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SOUTHERN COMPANY
Energy to Serve Your World℠

June 25, 2004

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NL-04-1096

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Joseph M. Farley Nuclear Plant Units 1 and 2
Application for License Renewal – Requests for Additional Information

Ladies and Gentlemen:

In response to NRC Staff requests, this letter provides supplemental and/or revised information for previously submitted Request for Additional Information (RAI) responses. Also provided are responses to new RAIs 3.5-15 and 3.5-16. This information is provided in the enclosure.

Mr. L. M. Stinson states he is a vice president of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

If you have any questions, please contact Charles Pierce at 205-992-7872.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

L. M. Stinson

Sworn to and subscribed before me this 25 *day of* June *2004.*

Notary Public

My commission expires: April 28, 2007

A099

LMS/JAM/slb

Enclosure: Joseph M. Farley Nuclear Plant, Units 1 and 2
Application for License Renewal – Supplemental Information and
Responses to Requests for Additional Information

cc: Southern Nuclear Operating Company
Mr. J. B. Beasley Jr., Executive Vice President
Mr. D. E. Grissette, General Manager – Plant Farley
Document Services RTYPE: CFA04.054; LC# 14069

U. S. Nuclear Regulatory Commission
Ms. T. Y. Liu, License Renewal Project Manager
Dr. W. D. Travers, Regional Administrator
Mr. S. E. Peters, NRR Project Manager – Farley
Mr. C. A. Patterson, Senior Resident Inspector – Farley

Alabama Department of Public Health
Dr. D. E. Williamson, State Health Officer

ENCLOSURE

Joseph M. Farley Nuclear Plant Units 1 and 2

Application for License Renewal

Supplemental Information and Responses to Requests for Additional Information

RAI 3.6.2-4 – Supplemental Response

(The following request for supplemental information was provided by the NRC staff.)

Follow-up question to the SNC response to RAI 3.6.2-4 provided in SNC letter NL-04-0678 dated April 22, 2004:

The transmission conductors are of aluminum cable - steel reinforced (ACSR). The referenced Ontario-Hydro (O-H) tests acknowledge loss-of-material in the supporting steel reinforcing center of ACSR cables. The applicant is requested to justify why the O-H test envelops the conductors at FNP to demonstrate that the material loss on the FNP ACSR transmission conductors is acceptable for the extended period of operation.

Response

Tests performed by Ontario Hydroelectric showed a 30% loss of composite conductor strength of an 80-year-old ACSR conductor due to corrosion. The National Electrical Safety Code (NESC) requires that tension on installed conductors be a maximum of 60% of the ultimate conductor strength. The NESC also sets the maximum tension a conductor must be designed to withstand under various load requirements, which includes consideration of ice, wind and temperature. These requirements were reviewed concerning the specific conductors used at FNP. The conductors with the smallest ultimate strength margin (4/0 ACSR) will be used as an illustration. FNP is in the light loading zone; therefore, the Ontario Hydroelectric heavy loading zone study is conservative.

The ultimate strength and the NESC heavy load tension requirements of 4/0 ACSR are 8350 lbs. and 2761 lbs., respectively. The margin between the NESC Heavy Load and the ultimate strength is 5589 lb.; i.e., there is a 67% ultimate strength margin. The Ontario Hydroelectric study showed a 30% loss of composite conductor strength in an 80-year-old conductor. In the case of the 4/0 ACSR transmission conductors, a 30% loss of ultimate strength would mean that there would still be a 37% ultimate strength margin between what is required by the NESC and the actual conductor strength in an 80-year old conductor. The 4/0 ACSR conductors have the lowest initial design margin of any transmission conductors used at FNP.

The transmission conductors in scope for license renewal are short spans located entirely within the high voltage switchyard. The spans are approximately 125 feet in length. Therefore, the tension exerted on the conductors is less than would be experienced in typical applications, which could be up to 1000 feet in length.

The Ontario Hydroelectric test envelops the conductors at FNP, and based on the conservatism in strength margin, demonstrates that the material loss on the FNP ACSR transmission conductors is acceptable for the period of extended operation. This illustrates with reasonable assurance that transmission conductors at FNP will have ample strength margin to perform their intended function throughout the renewal term and do not require an aging management program.

RAI 3.6.2-6 – Supplemental Response

(The following request for supplemental information was provided by the NRC staff.)

Follow-up question to the SNC response to RAI 3.6.2-6 provided in SNC letter NL-04-0678 dated April 22, 2004:

The applicant states the electrical system [neutral] ground as similar to the equipment [safety] ground. Loss of the 4160 volt system ground at either the transformer neutral or at the diesel generators neutral could result in the voltage on the power cables being raised from line-to-neutral voltage of 2400 volts to the line-to-line voltage of 4160 volts. How is loss of the system (neutral) ground detected? What about aging of the grounding resistor? The 4160 volt system is a supporting system for the accident analysis mitigating systems.

This follow-up question was clarified in a telephone conference with the staff on June 10, 2004 where the NRC staff indicated that the existence of differential protection for the start-up transformers and diesel generators would provide adequate assurance that the 4160 volt insulation system was protected with the loss of the system ground.

Response

Detection of a loss of the system ground at the start-up transformers or emergency diesel generators is not provided. However, differential protection is provided for all four start-up transformers and all five emergency diesel generators. Therefore, a line-to-line fault on the 4kV system would be detected and cleared by the automatic operation of circuit breakers.

RAI B.5.2-3 - Supplemental Response

(The following request for supplemental information on the Flux Detector Thimble Tube Inspection Program was provided by the NRC staff.)

Follow-up question (revised based on telecon on 6/7/04) to the SNC response to RAI B.5.2-3 provided in SNC letter NL-04-0617 dated April 16, 2004:

For the Unit 2 thimble tubes, the staff requests the following information to support that an inspection frequency of once every other refueling outage is reasonable:

a. worst case adjusted amount of wear used for the wear rate projection that supported an inspection frequency of once every other refueling outage, including a quantitative clarification of what NDE uncertainty value (as a percentage of the total thimble tube wall thickness) was used to adjust the amount of wear in the calculation;

b. clarification of what the thimble tube thickness is;

c. a statement that for the projection of wear, the applicant used the equation in Proprietary WCAP-12866 as the basis for projecting the wear to the next inspection outage, and that plant specific wear data applicable to the Farley thimble tubes was used to curve fit the equation and establish the curve coefficient. Specify what the amount of projected wear is for the Unit 2 thimble tubes using the Westinghouse equation (Note to SNC: only if Westinghouse agrees that it is non-proprietary, then the applicant is requested to provide the coefficient value for the wear rate equation.)

For the Unit 1 thimble tubes, since SNC has not yet performed two inspections of the new tube materials (the next one is in 2006), the staff requests that the applicant provide a commitment to submit the same information being requested for the Unit 2 tubes after the applicant performs the second inspection of the new Unit 1 thimble tubes in 2006. The staff requests that the applicant's Unit 1 submittal discuss the technical basis for establishing the inspection frequency that will be implemented after performing the second examination of the new tube materials.

Response

For the Unit 2 flux detector thimble tubes:

a. The worst case cumulative wear (for thimble tubes which have not been repositioned or capped) from the most recent Unit 2 inspection (U2R15) data (adjusted for uncertainty) was 58.8% for thimble tube J03 at 985.94" from the seal table. A 5% allowance for instrument error was applied to the measured wear data.

b. Nominal wall thickness of the Unit 2 thimble tubes is 0.049 +/- 0.002 inches.

c. For FNP, the methodology provided in Proprietary Class 2 WCAP-12866 is used to project thimble tube wear at the end of future operating cycles. Unit-specific measured wear data is adjusted for uncertainty and is input to the WCAP-12866

methodology to establish the curve coefficient (i.e., exponent "n") and determine the curve-fit representing thimble tube wear over time. The next inspection is scheduled for an outage before any thimble tubes are projected to exceed the acceptance criteria for wall loss, with consideration of plant and industry experience with thimble tube wear. This process is repeated after each inspection, therefore the inspection interval is re-evaluated after each inspection.

The curve coefficient (i.e., exponent "n") used in the latest projection of flux thimble tube wear was 0.302. Applying an exponent of 0.302 to the WCAP-12866 formula leads to a multiplier of approximately 1.022 to project wear at the end of cycle 16, and 1.043 to project wear at the end of cycle 17. For the worst case cumulative wear (for thimble tubes which have not been repositioned or capped) from the U2R15 inspection, this equates to wear projections of 60.10% at the end of cycle 16, and 61.33% at the end of cycle 17.

LRA Appendix B, Section B.5.2.12, indicated that no Unit 2 flux thimble tubes would require repositioning or capping based on the latest data, and the initial response to RAI B.5.2-3 noted that the next Unit 2 eddy current inspection was scheduled for U2R17 (Fall '05). During U2R16 (Spring '04), five thimble tubes were re-positioned and one was capped. SNC is currently considering the option of eliminating the eddy current inspection scheduled for U2R17 based on the additional margin provided by the repositioning and capping. This would allow Unit 2 to operate until U2R18 without further eddy current inspection. The Unit 2 thimble tubes will be inspected or replaced at U2R18. The decision to eliminate the U2R17 eddy current inspection will include evaluation of thimble tube wear projections performed in accordance with the WCAP-12866 methodology.

For the Unit 1 flux thimble tubes:

SNC commits to submit to the NRC the same information on the new Unit 1 flux thimble tubes requested for the Unit 2 tubes, after the second inspection (during U1R20 in 2006) and wear projection analysis is completed.

Specifically, SNC will submit the following information on the Unit 1 flux thimble tubes:

- The worst case cumulative wear from the U1R20 flux thimble tube eddy current inspection.
- The uncertainty applied to the actual measured wear data.
- The thimble tube wall thickness.
- The schedule for the next Unit 1 flux thimble tube inspection (inspection interval).
- The projected wear value for the worst case wear location at the end of the next inspection interval.
- A discussion of the technical basis for establishing the inspection interval that will be implemented after performing the U1R20 flux thimble tube eddy current inspection of the new tube materials. The discussion will address the use of the equation in Proprietary WCAP-12866 and the unit-specific wear data in projecting the wear to the next inspection outage. The curve coefficient (i.e., exponent "n") used in the projection of flux thimble tube wear will be provided.

The FNP License Renewal Future Action Commitments List will be updated accordingly.

RAI B.5.1-3 - Supplemental Response

(This is provided as supplemental information to SNC's response to RAI B.5.1-3 submitted in letter NL-04-0715 dated April 29, 2004.)

A telephone conference was held with the NRC staff on June 21, 2004 to discuss the definition of enhanced VT-1 examination in regards to the Reactor Vessel Internals Program. In the telephone conference, the staff requested SNC provide this information in a supplemental response.

Response

For the FNP Reactor Vessel Internals Program, SNC intends to use the definition for Enhanced VT-1 (EVT-1) examination adopted by the EPRI Materials Reliability Program (MRP) Reactor Internals Issue Task Group (RI-ITG). Currently, the EPRI Materials Reliability Program RI-ITG definition is provided in MRP-99, "Strategies for Managing Aging Effects in PWR Vessel Internals - Interim Update." MRP-99 adopts the examination requirements of BWRVIP-03, which describes EVT-1 as a visual examination method where the equipment and environmental conditions are such that a ½ mil detection resolution can be demonstrated against a neutral gray background. BWRVIP-03 demonstration protocols have been approved by the NRC staff in a safety evaluation regarding BWRVIP-03 and approved for license renewal in NUREG-1801, Section XI.M9, "BWR Vessel Internals."

Additionally, as stated in our response to RAI B.5.1-3 in SNC letter NL-04-0715 (dated April 29, 2004), the scope, inspection requirements (inspection locations, methods, qualifications, and frequencies), acceptance criteria, and corrective actions for the Reactor Vessel Internals Program will be based on the results of industry initiatives intended to clarify the nature and extent of aging mechanisms potentially affecting the reactor vessel internals. Therefore, the examination methods proposed, including the definition for EVT-1 examination, could change as a result of the industry initiatives.

RAI 3.5-15

In its response to RAI 2.3.3.13-2, the applicant asserted that cable fire wrap and fire stops consisting of Kaowool and Maranite situated in an inside environment have no aging effect requiring management, therefore, no AMP is required for the components (refer to the last table provided on page E2-19 of Enclosure 2 to SNC's letter dated April 7, 2004). The applicant is requested to provide additional information including vendor provided or lab tested material aging data of both the Kaowool and Maranite materials, and plant specific operating experience based aging data for the same in order to support the above assertion.

Response

Additional information is provided, in the form of vendor provided aging data and plant specific aging data, for Kaowool and Marinite materials. (Note that "Marinite" was misspelled as "Maranite" in the response to RAI 2.3.3.13-2.)

Vendor data indicates that Kaowool is an inorganic ceramic fiber material that is very stable under normal and extreme plant temperatures and common plant conditions, and does not exhibit age related degradation. It is produced from kaolin, provided as a fire proof insulation blanket intended for the physical separation of divisional electrical cables. Kaowool offers excellent handleability and high temperature stability. It has a melting point of 3200° F and a continuous use limit of 2000° F. Kaowool does not contain organic binders, provides excellent resistance to chemical attack (except hydrofluoric and phosphoric acid and strong alkalies such as Na_2O and K_2O) and thermal properties are unaffected by oil or water, after drying.

Vendor data indicates that Marinite boards are very durable, hard surfaced boards that do not exhibit age related degradation under normally expected plant environments and conditions. Marinite boards are incombustible structural insulation material formed from calcium silicate with inert fillers and reinforcing agents. These boards, usually ranging in thickness from ½ inch to 2 inches, can be cut or machined from 4' x 8' panels into various shapes and sizes and erected as barriers to provide fire safety and temperature control. They are frequently used in fire safety applications such as fire stops, fire walls, cable trays and fire doors. Marinite structural insulation is highly damage-resistant, non-corroding, and extremely water-resistant. Marinite has a melting point greater than 2300° F and is stable under normal ambient conditions.

A review of specific plant operating experience does not indicate any instances of age related degradation of Kaowool fire wrap or Marinite fire stops.

RAI 3.5-16

In its response to RAI 2.3.3.13-3, the applicant states, as part of its proposed 'Plant specific note 48' (refer to the last paragraph of page E2-20 of the same reference), that the sprayed-on or troweled-on fire resistive material has no aging effects requiring aging management. The applicant is requested to provide pertinent vendor generated or lab tested data as well as plant specific operating experience based aging data for the sprayed-on or troweled-on fire resistive material to further support the above statement.

Response

The fire resistive material applied to the structural steel and doors referred to in RAI 2.3.3.13-3 include Monokote and Albi Clad 89S. Vendor data indicates that these fire resistive materials are very durable and stable materials under normally expected plant environments and conditions. Vendor information indicates that Monokote is a cementitious material that bonds tightly to steel surfaces, forming a hard surface that does not spall, dust or flake. Testing per ASTM E937 indicates that Monokote does not promote corrosion. The vendor data states that Albi Clad 89S is a fire retardant intumescent mastic that dries to a hard, durable finish. Both Monokote and Albi Clad have undergone testing that demonstrates their fire resistance.

A review of plant specific operating experience does not indicate any instances of age related degradation of fire resistive material on structural steel components. The Structural Monitoring Program inspects the structural steel and doors with the fire resistive material and would detect degradation of the fire resistive material coating.