March 8, 2004

Mr. L. M. Stinson
Vice President
Southern Nuclear Operating Company
Post Office Box 1295
Birmingham, Alabama 35201

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION

Dear Mr. Stinson:

By letter dated September 12, 2003, Southern Nuclear Operating Company, Inc. (SNC or the applicant) submitted an application pursuant to 10 CFR Part 54, to renew the operating licenses for Joseph M. Farley Nuclear Plant (FNP), Units 1 and 2, for review by the U.S. Nuclear Regulatory Commission's (NRC). The NRC staff is reviewing the information contained in the license renewal application (LRA) and has identified, in the enclosure, areas where additional information is needed to complete the review. Specifically, the enclosed requests for additional information (RAIs) are from Section 3.3, Auxiliary Systems.

These RAIs, in a draft format, have been provided to Mr. Jan Fridrichsen of your staff on February 16 and 17, 2004. The NRC staff has discussed draft versions of these RAIs, via a conference call, to provide clarifications to the SNC staff on March 2, 2004. Your responses to these RAIs are requested within 30 days from the date of this letter. Mr. Fridrichsen has agreed to this request. If needed, the NRC staff is willing to meet or discuss with SNC again prior to the submittal of the applicant's responses to provide clarifications to the staff's RAIs.

If you have any questions, please contact me at 301-415-1315 or e-mail tyl1@nrc.gov.

Sincerely,

/***RA***/

Tilda Liu, Project Manager
License Renewal Section A
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
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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JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2
LICENSE RENEWAL APPLICATION
REQUEST FOR ADDITIONAL INFORMATION (RAI)

Section 3.3: Aging Management of Auxiliary Systems

RAI 3.3-6

In several systems (including the control room area ventilation system, the auxiliary and radwaste area ventilation system, and the liquid waste and drains system), the applicant credited the One-Time Inspection Program for managing the aging effects of loss of materials, change in material property, and cracking for elastomers components. However, the One-Time Inspection Program is intended for use as a verification AMP to check the degree of aging of components when significant aging is not expected, while periodic inspections are more appropriate if aging effects can reasonably be expected to occur. The degradation of elastomers depends upon the service loads and environmental conditions, including temperature, radiation level, and presence of aggressive chemicals. The applicant is requested to provide additional information on the service loads and environment of the components to justify the use of One-Time Inspection Program for managing the aging effects of elastomers.

RAI 3.3-7

Galvanized steel components exposed to a moist air environment may experience corrosion. However, for numerous systems, the LRA states that there is no aging effect on galvanized steel ducts and fittings exposed to an inside environment, which is moist and humid air. This conclusion may not be supported by industry experience. The applicant is requested to provide the technical basis for this conclusion considering industry experience.

RAI 3.3-8

In several systems, for example, the auxiliary and radwaste area ventilation system, and the fire protection system, the applicant identified the loss of materials as plausible aging effect on galvanized steel components in the inside environment and credited the Borated Water Leakage Assessment and Evaluation Program (BWLAEP) for managing this aging effect. However, galvanized steel components are not in the scope of the BWLAEP, and it is not clear from the LRA what mitigation or corrective activities will be taken if such corrosion is detected. The applicant is requested to provide information on the effects of boric acid corrosion on the galvanized steel, and how to manage this aging effect. The applicant is also requested to provide operating experience, if any, on boric acid corrosion on the relevant galvanized steel components.

RAI 3.3-9

In Table 3.0.4-1 (p. 3.0-14) of the LRA, the applicant provided specifics of the inside environment. In particular, it provided the average temperature of 120 degree F and the humidity range of 5-95% within containment. The applicant is requested to clarify whether the conditions specified for the containment environment are expected to be bounding for inside environment for all those buildings listed in the “description” column, and whether those conditions were assumed for the aging of all components in an inside environment. Also,

discuss whether conditions exist that render components susceptible to periodic wetting and drying and, if so, address the issue of applicable aging effects in these types of inside environments.

RAI 3.3-10

The Water Chemistry Control Program is normally augmented by an inspection program to verify the effectiveness of the AMP, especially for stagnant or low-flow areas. For example, the applicant credited Water Chemistry Control Program augmented by One-Time Inspection Program to manage the aging effect for carbon steel components exposed to closed cycle cooling water environment. However, for several auxiliary systems, the Water Chemistry Control Program is credited for managing the loss of material for the stainless steel components exposed to borated water or treated water (including closed cooling water) without being augmented by an inspection program. The applicant is requested to provide justification for the use of the Water Chemistry Control Program without an inspection program to verify its effectiveness for managing the loss of material for stainless steel components.

RAI 3.3-11

Loss of material due to general, pitting, crevice, microbiologically influenced corrosion and biofouling is a plausible aging effect for stainless steel and carbon steel in the raw water environment or stainless steel exposed to lube oil that may be contaminated with water. In the LRA, the applicant credited the One-Time Inspection AMP for managing the loss of material aging effect on stainless steel and carbon steel piping and valve bodies exposed to raw water environment or stainless steel components exposed to lube oil that may be contaminated with water. However, the staff notes that the One-Time Inspection Program is intended for use as a verification AMP to check the degree of aging of components when significant aging is not expected, while periodic inspections are more appropriate if aging effects can reasonably be expected to occur. The applicant is requested to provide justification for why the One-Time Inspection is appropriate for managing the identified aging effect.

RAI 3.3-12

In Tables 3.3.2-10 and 3.3.2-11 of the LRA, for copper alloy components exposed to inside environment, the LRA identified loss of material as the aging effect requiring management (AERM) for some components (cooling units), but concluded that there are no aging effects for other components (Pitot tubes). The applicant is requested to justify the different AMR results for the same material and environment combination.

RAI 3.3-13

The applicant stated that compressed air system (Table 3.3.2-7) and emergency diesel generator system (Table 3.3.2-15) components in a dried gas environment have no applicable aging effects. A dried gas environment is described by the applicant as containing non-condensable vapor with a very limited percentage of moisture present and that dried gases include compressed air (downstream of air dryers), and bottled gases such as carbon dioxide, hydrogen, nitrogen, oxygen and refrigerants. The staff agrees with this position if the gas is relatively dry and moisture-free. However, moisture present in gas may be a major contributor to aging degradation. The applicant is requested to discuss the measures for maintaining and verifying the dryness level in the gas environment, including the acceptance criteria and their basis.

RAI 3.3-14

For several auxiliary systems such as oil-static cable pressurization system and emergency diesel generator system, the applicant concluded that there are no applicable aging effects for components in lube oil environment. The staff agrees with this position if the lube oil is relatively dry and water-free. However, moisture present in lube oil maybe a major contributor to aging degradation. During operations, moisture may accumulate even though 'fresh' oil maybe relatively dry and water-free initially. The applicant is requested to describe the measures for maintaining and verifying the dryness of the lube oil, including the acceptance criteria and their basis.

RAI 3.3-15

Several auxiliary systems, such as spent fuel pool cooling and cleanup system, closed-cycle cooling water system, sampling system, and CVCS, have heat exchangers that are cooled by the closed-cycle cooling water system. It is not clear in the LRA whether inspections and monitoring will be performed on the subcomponents (e.g., tube sheets, tubes, etc.) exposed to closed-cycle cooling water. The applicant is requested to clarify the types of inspections or monitoring that will be performed on the heat exchangers.

RAI 3.3-16

The LRA does not identify cracking as an applicable AERM for bolting in auxiliary systems. LRA Table 3.3-1, item number 24, states that cracking is not applicable to bolting due to material selection and sound maintenance practices (control of torque, proper lubricants, and sealing compounds); however, the susceptibility to cracking is determined primarily by the bolting material and the operating temperature. In order to justify that cracking is not an applicable AERM, the applicant is requested to provide the reasons by identifying the bolting materials and the yield strength of the bolting procured for the auxiliary systems within the scope of license renewal, and the operating temperatures of the bolting. For high strength bolting (yield strength greater than 150 ksi), provide additional justification for the conclusion that cracking is not an applicable AERM, or provide an appropriate AMP to manage cracking.

RAI 3.3-17

a. Referring to Table 3.3-1 of the LRA, item 3.3.1-11 states in the discussion that the FNP Structural Monitoring Program (Appendix B.4.3) will manage loss of material of the carbon steel portions of the new fuel storage racks. Discuss applicable non-carbon steel materials (e.g., aluminum, stainless steel, etc.) that are used in FNP's new fuel rack assemblies, their environments, FNP specific aging related operating experience, and the results of their aging management review. Also, explain why these new fuel rack assemblies are not explicitly listed in section B.4.3.5, Program Scope, of the FNP's Structural Monitoring Program.

b. Referring to Table 3.3-1 of the LRA, item 3.3.1-13 states in the discussion that the spent fuel storage racks are not considered susceptible to stress corrosion cracking since the temperature of the borated water in the spent fuel pool is normally less than this threshold temperature for SCC. Elaborate on FNP's use of the phrase: "...normally less than this threshold temperature for SCC," define the threshold temperature referred to therein, explain expected or applicable

abnormal conditions implied in the phrase, and discuss applicable SCC related operating experience of FNP spent fuel storage racks and associated valves.

3.3.2.1.5 Open-Cycle Cooling Water System

RAI 3.3.2.1.5-1

The LRA states the Buried Piping and Tank Inspection Program is used to manage buried carbon steel and buried stainless steel piping in this system. However, the scope of the Buried Piping and Tank Inspection Program only includes buried carbon steel piping and tanks. The applicant is requested to clarify which AMP will be used to manage the buried stainless steel piping. If the Buried Piping and Tank Inspection Program will be used, provide the appropriate updates to the 10 elements or explain how the GALL program will be used for stainless steel components.

3.3.2.1.7 Compressed Air System

RAI 3.3.2.1.7-1

The LRA credits the One-Time Inspection Program (B.5.5) to manage the aging effect of loss of material of several components in air/gas (wetted) environment. The staff notes that One-Time inspections are used for verification when significant aging is not expected. The staff also observes that for comparable components/materials/environments/AERM in the compressed air system, the GALL recommends the use of GALL Program XI.M24, "Compressed Air Monitoring," which uses, in part, periodic inspection/testing of components. The applicant is requested to justify why a One-Time inspection is adequate in lieu of periodic inspection/testing of components for the compressed air system components in air/gas (wetted) environment.

3.3.2.1.8 Chemical and Volume Control System

RAI 3.3.2.1.8-1

The loss of fracture toughness/thermal aging embrittlement may be an applicable aging effect for cast austenitic stainless steel (CASS) components in high temperature borated water environment. The applicant is requested to clarify whether this is an applicable aging effect for the CASS components (such as the regenerative heat exchanger) in the CVCS and, if applicable, provide an aging management program.

RAI 3.3.2.1.8-2

For stainless steel boric acids tanks in air/gas (air space) environment, the applicant is requested to clarify whether the interior surface of the tank is subjected to periodic drying and wetting due to fluid level changes. If so, clarify whether this may lead to concentrated level of boric acid leading in turn to aging degradation, and provide information on how to manage this aging effect.

3.3.2.1.9 Control Room Area Ventilation System

RAI 3.3.2.1.9-1

Loss of material due to galvanic corrosion may be a susceptible aging effect on the contact of aluminum fin and copper tubes of the heat exchangers that are exposed to wetted air/gas environment. However, it was not clear in the LRA if galvanic corrosion is included in the One-Time Inspection Program. The applicant is requested to clarify whether the One-Time Inspection Program will manage the galvanic corrosion on the contact area of aluminum fin and copper coils.

3.3.2.1.14 Diesel Fuel Oil System

RAI 3.3.2.1.14-1

In LRA Table 3.3.2-14 for diesel fuel oil system, the applicant identified loss of material as the aging effect for carbon steel, alloy steel, and stainless steel pipes exposed to inside (protective trench) environment. The LRA does not define the protective trench environment. The applicant is requested to provide a description of this environment and discuss the differences from the regular inside environment (in particular as related to aging mechanisms and aging effects). For managing this aging effect, the LRA identifies the External Surface Monitoring Program for carbon steel and alloy steel piping, whereas it uses One-Time Inspection Program for stainless steel piping. The applicant is requested to provide the basis for using different AMPs.

RAI 3.3.2.1.14-2

For the carbon steel vent cap and screen in an outside environment, the LRA credits the One-Time Inspection Program for managing the loss of material. The One-Time Inspection Program is intended for components where no significant aging is expected. Since general corrosion is expected to occur in carbon steel in an outside environment, periodic inspection may be more appropriate than a One-Time inspection. The applicant is requested to provide additional justification for use of a One-Time inspection in lieu of periodic inspection for this component.

3.3.2.1.15 Emergency Diesel Generator System

RAI 3.3.2.1.15-1

The LRA identifies that copper alloy in a closed cooling water environment is subject to loss of material. For the heat exchanger components (Table 3.3.2-15, p. 3.3-119), the LRA credits the One-Time Inspection Program in conjunction with the Water Chemistry Control Program for aging management. However, for piping (Table 3.3.2-15, p. 3.3-122), the LRA only credits the Water Chemistry Control Program. The applicant is requested to discuss the different aging management of apparently similar material/environment/AERM.

RAI 3.3.2.1.15-2

In LRA Table 3.3.2-15 for emergency diesel generator system, for most copper alloy or stainless steel components exposed to an air/gas (wetted) environment, the LRA identifies loss of material as the applicable aging effect and credits the One-Time Inspection Program for aging management. However, for ducts and fittings in the intake/exhaust system, and the pipes and valve bodies in the air start system, the LRA also identifies cracking as an applicable aging effect, and credits the One-Time Inspection Program for aging management. The applicant is requested to explain the difference in aging effects for apparently similar material/environment combinations. If the cracking is due to cyclic loading of specific components, justify the use of the One-Time Inspection Program in lieu of periodic inspections, since such cracking may have a long incubation period.

3.3.2.1.19 Liquid Waste and Drains

RAI 3.3.2.1.19-1

Crack initiation and growth are susceptible aging effect on stainless steel components exposed to borated water environment. However, this is not identified as a plausible aging effect in the LRA, Table 3.3.2-19, for the stainless steel piping and valve bodies. The applicant is requested to provide technical basis for excluding this plausible aging effect.

3.3.2.1.21 Potable and Sanitary Water System

RAI 3.3.2.1.21-1

Selective leaching is a plausible aging effect for copper alloy components exposed to raw water. However, this aging effect is not identified, in LRA Table 3.3.2-21, for potable and sanitary water system, for the copper alloy piping and valve bodies exposed to raw water. The applicant is requested to provide technical basis for excluding this aging effect.

3.3.2.1.23 Reactor Makeup Water Storage System

RAI 3.3.2.1.23-1

Crack initiation and growth due to Stress Corrosion Cracking (SCC) may be a plausible aging effect on stainless steel and carbon steel exposed to treated water. However, the LRA does not identify this aging effect on any of the stainless steel or carbon steel components exposed to treated water in the reactor makeup water storage system. The applicant is requested to provide technical basis for excluding this aging effect for the stainless steel or carbon steel components exposed to treated water.

3.3.2.1.24 Sampling System

RAI 3.3.2.1.24-1

LRA Table 2.3.3.24 states that "exchange heat" is an intended function of the sampling system heat exchanger tubes. The tubes may be subject to buildup or deposit of fouling or other degradation that would result in a loss of heat exchange function; however, this aging effect is not identified in the LRA for the heat exchanger tubes in this system. The applicant is requested to provide the technical basis for excluding this aging effect on the heat exchangers.

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