



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

November 30, 2018

Ms. Cheryl A. Gayheart  
Regulatory Affairs Director  
Southern Nuclear Operating Co., Inc.  
3535 Colonnade Parkway  
Birmingham, AL 35243

SUBJECT: VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2 – RELIEF  
REQUEST REGARDING EXAMINATION COVERAGE FOR CERTAIN ASME  
CODE CLASS 2 CATEGORY WELDS (VEGP-ISI-RR-05)  
(EPID L-2018-LLR-0082)

Dear Ms. Gayheart:

By letter dated May 24, 2018, as supplemented by letter dated October 17, 2018, Southern Nuclear Operating Company (SNC or the licensee) submitted three requests for relief from certain requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code, Section XI. One of those relief requests, VEGP-ISI-RR-05, pertains to examination coverage of some ASME Code Class 2 component welds achieved during the third 10-year inservice inspection (ISI) program interval at the Vogtle Electric Generating Plant (Vogtle), Units 1 and 2. Out of the three relief requests, VEGP-ISI-RR-03 was issued on October 31, 2018, and VEGP-ISI-RR-06 will be dispositioned under separate correspondence.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(5)(iii), the licensee requested relief from the required examination coverage and to use alternative requirements, if necessary, for inspection of Category C-A, Item No. C1.20 (boron injection tank circumferential head welds) and Category C-B, Item Nos. C2.21 (Class 2 nozzle-to-shell welds) on the basis that the ASME Code requirement is impractical.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the relief request and concludes, as set forth in the enclosed safety evaluation, that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(5)(iii). Therefore, in accordance with 10 CFR 50.55a(g)(6)(i), the NRC staff grants relief request VEGP-ISI-RR-05, for Vogtle, Unit Nos. 1 and 2, for the third 10-year ISI interval, which ended on May 30, 2017.

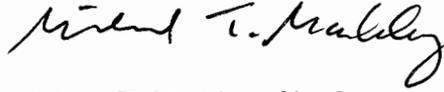
All other ASME BPV Code, Section XI, requirements for which relief was not specifically requested and authorized herein by the staff remain applicable, including the third-party review by the Authorized Nuclear Inservice Inspector.

C. A. Gayheart

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If you have any questions, please contact the Vogtle project manager, Michael Orenak, at 301-415-3229 or by e-mail at [Michael.Orenak@nrc.gov](mailto:Michael.Orenak@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Michael T. Markley". The signature is written in a cursive style with a large, looping initial "M".

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

Docket Nos. 50-424 and 50-425

Enclosure:  
Safety Evaluation

cc: Listserv



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST VEGP-ISI-RR-05

REGARDING EXAMINATION COVERAGE FOR CERTAIN

ASME CODE CLASS 2 CATEGORY WELDS

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

VOGTLE ELECTRIC GENERATING PLANT, UNITs 1 AND 2

DOCKET NUMBERS 50-424 AND 50-425

1.0 INTRODUCTION

By letter to the U.S. Nuclear Regulatory Commission (NRC, the Commission), dated May 24, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18144B012), as supplemented by letter dated October 17, 2018, (ADAMS Accession No. ML18290A709), Southern Nuclear Operating Company (SNC or the licensee) submitted three requests for relief from certain requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code, Section XI. One of those relief requests, VEGP-ISI-RR-05, pertains to examination coverage of some ASME Code Class 2 component welds achieved during the third 10-year inservice inspection (ISI) program interval at the Vogtle Electric Generating Plant (Vogtle), Units 1 and 2. Out of the three relief requests, VEGP-ISI-RR-03 was issued on October 31, 2018 (ADAMS Accession No. ML18296A717), and VEGP-ISI-RR-06 will be dispositioned under separate correspondence.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), 50.55a(g)(5)(iii), the licensee requested relief from the required examination coverage and to use alternative requirements, if necessary, for inspection of Category C-A, Item No. C1.20 (boron injection tank (BIT) circumferential head welds) and Category C-B, Item Nos. C2.21 (Class 2 nozzle-to-shell welds) on the basis that the ASME BPV Code requirement is impractical.

2.0 REGULATORY REQUIREMENTS

Pursuant to 10 CFR 50.55a(g)(4), *Inservice inspection standards requirement for operating plants*, states, in part, that Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, 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 BPV Code that become effective subsequent to editions specified in paragraphs (g)(2) and (3) of 50.55a, and that are incorporated by reference in paragraph (a)(1)(ii) of 50.55a, to the extent practical within the limitations of design, geometry, and materials of construction of the components.

Pursuant to 10 CFR 50.55a(g)(4)(ii), *Applicable ISI Code: Successive 120-month intervals*, states, in part, that Inservice examination of components and system pressure tests conducted during successive 120-month inspection intervals must comply with the requirements of the latest edition and addenda of the ASME BPV Code incorporated by reference in paragraph (a) of this section, 12 months before the start of the 120-month inspection interval (or the optional ASME Code Cases listed in NRC Regulatory Guide (RG) 1.147, Revision 17, when using ASME BPV Code, Section XI, as incorporated by reference in paragraphs (a)(3)(ii) of this section), subject to the conditions listed in paragraph (b) of this section. However, a licensee whose ISI interval commences during the 12 through 18-month period after August 17, 2017, may delay the update of their Appendix VIII program by up to 18 months after August 17, 2017. Alternatively, licensees may, at any time in their 120-month ISI interval, elect to use the Appendix VIII in the latest edition and addenda of the ASME Code incorporated by reference in paragraph (a) of this section, subject to any applicable conditions listed in paragraph (b) of this section. Licensees using this option must also use the same edition and addenda of Appendix I as Appendix VIII, including any applicable conditions listed in paragraph (b) of this section.

Pursuant to 10 CFR 50.55a(g)(5)(iii), *ISI program update: Notification of impractical ISI code requirements*, states, in part, that If the licensee has determined that conformance with the ASME BPV Code requirement is impractical for its facility, the licensee must notify the NRC and submit, as specified in § 50.4, information to support the determinations. Determinations of impracticality in accordance with this section must be based on the demonstrated limitations experienced when attempting to comply with the Code requirements during the ISI interval for which the request is being submitted. Requests for relief made in accordance with this section must be submitted to the NRC no later than 12 months after the expiration of the initial or subsequent 120-month inspection interval for which relief is sought.

Pursuant to 10 CFR 50.55a(g)(6)(i), *Impractical ISI requirements: Granting of relief*, states, in part, that The Commission will evaluate determinations under paragraph (g)(5) of 10 CFR this section, that code requirements are impractical. The Commission may grant such relief and may impose such alternative requirements as it determines are authorized by law, and will not endanger life or property or the common defense and security, and are otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

Based on the above, and subject to the following technical evaluation, the NRC staff finds that regulatory authority exists for the licensee to request and the NRC to grant the relief requested by the licensee.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Components Affected

The affected components are ASME Code Class 2 component welds as identified in Table RR-5 of VEGP-ISI-RR-05 of the licensee's letter dated May 24, 2018.

ASME Section XI Category/Item No.	Identification No.	Description
C-A / C1.20	11204-V6-001-W02	VEGP-1 BIT Head to Vessel Shell
C-B / C2.21	11201-B6-001-W18	VEGP-1 32" SG Main Steam Outlet Nozzle to Head Weld
C-B / C2.21	11201-B6-002-W19	VEGP-1 16" SG Feedwater Nozzle TO Shell Weld
C-B / C2.21	11201-B6-002-W26	VEGP-1 6" SG Aux. Feedwater Nozzle to Shell Weld
C-B / C2.21	11205-E6-001-W04	VEGP-1 RHR HX Tube Side Shell to 14" Inlet Nozzle Weld
C-B / C2.21	11205-E6-001-W05	VEGP-1 RHR HX Tube Side Shell to 14" Outlet Nozzle Weld
C-B / C2.21	11204-V6-001-W04	VEGP-1 BIT Outlet Nozzle to Head Weld
C-B / C2.21	11204-V6-001-W01	VEGP-1 BIT Inlet Nozzle to Vessel Head
C-B / C2.21	21201-B6-001-W18	VEGP-2 32" SG Main Steam Outlet Nozzle to Head Weld
C-B / C2.21	21201-B6-002-W19	VEGP-2 16" SG Feedwater Nozzle to Shell Weld
C-B / C2.21	21201-B6-002-W26	VEGP-2 6" SG Aux. Feedwater Nozzle to Shell Weld
C-B / C2.21	21205-E6-001-W04	VEGP-2 RHR HX Tube Side Shell to 14" Inlet Nozzle Weld
C-B / C2.21	21205-E6-001-W05	VEGP-2 RHR HX Tube Side Shell to 14" Outlet Nozzle Weld

### 3.2 Applicable Code Edition and Addenda

The code of record for the third 10-year ISI interval is the 2001 Edition through 2003 Addenda of the ASME BPV Code.

### 3.3 Duration of Relief Request

The licensee submitted this relief request for the third 10-year ISI interval which started on May 31, 2007, and ended on May 30, 2017.

### 3.4 ASME BPV Code Requirement

The ASME BPV Code requirements applicable to the Class 2 welds originate in Table IWC-2500-1 of Section XI to the ASME BPV Code. For Examination Category C-A (Item No. C1.20), Table IWC-2500-1 requires volumetric examinations of pressure-retaining welds of Class 2 pressure vessels. Applicable examination volumes are shown in Figure IWC-2500-1. For Examination Category C-B (Item No. C2.21), Table IWC-2500-1 requires volumetric and surface examinations of Nozzle-to-Shell welds of Class 2 pressure vessels. The applicable examination volume is shown in Figure IWC-2500-4.

### 3.5 Impracticality of Compliance

For BIT circumferential head welds (C-A/C1.20), the licensee stated that the outside diameter configuration, combined with the interfering support legs, presents physical limitations that

prevent complete coverage during ultrasonic (UT) examinations of weld 11204-V6-001-W02.

For Class 2 nozzle-to-shell welds (C-B/C2.21), the licensee stated that the geometric configuration of the steam generator (SG) main steam, main feedwater, auxiliary feedwater, residual heat removal heat exchanger (RHR HX), and BIT nozzles presents physical limitations that prevent complete UT coverage of weld (1/2)1201-B6-001-W18, weld (1/2)1201-B6-002-W19, weld (1/2)1201-B6-002-W26, weld (1/2)1205-E6-001-W04 & W05, and weld 11204-V6-001-W04 & W01, respectively. As a result, scanning from the nozzle side is not feasible. However, all of the welds mentioned above received a surface examination via either a liquid penetrant or magnetic particle examination with no recordable indications.

The licensee stated that compliance would result in substantial burden in requiring extensive modifications to allow ASME BPV Code required examinations.

### 3.6 Proposed Alternative and Bases for Relief

The licensee stated that the examinations of the affected Class 2 pressure vessel welds are being examined to the fullest extent practical. Class 2 pressure boundary, pressure tests are performed in each examination period. Additionally, surface examinations were performed on Category C-B, Item C2.21 welds contained in this relief request.

The licensee further stated that although there are physical limitations which limit and/or prohibit the amount of examination coverage for those components identified in Table RR-5, reasonable assurance still exists that an acceptable level of quality and safety will be maintained. As a result, the licensee requests that relief be authorized pursuant to 10 CFR 50.55a(g)(6)(i) since it is impractical to perform the examinations as required by the ASME BPV Code.

### 3.7 NRC Staff Evaluation

The NRC staff has evaluated the affected Class 2 pressure vessel welds in this relief request pursuant to 10 CFR 50.55a(g)(6)(i). The NRC staff's evaluation focused on: (1) whether a technical justification exists to support the determination that the ASME BPV Code requirement is impractical; (2) that imposition of the ASME BPV Code required inspections would result in a burden to the licensee; and (3) that the licensee's proposed alternative (accepting the reduced inspection coverage in this case) provides reasonable assurance of structural integrity and leak tightness of the subject welds. The NRC staff finds that if these three criteria are met, the requirements of 10 CFR 50.55a(g)(6)(i), (i.e., granting the requested relief will not "endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility"), will also be met.

#### 3.7.1 Impracticality of Compliance

As described in the licensee's letter dated May 24, 2018 (Figures RR-5-1 to RR-5-6), the affected welds can be divided into two groups: (1) pressure vessel head circumferential welds and (2) nozzle-to-head or shell welds. The Group 1 welds have achieved coverage of 32.5 percent. The NRC staff examined Figure RR-5-1 and confirmed the coverage. This coverage was primarily caused by the curvature of the BIT shell, which does not allow UT of the subject welds from the BIT shell side. BIT vessel supports also contribute to reduction of coverage.

The coverage for Vogtle, Unit 1 BIT head to vessel shell welds achieved during the third ISI interval is 63.7 percent.

The Group 2 welds have achieved coverage from 41.5 percent to 80 percent. Likewise, the NRC staff examined Figures RR-5-2 to RR-5-8 and confirmed the coverages. The predominant limitations that prevented the licensee's UT and surface examinations to achieve essentially 100 percent coverage of the Group 2 welds were the presence of the various nozzles which allow access to the subject welds from only one side. The secondary limitations are due to the configuration of each nozzle. The lowest coverages of 41.5 percent are for RHR HX shell to nozzle welds, not previously inspected for Vogtle, Units 1 and 2.

These coverages were obtained using Appendix VIII requirements in accordance with the 2001 Edition of the ASME Code, Section XI and applicable Electric Power Research Institute Performance Demonstration Initiative Program guidance and, therefore, represent best-effort UT results to the extent practical. Except for the Group 1 component of Vogtle, Unit 1, this best-effort is supported by the increased coverages of 30 percent for various components over those achieved during the second ISI interval.

Based on the above, the NRC staff concludes that sufficient justification exists to support the determination that achieving essentially 100 percent coverage is impractical.

### 3.7.2 Burden of Compliance

The licensee stated that compliance would require extensive modifications to allow examination that would require a high capital investment. Considering the access limitation due to vessel supports and weld configuration for the Group 1 weld and nozzle configuration for the Group 2 welds, the NRC staff finds that replacing or reconfiguring the components of the subject welds to achieve full coverage would constitute a burden on the licensee.

### 3.7.3 Structural Integrity and Leak Tightness

The NRC staff considered whether the licensee's proposed alternative provides reasonable assurance of structural integrity and leak tightness of the subject welds based on: (1) safety significance of unexamined volumes - unachievable coverage (e.g., any stress or the material condition of the welds, indicating that the uncovered areas are more susceptible to cracking or degradation), and (2) operating experience supporting structural integrity and leak tightness.

For the safety significance of the unexamined volumes of welds, the NRC staff reviewed the information in the licensee's letter dated May 24, 2018 (Figures RR-5-1 to RR-5-8) and the licensee's October 17, 2018 supplement:

- The NRC staff verified that, for the BIT inlet and outlet nozzle welds, the licensee's UT examinations have covered, to the extent possible, the regions that are typically susceptible to higher stresses and, therefore, the inspection results represent the entire BIT inlet and outlet nozzle welds. For the SG main steam nozzle welds, the design peak stress ratio is slightly higher above the area of limited scanning. To ensure the welds' structural integrity, a supplemental magnetic particle examination of 100 percent coverage was performed on these welds without recordable indications. For various RHR HX nozzle welds, the information on relative stress magnitude between the missed and covered regions is not available. To ensure the welds' structural integrity, a supplemental liquid penetrant examination of 100 percent coverage was performed on

these welds without recordable indications. Therefore, the inspection results (UT + surface examination) of the SG main steam and RHR HX nozzle welds is representative of the subject welds of these two components. Consequently, if significant service induced degradation had occurred, some evidence would likely have been detected by the examinations that the licensee performed for all subject component welds.

- After reviewing the SNC fleet operating experience (for Vogtle, Units 1 and 2 and the Farley Nuclear Plant, Units 1 and 2), SNC found no leakage or indications that require flaw evaluations or repairs from the Category C-A, Item Nos. C1.20 and Category C-B, Item No. C2.21 for inspections performed during the previous interval.

In addition, the licensee stated that Class 2 pressure boundary, pressure tests are performed in each examination period. Pressure tests will provide additional assurance that any through-wall cracking, if occurred, would be detected and the licensee will take appropriate corrective actions.

Therefore, the NRC staff finds that the UT and surface examinations performed provide reasonable assurance of structural integrity and leak tightness of the subject welds.

#### 4.0 CONCLUSION

As set forth above, the NRC staff determines that it is impractical for the licensee to comply with the ASME BPV Code, Section XI, requirement; that the proposed inspection provides reasonable assurance of structural integrity or leak tightness of the subject welds; and that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i). Therefore, the NRC staff grants this relief request VEGP-ISI-RR-05 for Vogtle, Units 1 and 2, for the third 10-year ISI interval, which commenced on May 31, 2007, and ended on May 30, 2017.

All other ASME BPV Code, Section XI, requirements for which relief was not specifically requested and authorized herein by the NRC staff remain applicable, including the third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: S. Sheng, NRR

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REQUEST REGARDING EXAMINATION COVERAGE FOR CERTAIN ASME  
CODE CLASS 2 CATEGORY WELDS (VEGP-ISI-RR-05)  
(EPID L-2018-LLR-0082) DATED NOVEMBER 30, 2018

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