August 6, 2008

Mr. J. Randy Johnson
Vice President – Farley
Joseph M. Farley Nuclear Plant
7388 North State Highway 95
Columbia, AL 36319

SUBJECT: JOSEPH M FARLEY NUCLEAR PLANT, UNITS 1 AND 2, SAFETY EVALUATION ON RELIEF REQUESTS RR-P-2 AND RR-P-3 FROM ASME CODE REQUIREMENTS (TAC NOS. MD8746, MD8747, MD8748, MD8749, MD8750, MD8751, MD8752 AND MD8753)

Dear Mr. Johnson:

By letter dated August 14, 2007 to the U.S. Nuclear Regulatory Commission (NRC), Southern Nuclear Operating Company, (the licensee), submitted relief requests RR-P-1, RR-P-2, RR-P-3, and RR-V-1 for the fourth 10-year interval inservice testing program at Farley Nuclear Plant, Units 1 and 2. The licensee requested relief from certain inservice testing requirements of the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants (ASME OM Code). In response to the NRC staff request for additional information, the licensee submitted additional information to the NRC in a letter dated July 14, 2008. The licensee also withdrew relief requests RR-P-1 and RR-V-1.

The NRC staff completed its review of relief requests RR-P-2 and RR-P-3 and is providing the enclosed safety evaluation. Relief request RR-P-2 is authorized for the fourth 10-year interval pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(a)(3)(ii) based on the determination that compliance with the specified ASME OM Code requirements results in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Relief request RR-P-3 is authorized for an interim period until July 1, 2010, pursuant to 10 CFR 50.55a(a)(3)(ii) based on the determination that compliance with the specified ASME OM Code requirements results in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Please contact Richard Jervey at 301-415-2728 with any questions.

Sincerely,

/RA/

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

Docket No. 50-348 and 50-364

Enclosure: Safety Evaluation

cc w/encl: See next page

Please contact Richard Jervey at 301-415-2728 with any questions.

Sincerely,

/RA/

Melanie C. Wong, 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

cc w/encl: See next page

DISTRIBUTION:
Public/Non Sensitive

LPL2-1 R/F	RidsOgcRp Resource	RidsNrrLAGLappert Resource
RidsNrrDorlLpl2-1 Resource	RidsAcrs&Acnw_MailCenter Resource	RidsNrrPMRJervey REsource
RidsRgn2MailCenter Resource	RidsNrrDciCptb Resource	

Accession Number: ML082050002 NRR-028 *Per memo dated:

OFFICE	NRR/LPL2-1/PM	NRR/LPL2-1/LA	DCI/CPTB	OGC	LPL2-1/BC
NAME	RJervey	GLappert	JMcHale*	DRoth, NLO	MWong
DATE	8/4/08	8/4/08	7/22/08	7/29/08	8/6/08

OFFICIAL RECORD COPY

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE INSERVICE TESTING PROGRAM, FOURTH 10-YEAR INTERVAL

JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

DOCKET NOS. 50-348 AND 50-364

1.0 INTRODUCTION

By letter dated August 14, 2007 (Agencywide Document Access and Management System (ADAMS) Accession No. ML072280494) to the U.S. Nuclear Regulatory Commission (NRC), Southern Nuclear Operating Company, (the licensee), submitted relief requests RR-P-1, RR-P 2, RR-P-3, and RR-V-1 for the fourth 10-year interval inservice testing (IST) program at Farley Nuclear Plant, Units 1 and 2 (FNP). The licensee requested relief from certain IST requirements of the 2001 Edition through 2003 Addenda of the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants (ASME OM Code). In response to the NRC staff request for additional information, the licensee submitted additional information in a letter dated July 14, 2008 (ADAMS Accession No. ML081970245). The licensee also withdrew relief requests RR-P-1 and RR-V-1. The FNP fourth 10-year IST interval commenced on December 1, 2007.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a, requires that IST of certain ASME Code Class 1, 2, and 3 pumps and valves be performed at 120-month (10-year) IST program intervals in accordance with the specified ASME OM Code and applicable addenda incorporated by reference in the regulations, except where alternatives have been authorized or relief has been requested by the licensee and granted by the NRC pursuant to 10 CFR 50.55a paragraphs (a)(3)(i), (a)(3)(ii), or (f)(6)(i). In accordance with 10 CFR 50.55a(f)(4)(ii), licensees are required to comply with the requirements of the latest edition and addenda of the ASME OM Code incorporated by reference in the regulations 12 months prior to the start of each 10-year IST program interval. In accordance with 10 CFR 50.55a(f)(4)(iv), IST of pumps and valves may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in 10 CFR 50.55a(b), subject to NRC approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions and addenda are met.

In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for the facility. Section 50.55a authorizes the NRC to approve alternatives and to grant relief from ASME OM Code requirements upon making necessary findings. NRC guidance contained in Generic Letter (GL) 89-04, “Guidance on Developing Acceptable Inservice Testing Programs,” provides alternatives to ASME OM Code

requirements which are acceptable. Further guidance is given in GL 89-04, Supplement 1, and NUREG-1482 Revision 1, "Guidance for Inservice Testing at Nuclear Power Plants."

3.0 TECHNICAL EVALUATION

3.1 Pump Relief Request RR-P-2

3.1.1 Code Requirements

The licensee requested relief from the requirements of ISTB-5121 which requires that flow rate be determined and recorded during the quarterly Group A pump test. Relief was requested for the following boric acid transfer pumps:

Q1E21P005A
Q1E21P005B
Q2E21P005A
Q2E21P005B

3.1.2 Licensee's Basis for Requesting Relief

In the licensee's August 14, 2007 request (ADAMS Accession No. ML072280494) it was stated: "Quarterly Group A testing is performed using the orificed pump discharge test line which runs back to the boric acid storage tank. This line does not have any installed flow measuring instrumentation. To utilize the system flow meter would require a test flow path which would transfer highly concentrated boric acid from the boric acid tank into the chemical and volume control system (CVCS) and into the reactor coolant system (RCS) through the operating CVCS charging pump. The addition of concentrated boric acid to the RCS during normal operations would adversely affect the boric acid concentration in the RCS and could cause a forced plant shutdown."

3.1.3 Licensee's Proposed Alternative Testing

In the licensee's August 14, 2007 request (ADAMS Accession No. ML072280494) it was stated: "Pump differential pressure and vibration readings will be measured on a quarterly basis during the Group A pump test", and "Since it is not feasible to measure the flow rate during the quarterly Group A test due to lack of flow instrumentation in the recirculation line, the proposed alternative to measure differential pressure and vibration provides reasonable assurance that the mechanical condition of the pumps demonstrated during quarterly Group A tests supports operational readiness".

3.1.4 Evaluation of Relief Request RR-P-2

The boric acid transfer pumps are classified as Group A pumps. Table ISTB-3400-1 requires that Group A pumps be tested quarterly and biennially. Requirements for the quarterly test are less rigorous than the requirements for the comprehensive [biennial] test. Quarterly Group A boric acid transfer pump tests are normally performed when the plant is operating. Comprehensive boric acid transfer pump tests are performed biennially, generally during an outage, shutdown, or startup. ISTB-5121 and Table ISTB-3000-1 state that quarterly tests shall be conducted with the pumps operating at a specified reference point.

The NRC staff reviewed the licensee's proposed alternative and determined that, due to system design, the orificed pump discharge test line which runs back to the boric acid storage tank is the only flow path that can be utilized for quarterly testing of the boric acid transfer pumps while the unit is at power. The orificed pump discharge test line flow path used by the boric acid transfer pumps is a fixed resistance flow path. There is no flow instrumentation installed in the flow path. The NRC staff considers the installation of flow instrumentation to be an undue burden when compared to the limited benefits gained.

During the performance of the quarterly pump testing, pump differential pressure and vibration will be measured. Pump flow rate will not be varied, measured, or recorded during the performance of the quarterly boric acid transfer pump tests. The performance of pump tests using a recirculation flow path is an acceptable alternative per GL 89-04, Attachment 1 *Potential Generic Deficiencies Related To IST Programs and Procedures,* paragraph 9, *Pump Testing Using Minimum Flow Line With or Without Flow measuring devices*, "In cases where flow can only be established through a non-instrumented minimum-flow path during quarterly pump testing and a path exists at cold shutdowns or refueling outages to perform a test of the pump under full or substantial flow conditions, the staff has determined that the increased interval is an acceptable alternative to the Code requirements provided that pump differential pressure, flow rate, and bearing vibration measurements are taken during this testing and that quarterly testing also measuring at least pump differential pressure and vibration is continued."

Biennial comprehensive pump testing requires that boric acid transfer pump differential pressure, flow rate, and vibration be measured and evaluated to determine acceptable pump performance at substantial flow conditions.

Testing the boric acid transfer pumps quarterly by measuring differential pressure and vibration in conjunction with the ASME OM Code required biennial comprehensive pump test provides reasonable assurance of the operational readiness of the boric acid transfer pumps. Requiring the licensee to meet the ASME OM Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety due to the addition of concentrated boric acid into the RCS during normal operations that would adversely affect the boric acid concentration in the RCS and could cause a forced plant shutdown.

3.1.5 Conclusion

Based on the above evaluation, the NRC staff concludes that the licensee's alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) based on the determination that compliance with the specified ASME OM Code requirements results in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The licensee's proposed alternative provides reasonable assurance of the operational readiness of the boric acid transfer pumps. The proposed alternative is authorized for the remainder of the fourth 10-year IST interval.

3.2. Pump Relief Request RR-P-3

3.2.1 Code Requirements

The licensee requested relief from the requirements of ISTB 5121, which requires that flow rate be determined and recorded during the quarterly Group A pump test. Relief was requested for the following motor driven auxiliary feedwater (AFW) pumps:

Q1N23P001A
Q1N23P001B
Q2N23P001A
Q2N23P001B

3.2.2 Licensee's Basis for Requesting Relief

As paraphrased in the licensee's application of August 14, 2007 (ADAMS Accession No. ML072280494), ISTB-5121 requires a quarterly Group A pump test by varying system resistance until either the differential pressure or flow rate equals the corresponding reference value. The only system valve with flow throttling capability is located in the injection line to the steam generators. Use of the injection line is not practical during normal operation because injection of cold water into the hot steam generators results in a significant thermal shock of the injection nozzles and could result in nozzle cracking.

In the licensee's August 14, 2007 request (ADAMS Accession No. ML072280494) it was stated: "Use of the 2-inch minimum flow fixed resistance line limits the flow rate of the 350 gpm AFW pumps to approximately 50 gpm. IST at this significantly low flow rate would provide only minimal data for determining pump operational readiness or monitoring degradation"; and, "Each pump is also provided with a 4-inch return line to the condensate storage tank (CST). However, the lines downstream of the first isolation valve are ANSI B31.10, Class III non-nuclear and the piping and supports were not designed and installed to be used for full flow testing of the AFW pumps. Farley Nuclear Plant attempted to utilize these 4-inch return lines for AFW pump IST and experienced significant piping vibration that was considered detrimental to long term component integrity. Redesign and modification of these 4-inch return lines would result in a significant hardship with minimal increase in the level of quality and safety since each motor driven AFW pump is tested every refueling outage at the design flow rate during the comprehensive pump test."

3.2.3 Licensee's Proposed Alternative Testing

The following is paraphrased from the licensee's August 14, 2007 (ADAMS Accession No. ML072280494) request:

The quarterly Group A test will be performed utilizing the 2-inch fixed resistance minimum flow line with measurement of differential pressure and vibration only.

Quarterly IST using the 2-inch fixed resistance minimum flow line provides some assurance of pump operational readiness and will detect gross degradation. The quarterly IST combined with a comprehensive pump test each refueling outage, at design flow rate, provides adequate test data to evaluate operational readiness and monitor degradation.

3.2.4 Evaluation of Relief Request RR-P-3

The motor driven AFW pumps are classified as Group A pumps. Table ISTB-3400-1 requires that Group A pumps be tested quarterly and biennially. Requirements for the quarterly test are less rigorous than the requirements for the comprehensive (biennial) test. Quarterly Group A motor driven AFW pump tests are normally performed when the plant is operating. Comprehensive AFW pump tests are performed biennially during a refueling outage. ISTB 5121 and Table ISTB-3000-1 state that quarterly tests shall be conducted with the pumps operating at a specified reference point.

The NRC staff reviewed the licensee's proposed alternative and determined that, due to system design, the minimum flow line is the only flow path that can presently be utilized for quarterly testing of the AFW pumps while the plant is at power. The minimum flow path used by the motor driven AFW pumps is a fixed resistance flow path with limited flow capacity (approximately 50 gpm). Use of the normal AFW injection line for quarterly pump testing is not practical during normal operation because injection of cold water into the hot steam generators results in a significant thermal shock of the injection nozzles and could result in nozzle cracking.

Use of the 4-inch return lines for full flow testing of the AFW pumps results in significant piping vibration that was considered detrimental to long term component integrity.

During the performance of quarterly pump testing, pump differential pressure and vibration will be measured. Pump flow rate will not be varied, measured, or recorded during the performance of the quarterly motor driven AFW pump tests. The performance of pump tests using a recirculation flow path is an acceptable alternative per Position 9 of GL 89-04, provided that comprehensive pump testing is performed biennially.

Biennial comprehensive pump testing requires that motor driven AFW pump differential pressure, flow rate and vibration be measured and evaluated to determine acceptable pump performance at substantial flow conditions.

The NRC staff considers the licensee request to test the AFW pumps quarterly by measuring differential pressure and vibration in conjunction with the ASME OM Code required biennial comprehensive pump test provides reasonable assurance of the operational readiness of the AFW pumps. Requiring the licensee to meet the ASME OM Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety due to injection of cold water into the hot steam generators resulting in a significant thermal shock of the injection nozzles that could result in nozzle cracking or significant piping vibration of the 4-inch return line to the CST at full flow conditions that was considered detrimental to long term component integrity.

In a letter dated July 14, 2008 (ADAMS Accession No. ML081970245) to the NRC, the licensee stated that additional testing and evaluation would be conducted on the 4-inch return line to determine if substantial flow rates could be achieved through the return line (less than full flow but greater than 50 gpm) without inducing significant piping vibration detrimental to long term component integrity and interim relief from the ASME OM Code requirements was requested until the additional testing and evaluation could be completed.

3.2.5 Conclusion

Based on the above evaluation, the NRC staff concludes that the licensee's alternative is authorized for an interim period until July 1, 2010, pursuant to 10 CFR 50.55a(a)(3)(ii) based on the determination that compliance with the specified Code requirements results in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The licensee's proposed alternative provides reasonable assurance of the operational readiness of the AFW pumps for the interim period to allow additional testing and evaluation of the flow capabilities of the 4-inch return line to the CST.

Principal Contributor: K. Poertner

Date: August 6, 2008

Joseph M. Farley Nuclear Plant, Units 1 & 2

cc:

Mr. J. Randy Johnson
Vice President - Farley
Joseph M. Farley Nuclear Plant
7388 North State Highway 95
Columbia, AL 36319

Mr. B. D. McKinney, Licensing Manager
Southern Nuclear Operating Company, Inc.
P.O. Box 1295
Birmingham, AL 35201-1295

Mr. M. Stanford Blanton
Balch and Bingham Law Firm
P.O. Box 306
1710 Sixth Avenue North
Birmingham, AL 35201

Mr. J. Gasser
Executive Vice President
Southern Nuclear Operating Company, Inc.
P.O. Box 1295
Birmingham, AL 35201

State Health Officer
Alabama Department of Public Health
434 Monroe St.
Montgomery, AL 36130-1701

Chairman
Houston County Commission
P.O. Box 6406
Dothan, AL 36302

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

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