

November 21, 2003

Mr. Jeffrey T. Gasser, Vice President
Southern Company
Southern Nuclear Operating Company, Inc.
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, AL 35201

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2, JOSEPH M. FARLEY
NUCLEAR POWER PLANT, UNITS 1 AND 2, AND VOGTLE ELECTRIC
GENERATING PLANT, UNITS 1 AND 2 (TAC NOS. MB8959, MB8960, MB8961,
MB8962, MB8963, AND MB8964)

Dear Mr. Glasser:

By letter dated May 7, 2003, Southern Nuclear Operating Company, Inc. (the licensee) submitted a proposed alternative to the requirements of IWA-4120(a) and IWA-4310 of American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel Code (Code), Section XI. The licensee requested that the U.S. Nuclear Regulatory Commission (NRC) approve ASME Code Case N-661, "Alternative Requirements for Wall Thickness Restoration of Class 2 and 3 Carbon Steel Piping for Raw Water Service" for use at its Edwin I. Hatch Nuclear Plant, Units 1 and 2, Joseph M. Farley Nuclear Power Plant, Units 1 and 2, and Vogtle Electric Generating Plant, Units 1 and 2. The request was made pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i) for the current 10-year inservice inspection (ISI) interval.

ASME Code, Section XI, IWA-4120(a) requires that repairs be performed in accordance with the Owner's Design Specification and the original Construction Code of the component or system. IWA-4310 requires that the defect be removed or reduced in size in accordance with Article IWA-4000. Code Case N-661 allows the application of a weld metal overlay on the exterior of the piping system to restore the wall thickness of the component.

Based on the information provided in the licensee's submittal, the NRC staff concludes that the licensee has provided an acceptable alternative to the requirements of IWA-4120(a) and IWA-4310 of ASME Code, Section XI subject to the following three conditions that must be met when using Code Case N-661. These conditions are: (a) if the root cause of the degradation has not been determined, the repair is only acceptable for one cycle, (b) weld overlay repair of an area can only be performed once in the same location, and (c) when through-wall repairs are made by welding on surfaces that are wet or exposed to water, the weld overlay repair is only acceptable until the next refueling outage. The NRC staff concludes that the proposed alternative, as supplemented by the three conditions listed above provides reasonable assurance of structural integrity and safety. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the Edwin I. Hatch Nuclear Power Plant, and

Joseph M. Farley Nuclear Power Plant for the third 10-year ISI interval, and Vogtle Electric Generating Plant for the second 10-year ISI interval, or until Code Case N-661 is approved for general use by reference in Regulatory Guide 1.147 "Inservice Inspection Code Case Acceptability -- ASME Section XI, Division 1." The NRC staff's Safety Evaluation is enclosed.

Sincerely,

/RA/

John A. Nakoski, Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-321, 50-366, 50-348, 50-364, 50-424 and 50-425

Enclosure: As stated

cc w/encl: See next page

Joseph M. Farley Nuclear Power Plant for the third 10-year ISI interval, and Vogtle Electric Generating Plant for the second 10-year ISI interval, or until Code Case N-661 is approved for general use by reference in Regulatory Guide 1.147 "Inservice Inspection Code Case Acceptability -- ASME Section XI, Division 1." The NRC staff's Safety Evaluation is enclosed.

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John A. Nakoski, Chief, Section 1
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Enclosure: As stated

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST TO USE ASME CODE CASE N-661

SOUTHERN NUCLEAR OPERATING COMPANY, INC

EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2

JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2

VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2

DOCKET NOS. 50-321, 50-348, 50-364, 50-366, 50-424 AND 50-425

1.0 INTRODUCTION

By letter dated May 7, 2003, Southern Nuclear Operating Company, Inc. (SNC, the licensee) requested that the U.S. Nuclear Regulatory Commission (NRC) approve an alternative to the requirements of IWA-4120(a) and IWA-4310 of American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel Code (Code), Section XI. Specifically, the licensee requested that the (NRC) approve ASME Code Case N-661, "Alternative Requirements for Wall Thickness Restoration of Class 2 and 3 Carbon Steel Piping for Raw Water Service" for use at the Edwin I. Hatch Nuclear Power Plant (HNP), Joseph M. Farley Nuclear Power Plant (FNP) and Vogtle Electric Generating Plant (VEGP). The request was made pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i). The relief is needed to address replacement or internal weld repair of wall thinning conditions resulting from various wall thinning degradation mechanisms such as erosion, corrosion, cavitation, and pitting in Class 2 and 3 carbon steel raw water piping systems. Code Case N-661 provides an alternative to allow the licensees to restore wall thickness externally by means of a weld-deposited carbon or low-alloy steel reinforcement on the outside surface of the piping. The stated reason for the request was to provide adequate time for additional examination of adjacent piping so that pipe replacement can be planned to reduce impact on system availability and availability of replacement materials.

2.0 REGULATORY EVALUATION

10 CFR 50.55a(g) specifies that inservice inspection (ISI) of nuclear power plant components shall be performed in accordance with the requirements of the ASME Code, Section XI, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (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. 10 CFR 50.55a(g)(5)(iii) states that if the licensee has determined that conformance with certain code requirements is impractical for its facility, the

licensee shall notify the Commission and submit, as specified in 10 CFR 50.4, to support the determinations.

The Code of record for HNP, FNP, and VEGP is the 1989 Edition of the ASME Code, Section XI. The NRC's findings with respect to authorizing alternatives and granting or denying the ISI program relief requests are discussed below.

3.0 TECHNICAL EVALUATION

The licensee's regulatory and technical analyses in support of its requests for relief is described in the licensee's submittal dated May 7, 2003. The licensee submitted a relief request to use ASME Code Case N-661 at its HNP, FNP, and VEGP as an alternative to ASME Section XI, IWA-4120(a) and IWA-4310. A description of the relief request and the NRC staff evaluation follows.

3.1 Generic Request Number GR-03-02

The licensee requested to implement the requirements of Code Case N-661 for Class 2 and 3 carbon steel plant raw water piping system repairs resulting from degradation mechanisms such as erosion, corrosion, cavitation, or pitting.

ASME Code, Section XI, IWA-4120(a) requires that repairs be performed in accordance with the Owner's Design Specification and the original Construction Code of the component or system. ASME Code, Section XI, IWA-4310 requires that the defect be removed or reduced in size in accordance with Article IWA-4000.

3.1.1 Reason for Request:

Relief is requested from replacement or internal weld repair of wall thinning conditions resulting from various wall thinning degradation mechanisms such as erosion, corrosion, cavitation, and pitting in Class 2 and 3 carbon steel raw water piping systems in accordance with the design specification and the original construction code. The primary reason for this request is to provide adequate time for additional examination of adjacent piping so that pipe replacement can be planned to reduce impact on system availability including Maintenance Rule applicability and availability of replacement materials.

3.1.2 Proposed Alternative and Basis for Use:

The Farley Nuclear Plant, Hatch Nuclear Plant, and Vogtle Electric Generating Plant will implement the requirements of ASME Code Case N-661 for Class 2 and 3 plant raw water piping system repairs resulting from degradation mechanisms such as erosion, corrosion, cavitation, or pitting as an alternative to the requirements of IWA-4000. These type defects are typically identified by small leaks in the piping system or by pre-emptive non-code required examinations performed by the Licensee to monitor the degradation mechanisms. The alternative repair technique described in Code Case N-661 involves the application of additional weld metal on the exterior of the piping system which restores the wall thickness requirement. This repair technique will

be utilized whenever engineering evaluation determines that such a repair is suitable for the particular defect or degradation being resolved. Provisions for use of this Code Case will be addressed in the Repair and Replacement Program.

Those provisions will require that adjacent areas be examined to verify that the entire flawed area will be encompassed by the repair and that there are no other unacceptable degraded locations within a representative area dependent on the degradation mechanism present. An evaluation of the degradation mechanism will be performed to determine the re-examination schedule to be performed over the life of the repair. The repair will be considered to have a maximum service life of two fuel cycles unless examinations during each of the two fuel cycles are performed to establish the expected life of the repair.

The basis for use of the repair technique described in Code Case N-661 is Section XI of the ASME Code determined this repair technique provides an acceptable alternative to the requirements of IWA-4000 and provides an acceptable level of quality and safety. Therefore, the proposed alternative is justified per 10CFR50.55a(a)(3)(i).

Code Case N-661 was approved by the ASME Section XI Code on July 23, 2002; however, it has not been incorporated into NRC Regulatory Guide 1.147 and thus is not available for application at nuclear power plants without specific NRC approval. Therefore, SNC is documenting the request to apply the alternative repair technique described in the Code Case via this relief request. A copy of ASME Section XI Code Case N-661 is attached for reference.

The licensee stated that the alternative will be used for each plant's present 10-year ISI interval or until the NRC publishes Code Case N-661 in a future revision of the applicable Regulatory Guide.

3.1.3 Staff Evaluation

By letter dated May 7, 2003, SNC requested that the NRC approve an alternative to the requirements of IWA-4120(a) and IWA-4310 of ASME Code, Section XI. Specifically, the licensee requested that the NRC approve ASME Code Case N-661 for use at HNP, FNP, and VEGP. The request was made pursuant to 10 CFR Part 50.55a(a)(3)(i). The relief is needed to address replacement or internal weld repair of wall thinning conditions resulting from various wall thinning degradation mechanisms such as erosion, corrosion, cavitation, and pitting in Class 2 and 3 carbon steel raw water piping systems. The stated reason for the request was to provide adequate time for additional examination of adjacent piping so that pipe replacement can be planned to reduce the impact on system availability and availability of replacement materials. The FNP, HNP, and VEGP are committed to meet the requirements of the 1989 Edition of Section XI of the ASME Code.

ASME Code, Section XI, IWA-4120(a) requires that repairs be performed in accordance with the Owner's Design Specification and the original Construction Code of the component or system. IWA-4310 requires that the defect be removed or reduced in size in accordance with Article IWA-4000. The licensee is proposing to use the provisions of Code Case N-661 to

perform an alternative repair of degraded components that involves the application of weld metal overlay on the exterior of the piping system to restore the wall thickness of the component. This repair technique will be utilized by the licensee whenever engineering evaluation determines that such a repair is suitable for the particular defect or degradation being resolved. Provisions for use of this Code Case will be addressed in the licensee's Repair and Replacement Program. Those provisions will require that adjacent areas be examined to verify that the entire flawed area will be encompassed by the repair and that there are no other unacceptable degraded locations within a representative area dependent on the degradation mechanism present. An evaluation of the degradation mechanism will be performed to determine the re-examination schedule to be performed over the life of the repair. The repair will be considered to have a maximum service life of two fuel cycles unless examinations during each of the two fuel cycles are performed to establish the expected life of the repair.

The NRC staff finds the licensee's reasoning in support of its request for relief acceptable. This finding is based on the fact that the NRC staff has reviewed Code Case N-661 for inclusion in its Regulatory Guide 1.147 "Inservice Inspection Code Case Acceptability -- ASME Section XI, Division 1." However, this review established three conditions that the licensee needs to consider when using the provisions of Code Case N-661 to repair raw water system components. These conditions are: (a) if the root cause of the degradation has not been determined, the repair is only acceptable for one cycle, (b) weld overlay repair of an area can only be performed once in the same location, and (c) when through-wall repairs are made by welding on surfaces that are wet or exposed to water, the weld overlay repair is only acceptable until the next refueling outage.

The NRC staff established these three conditions based on the following considerations: (a) if the root cause of the degradation has not been determined, a suitable reinspection frequency cannot be established, (b) weld overlay repair of an area can only be performed once to ensure that ineffective repairs are not being repeatedly implemented in the same location, and (c) performing through-wall weld repairs on surfaces that are wet or exposed to water would produce welds that include weld defects such as porosity, lack of fusion, and cracks. It is highly unlikely that a weld can be made on an open root joint with water present on the backside of the weld without having several weld defects. These types of weld defects can, and many times do, lead to premature failure of a weld joint.

4.0 CONCLUSION

Based on the information provided in the licensee's submittal, the NRC staff concludes that the licensee has provided an acceptable alternative to the requirements of IWA-4120(a) and IWA-4310 of ASME Code, Section XI subject to the following three conditions that must be met when using Code Case N-661. These conditions are: (a) if the root cause of the degradation has not been determined, the repair is only acceptable for one cycle, (b) weld overlay repair of an area can only be performed once in the same location, and (c) when through-wall repairs are made by welding on surfaces that are wet or exposed to water, the weld overlay repair is only acceptable until the next refueling outage. The NRC staff concludes that the proposed alternative, as supplemented by the three conditions listed above provides reasonable assurance of structural integrity and safety. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for HNP and FNP for the third 10-year ISI interval, and for VEGP for the second 10-year ISI interval, or until Code Case N-661 is approved for general use by reference in Regulatory Guide 1.147 "Inservice Inspection Code Case Acceptability -- ASME

Section XI, Division 1.” After that time, the licensees must follow the conditions, if any, specified in the regulatory guide. All other ASME Code, Section XI, requirements for which relief was not specifically requested and authorized herein by the NRC staff remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: G. Georgiev

Date: November 21, 2003

Joseph M. Farley Nuclear Plant

cc:

Mr. Don E. Grissette
General Manager -
Southern Nuclear Operating Company
Post Office Box 470
Ashford, Alabama 36312

William D. Oldfield
SAER Supervisor
Southern Nuclear Operating Company
P. O. Box 470
Ashford, Alabama 36312

Mr. B. D. McKinney, Licensing Manager
Southern Nuclear Operating Company
Post Office Box 1295
Birmingham, Alabama 35201-1295

Mr. M. Stanford Blanton
Balch and Bingham Law Firm
Post Office Box 306
1710 Sixth Avenue North
Birmingham, Alabama 35201

Mr. J. D. Woodard
Executive Vice President
Southern Nuclear Operating Company
Post Office Box 1295
Birmingham, Alabama 35201

State Health Officer
Alabama Department of Public Health
434 Monroe Street
Montgomery, Alabama 36130-1701

Chairman
Houston County Commission
Post Office Box 6406
Dothan, Alabama 36302

Resident Inspector
U.S. Nuclear Regulatory Commission
7388 N. State Highway 95
Columbia, Alabama 36319

Vogtle Electric Generating Plant

cc:

Mr. N.J. Stringfellow
Manager, Licensing
Southern Nuclear Operating
Company, Inc.
P. O. Box 1295
Birmingham, Alabama 35201-1295

Mr.G. R. Frederick
General Manager, Vogtle Electric
Generating Plant
Southern Nuclear Operating
Company, Inc.
P. O. Box 1600
Waynesboro, Georgia 30830

Mr. J. D. Woodard
Executive Vice President
Southern Nuclear Operating
Company, Inc.
P. O. Box 1295
Birmingham, Alabama 35201-1295

Steven M. Jackson
Senior Engineer - Power Supply
Municipal Electric Authority
of Georgia
1470 Riveredge Parkway, NW.
Atlanta, Georgia 30328-4684

Mr. Reece McAlister
Executive Secretary
Georgia Public Service Commission
244 Washington St., S. W.
Atlanta, Ga. 30334

Harold Reheis, Director
Department of Natural Resources
205 Butler Street, SE. Suite 1252
Atlanta, Georgia 30334

Attorney General
Law Department
132 Judicial Building
Atlanta, Georgia 30334

Mr. J. D. Sharpe
Resident Manager
Oglethorpe Power Corporation
Alvin W. Vogtle Nuclear Plant
P. O. Box 1600
Waynesboro, Georgia 30830

Charles A. Patrizia, Esquire
Paul, Hastings, Janofsky & Walker
10th Floor
1299 Pennsylvania Avenue
Washington, DC 20004-9500

Arthur H. Domby, Esquire
Troutman Sanders
NationsBank Plaza
600 Peachtree Street, NE.
Suite 5200
Atlanta, Georgia 30308-2216

Resident Inspector
Vogtle Plant
8805 River Road
Waynesboro, Georgia 30830

Office of the County Commissioner
Burke County Commission
Waynesboro, Georgia 30830

Edwin I. Hatch Nuclear Plant

cc:

Laurence Bergen
Oglethorpe Power Corporation
2100 East Exchange Place
P.O. Box 1349
Tucker, GA 30085-1349

Mr. R. D. Baker
Manager - Licensing
Southern Nuclear Operating
Company, Inc.
P. O. Box 1295
Birmingham, Alabama 35201-1295

Resident Inspector
Plant Hatch
11030 Hatch Parkway N.
Baxley, Georgia 31531

Mr. Charles H. Badger
Office of Planning and Budget
Room 610
270 Washington Street, SW.
Atlanta, Georgia 30334

Harold Reheis, Director
Department of Natural Resources
205 Butler Street, SE., Suite 1252
Atlanta, Georgia 30334

Steven M. Jackson
Senior Engineer - Power Supply
Municipal Electric Authority
of Georgia
1470 Riveredge Parkway, NW
Atlanta, Georgia 30328-4684

Mr. Reece McAlister
Executive Secretary
Georgia Public Service Commission
244 Washington St., S. W.
Atlanta, Ga. 30334

Arthur H. Domby, Esq.
Troutman Sanders
Nations Bank Plaza
600 Peachtree Street, NE, Suite 5200
Atlanta, GA 30308-2216

Chairman
Appling County Commissioners
County Courthouse
Baxley, Georgia 31513

Mr. J. D. Woodard
Executive Vice President
Southern Nuclear Operating
Company, Inc.
P. O. Box 1295
Birmingham, Alabama 35201-1295

Mr. G. R. Frederick
General Manager, Edwin I. Hatch
Nuclear Plant
Southern Nuclear Operating
Company, Inc.
U.S. Highway 1 North
P. O. Box 2010
Baxley, Georgia 31515

Mr. K. Rosanski
Resident Manager
Oglethorpe Power Corporation
Edwin I. Hatch Nuclear Plant
P. O. Box 2010
Baxley, Georgia 31515