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SOUTHERN COMPANY
Energy to Serve Your World℠

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NL-04-1486

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 – Supplemental Information

Ladies and Gentlemen:

In response to NRC Staff requests, this letter provides supplemental information for the review of the Joseph M. Farley Nuclear Plant, Units 1 and 2, License Renewal Application. Descriptions of the specific requests and the SNC responses are 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 19th *day of* August *, 2004.*

Notary Public

My commission expires: 06-07-05

LMS/JAM/slb

A099

Enclosure: Joseph M. Farley Nuclear Plant, Units 1 and 2
Application for License Renewal – Supplemental 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# 14119

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

Audit Followup Question Concerning CASS Thermal Embrittlement

In Table 3.1.1-24 of the FNP LRA, the applicant stated that no program is needed to manage loss of fracture toughness of the FNP reactor coolant system CASS piping and fittings due to thermal embrittlement. The applicant also stated that FNP has updated the original leak before break analyses to address the period of extended operation, and that the results of this calculation update indicate that adequate margin exists between the critical crack size and the postulated crack size that yields a detectable leak rate.

The staff acknowledges that updating the leak before break analyses validate and demonstrate the leak before break for the period of extended operation. However, the leak before break analyses do not demonstrate the effects of aging will be adequately managed as required by 10CFR54.21(a)(3). The GALL report recommends that either enhanced volumetric examination or flaw tolerance evaluation be performed to manage the aging effects for CASS components.

Leak Before break analysis is not a flaw tolerance evaluation. The flaw postulated in the leak before break analysis is a through-wall flaw that, under the applicable loading combination, yields a detectable leak rate. The flaw tolerance evaluation is to determine the allowable flaw which is a partial through wall flaw with no leak at all. The applicant is requested to explain how the leak before break analyses can be taken as the flaw tolerance evaluation which manages this aging effect. Otherwise, the applicant is requested to identify which alternative, enhanced volumetric examination or flaw tolerance evaluation will be used to manage this aging effect during the period of extended operation.

Response

Consistent with NUREG-1801 Section XI.M12, SNC will use enhanced volumetric examination or a flaw tolerance evaluation to demonstrate cast austenitic stainless steel (CASS) piping components potentially susceptible to thermal embrittlement have adequate fracture toughness.

In Table 3.1.1 item 24, the first paragraph in the "Discussion" column should be deleted and the fourth and fifth paragraph replaced with the following:

> "For cast austenitic stainless steel piping components potentially susceptible to thermal embrittlement, either enhanced volumetric examinations as part of the Inservice Inspection Program (Appendix B.3.1) or a plant or component specific flaw tolerance evaluation (considering reduced fracture toughness and specific geometry and stress information) will be used to demonstrate that the thermally-embrittled material has adequate fracture toughness consistent with NUREG-1801 Section XI.M12."

In LRA Table 3.1.2-3 (LRA page 3.1-60), the CASS "Piping, Class 1 (Reactor Coolant Loop)" component type is revised to include loss of fracture toughness as an aging effect in the borated water environment. The associated NUREG-1801 Volume 2 Item is "IV.C2.1-f" and the Table 1 Item is "3.1-24." The aging management program is as discussed above and is consistent with GALL (Note A).

NRC Question:

In the FNP LRA Table 3.1.1-25, applicant states the FNP replacement SG feedwater inlet and main steam outlet nozzle are fabricated from alloy steel and carbon steel. The applicant also states that these alloy steel components are much less susceptible to FAC than carbon steel components.

NSAC-202L states that FAC is known to occur in piping systems made of carbon steel and low-alloy steel with flowing water or wet steam. Please provide the material information and justification for exclusion of FAC for the SG components (FW inlet & steam outlet nozzles & safe end, etc).

Response:

Please note that FNP LRA Table 3.1.1-25 states the feedwater inlet and main steam outlet nozzles for the replacement steam generators (SGs) are fabricated from alloy steel, not carbon steel.

The alloy material specification applicable to the replacement SG feedwater inlet and main steam outlet nozzle is ASME SA-508 Class 3.

FAC is not a concern for the replacement SG main steam outlet nozzle. Dry steam is not a concern for flow-accelerated corrosion (FAC). Removal of the oxide layer due to FAC will only occur in the presence of moisture. The steam exiting the replacement SG main steam outlet nozzle is dry (less than 0.1% moisture content), therefore no significant FAC can occur.

A review of the fluid conditions, operating experience and nozzle material has concluded FAC is also not a concern for the replacement SG feedwater inlet nozzle. The subcooled, single phase nature of the fluid entering the SG feedwater inlet nozzle is less conducive to FAC than areas of two phase flow. The chemistry and temperature of the feedwater system at this point is such that FAC rates, even in the more susceptible carbon steel feedwater piping components, are very low. None of the feedwater piping inside containment has required replacement due to FAC. The replacement SG feedwater nozzle SA-508 Class 3 alloy steel material (which includes molybdenum) provides increased resistance to FAC as compared to carbon steel. The fluid velocity at the steam generator nozzle is lower than in the feedwater piping (16-inch SG feedwater nozzle versus 14-inch feedwater piping) which also decreases the relative FAC rate of the SG feedwater nozzle (versus the feedwater piping). The operating experience at FNP indicates FAC is not a concern at the SG feedwater nozzle locations during the period of extended operation.