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

January 9, 2020

Ms. Cheryl A. Gayheart
Regulatory Affairs Director
Southern Nuclear Operating Company, Inc.
P. O. Box 1295, Bin 038
Birmingham, AL 35201-1295

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT, UNIT NOS. 1 AND 2 – PROPOSED ALTERNATIVE HNP-ISI-ALT-05-10 FOR THE IMPLEMENTATION OF BWRVIP-38 AND -76 IN LIEU OF B-N-2 EXAMINATIONS FOR CORE SUPPORT STRUCTURES (EPID L-2019-LLR-0102)

Dear Ms. Gayheart:

By letter dated November 4, 2019, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19308A110), Southern Nuclear Operating Company (SNC, the licensee) requested relief from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (B&PV Code) for the Edwin I. Hatch Nuclear Plant (HNP), Unit Nos. 1 and 2.

By letter dated January 22, 2019 (ADAMS Accession No. ML19011A010), the U.S. Nuclear Regulatory Commission (NRC) authorized the use of proposed Alternative HNP-ISI-ALT-05-04 for HNP, Units 1 and 2. This authorization allowed use of use Boiling Water Reactor Vessel and Internals Project (BWRVIP) guidelines as an alternative to certain requirements of Section XI of the ASME B&PV Code for the inservice inspection (ISI) of reactor pressure vessel interior surfaces, attachments, and core support structures.

The licensee (SNC) identified that certain examinations pursuant to the HNP, Units 1 and 2, shroud and shroud repair were not clearly identified, and that the relationship between the ASME Code, BWRVIP, and previous HNP submittals regarding the shroud repair modification were not delineated sufficiently. Alternative HNP-ISI-ALT-05-10 will provide clarity of HNP, Unit 1 and Unit 2, specific design characteristics of the shroud support structure, and its relationship with the applicable BWRVIP guidance and previous HNP correspondence.

The licensee proposed to use BWRVIP guidelines as an alternative to certain requirements of Section XI of the ASME B&PV Code for ISI of shroud and shroud repair. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.55a(z)(1), the licensee requested to use the proposed alternative on the basis that the alternative provides an acceptable level of quality and safety.

The NRC staff has completed its review of request for alternative HNP-ISI-ALT-05-10. As described in the enclosed safety evaluation, the NRC staff has determined that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1).

Accordingly, the NRC staff concludes that the licensee's proposed alternative provides an acceptable level of quality and safety. Therefore, the NRC staff authorizes the use of alternative HNP-ISI-ALT-05-10 at HNP, Unit Nos. 1 and 2. The subject alternative is authorized for the duration of the fifth 10-year ISI interval for both units.

All other requirements of the ASME Code, Section XI, for which an alternative has not been specifically requested remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

If you have any questions, please contact the Senior Project Manager, John G. Lamb, at 301-415-3100 or by e-mail at John.Lamb@nrc.gov.

Sincerely,

/RA/

Michael T. Markley, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-321 and 50-366

Enclosure:
Safety Evaluation

cc: Listserv

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR ALTERNATIVE HNP-ISI-ALT-05-10

FOR FIFTH 10-YEAR INTERVAL INSERVICE INSPECTION

EDWIN I. HATCH NUCLEAR PLANT, UNIT NOS. 1 AND 2

SOUTHERN NUCLEAR OPERATING COMPANY

DOCKET NOS. 50-321 AND 50-366

1.0 INTRODUCTION

By letter dated November 4, 2019, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19308A110), Southern Nuclear Operating Company (SNC, the licensee) requested relief from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (B&PV Code) for the Edwin I. Hatch Nuclear Plant (HNP), Unit Nos. 1 and 2. Specifically, SNC submitted Alternative Request HNP-ISI-ALT-05-10 to the U.S. Nuclear Regulatory Commission (NRC) for its fifth 10-year inservice inspection (ISI) interval regarding inspection of its interior attachments and the core support structure at HNP, Units 1 and 2.

By letter dated January 22, 2019 (ADAMS Accession No. ML19011A010), the U.S. Nuclear Regulatory Commission (NRC) authorized the use of proposed Alternative HNP-ISI-ALT-05-04 for HNP, Units 1 and 2. This authorization allowed use of use Boiling Water Reactor Vessel and Internals Project (BWRVIP) guidelines as an alternative to certain requirements of Section XI of the ASME B&PV Code for the ISI of reactor pressure vessel (RPV) interior surfaces, attachments, and core support structures.

The licensee (SNC) identified that certain examinations pursuant to the HNP, Units 1 and 2, shroud and shroud repair were not clearly identified, and that the relationship between the ASME Code, BWRVIP, and previous HNP submittals regarding the shroud repair modification were not delineated sufficiently. Alternative HNP-ISI-ALT-05-10 will provide clarity of HNP, Unit 1 and Unit 2, specific design characteristics of the shroud support structure, and its relationship with the applicable BWRVIP guidance and previous HNP correspondence.

The licensee proposed to use BWRVIP guidelines as an alternative to certain requirements of Section XI of the ASME B&PV Code for ISI of shroud and shroud repair. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.55a(z)(1), the licensee requested to use the proposed alternative on the basis that the alternative provides an acceptable level of quality and safety.

2.0 REGULATORY REQUIREMENTS

The ISI of the ASME Code Class 1, 2, and 3 components is performed in accordance with Section XI of the ASME Code and applicable addenda to detect anomaly and degradation indications so that structural integrity of these components can be maintained. This is required by 10 CFR 50.55a(g), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i).

The regulation 10 CFR 50.55a(z) states that alternatives to the requirements of paragraphs (b) through (h) of 10 CFR 50.55a or portions thereof may be used, when authorized by the Director, Office of Nuclear Reactor Regulation. A proposed alternative must be submitted and authorized prior to implementation. The applicant or licensee must demonstrate that: (1) the proposed alternative would provide an acceptable level of quality and safety; or (2) compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), components (including supports) that are classified as ASME Code Class 1, Class 2, and Class 3 must meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI of editions and addenda of the ASME Code, that become effective subsequent to editions specified in paragraphs (g)(2) and (3) of this section, to the extent practical within the limitations of design, geometry, and materials of construction of the components.

The regulations require that inservice examination of components and system pressure tests conducted during the successive 120-month inspection intervals (following the initial 120-month inspection interval) must comply with the requirements in the latest edition and addenda of the ASME Code, which was incorporated by reference in 10 CFR 50.55a(a) 12 months before the start of the 120-month interval (or the optional ASME Code Cases listed in NRC Regulatory Guide (RG) 1.147, Revision 18), subject to the conditions listed in 50.55a(b).

The applicable ASME Code of record for the fifth 10-year ISI interval for HNP, Units 1 and 2, is ASME Code, Section XI, 2007 Edition through the 2008 Addenda.

3.0 LICENSEE'S EVALUATION

Components for Which an Alternative is Requested

ASME Code, Section XI, Class 1, Examination Category B-N-2, Code Item Numbers B13.30 (Interior Attachments beyond Beltline Region), and B13.40 (Core Support Structure).

Examination Requirements for Which an Alternative is Requested

The licensee stated that per the NRC safety evaluation (SE) for Alternative Request HNP-ISI-ALT-05-04, the following BWRVIP requirements apply to the items listed below for HNP, Units 1 and 2:

ASME Item No. Table IWB-2500-1	Component	Applicable BWRVIP Document	BWRVIP Exam Scope	BWRVIP Exam Type	BWRVIP Frequency
B13.30	Shroud Support (Weld H9) including gussets	BWRVIP-38, 3.1.3.2, Figures 3-2 and 3-5	Weld H9 including gussets	EVT-1 or UT	Maximum of 6 years for EVT-1, Maximum of 10 years for UT Note: HNP, Unit 2 configuration does not have gussets.
B13.40	Integrally Welded Core Support Structure	BWRVIP-38, 3.1.3.2, Figures 3-2 and 3-5	Shroud support welds H8 and H9 including gussets	EVT-1 or UT	Based on as-found conditions, to a maximum 6 years for EVT-1, 10 years for UT where accessible

In the above table, UT stands for ultrasonic techniques and EVT-1 stands for enhanced visual inspection as defined in BWRVIP-38.

Licensee's Basis for Requesting an Alternative and Justification for Granting Relief

In the letter dated November 4, 2019, the licensee stated that upon review of details in the previously approved Alternative Request HNP-ISI-ALT-05-04, SNC identified that certain examinations for shroud and shroud repair were not identified clearly, and that the relationship between the ASME Code, BWRVIP, and previous submittals regarding the shroud repair modification were not described sufficiently. Therefore, SNC submitted this alternative to clarify the plant-specific design characteristics of the shroud support structure and its relationship with BWRVIP guidance and previous correspondence. The modified examination requirements are shown in Table 1 of the alternative request.

The licensee stated that use of the proposed alternative will maintain an adequate level of quality and safety of the affected welds and components. Also, as part of its justification for the relief, the licensee stated that the BWRVIP Inspection and Evaluation (I&E) Guidelines recommend specific inspection by boiling-water reactor (BWR) owners to identify material degradation with BWR components. The BWRVIP I&E Guidelines focus on specific and susceptible components, specify appropriate inspection methods capable of identifying known or potential degradation mechanisms, and require re-examination at appropriate intervals. The licensee further stated that scope of the BWRVIP I&E Guidelines exceeds that of ASME Section XI and, in most instances, include components that are not part of the ASME Section XI jurisdiction. The licensee further stated that the proposed alternative will maintain adequate level of quality and safety and avoid duplicate or unnecessary inspections, while conserving radiological dose.

B13.30 - Interior Attachments Beyond the Beltline Region

In lieu of the requirements specified in the previously approved alternative request presented in the above Table, SNC proposed to examine this component in accordance with BWRVIP I&E guideline requirements in BWRVIP-38. The licensee stated that BWRVIP-38 governs the

industry requirements for Weld H9, and this report states in Section 2.1.2 that the HNP, Unit 2, H9 weld is not addressed since it is a low alloy steel weld that is not susceptible to intergranular stress corrosion cracking (IGSCC).

B13.40 – Core Support Structure

In lieu of the requirements specified in the previously approved alternative request presented in the above Table, SNC proposed to examine this component in accordance with BWRVIP I&E guideline requirements in BWRVIP-38 and BWRVIP-76-R1-A. The licensee stated that the previously approved ISI-ALT-05-04 did not include the H8 weld as structurally replaced by the shroud tie rod repair (tie rod repair and its SE for Unit 1 (ADAMS Accession Nos. ML072280298 and ML080570109); tie rod repair and its SE for Unit 2 (ADAMS Accession Nos. ML082490744 and ML090330216). These references establish that the shroud repair also includes the H8 weld for HNP, Units 1 and 2.

For HNP Unit 2, the licensee stated that Unit 2 has a uniquely thick shroud support plate fabricated from low alloy steel, which structurally takes the place of the thinner support plate/gussets or thinner support plate/support leg configurations found in other BWRs. Therefore, no gusset plate examinations are specified, and the Unit 2 shroud support is exempted from the inspection criteria of BWRVIP-38.

Duration of Proposed Alternative

The proposed alternative will be used for the fifth 10-year ISI interval for HNP, Units 1 and 2 that covers the period January 12, 2016, to December 31, 2025.

4.0 NRC STAFF EVALUATION

Based on the SE for Alternative Request HNP-ISI-ALT-05-04, the NRC staff already established that the existing alternative ensures that the integrity of the reactor vessel surfaces, attachments, and core support structures is maintained with an acceptable level of quality and safety and can be implemented in lieu of the ASME Code, Section XI inspection requirements for these components. Since the nature of this proposed alternative is to modify the existing alternative for only Class 1, Examination Category B-N-2, Item Numbers B13.30 (Interior Attachments Beyond Beltline Region) and B13.40 (Core Support Structure), the NRC staff focused on the modified alternative in Table 1 versus the existing alternative in the table under Section 3 (the Section 3 table) of this alternative request. The following is the NRC staff's evaluation of this information.

Examination of Interior Attachments beyond Beltline (Item B13.30)

The ASME Code requires a VT-3 examination of accessible reactor vessel interior attachment welds beyond the vessel beltline region during each inspection interval.

For Unit 1, the NRC staff compared the proposed alternative for B13.30 in Table 1 versus the existing alternative in the Section 3 table. This comparison revealed that although under "BWRVIP Exam Scope," the existing alternative lists "Weld H9 including gussets" while the proposed alternative lists only "Weld H-9" for B13.30, the gussets are not excluded from inspection, but listed, instead, under B13.40 in Table 1 for better classification. Therefore, this change is acceptable because it does not affect the inspection of any component. Further,

"BWRVIP Exam Type" and "BWRVIP Frequency" in Table 1 for the proposed alternative remain the same as the Section 3 table for the existing alternative.

For Unit 2, the proposed alternative references guidance from Section 2.1.2 of BWRVIP-38 and provides no inspection for the H-9 weld. The NRC staff verified this information and confirmed that the H-9 weld is a low alloy steel weld that is not susceptible to IGSCC. The NRC staff accepts the Table 1 listing of "None" under BWRVIP Exam Type and the statement of "Per BWRVIP-38, [H-9] is not susceptible to IGSCC, continuation of B13.40 visual (VT-3) each 10-year interval is sufficient for degradation monitoring" under BWRVIP Frequency for Weld H-9.

The NRC staff finds that the licensee's proposed alternative provides an acceptable level of quality and safety for the Item B13.30 components, because the proposed alternative provides for equivalent or superior flaw detection and characterization, with an examination frequency that is equivalent or more frequent than the ASME Code requirements.

Examination of Core Support Structure (Item B13.40)

The ASME Code requires a VT-3 examination of accessible surfaces of the core support structure during each inspection interval.

For Unit 1, the NRC staff compared the proposed alternative for B13.40 in Table 1 versus the existing alternative in the Section 3 table and identified two major modifications in Table 1: (1) the BWRVIP examination scope is expanded to include shroud hardware (tie rod repair components) and anchorages, along with the inspection guidance in BWRVIP-76-R1-A, the BWRVIP examination type, and the BWRVIP examination frequency for these newly identified components, and (2) no inspection is specified for Weld H-8.

Modification 1 is acceptable, because the BWRVIP examination scope is expanded to include inspection of the areas associated with the shroud tie rod, which was not recognized in the existing alternative, and the guidance is in accordance with BWRVIP-76-R1-A approved by the NRC staff.

Modification 2 is acceptable, because the shroud tie rod structurally replaced Weld H-8, making structural integrity and inspection of Weld H-8 irrelevant. For the shroud support Weld H-8 and H-9 and gussets, which appear in the existing alternative, Table 1 provides further clarification in the examination scope, i.e., EVT-1 or UT is for Weld H-9 and gussets only and Weld H-8 is dropped from Table 1 for EVT-1 or UT. The NRC staff finds this acceptable, because the shroud tie rod structurally replaced Weld H-8 and no further inspection is needed for this weld.

For Unit 2, since the similar tie rod repair was also implemented to this unit, the two modifications regarding inspection of the B13.40 components mentioned above for Unit 1 should also apply to Unit 2. However, the submittal indicated that Unit 2 was uniquely constructed with an 8.8 inch thick low-alloy-steel shroud support plate, and this thick plate structurally takes place of the thinner gussets for other BWRs.

Modification 1 for Unit 2 is different from Unit 1, i.e., under BWRVIP Exam Scope, "shroud hardware and anchorages" for Unit 1 is revised to "shroud hardware" for Unit 2. In addition, under BWRVIP Exam Type, "EVT-1 of four gussets serving as anchorages" for Unit 1 is revised to "None" for Unit 2. The NRC staff finds these revisions acceptable because the thick shroud support plate structurally replaced the thinner gussets, making structural integrity and inspection of gussets irrelevant.

Modification 2, “EVT-1 or UT of H9 and gussets” under BWRVIP Exam Type for Unit 1 is revised to “VT-3 of accessible surfaces” for Unit 2. The NRC staff noted that the “accessible surfaces” refer to the thick shroud support plate surfaces. These additional surfaces of inspection are per BWRVIP-38 and is acceptable to the NRC staff. The NRC staff further confirmed from BWRVIP-38 Figure 2-2 that the shroud support plate is cladded with Type 304 stainless steel on the bottom and the alloy 82/182 on the top, which covered the H-9 weld and makes the inspection impossible. Therefore, the NRC staff finds dropping the EVT-1 or UT of the H-9 weld from the Unit 2 inspection requirements acceptable.

The NRC staff finds that the licensee’s proposed alternative provides an acceptable level of quality and safety for the Item B13.40 components, because the proposed alternative provides for equivalent or superior flaw detection and characterization with an examination frequency that is equivalent or more frequent than the ASME Code requirements.

5.0 CONCLUSION

Based on the above, the licensee’s basis for the proposed alternative and the associated justification under Section 3.0 for the ASME Code, Section XI, Class 1, Examination Category B-N-2, Code Item Numbers B13.30 and B13.40 reactor vessel internal (RVI) components is acceptable. The NRC staff noted that the modifications in the proposed alternative reflect inspection scope change due to recognition of the tie rod repair and consideration of the Unit 2-specific core support structure. The NRC staff also noted that the associated inspection revision is in accordance with the guidance in BWRVIP-38, BWRVIP-76-R1-A, and the SEs approving the tie rod repairs. Therefore, providing an acceptable level of quality and safety that was established in the SE for Alternative Request HNP-ISI-ALT-05-04 continues to be valid in this proposed alternative.

In summary, the NRC staff determined that the specified BWRVIP guideline requirements meet the subject Code requirements for examination method and frequency of the reactor vessel interior and provide an acceptable level of quality and safety.

Based on the above, the NRC staff concludes that the alternative proposed by the licensee will ensure that the integrity of the reactor vessel interior attachments beyond beltline region and core support structures is maintained with an acceptable level of quality and safety. The NRC staff reviewed the status of BWRVIP-38 and BWRVIP-76-R1-A and concludes that the application of them, with implementation of the NRC conditions associated with the latest SE for each BWRVIP report, will provide effective aging management. Therefore, pursuant to 10 CFR 50.55a(z)(1), the licensee’s proposed alternative for HNP, Units 1 and 2, is authorized for the fifth 10-year ISI interval that covers the period January 12, 2016, to December 31, 2025.

All other requirements of the ASME Code, Section XI for which an alternative has not been specifically requested remain applicable. Any ASME Code, Section XI, reactor vessel internal components that are not included in this alternative request will continue to be inspected in accordance with the ASME Code, Section XI requirements.

The NRC staff notes that if the licensee intends to take exceptions to, or deviations from, the NRC staff-approved BWRVIP inspection guidelines, this will require the licensee to revise and re-submit this alternative request. The licensee shall obtain NRC staff approval for such exceptions prior to implementing the revised inspection guidelines for HNP, Units 1 and 2, regarding RPV interior attachments beyond beltline region and core support structures.

Principal Contributor: S. Sheng, NRR

Date: January 9, 2020

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT, UNIT NOS. 1 AND 2 – PROPOSED ALTERNATIVE HNP-ISI-ALT-05-10 FOR THE IMPLEMENTATION OF BWRVIP-38 AND -76 IN LIEU OF B-N-2 EXAMINATIONS FOR CORE SUPPORT STRUCTURES (EPID L-2019-LLR-0102) DATED JANUARY 9, 2020

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ADAMS Accession No. ML19361A056 ***via email**

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