March 22, 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 (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 3.1, Aging Management of Reactor Vessel, Internals, and Reactor Coolant System; Section 3.5, Aging Management of Containments, Structures, and Component Supports; and Section 3.6, Aging Management of Electrical Supports.

These RAIs, in a draft format, have been provided to Mr. Jan Fridrichsen of your staff on March 1, 15, and 16, 2004, respectively. The NRC staff has discussed draft versions of these RAIs, via conference calls, to provide clarifications to the SNC staff on March 15, 16, and 17, 2004, respectively. 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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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 3.1: Aging Management of Reactor Vessel, Internals, and Reactor Coolant Systems

RAI 3.1.2.4-1

LRA Table 3.1.2-4 lists the aging effects of cracking and loss of material for the Alloy 690 TT channel divider plate, primary nozzle dam rings, and steam outlet flow limiter, and credits the Water Chemistry Control Program for aging management of these components during the extended period of operation. However, Table 3.1.2-4 notes that neither the component, nor the material and environment combination is evaluated for these SG components in the GALL report. The staff notes that an inspection program capable of detecting the presence of degradation should also be credited in conjunction with an aging management program. The staff also notes that the adequacy of the Water Chemistry Control Program in managing cracking and loss of material in these components cannot be ascertained without an identification of the responsible aging mechanisms.

The staff requests that the applicant discuss:

a. The program that will be used to detect cracking and loss of material in these SG components,
b. How the program identified in part a. will be used to detect degradation, thereby verifying that the Water Chemistry Control Program alone can effectively manage aging of these components during the period of extended operation (e.g., the Water Chemistry Control Program is augmented with an inspection to detect the aging effects, or the water chemistry control program has a one-time inspection which includes this material/environment combination), and

c. Identify the aging mechanisms responsible for the aging effects listed for these components.

RAI 3.1.2.4-2

There is no aging effect for secondary closure bolting listed on page 3.1-73 of LRA Table 3.1.2-4. In addition, Note 8 to the table states that the secondary handholes are removed to facilitate sludge removal and visual inspection; therefore, loss of bolting preload is not an aging effect requiring management. However, the staff notes that the secondary manholes bolting may still be subjected to loss of prestress.

The staff requests that the applicant provide details (and a technical basis) on how loss of prestress of secondary closure bolting is managed.

RAI 3.1.2.4-3

LRA Table 3.1.2-4 lists the aging effects of cracking and/or loss of material for the feedwater distribution assembly, primary manway covers and disc inserts, tube support plates, flow distribution baffles, and antivibration bars, and credits the Water Chemistry Program for management of these components during the period of extended operation. In addition, the Steam Generator Program is also credited for the management of cracking and loss of material for the feedwater distribution assembly, tube support plates, flow distribution baffles, and antivibration bars.

The staff requests that the applicant provide details (and a technical basis) on how the program(s) credited for the management of cracking and/or loss of material in these steam generator components will detect cracking and/or loss of material.

RAI 3.1.2.4-4

There are no aging effects requiring management listed for the inside environment (i.e., exterior surfaces inside the containment structure) for the feedwater inlet nozzle, secondary shell penetrations, upper head with integral steam nozzles, upper shells, lower shells, and transition cones in LRA Table 3.1.2-4. GALL AMP XI.M10, "Boric Acid Corrosion," states that the program covers any carbon steel and low-alloy steel structure or component on which borated water may leak.

In light of recent events at Davis-Besse that involved the leakage of borated coolant water and subsequent corrosion of a ferrous component, the staff requests that the applicant discuss why loss of material due to borated water leakage was not listed as an aging effect requiring management, and describe the program that will detect and manage borated water leakage and corrosion of the exterior surfaces (exposed to the inside environment) for these steam generator components.

RAI 3.1.2.4-5

The applicant's Steam Generator Program is based on NEI 97-06, and is consistent with GALL Section XI.M19 (Steam Generator Tube Integrity), which is an aging management program that is credited for managing the aging effects of the steam generator tubes and tube plugs. GALL Section XI.M19 recommends preventative measures to mitigate degradation related to corrosion phenomena, assessment of degradation mechanisms, inservice inspection of steam generator tubes to detect degradation, evaluation and plugging or repair, and leakage monitoring to maintain the structural and leakage integrity of the pressure boundary. The applicant also credits its Steam Generator Program to manage the aging effects of secondary-side internals, which are listed in LRA Table 3.1.2-4 and repeated as follows:

- Feedwater distribution assembly (cracking and loss of material)
- Primary moisture separator and sludge collector assembly (loss of material)
- Secondary moisture separator assembly (loss of material)
- Stayrod assemblies (loss of material)
- Tube bundle wrapper and support assembly (loss of material)
- Tube support plates, flow distribution baffles, and anti-vibration bars (cracking and loss of material)
- Tubesheet (loss of material)

Since GALL Section XI.M19 is specific to the aging management of tubes and tube plugs, it is not clear how the steam generator secondary-side internals are managed. Therefore, staff requests that the applicant address the following program elements for the Steam Generator Program:

a. Scope of the program: Clarify that the scope of the Steam Generator Program credited for the management of the aging effects of the steam generator secondary-side internals includes the components listed above.

b. Preventative actions: Discuss how the steam generator secondary-side internals are managed using preventative measures, such as materials selection and component design, so that degradation and failure are prevented or mitigated.

c. Parameters monitored or inspected: Discuss the aspects of the Steam Generator Program that pertain to parameters monitored or inspections performed for signs of degradation of the steam generator secondary-side internals.

d. Detection of aging effects: Discuss how the aging effects will be detected in the steam generator secondary-side internals. Include a discussion of the methods used, such as visual inspection, ultrasonic and eddy current exams, etc., and their technical basis.

e. Monitoring and trending: Discuss how monitoring and trending will be used to detect, in a timely manner, aging effects in the applicant's steam generator secondary-side internals.

f. Acceptance criteria: Discuss how the acceptance criteria that specifies what action that will be taken upon the detection of degradation in the applicant's steam generator secondary-side internals.

g. Operating experience: Provide details of the most recent inspections of the steam generator secondary-side internals to support the assertion that the applicant's program for management of degradation is effective. Include in the discussion the operating experience of other plants with similar steam generator secondary-side internals.

RAI 3.1.2.4-6

The applicant's FSAR states that the Steam Generator Program, used to perform tube surveillance, is in accordance with the Technical Specifications, and that the Steam Generator Program is based on NEI 97-06. The applicant also states that the Steam Generator Program is consistent with the ten attributes of the aging management program GALL Section XI.M19 (Steam Generator Tube Integrity).

However, the FSAR does not describe the management of the aging effects of the steam generator secondary-side internals. The staff requests that the applicant state in the FSAR that the aging effect of steam generator secondary-side internals will be managed in a manner consistent with the attributes described in RAI 3.1.2.4-5.

Section 3.5: Aging Management of Containments, Structures, and Component Supports

RAI 3.5-12

Item 3.5.1-23, Table 3.5.1 (page 3.5-27) of the Farley LRA lists Water Chemistry and monitoring of spent fuel pool water level as aging management programs credited to manage aging of Group 5 liners. FNP stated under the discussion column that AMR results are consistent with NUREG -1801 with some minor exceptions and loss of material due to localized corrosion will be managed by FNP Water Chemistry Control Program. Clarify what is intended by the term "some minor exceptions?" Is spent fuel pool water level monitoring credited as part of the FNP's AMPs for aging management of this item? If not, provide the basis for not crediting the spent fuel pool water level monitoring program as indicated in NUREG -1801, item III A5.2-b (page III A5-10).

Section 3.6: Aging Management of Electrical Components

RAI 3.6.2-2

Exposure of electrical cables to localized environments caused by heat, radiation, or moisture can result in reduced insulation resistance (IR). Reduced IR causes an increase in leakage currents between conductors and from individual conductors to ground. A reduction in IR is a concern for circuits with sensitive, low-level signals such as radiation monitoring and nuclear instrumentation since it may contribute to inaccuracies in the instrument loop. The Farley LRA stated that a representative sample of instrumentation circuit cables with sensitive, high-voltage low-level signals which are installed in adverse localized environments will be tested at least every 10 years. This sampled approach to a small population in this category of sensitive cables is not consistent with previously accepted NRC position documented in Interim Staff Guidance (ISG) 15, "Revision of Generic Aging Lessons Learned (GALL) Aging Management Program (AMP) XI.E2, 'Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits."

During the AMP audit conducted at Southern Nuclear Operating Company (SNC) during the week of November 3, 2003, and by its letter NL-03-2418, dated December 5, 2003, the applicant indicated that it would amend the AMP to include all the instrumentation cables in this population. Provide the revised AMP.

Also, provide a description of the testing program that will be relied upon to detect aging degradation in sensitive, low-level signal circuits.

RAI 3.6.2-3

Surface oxidation of high voltage electrical switchyard bus connections are not considered significant aging mechanism at FNP. In its letter NL-03-2418, dated December 5, 2003, SNC addressed this concern by stating that, based on the operating experience at FNP, the surface oxidation did not affect the function of the conductors and cable accessories. SNC also stated that the connection surfaces were coated with an anti-oxidant compound prior to tightening the connection. Confirm that the anti-oxidant compound is stable, at a minimum, through the period of the extended operation.

RAI 3.6.2-4

The most prevalent mechanism contributing to loss of high voltage transmission conductor strength is corrosion which includes corrosion of steel core and aluminum strand pitting. In its letter NL-03-2418, dated December 5, 2003, SNC addressed the loss of strength caused by aging by referring to an Ontario-Hydro corrosion test which demonstrated satisfactory strength in 80-year old aluminum cable-steel reinforced (ACSR) conductor. Confirm that the conductors in use at FNP are identical to those tested by Ontario-Hydro or provide an evaluation of the differences. Also, indicate the useful life of the transmission conductors and their accessories such as line terminal connectors and line splices used at FNP.

RAI 3.6.2-5

Section 2.2, Table 2.2-1f of the LRA indicates that the non-segregated phase bus duct is included within the scope of license renewal for FNP. In its letter NL-03-2418, dated December 5, 2003, question E17, SNC stated that the term non-segregated buses listed in Table 2.2-1f was the same component as metal enclosed cable bus listed in Table 2.5.1. The applicant stated that its review of metal enclosed cable bus has concluded that no aging effects exist requiring an aging management program.

Industry operating experiences, as documented in Information Notices 89-64, 98-36, 2000-14, and Sandia 96-0344, indicate problems associated with bus ducts. The problems are related to the insulation material deterioration due to aging, moisture/debris intrusion, and bolt loosening due to thermal cycling. The applicant is requested to describe the aging management review that was used to reach its conclusion.

Section 3.6 of LRA did not address the non-segregated phase bus duct. The applicant is requested to describe how it plans to manage the aging effects associated with this equipment.

RAI 3.6.2-6

The FNP FSAR does not describe the electrical system grounding. Are the safety related 4160V and 480V systems solidly grounded or grounded through an impedance? Describe the cable that grounds the system. Is it a bare conductor or insulated? How is the ground connection monitored for the effects of aging, such as corrosion or mechanical wear?

Joseph M. Farley Nuclear Plant

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