

September 29, 2006

Mr. D. E. Grissette
Vice President
Southern Nuclear Operating
Company, Inc.
Post Office Box 1295
Birmingham, AL 35201-1295

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT, UNIT 1, AND VOGTLE ELECTRIC
GENERATING PLANT, UNITS 1 AND 2 - EVALUATION OF RELIEF REQUEST
ISI-GEN-ALT-06-02 (TAC NOS. MD 2482, MD2483 AND MD2484)

Dear Mr. Grissette:

By letter dated June 29, 2006, as supplemented on September 8 and 15, Southern Nuclear Operating Company, Inc. (the licensee), submitted a proposed alternative to the requirements of Section XI of the American Society of Mechanical Engineers, *Boiler and Pressure Vessel Code* (ASME Code), under the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a(a)(3)(i) for the Joseph M. Farley Nuclear Plant, Unit 1 (Farley, Unit 1), and the Vogtle Electric Generating Plant, Units 1 and 2 (Vogtle, Units 1 and 2).

In ISI-GEN-ALT-06-02, the licensee proposed using root mean square (RMS) errors for sizing flaws that are greater than ASME Code, Section XI, Appendix VIII, Supplement 2, "Qualification Requirements for Wrought Austenitic Piping Welds," and Nuclear Regulatory Commission (NRC) endorsed Code Case N-695, "Qualification Requirements for Dissimilar Metal Piping Welds" (N-695), acceptance criterion for examinations performed from the inside surface of pressure boundary piping.

Based on the review of the information the licensee provided, the NRC staff concluded that achieving the ASME Code-required 0.125-inch RMS error value is impractical and that the licensee's proposed alternative in ISI-GEN-ALT-06-02 provides an acceptable level of quality and safety. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(g)(6)(i) for the remainder of the third 10-year inservice inspection ISI interval for Farley, Unit 1, and the remainder of the second 10-year ISI interval for Vogtle, Units 1 and 2. Granting of 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.

The licensee's letter dated June 29, 2006, also included relief request ISI-GEN-ALT-06-01. The NRC staff's evaluation is documented in a letter dated September 20, 2006.

D. Grissette

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The NRC staff's safety evaluation is enclosed. If you have any questions, please contact Christopher Gratton at 301-415-1055.

Sincerely,

/RA/

Evangelos C. Marinos, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-348, 50-424, and 50-425

Enclosure: Safety Evaluation

cc w/encl: See next page

D. Grissette

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ADAMS ACCESSION NUMBER: ML062770359

*SE input dated

NRR-028

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

INSERVICE INSPECTION PROGRAM PROPOSED ALTERNATIVE ISI-ALT-06-02

JOSEPH M. FARLEY NUCLEAR PLANT, UNIT 1

VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

DOCKET NOS. 50-348, 50-424, AND 50-425

1.0 INTRODUCTION

By letter dated June 29, 2006 (Agencywide Documents Access and Management System Accession No. ML061860048), as supplemented by letters dated September 8 and 15, 2006 (ML062540226 and ML062580360, respectively), the Southern Nuclear Operating Company, Inc., (the licensee) submitted a relief request proposing an alternative to certain requirements of the American Society of Mechanical Engineers (ASME), *Boiler and Pressure Vessel Code* (Code), at Joseph M. Farley Nuclear Plant, Unit 1 (Farley, Unit 1) and Vogtle Electric Generating Plant, Units 1 and 2 (Vogtle, Units 1 and 2). Specifically, the licensee proposed using root mean square (RMS) errors for sizing flaws that are greater than ASME Code Section XI, Appendix VIII, Supplement 2, "Qualification Requirements for Wrought Austenitic Piping Welds," and Nuclear Regulatory Commission (NRC) endorsed Code Case N-695, "Qualification Requirements for Dissimilar Metal Piping Welds," (N-695) acceptance criterion for examinations performed from the inside surface of pressure boundary piping. The request is for the remainder of the third 10-year inservice inspection (ISI) interval at Farley, Unit 1 (December 1, 1997, through November 30, 2007) and the second 10-year ISI interval at Vogtle, Units 1 and 2 (May 31, 1997, through May 30, 2007).

2.0 REGULATORY EVALUATION

The ISI of the ASME Code Class 1, 2, and 3 components is to be performed in accordance with the applicable edition and addenda of Section XI of the ASME Code, and as required by Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Section 50.55a(a)(3) states in part that alternatives to the requirements of paragraph (g) may be used when authorized by the NRC, if the applicant demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements 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), ASME Code Class 1, 2, and 3 components (including supports) will meet the requirements, except the design and access provisions and the

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preservice examination requirements, set forth in ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 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 first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. Section 50.55a(g)(4)(iv) states that inservice examination of components and system pressure tests may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in Section 50.55a(b), subject to the limitations and modification listed in Section 50.55a(b) and subject to Commission approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions or addenda are met. The code of record for the third 10-year ISI interval at Farley, Unit 1, and second 10-year ISI interval at Vogtle, Units 1 and 2, is the 1989 edition of the ASME Code with no addenda.

3.0 TECHNICAL EVALUATION

3.1 Affected Components

The dissimilar piping welds affected are:

Vogtle Unit 1, 11201-V6-001-W33, W34, W35, W36, W37, W38, W39, and W40;
Vogtle Unit 2, 21201-V6-001-W33, W34, W35, W36, W37, W38, W39, and W40; and
Farley Unit 1, ALA1-4100-1DM, ALA1-4100-14DM, ALA1-4200-1DM, ALA1-4200-14DM,
ALA1-4300-1DM, and ALA1-4300-14DM.

The stainless steel-to-stainless steel welds are:

Vogtle Unit 1, 11201-001-1, 11201-002-1, 11201-003-1, 11201-004-1, 11201-009-9,
11201-010-7, 11201-011-8, and 11201-012-9;
Vogtle Unit 2, 21201-001-1, 21201-002-1, 21201-003-1, 21201-004-1, 21201-009-9,
21201-010-7, 21201-011-8, and 21201-012-9; and
Farley Unit 1, ALA1-4100-2, ALA1-4100-13, ALA1-4200-2, ALA1-4200-13, ALA1-4300-2, and
ALA1-4300-13.

3.2 Applicable Code

Vogtle, Units 1 and 2, and Farley, Unit 1, are in their second and third ISI intervals, respectively. The applicable Code edition and addenda is the 1989 edition of the ASME Code, Section XI. In addition, as required by 10 CFR 50.55a, ASME Code Section XI, 1995 Edition with 1996 Addenda is used for Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems."

The 1995 edition of ASME Code, Section XI, Appendix VIII, Supplement 2, paragraph 3.2(b), with the 1996 addenda states, "The RMS [root mean square] error of the flaw depths estimated by ultrasonics, as compared with the true depths, shall not exceed 0.125 in."

N-695, paragraph 3.3(c) states, "Examination procedures, equipment, and personnel are qualified for depth-sizing when the RMS error of the flaw depth measurements, as compared to the true flaw depths, do not exceed 0.125 in." N-695 is endorsed in Regulatory Guide (RG) 1.147, Revision 14. N-695 is an alternative for Section XI, Appendix VIII, Supplement 10, "Qualification Requirements for Dissimilar Metal Piping Welds," requirements.

3.3 Proposed Alternative

The licensee proposes to use Code Case N-696¹ (N-696) to perform a combined Supplement 2 and 10 qualification when examining the dissimilar metal welds and austenitic welds. The difference between the 0.245-inch RMS error and the N-696 required 0.125-inch RMS error will be applied to the flaw depths determined during actual sizing of flaws. The licensee also proposes that if only the dissimilar metal welds are examined, the difference between the 0.189-inch RMS error and the N-695 required 0.125-inch RMS error will be applied to the flaw depths determined during actual sizing of flaws.

3.4 Licensee's Basis for the Alternative

The licensee's vendor has performed all inservice reactor pressure vessel and pipe examinations at Farley, Unit 1, and Vogtle, Units 1 and 2. To date, no vendor has demonstrated the ability to achieve the required 0.125-inch RMS value for examinations performed from the inside diameter (ID) surface of the pipe. For most 3- and 4-loop Westinghouse designs, dissimilar metal welds (Supplement 10) have been shop machined, resulting in less or no ID geometric interferences. Both Farley, Unit 1, and Vogtle, Units 1 and 2, Supplement 10 configurations are expected to be unimpeded. Therefore, it is expected that the proposed alternative 0.189-inch RMS (or 0.245-inch RMS for combined Supplements 2 and 10) would be a conservative alternative compared to the results achieved with the qualification specimens. Surface scan access and/or cast stainless material difficulties restrict the examinations for the Farley, Unit 1, and Vogtle, Units 1 and 2, configurations from the outside diameter (OD). Studies and projects are currently under way for the examinations of cast material. Industry efforts with "phased Array" examinations may be able to achieve greater coverage from the OD in the future, which may also aide in through-wall sizing.

In addition, part of the examination process for remote mechanized inspections is the gathering of the weld profile. This information is used for coverage determinations. The data will also be beneficial to ensure qualification mock-ups represent the full alignment of field conditions within the industry.

¹N-696, "Qualification Requirements for Appendix VIII Piping Examinations Conducted From the Inside Surface," has not been endorsed in RG 1.147. N-696 is an alternative to ASME Code Section XI, Appendix VIII, Supplement 2. The proposed alternative to paragraph 3.3(d) in N-696 changes paragraph 3.2(b) in Supplement 2 of Appendix VIII to Section XI that the licensee submitted in a separate request ISI-GEN-ALT-06-01, dated June 29, 2006.

3.5 Technical Evaluation

The applicable code of record for Farley, Unit 1 for the third ISI interval, and Vogtle, Units 1 and 2 for the second ISI interval is the 1989 edition of the ASME Code. Section 50.55a(g)(6)(ii)(C)(2) requires, in part, implementation of Appendix XI for qualifications purposes. The licensee proposed using a 0.189-inch RMS error for depth sizing flaws in dissimilar metal welds (Supplement 10 or NRC-endorsed Code Case N-695), and 0.245-inch RMS error for depth sizing flaws when examining dissimilar metal welds and austenitic welds (Supplements 10 and 2). The licensee performed a Supplement 2 performance demonstration as an add-on to an existing Supplement 10 performance demonstration (Code Case N-696).

The ASME Code requires that the maximum error for flaw depth measurements, when compared with the true flaw depths, must not exceed 0.125-inch RMS error. The nuclear industry is in the process of qualifying personnel in accordance with Supplement 10/Code Case N-695 and Supplement 2/Code Case N-696 requirements, as implemented through the Electric Power Research Institute - Performance Demonstration Initiative (PDI) program. However, personnel have been unsuccessful at achieving the ASME Code-required RMS error value for flaw depth sizing demonstrations performed from the inside surface of pipe weldment mock-ups. At this time, achieving a 0.125-inch RMS error is impractical. The licensee has stated that its vendor has only been able to achieve a 0.189-inch RMS error for dissimilar metal welds examined per Supplement 10/ N-695 and 0.245-inch RMS error for similar austenitic metal welds (Supplement 2/N-696) from the ID. The licensee explained that in the event a flaw is identified during the examination of the subject welds, the difference between the sizing error determined during the flaw depth sizing demonstrations (e.g., 0.245 RMS error for Supplement 2/N-696) and the maximum error for flaw depth measurements required by the Code (i.e., 0.125-inch RMS error) will be added to the flaw depth identified during the examination of the subject welds.

For the reasons stated above, the NRC staff finds that compliance with the ASME Code-required RMS error value is impractical and that adding the difference between the ASME Code-required RMS error and the demonstrated accuracy to the measurements acquired from flaw sizing, in addition to the use of the acceptance standards specified in Section IWB-3500 of the ASME Code, provides reasonable assurance of structural integrity.

4.0 Conclusion

Based on the above review, the NRC staff concludes that compliance with the ASME Code-required RMS error value is impractical, and that the proposed alternative to Supplement 2, paragraph 3.2(b) and (Supplement 10) Code Case N-695, paragraph 3.3(c) provides reasonable assurance of structural integrity. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), relief is granted for Farley, Unit 1, for the remainder of the third 10-year ISI interval, and Vogtle, Units 1 and 2, for the remainder of the second 10-year ISI interval. Granting of 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.

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

Principle Contributor: D. Naujock, NRR

Date: September 29, 2006