (FSWOL) as an alternative repair technique for steam generator (SG) hot leg nozzle dissimilar metal (DM) welds at North Anna Power Station, Unit No. 1 (North Anna, Unit 1).

RR N1-I4-CMP-001 was submitted as a contingency in case unacceptable flaw indications are found during the examinations of North Anna, Unit 1, SG hot leg nozzle DM welds during the fourth 10-year inservice inspection (ISI) interval. The fourth 10-year ISI interval commenced on May 1, 2009, and will end on April 30, 2019.

The NRC staff has reviewed the information provided by the licensee in RR N1-I4-CMP-001 and finds additional information is needed to complete its review.

1. On page 1 of Enclosure 1, Section 1 stated that the ASME Code components affected an Examination Category B-F and Item No. B9.11. The NRC staff recognizes that the item no. should be B5.70. Please clarify and/or revise the examination category and/or item no.

2. On page 1 of Enclosure 1, Section 3 does not contain the ASME Code, Section XI, Appendix VIII, Supplements 2 and 10, as the applicable ASME Code requirement, even though on page 15 of Enclosure 1, Attachment 1, Section A1.3(a)(3) specifies both supplements.

    a. Clarify why these supplements are not required and/or not included in the submittal as the applicable ASME Code requirement.
    b. Specify which edition and addenda of the ASME Code, Section XI, will be used for Appendix VIII, Supplements 2 and 10.

3. On page 2 of Enclosure 1, Section 3 does not contain the appropriate edition and addenda of the ASME Code, Section XI, for Appendix VIII, Supplement 11. Specify the appropriate edition and addenda of the ASME Code, Section XI, for Appendix VIII, Supplement 11.

Enclosure

4. On page 9, Enclosure 1, Section 5, Subsection titled "Area Limitation," the licensee proposes to extend the temper bead surface area to up to greater than 700 in^2 but less than 1000 in^2 over the low alloy steel. The licensee stated that EPRI [Electric Power Research Institute] has issued Report 1021073 on June 21, 2010, entitled "Justification for Extension of the Temper Bead Limit to 1000 Square Inches for WOL [Weld Overlay] of P1 and P3 Materials." The licensee stated that this report showed that the WOL area could be expanded to an area of 1000 square inches without creating deleterious residual stress levels and still maintain the structural integrity of the component. The staff previously approved up to 700 in^2 surface area over the low alloy steel only but not greater than 700 in^2 (i.e., safety evaluation letter dated January 21, 2010, "Davis Besse Nuclear Power Station, Unit 1, relief request RR A33 for the Application of Full Structural Weld Overlays on Dissimilar Metal Welds of Reactor Coolant Piping (TAC No. ME0478)," ADAMS Accession No. ML100080573). Provide the results of the stress analysis performed on the FSWOL for surface area up to 1000 in^2 over the low alloy steel at North Anna, Unit 1.

5. On page 14 of Enclosure 1, Attachment 1, Section A1.2.2, Subsection (d)(3) specifies the delta ferrite content of 5 - 15 Ferrite Number (FN) for the stainless steel filler metal that will be used. ASME Code Case N-504-4, Section (e), states that, "The weld reinforcement shall consist of a minimum of two weld layers having as-deposited delta ferrite content of at least 7.5 FN. The first layer of weld metal with delta ferrite content of least 7.5 FN shall constitute the first layer of the weld reinforcement design thickness. Alternatively, the first layers of at least 5 FN may be acceptable based on evaluation." Discuss whether the requirements of ASME Code Case N-504-4, Section (e), will be satisfied.

6. On page 16 of Enclosure 1, Attachment 1, Section A1.3, Subsection (b)(1) specifies the axial length of the weld overlay to be 0.75 $\sqrt{Rt}$. Clarify if this distance is required to be applied to both sides of the weld overlay (i.e., the nozzle side and the safe end side).

7. On page 18 of Enclosure 1, Attachment 1, Footnote 1 of Figure A1-1 states that "Dimension b is equivalent to the nominal thickness of the nozzle or pipe being overlaid, as appropriate." Dimension b is the UT distance away from the toe of the original weld. The above requirement is inadequate and inconsistent with Footnote 2 of Figure A1-2 which requires that the examination extent shall be at least ½ inch beyond the as found flaw. The staff suggests the following wording:

   > *"...Dimension b is equivalent to the nominal thickness of the nozzle or pipe being overlaid, as appropriate; however it shall not be less than ½ inch from the toe of the original weld..."*

   Revise Footnote 1 of Figure A1-1 or justify why the proposed Footnote 1 of Figure A1-1 is adequate.

8. On Page 9 of Enclosure 1, "Analyses and Verifications," Item No. 1 states that inside diameter (ID) weld repairs shall be assumed in the stress analyses to effectively bound any actual weld repairs that may have occurred in the nozzles. Discuss the repaired flaw size that was assumed in the stress analyses.

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