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

November 23, 2016

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

SUBJECT: VOGTLE ELECTRIC GENERATING PLANT, UNIT 1 – ALTERNATIVE FOR REACTOR PRESSURE VESSEL ATTACHMENTS B-N-2 AND B-N-3 WELD EXAMINATIONS (CAC NO. MF8225)

Dear Mr. Pierce:

By application dated August 4, 2016, as supplemented by letter dated October 24, 2016 (Agencywide Documents Access and Management System Accession Nos. ML16217A428 and ML16298A048, respectively), Southern Nuclear Operating Company, Inc. (SNC) submitted Request for Alternative VEGP-ISI-ALT-12 for the Vogtle Electric Generating Plant (VEGP), Unit 1. Request for Alternative VEGP-ISI-ALT-12 proposes to defer the Unit 1 Category B-N-2 and B-N-3 examination from the spring 2017 Refueling Outage (RF) (1R20) until the following fall 2018 RF (1R21). SNC indicates that this alternative would extend the third inspection interval by approximately 5 months for this examination.

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of Alternative VEGP-ISI-ALT-12 for VEGP, Unit 1. Given the approval of the third inservice inspection (ISI) interval extension for the ultrasonic testing of the reactor pressure vessel (RPV) Category B-A and B-D welds, the core support structure of Unit 1 will not be accessible for the required VT-3 examinations for the Category B-N-2 and B-N-3 components during RF 1R20. Based on this inaccessibility, the risk associated with performing multitask activities in RF 1R20, the resulting challenge to maintaining outage dose and contamination to as low as reasonably achievable (ALARA) and the prior plant-specific inspection results, the NRC staff concludes that deferring the ISI VT-3 examination of Category B-N-2 and B-N-3 components from RF 1R20 to RF 1R21, five months beyond the maximum ISI interval length allowed by the American Society of Mechanical Engineers (ASME) Code, is acceptable, because it minimizes the risk associated with removal of the core barrel and fuel and follows the ALARA principles. Accordingly, the NRC staff concludes that requiring the licensee to follow the ASME Code requirements would represent a hardship without a compensating increase in the level of quality and safety. Therefore, Alternative VEGP-ISI-ALT-12 is authorized for Category B-N-2 and B-N-3 components pursuant to Title 10 of the *Code of Federal Regulations* 50.55a(z)(2) until the end of RF 1R21, currently scheduled for September 2018.

All other ASME Code, Section XI requirements for which an alternative was not specifically requested and approved in this request for the alternative remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Sincerely,

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

Docket No. 50-424

Enclosure:
Safety Evaluation

cc w/enclosure: Distribution via Listserv

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

INSERVICE INSPECTION ALTERNATIVE VEGP-ISI-ALT-12

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

VOGTLE ELECTRIC GENERATING PLANT, UNIT 1

DOCKET NO. 50-424

1.0 INTRODUCTION

By application dated August 4, 2016, as supplemented by letter dated October 24, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML16217A428 and ML16298A048, respectively), Southern Nuclear Operating Company, Inc. (SNC, the licensee) proposed an alternative to the inservice inspection (ISI) interval requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, ISI Program, for the Vogtle Electric Generating Plant (VEGP), Unit 1.

The August 4, 2016, letter transmits Request for Alternative VEGP-ISI-ALT-12. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(2), this alternative requests an extension of the interval by approximately 5 months beyond the ASME Code allowed end-of-interval extension for the performance of ASME Code required Category B-N-2 and B-N-3 examinations of the reactor pressure vessel (RPV) interior attachments and core support structure.

The current third 10-year ISI interval ends on May 30, 2017, for the VEGP, Unit 1, RPV.

2.0 REGULATORY EVALUATION

2.1 Regulations and Guidance

ISI of ASME Code Class 1, 2, and 3 components is performed in accordance with Section XI of the ASME Code, and applicable addenda, to detect anomalies 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 U.S. Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i). The regulation in 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.

For the third 10-year ISI intervals at VEGP, Unit 1, the Code of record for the inspection of ASME Code Class 1, 2, and 3 components is the 2001 Edition through the 2003 Addenda of the ASME Code, Section XI.

2.2 Background

The ISI of Category B-N-2 and B-N-3 components consists of visual and/or ultrasonic examinations intended to discover whether flaws have initiated, whether pre-existing flaws have extended, and whether pre-existing flaws may have been missed in prior examinations. These examinations are required to be performed at regular intervals, as defined in Section XI of the ASME Code.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Evaluation

3.1.1 Description of Proposed Alternative

In Alternative VEGP-ISI-ALT-12, the licensee proposed to extend the current inspection interval for Category B-N-2 and B-N-3 from the end of Refueling Outage (RF) 1R20 (scheduled to start in March 2017) to 1R21 (the next scheduled outage to start in September 2018).

3.1.2 Components for Which Alternative is Requested

The affected components are the subject plant interior attachments and core support structure. The following examination categories and item numbers from IWB-2500 and Table IWB-2500-1 of the ASME Code, Section XI, are addressed in this request:

Exam Category	Item Number	Description
B-N-2	B13.60	Interior Attachments Beyond Beltline Region
B-N-3	B13.70	Removable Core Support Structures

3.1.3 Reason for Proposed Alternative

The Category B-N-2 and B-N-3 inspections are typically performed at the end of an ISI interval in conjunction with the ultrasonic testing (UT) of the RPV welds, which corresponds with a full offload of the core and the core barrel, allowing access to the core support structure. For the third ISI interval at VEGP, Unit 1, this corresponds to RF 1R20. The licensee has previously submitted Alternatives VEGP-ISI-ALT-05 (Unit 1) and VEGP-ISI-ALT-06 (Unit 2) and received approval in a safety evaluation dated March 20, 2014, to extend the third ISI interval from 10 years to 20 years for examination of the reactor vessel Category B-A and B-D welds for VEGP, Units 1 and 2 (ADAMS Accession No. ML14030A570). As a result, except for the BN2 and BN3 inspections, VEGP, Unit 1, has no other requirements or activities that require removing the core barrel during RF 1R20. Given the approval of the third ISI interval extension for the UT of the RPV welds, the core support structure of Unit 1 will not be accessible for the required VT-3 examinations for the Category B-N-2 and B-N-3 components during RF 1R20.

3.1.4 Proposed Alternative and Basis for Use

Pursuant to 10 CFR 50.55a(z)(2), SNC proposed to extend the third ISI interval for the Category B-N-2 interior attachment welds beyond the RPV beltline region and the Category B-N-3 RPV core support structure surfaces by one additional operating cycle to allow examination during RF 1R21, which is scheduled to begin in September of 2018.

To demonstrate that conducting the Category B-N-2 and B-N-3 examinations as scheduled during RF 1R20 would constitute a hardship, the October 24, 2016, response to the NRC staff's request for additional information states, in part:

> [F]lux thimble tube replacement and core barrel removal are currently planned for the spring 2017 refueling outage 1R20. Vogtle Electric Generating Plant (VEGP) will also be performing eddy current examinations of all four steam generators (SGs) during 1R20. In order to perform the SG eddy current examinations, SG nozzle dams must be installed. Nozzle dams are installed at the beginning of the defueled window and will remain in place throughout the duration of SG eddy current testing. Performing outage activities with the SG nozzle dams installed represents an off-normal configuration and results in accrual of incremental risk each day they are installed. SNC strives to maintain outage dose and contamination to as low as reasonably achievable. If the SG nozzle dams were to fail with the reactor core barrel removed, there would be potential for significant personnel exposure and significant contamination. The significant personnel exposure would be from the loss of the core barrel water shielding. The significant contamination would be from the highly contaminated refueling water draining to the lower levels of containment. VEGP strives to minimize the amount of time spent in off-normal configurations. However, attempting to rearrange the outage schedule such that these major outage activities are performed in a "normal" configuration is not practical. Simultaneous performance of flux thimble tube replacement and core barrel removal is not possible due to space limitations in the refueling cavity.

Based on the above, the licensee concludes that splitting these major project activities will provide a safety benefit by allowing the core barrel removal to be performed in a normal configuration during RF 1R21, and performing this activity during RF 1R20 induces a hardship without a commensurate level of safety benefit.

3.1.5 Duration of Proposed Alternative

ASME Code, Section XI, IWA-2430(d)(1), allows inspection intervals to be extended by up to 1 year (12 months). The proposed alternative would perform the required Category B-N-2 and B-N-3 inspections during RF 1R21, which will require a 17-month extension of the third ISI interval, approximately 5 months more than allowed by regulation.

3.1.6 Precedents

The licensee noted that a similar alternative was granted by the NRC on December 10, 2014, for the Wolf Creek Generating Station (ADAMS Accession No. ML14321A864).

3.2 NRC Staff Evaluation

The NRC staff has reviewed the information in the enclosure to the August 4, 2016, submittal. Historically, the RPV welds and the VT-3 inspections of the core support structures have always been performed at the same time. Given approval of the third ISI interval extension for RPV welds on March 20, 2014, there is no reason that the core barrel would be removed during RF 1R20 other than the ISI VT-3 inspection of the B-N-2 and B-N-3 components associated with this alternative. The staff notes that every time the core barrel and fuel are removed from the unit, there is a risk associated with that activity, and there will be additional radiation exposure to workers in the area. Therefore, to minimize risk and reduce radiation exposure of the workers to ALARA, the licensee proposed this alternative.

In addition to the core barrel removal associated with inspection of Category B-N-2 and B-N-3 components, two more tasks have been scheduled for the coming RF 1R20: (1) replacement of the existing in-core flux thimble tubes due to excessive thimble wear and (2) performing eddy current examinations of all four SG tubes. The NRC staff agrees with the licensee's determination that having nozzle dams in place throughout the duration of SG eddy current testing represents an off-normal configuration and would result in accrual of incremental risk each day they are installed. The NRC staff also determined that adding the core barrel and fuel removal for the Category B-N-2 and B-N-3 inspection and the in-core flux thimble tubes replacement efforts to the eddy current examinations of all four SG tubes makes the multitask activities more complex and could have an impact on safety. For instance, if the SG nozzle dams were to fail with the reactor core barrel removed, there would be potential for significant personnel exposure from the loss of the core barrel water shielding and contamination from the refueling water draining to the lower levels of containment. This would create a challenge to maintaining outage dose and contamination to ALARA. Thus, the NRC staff concludes that ISI VT-3 examination of Category B-N-2 and B-N-3 components in RF 1R20 for VEGP, Unit 1, represents a hardship.

In addition to hardship, 10 CFR 50.55a(z)2 also requires the licensee to demonstrate that maintaining the current scheduled Category B-N-2 and B-N-3 inspections in RF 1R20 is without a compensating increase in quality and safety. Alternative VEGP-ISI-ALT-12 addressed this issue by providing prior plant-specific inspection results for the Category B-N-2 and B-N-3 components. The alternative states that visual examinations of the subject components were performed twice at VEGP, Unit 1. No relevant indications were noted during the first ISI interval inspection. Although a foreign object of approximately 0.375 inch length was observed at the bottom surface of the upper core plate clevis insert during the second ISI interval inspection, this was not service-related and was determined to have no effect on the structural integrity of the reactor internals. Further, WCAP-17435-NP, Revision 1, "Results of the Reactor Internals Operating Experience Survey Conducted under PWROG Project Authorization PA-MSC-0568," dated March 15, 2013, for information, indicated no inspection indications for the Category B-N-2 and B-N-3 components for the domestic fleet of RPVs.

Based on prior plant-specific B-N-2 and B-N-3 examination results and the domestic fleet inspection results showing no issues with the B-N-2 and B-N-3 components, the NRC staff determined that maintaining the current scheduled B-N-2 and B-N-3 inspection in RF 1R20 would represent hardship without a compensating increase in quality and safety, because it is very unlikely that an event would happen during the requested 5-month interval extension that would compromise the B-N-2 and B-N-3 component functions.

4.0 CONCLUSION

The NRC staff has completed its review of Alternative VEGP-ISI-ALT-12 for VEGP, Unit 1. Considering the approval of the third ISI interval extension for the UT of the RPV Category B-A and B-D welds, the core support structure of Unit 1 will not be accessible for the required VT-3 examinations for the Category B-N-2 and B-N-3 components during RF 1R20. Based on this inaccessibility, the risk associated with performing multitask activities in RF 1R20, the resulting challenge to maintaining outage dose and contamination to ALARA, and the prior plant-specific inspection result, the NRC staff concludes that deferring the ISI VT-3 examination of Category B-N-2 and B-N-3 components from RF 1R20 to RF 1R21, five months beyond the maximum ISI interval length allowed by the ASME Code, is acceptable, because it minimizes the risk associated with removal of the core barrel and fuel and follows the ALARA principles. Accordingly, the NRC staff concludes that requiring the licensee to follow the ASME Code requirements would represent a hardship without a compensating increase in the level of quality and safety. Therefore, Alternative VEGP-ISI-ALT-12 is authorized for Category B-N-2 and B-N-3 components pursuant to 10 CFR 50.55a(z)(2) until the end of RF 1R21, currently scheduled for September 2018. Further, the NRC staff also notes that fleet ISI examinations in WCAP-17435-NP for Category B-N-2 and B-N-3 components found no inspection indications for the domestic fleet of RPVs

All other ASME Code, Section XI requirements for which alternative was not specifically requested and approved in this request for the alternative remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: S. Sheng

Date: November 23, 2016

All other ASME Code, Section XI requirements for which an alternative was not specifically requested and approved in this request remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Sincerely,

/RA/

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

Docket No. 50-424

Enclosure:
Safety Evaluation

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