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

March 30, 2010

Mr. Mark J. Ajluni
Manager, Nuclear Licensing
Southern Nuclear Operating Company, Inc
40 Inverness Center Parkway
Birmingham, Alabama 35201

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2, SAFETY EVALUATION OF RELIEF REQUEST FNP-ISI-ALT-04, 05, AND 06, VERSION 1.0, FOR THE FOURTH 10-YEAR INSERVICE INSPECTION INTERVAL (TAC NOS. ME1767 AND ME1768)

Dear Mr. Ajluni:

By letter to the U.S. Nuclear Regulatory Commission (NRC), dated July 24, 2009, Southern Nuclear Operating Company, Inc. (SNC, the licensee) submitted requests for relief FNP-ISI-ALT-04, FNP-ISI-ALT-05 and FNP-ISI-ALT-06 from certain requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) at the Joseph M. Farley Nuclear Plant, Units 1 and 2. Specifically, SNC proposed alternates to the pressure testing requirements for the ASME Code piping segments in the reactor coolant system vent and drain piping, the embedded portions of spent fuel pool piping (SFP) and certain safety injection system piping.

The NRC staff has determined that requiring the licensee to perform a system leakage test of the subject vent and drain lines, and the subject safety injection system piping at the ASME Code-required test pressure and requiring the licensee to measure the flowrate in the embedded SFP cooling piping would result in a hardship or unusual difficulty for the licensee without any compensating increase in the level of quality and safety. The NRC staff finds that the licensee's proposed alternatives provide reasonable assurance of structural integrity and are acceptable, pursuant to Title 10 of the *Code of Federal Regulations* 50.55a(a)(3)(ii). Therefore, relief is granted pursuant to 10 CFR 50.55a(3)(ii) for the remainder of the fourth 10-year inservice inspection interval. 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.

Sincerely,

Gloria Kulesa, Branch Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-348 and 50-364

Enclosure: Safety Evaluation

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUEST NOS. FNP-ISI-ALT-04, 05, and 06,

FOURTH 10-YEAR INSERVICE INSPECTION INTERVAL

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NUMBERS 50-348 AND 50-364

1.0 INTRODUCTION

By letter dated July 24, 2009, (Agencywide Documents Access & Management System (ADAMS) ML092050741) Southern Nuclear Operating Company, Inc., (SNC, the licensee), submitted relief request (RR) Nos. FNP-ISI-ALT-04 , FNP-ISI-ALT-05, and FNP-ISI-ALT-06, Version 1, related to the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, requirements for the fourth 10-year interval inservice inspection (ISI) program for the Joseph M. Farley Nuclear Plant (FNP), Units 1 and 2. SNC proposed alternates to the ASME Code pressure testing requirement for the reactor coolant system (RCS) vent and drain piping, the embedded portions of spent fuel pool (SFP) cooling system piping and certain safety injection system piping.

2.0 REGULATORY REQUIREMENTS

10 CFR 50.55a(g) requires that ISI of ASME Code Class 1, 2, and 3 components be performed in accordance with Section XI of the ASME Code and applicable addenda, except where specific written relief has been granted by the U.S. Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i). According to 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph 50.55a(g) may be used, when authorized by the NRC if an applicant demonstrates that the proposed alternatives would provide an acceptable level of quality and safety or if the specified requirement 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) shall 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 (ISI) 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 ISI 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 the fourth 10-year ISI interval for the FNP, Units 1 and 2, is the 2001 Edition through the 2003 Addendum of the ASME Code, Section XI.

3.0 TECHNICAL EVALUATION

3.1 System/Component(s) for Which Relief is Requested

FNP-ISI-ALT-04: 39 Unit 1 and 51 Unit 2 Class 1 reactor coolant system vent and drain isolation valves less than or equal to 1 inch in size.

FNP-ISI-ALT-05: Spent fuel pool cooling system piping immediately adjacent to the spent fuel pit that is encased in concrete.

FNP-ISI-ALT-06: ASME Code Class 2 piping segments in the safety injection system that cannot be isolated from Class 1 piping in order to perform pressure testing at the Class 2 required test pressure.

3.2 Applicable ASME Code Requirements

Regarding FNP-ISI-ALT-04: ASME Section XI, 2001 Edition through 2003 Addenda, paragraph IWB-2500, Table IWB-2500-1, Examination Category B-P, Item No. B15.10, requires that in each refueling outage, all Class 1 pressure retaining components be subjected to a system leakage test, in accordance with IWB-5220, and that the examination method is visual (VT-2). Per IWB-5222(b), the pressure retaining boundary during the system leakage test conducted at or near the end of each inspection interval shall be extended to all Class 1 pressure retaining components within the system boundary.

Regarding FNP-ISI-ALT-05: Paragraph IWA-5244(b)(2) states, "The system pressure test for nonisolable buried components shall consist of a test to confirm that flow during operation is not impaired."

Regarding FNP-ISI-ALT-06: ASME Section XI, 2001 Edition through 2003 Addenda, Table IWC-2500-1, Category C-H, requires a system leakage test of Class 2 pressure retaining components in accordance with IWC-5220 once each inspection period. At issue is IWC-5221 which states, "The system leakage test shall be conducted at the system pressure obtained while the system, or portion of the system, is in service performing its normal operating function."

3.4 Licensee's Request for Relief and Basis

3.4.1 FNP-ISI-ALT-04

Each vent and drain line is equipped with two isolation valves to provide double isolation of the RCS. These valves are generally maintained closed during normal operation. The piping outboard of the first isolation valve is not normally pressurized. Under normal operating conditions, these vent and drain lines, are subject to RCS pressure and temperature only if leakage through the inboard valves occurs. Because these lines and connections typically do

not have test connections that would allow them to be individually pressure tested without design modifications, it would be necessary to open the inboard valves to pressurize these lines and connections to perform the ASME Code-required pressure test. Pressurization by this method would defeat the double isolation feature and would present significant safety concerns for the personnel performing the test on the valves at normal RCS pressure and temperature.

The licensee has requested relief to allow performance of the Class 1 system 10-year test with both inboard and outboard isolation valves in the closed position.

The licensee states that performing this test with the inboard isolation valves open requires several man-hours to position or cycle these valves for the test and restore the valves after the test is complete. Most of these valves are located in close proximity to the RCS loop piping and thus, require personnel entry into high radiation areas within the containment. The estimated radiation exposure associated with valve alignment and realignment would result in an additional 1.2 man-Rem for test personnel for each unit.

3.4.2 FNP-ISI-ALT-05

Portions of these pipe lines are embedded in concrete with no annulus to facilitate VT-2 visual examination. The original design did not include any flow measuring instrumentation on the suction and the discharge piping or any means of measuring change in flow between the inlet and the outlet of the embedded piping. SNC states that compliance to the ASME Code requirement would result in hardship without a compensating increase in the level of quality and safety.

The licensee has requested relief from the requirement to perform the IWA-5244(b)(2) flow test for the concrete encased portions of the SFP cooling system

3.4.3 FNP-ISI-ALT-06

The licensee states that the Class 2 pipe segments are in safety injection systems, in portions of piping between an inboard check valve and an outboard motor operated valve upstream that are not normally pressurized to RCS pressure during plant operation. In order to perform the ASME Code-required pressure test of these piping segments, it would be necessary to connect jumpers circumventing the inboard check valve boundaries from the RCS. This is a personnel safety concern that would result in an estimated additional personnel radiation exposure.

The licensee requests relief from the requirement to perform the IWC-5221 pressure test for these piping segments.

3.5 Licensee's Proposed Alternatives

3.5.1 FNP-ISI-ALT-04

The RCS vent and drain connections will be visually examined with the isolation valves in the normally closed position each refueling outage for leakage and evidence of past leakage during the ASME Code, Section XI, Class 1, System Leakage Test (IWB-5220).

The RCS vent and drain connection will also be visually examined with the isolation valves in the normally closed position during the fourth 10-year ISI system pressure test (IWB-5222(b)).

3.5.2 FNP-ISI-ALT-05

The piping sections immediately adjacent to the concrete encased sections will be VT-2 visually examined each examination period to determine any evidence of material degradation or potential leakage during system inservice test conducted each examination period.

3.5.3 FNP-ISI-ALT-06

The Class 2 piping segments will be included within the VT-2 visual examination boundary during the Class 1 System Leakage Test (IWB-5220) each refueling outage. Additionally, the piping segments will be pressurized to approximately RCS nominal operating pressure in conjunction with the end of interval system leakage test.

4.0 STAFF EVALUATION

FNP-ISI-ALT-04

ASME Section XI, Table IWB-2500-1, Examination Category B-P, Items B15.10, requires that Class 1 components undergo system leakage tests in accordance with IWB-5220. Pursuant to 10 CFR 50.55a(a)(3)(ii), SNC proposed to perform the Class 1 system hydrostatic test with the vent and drain valves in the closed position stating that the RCS vent and drain connections will be visually examined with the isolation valves in the normally closed position during each refueling outage for leakage and evidence of past leakage during the ASME Section XI, Class 1, system leakage test. The licensee has also stated that the RCS vent and drain connections will be visually examined with the isolation valves in the normally closed position during the 10-year ISI pressure test. In order for the licensee to perform the ASME Code-required test, it would be necessary to manually open the inboard valve to pressurize the line segment. Pressurization by this method would defeat double isolation of the RCS and may cause safety hazards for the personnel performing the examination. Moreover, manual opening and closing of these valves, which are in close proximity to the RCS main loop, would expose plant personnel to approximately 1.2 man-rem per test. The NRC staff has determined that compliance with the ASME Code requirement would result in hardship without a compensating increase in the level of quality and safety. The licensee's proposed alternative will provide reasonable assurance of structural integrity of the line segments and therefore, is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

FNP-ISI-ALT-05

In RR FNP-ISI-ALT-05, Version 1, pertaining to VT-2 visual examination of the embedded SFP cooling piping, the change in flow between the inlet and the outlet to the embedded piping can not be measured due to lack of flow measuring instrumentation in the system. The piping is made of stainless steel and is subject to very low pressure and temperature based on SFP water head and the pump discharge pressure. There is no degradation mechanism; e.g., thermal fatigue, inter-granular stress corrosion cracking, or primary water stress corrosion cracking that is likely to affect the welds in the subject embedded piping segments. The NRC staff finds that the licensee's alternative in RR FNP-ISI-ALT-05, to perform VT-2 visual

examination of piping sections immediately adjacent to the concrete encased sections, during each examination period's system inservice test, will provide reasonable assurance of detection of material degradation and/or potential leakage and thus will provide reasonable assurance of structural integrity for the embedded SFP cooling lines. The NRC staff concludes that compliance with the ASME Code requirement would result in hardship to the licensee without a compensating increase in the level of quality and safety.

FNP-ISI-ALT-06

ASME Section XI, Table IWC 2500-1, Category C-H, requires pressure testing of Class 2 pressure retaining components in accordance with IWC-5220. Pursuant to 10 CFR 50.55a(a)(3)(ii), SNC requested relief from performing the pressure test at the required pressure since the system, as designed, has no provision for isolating the subject Class 2 piping segments form the Class 1 system to perform Code-required pressure testing. The boundary valves between the Class 1 and the Class 2 piping consist of check valves that allow flow to the RCS. SNC's proposed alternative is to include the subject Class 2 piping segments within the VT-2 visual examination boundary of the Class 1 system leakage test performed during each refueling outage. In addition, once each inspection interval, SNC will pressurize the piping segments to nominal RCS operating pressure in conjunction with the Class 1 10-year leakage test. The NRC staff has determined that compliance to the Code requirement would result in hardship without a compensating increase in the level of quality and safety. The licensee's proposed alternative will provide reasonable assurance of structural integrity of the line segments and therefore, is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

5.0 CONCLUSION

Based on the above review, the NRC staff has determined that requiring the licensee to perform a system leakage test of (a) the isolable RCS vent and drain lines, (b) the piping segments in safety injection systems between the inboard and an outboard isolation valves at the ASME Code-required test pressure and (c) requiring the licensee to measure the change in flow between inlet and outlet ends of the embedded SFP cooling piping would result in a hardship or unusual difficulty for the licensee without any compensating increase in the level of quality and safety. The licensee's proposed alternatives provide reasonable assurance of structural integrity. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternatives in relief requests FNP-ISI-ALT-04, FNP-ISI-ALT-05, and FNP-ISI-ALT-06, Version 1, are authorized for the fourth 10-year ISI interval of the FNP, Units 1 and 2. All other requirements of the ASME Code, Section XI, for which relief has not been specifically requested remain applicable, including a third-party review by the Authorized Nuclear Inservice Inspector.

References:

1 Letter, M. Wong, NRC, to J. Johnson, SNC, granting relief for alignment of the schedule for the fourth ISI intervals for FNP, Units 1 and 2, October 17, 2008, ML082940114.

2. Letter, H. N. Berkow, NRC, to D. N. Morey, SNC, "Relief Request for the Inservice Inspection Program, Joseph M. Farley Nuclear Plant, Units 1 and 2, January 12, 1999.

Principal contributor: Prakash Patnaik, NRR/DCI

Date of issuance: March 30, 2010

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SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2, SAFETY EVALUATION OF RELIEF REQUEST FNP-ISI-ALT-04, 05, AND 06, VERSION 1.0, FOR THE FOURTH 10-YEAR INSERVICE INSPECTION INTERVAL (TAC NOS. ME1767 AND ME1768)

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Sincerely,

/RA/

Gloria Kulesa, Branch Chief
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Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-348 and 50-364

Enclosure: Safety Evaluation

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