UNITED STATES
NUCLEAR REGULATORY COMMISSION
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October 13, 2015

Mr. C. R. Pierce
Regulatory Affairs Director
Southern Nuclear Operating Company, Inc.
P. O. Box 1295/Bin - 038
Birmingham, AL 35201-1295

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2 – REQUEST FOR ADDITIONAL INFORMATION (TAC NOS. MF6063 AND MF6064)

Dear Mr. Pierce:

The U.S. Nuclear Regulatory Commission staff reviewed the Southern Nuclear Operating Company, Inc., license amendment request, dated April 2, 2015 (Agencywide Documents Access and Management System Accession No. ML15092A856), and has determined that additional information is necessary as stated in the Enclosure. Please provide responses that address these requests within thirty (30) days of the date of this letter.

Sincerely,

Bob Martin

Bob Martin, Senior Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos.: 50-321, 50-366

cc: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

DOCKET NOS. 50-321 AND 50-366

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the Southern Nuclear Operating Company, Inc. (SNC), license amendment request (LAR), dated April 2, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15092A856), and has determined that additional information is necessary. Please provide responses that address the following requests for additional information (RAIs):

RAI 1

Provide the following references from Enclosures 5 and 6 of the April 2, 2015, submittal to afford the NRC staff supporting information regarding the data and methodology necessary for determining best estimate chemistries, material chemistry factors, and neutron fluence:

i. Enclosure 5, Reference 7: Structural Integrity-Associates Calculation No. 1001527.301, Revision 1, "Hatch Unit 1 RPV Material Summary and ART Calculation," July 2014.
ii. Enclosure 5, Reference 12: Hatch 1 specific portions of EPRI Report No. 1020231, "BWRVIP-135, Revision 2: BWR Vessel and Internals Project, Integrated Surveillance Program (ISP) Data Source Book and Plant Evaluations," Palo Alto, CA, 2009, and any related follow-on documents containing data specific to Hatch 1.
iii. Enclosure 6, Reference 7: Structural Integrity-Associates Calculation No. 1001527.302, Revision 1, "RPV Material Summary and ART Calculation," July 2014.
iv. Enclosure 6, Reference 12: Hatch 2 specific portions of EPRI Report No. 1020231, "BWRVIP-135, Revision 2: BWR Vessel and Internals Project, Integrated Surveillance Program (ISP) Data Source Book and Plant Evaluations," Palo Alto, CA, 2009, and any related follow-on documents containing data specific to Hatch 2.
v. Enclosure 5, Reference 5: Transware Enterprises Inc. Report No. SNC-HA1-002-R-001 Revision 0, "Edwin I. Hatch Unit 1 Fluence Evaluation at End of Cycle 25 and 49.3 EFPY."
vi. Enclosure 6, Reference 5: Transware Enterprises Inc. Report No. SNC-HA2-001-R-001 Revision 0, "Edwin I. Hatch Unit 2 Fluence Evaluation at End of Cycle 22 and 50.1 EFPY."

RAI 2

Page 11 of Enclosure 5 of SNC's April 2, 2015 submittal states the following:

> *The following summarizes the development of the thermal and pressure stress intensity factors for the* [core delta-pressure] *CDP nozzle [14]:*

- *The K_{IT} term is calculated using the ASME XI, Non-mandatory Appendix G, Paragraph G-2214.3 [17] methodology for a heat-up/cool-down rate of 100 °F/hr as described in Reference [14].*

Paragraph G-2214.3 of Section XI, Appendix G, contains methods for calculating the thermal stress intensity factor, K_{IT}, for beltline shell regions of the reactor pressure vessel (RPV) due to radial thermal gradients. Normally, discontinuities (such as the CDP nozzle) would be evaluated based on Paragraph G-2220 of Section XI, Appendix G, "Nozzles, Flanges, and Shell Regions near Geometric Discontinuities." However, the NRC staff notes that on page 2-19 of NRC-approved Topical Report (TR) BWROG-TP-11-022-A, Revision 1, "Pressure-Temperature Limits Report Methodology for Boiling Water Reactors," June 2013 (ADAMS Accession No. ML13277A557), the following is stated:

> *A conservative alternative to using Equation 2.5.3-3a or 2.5.3-3b is to use the ASME Code, Section XI, Nonmandatory Appendix G [5] method for calculating a thermal stress intensity factor for an edge cracked plate given in Equation 2.5.1-8, above, where the section thickness is taken as the length of the diagonal path through the nozzle blend radius shown in Figure 2-7.*

Equation 2.5.1-8 of TR BWROG-TP-11-022-A, Revision 1 is as follows:

$$K_{IT} = 0.953x10^{3} (CR) (t^{2.5})$$

Where CR is the cooldown rate in °F/hr and t is the RPV wall thickness in inches. This equation is identical to the equation in Paragraph G-2214.3 of Section XI, Appendix G for the maximum K_{IT} produced by a radial thermal gradient for a postulated axial or circumferential inside surface defect in a shell region. However, there are also several other equations contained in Paragraph G-2214.3 of Section XI, Appendix G for computing K_{IT}.

Confirm that Equation 2.5.1-8 of TR BWROG-TP-11-022-A, Revision 1 was used to calculate K_{IT} for the CDP nozzle.

RAI 3

Page 8 of Enclosure 5 of SNC's April 2, 2015, submittal briefly addresses the water level instrument (WLI) nozzle for Hatch 1. Pages 9 through 11 of Enclosure 5 address the feedwater nozzle for Hatch 1. Page 11 of Enclosure 5 addresses the CDP nozzle for Hatch 1. A summary of the thermal stress intensity factors, K_{IT}, for all three nozzles is provided in Table 9 of Enclosure 5.

Similar discussions for the WLI and feedwater nozzles for Hatch 2 are contained on pages 8 through 11 of Enclosure 6; however, discussion of the CDP nozzle is not included in Enclosure 6 for Hatch 2, nor is the CDP nozzle included in the summary of nozzle stress intensity factors for Hatch 2 in Table 9 of Enclosure 6.

It is also not clear from the discussion or the Table 9 K_{IT} values contained in either Enclosures 5 or 6 which nozzles are controlling with respect to any of the pressure-temperature (P-T) limit curves shown in Figures 1 through 6 of both enclosures.

Provide the following:

a. Explain why the CDP nozzle was addressed for Hatch 1 and not for Hatch 2.
b. Explain whether any of the evaluated nozzles control any portions of the P-T limit curves shown in Figures 1 through 6 of both Enclosures 5 and 6 and, if so, identify which nozzles are limiting and describe the portions of the P-T curves that they control.

RAI 4

Pages 2-5 and 2-6 of Licensing Topical Report BWROG-TP-11-022-A, Rev. 1 state, in part, the following:

> *The following information should be included in the PTLR with respect to the ART calculations:*
>
> *a. The IRT_{NDT} for all RPV materials and the method of determining the IRT_{NDT} (i.e., ASME Code, Generic Communication, Branch Technical Position MTEB 5-2 in Standard Review Plan 5.3.2 in NUREG-0800, or other NRC-approved methodologies).*
>
> ...
>
> *c. Identify whether "Procedure 1" or "Procedure 2" from Appendix A was utilized to evaluate the surveillance data. If surveillance data was utilized, provide the surveillance data and the analysis of the surveillance data that was used to determine the ART values. If surveillance data was not utilized, state why it was not utilized.*

Provide the following information in the PTLRs:

a. The method used to compute the initial RT_{NDT} values for both Hatch units.
b. Identify whether "Procedure 1" or "Procedure 2" was utilized to evaluate the surveillance data for both Hatch units.

RAI 5

The NRC staff is unable to reproduce the P-T limits in the Hatch, Unit 1 and 2, PTLRs within reasonable accuracy. However, many of the inputs needed to determine the P-T limits are not included in the PTLRs.

Provide the necessary P-T limits inputs for both Hatch units similar to the recommendations made in the NRC presentation, "Recommendations for Inputs Related to Pressure-Temperature (P-T) Limits Submittals" (ADAMS Accession No. ML15155B464) presented at the Industry/NRC Materials Programs Technical Information Exchange Meeting that was held at NRC Headquarters on June 2 - 4, 2015. Alternatively, if the inputs are clearly defined in References 8 and 14 of each PTLR, provide copies of those three documents.

RAI 6

The Non-Beltline curve in Figure 3, "HNP-1 P-T Curve C (Normal Operation - Core Critical) for 38 EFPY," of the Hatch, Unit 1, PTLR indicates a temperature of ~201°F for pressures greater than 312.6 psig. On the other hand, the tabular values for this curve in Table 3, "HNP-1 P-T Curve C (Normal Operation - Core Critical) for 38 EFPY," of the Hatch, Unit 1, PTLR indicate a temperature of 217°F for pressures greater than 312.6 psig. The NRC staff could not verify either of these temperature values as appropriate for Curve C for Hatch, Unit 1, using the minimum temperature requirements of Table 1 of Title 10 of the *Code of Federal Regulations*, Part 50 (10 CFR 50), Appendix G, "Fracture Toughness Requirements."

Furthermore, since the Non-Beltline region is unaffected by fluence, the NRC staff expected Curve C for the Non-Beltline region for 38 EFPY to be identical to Curve C for the Non-Beltline region for 49.3 EFPY. The values reflected in Figure 3 and Table 3 of the Hatch, Unit 1, PTLR for 38 EFPY, and Figure 6 and Table 6 of the Hatch, Unit 1, PTLR for 49.3 EFPY do not reflect this expectation.

The NRC staff was able to confirm the Curve C Non-Beltline region temperature values indicated in the Hatch, Unit 2, PTLR for pressures greater than 312.6 psig using the minimum temperature requirements of Table 1 of 10 CFR 50, Appendix G.

Provide the following:

a. Identify the correct temperature values for Curve C for the Non-Beltline region for Hatch, Unit 1, for pressures greater than 312.6 psig for 38 and 49.3 EFPY.
b. Provide the basis for the temperature values for Curve C for the Non-Beltline region for Hatch, Unit 1, for pressures greater than 312.6 psig for 38 and 49.3 EFPY.
c. Explain any discrepancies with the temperature values for Curve C for the Non-Beltline region for Hatch, Unit 1, for pressures greater than 312.6 psig and the temperature values in Figures 3 and 6 and Tables 3 and 6 of the Hatch, Unit 1, PTLR for 38 and 49.3 EFPY.

RAI 7

In the LAR, the PTLRs contain new P-T Curves for Hydrostatic Pressure and Leak Test (Curve A), Normal Operation – Core Not Critical (Curve B), and Normal Operation – Core Critical (Curve C) for Unit 1 at 38 EFPY and 49.3 EFPY, and for Unit 2 at 37 EFPY and 50.1 EFPY. The PTLR P-T curves are different than the deleted P-T curves in the current Technical Specifications. Explain the factors that lead to the differences observed between the PTLR P-T curves and the TS P-T curves.

October 13, 2015

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/RA/

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