July 26, 2002

Mr. D. N. Morey
Vice President - Farley Project
Southern Nuclear Operating
Company, Inc.
Post Office Box 1295
Birmingham, Alabama 35201-1295

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2 RE: RELIEF REQUESTS FOR THE THIRD 10-YEAR INSERVICE INSPECTION (ISI) INTERVAL (TAC NOS. MB3058 AND MB3059)

Dear Mr. Morey:

By letter dated September 28, 2001, you submitted Relief Request Nos. RR-48 and RR-49 for the Joseph M. Farley Nuclear Plant, Units 1 and 2, third 10-year ISI program, which proposed an alternative from certain requirements of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) with regard to the performance of volumetric examinations. On April 30, 2002, you submitted Revision 1 to RR-48; therefore, RR-48 will be addressed in future correspondence.

We have reviewed and evaluated the information provided in Relief Request No. RR-49 against the requirements of the 1989 Edition of the ASME Code, Section XI and Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i). We find that your proposed alternatives provide an acceptable level of quality and safety, therefore, RR-49 is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third 10-year ISI interval. Our Safety Evaluation is enclosed.

Sincerely,

**/RA/**

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

Docket Nos. 50-348 and 50-364

Enclosure: As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE THIRD 10-YEAR INSERVICE INSPECTION INTERVAL

RELIEF REQUEST NO. RR-49

JOSEPH M. FARLEY NUCLEAR PLANT

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

DOCKET NOS. 50-348 AND 50-364

## 1.0 INTRODUCTION

The inservice inspection (ISI) of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Class 1, Class 2, and Class 3 components is to be performed in accordance with Section XI of the ASME Code and applicable edition and addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g), 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 in part that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the licensee 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 preservice examination requirements, set forth in the 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) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The ISI Code of record for Joseph M. Farley Nuclear Plant (Farley), Units 1 and 2 is the 1989 Edition of Section XI of the ASME Boiler and Pressure Vessel Code. Farley, Units 1 and 2 are in their second 10-year interval.

By letter dated September 28, 2001, Southern Nuclear Operating Company, Inc. (the licensee), requested relief from certain ASME Code requirements at the Joseph M. Farley Nuclear Plant, Units 1 and 2. Specifically, the licensee requested relief from complete stud volume examinations, from stud surface examination, and from stud examination deferral requirements.

2.0 RR-49 System/Components for Which Relief is Requested

Examination of Class 1 bolting, ASME Code Category B-G-1.

2.1 Code Requirements for Which Relief is Requested

The licensee is requesting relief from the 1989 Edition of ASME Section XI, Table IWB-2500-1, Examination Category B-G-1 for the third 10-year interval.

(a) Examination Figure IWB-2500-12 for Item B6.30 requires the examination volume be defined as the full volume of the load-bearing portion of the stud.

(b) Table IWB-2500-1 requires that the examinations include both a surface and volumetric method when the studs are removed (Item B6.30).

(c) Table IWB-2500-1 does not allow deferral for Items B6.20, "RPV Closure Studs, In Place," B6.40, "Threads in Flange," and B6.50, "Closure Washers, Bushings."

2.2 Licensee's Proposed Alternative to Code

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee requests approval to use the proposed alternative to Code.

For ultrasonic examinations (UT) inspections, the licensee proposes to use the ASME Code Case N-307-3. The volumetric examinations will be performed with procedures and personnel qualified in accordance with ASME Section XI, Appendix VIII as required by 10 CFR 50.55a(g)(6)(ii)(C).

Deferrals for scheduling purposes will be optional and utilized, provided a 10-year maximum duration is not exceeded between examinations. A "re-zeroing" of examinations will be necessary if the scheduling option is chosen.

2.3 Licensee's Bases for Requesting Relief (as stated)

(a) In ASME Code Case N-307-2, which was passed by ASME on September 24, 1999 and incorporated in the 2000 Addenda of the ASME Section XI Code, the required volume was reduced to include the outside diameter to a radial depth of 1/4" when performing volumetric examinations on RPV studs ... . ['Code Case N-307-3 was passed by the ASME Main Committee on February 16, 2001, and is scheduled for publication in the next ASME Supplement.']

(b) Table IWB-2500-1 in the 2000 Addenda of the ASME Section XI Code specifies that a volumetric or surface examination be performed when RPV studs are removed. Code Case N-307-3 was developed to allow similar provisions for earlier editions of the Code. The only difference is the surface examination may be eliminated when performing volumetric examinations from the end of the stud or from the center-drilled hole. Changing the examination requirements to a volumetric examination only

reduces the necessary manpower and is consistent with the ALARA principle. Typically, extensive cleaning of the heavy and contaminated studs is required prior to the fluorescent magnetic particle (MT) examinations, which creates logistic problems. Studs not properly cleaned may give false indications. Performing only a volumetric (UT) examination does not require extensive cleaning and does not generally create logistic problems. To perform the volumetric examination, only one end of the stud is required to be accessible and the total preparation and examination time is reduced by a factor of 10.

(c) Examination of RPV studs in place, flange ligaments, and ligament bushing are often performed simultaneously while in the vessel cavity. Beginning with the 1995 ASME Section XI with 1996 Addenda, the Code allows for deferral of these items to the end of the inspection interval. The scheduling option will allow for more efficient coordination and reduce examination time for exams performed in the cavity, thus reducing radiation exposure.

## 3.0 EVALUATION

In lieu of the examination requirements of Section XI, Figure IWB-2500-12, Item B6.30, Code Case N-307-3 reduces the examination volume to that of a volumetric cylinder 1/4" deep from the root of the threads. The root of the threads are stress risers and preferred sites for crack initiation. Cracks at the root of the threads would be perpendicular to straight beam UT performed from the stud ends, and the cracks would create a corner trap for angle beam UT examinations performed from a center hole in the stud. The capabilities of a UT examination finding cracks in a stud is demonstrated through procedure and personnel qualifications. These are performance-based qualifications according to the requirements of Section XI, Appendix VIII, Supplement 8.

In lieu of the examination requirements of Section XI, Table IWB-2500-1, Item B6.30, Code Case N-307-3 eliminates surface examination of the reactor pressure vessel closure stud when removed. The function of UT examination is to find cracks in the stud volume. These cracks, if they exist, initiate from the surface. The function of the surface examination is to find cracks on the surface. Performing both volumetric and surface examinations on a stud duplicates the intent of the examinations which is to find cracks. Of the two nondestructive examination methods, surface examinations are tedious and subjective, and performance-based UT provides demonstrated assurances for finding cracks. Therefore, elimination of the surface examination does not diminish the effectiveness in detecting cracks.

Code Case N-307-3, was developed through a consensus building process. The NRC, through its normal participation in the ASME committee process, participated in this process through which it expressed the staff’s opinion and support.

In the 1983 Edition, the Code allowed the deferral of the reactor pressure vessel stud examinations until the end of the interval. In the1983 Edition with Winter of 1983 Addenda, the Code changed the examination requirements, making the deferral to the end of the interval non-permissible. In the 1992 Edition with1994 Addenda, the Code again changed the examination criteria for Items B6.20, B6.40, and B6.50 that permitted the deferral of

examinations until the end of the interval. The staff incorporated these changes by reference in 10 CFR 50.55a(b). The changes to Table IWB-2500-1, Items B6.20, B6.40, and B6.50 examination criteria do not affect other parts of the Code. The change does not eliminate the number of studs examined; it only provides the option for consolidating the number of studs examined at any one time. Therefore, the licensee's proposed change will result in an acceptable level of quality and safety.

## 4.0 CONCLUSION

Based on the above information, the NRC staff has concluded that the proposed alternative (RR-49) to reduce the ultrasonic testing volume, eliminate the surface examination, and permit deferring inspections for reactor pressure vessel studs will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative (RR-49) is authorized for the third 10-year ISI interval.

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Date: July 26, 2002

Joseph M. Farley Nuclear Plant

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