Southern Nuclear Operating Company, Inc.
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, Alabama 35201-1295

Tel 205.992.5000

SOUTHERN COMPANY

February 3, 2012

Docket Nos.: 50-348
50-364

NL-12-0016

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

Joseph M. Farley Nuclear Plant
Response to NRC Request for Additional Information on License Amendment Request for Technical Specification Table 3.3.1-1 in Response to Westinghouse NSAL 09-01, Rod Withdrawal at Power

Ladies and Gentlemen:

By letter to the U.S. Nuclear Regulatory Commission (NRC) dated September 9, 2011 (Agencywide Documents Access and Management System (ADAMS), Accession No. ML112521438), Southern Nuclear Operating Company, Inc., (SNC) submitted a license amendment request for TS Table 3.3.1-1, "Reactor Trip System Instrumentation," Function 3, "Power Range Neutron Flux High Positive Rate." The change adds Surveillance Requirement 3.3.1.14 which requires verification that the response time is within limits every 18 months on a STAGGERED TEST BASIS. On December 1, 2011, the NRC provided SNC with a Request for Additional Information (RAI), letter (ML11327A065), containing 4 questions regarding license amendment request.

The Enclosures to this letter contain SNC's response to this request.

This letter contains no NRC commitments. If you have any questions, please contact Jack Stringfellow at (205) 992-7037.

Mr. M. J. Ajluni states he is Nuclear Licensing Director 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.

Respectfully submitted,

Mark J Ajluni

M. J. Ajluni
Nuclear Licensing Director

Sworn to and subscribed before me this 3 *day of* Feb, *2012.*

Notary Public

My commission expires: 11-02-2013

MJA/DWM/lac

Enclosures:
1. Response to Request for Additional Information RAI Regarding License Amendment Request for Technical Specifications (TS) Table 3.3.1-1
2. Unit 1 Data
3. Unit 2 Data

cc: Southern Nuclear Operating Company
Mr. S. E. Kuczynski, Chairman, President & CEO
Mr. D. G. Bost, Vice President & Chief Nuclear Officer
Mr. T. A. Lynch, Vice President - Farley
Mr. B. L. Ivey, Vice President-Regulatory Affairs
Mr. B. J. Adams, Vice President-Fleet Operations
RTYPE: CFA04.054

U. S. Nuclear Regulatory Commission
Mr. V. M. McCree, Regional Administrator
Mr. R. E. Martin, NRR Project Manager – Farley
Mr. E. L. Crowe, Senior Resident Inspector – Farley

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

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Enclosure 1

Response to Request for Additional Information RAI Regarding License Amendment Request for Technical Specification (TS) Table 3.3.1-1

RAI 1:

License Amendment Request (LAR) dated September 9, 2011 (Agency wide Documents Access and Management System Accession No. ML 112521438), Section 3 of Enclosure 2 states that the response time testing acceptance criteria are included in the Final Safety Analysis Report (FSAR), Chapter 16. However, Chapter 16 of the FNP FSAR describes the Technical Specifications (TS) for seismic instrumentation, meteorological instrumentation, containment hydrogen monitors, and the Technical Requirements Manual. Note that FSAR Table 7.2-5, "Reactor Trip System Instrumentation Response Times," lists the response time for this function as "N/A" [not applicable]. To support the Nuclear Regulatory Commission (NRC) staff's review, please identify:

a. Where the response time criteria is included in the FSAR.

b. The current FNP response time for the power range neutron flux high positive rate trip (PFRT).

SNC Response:

a. The response time criteria will be added to FSAR Table 7.2-5, "REACTOR TRIP SYSTEM INSTRUMENTATION RESPONSE TIMES."

b. The power range neutron flux high positive rate trip response time is not currently measured. The data below is from pre-op testing.

Unit 1 data – Enclosure 2

Table 2 data sheet information is labeled as follows:

- Sensor signal transmission time was recorded in Column "A" (sensor to rack time not included, therefore N/A) (Enclosure 2 page 2)
- Signal processing time, including process cabinet input to Undervoltage (UV) card output, was recorded in Column "B" (Enclosure 2 page 2)
- Automatic reactor trip breaker time from UV coil de-energization to actual Reactor Trip Breaker (RTB) opening , was recorded for each train in spaces designated Train A – "C" and Train B – "C" (Enclosure 2 page 1)
- RTB opening to loss of control rod stationary gripper voltage was recorded in the spaces marked "D" (Enclosure 2 page 1)
- The overall automatic reactor trip time was computed as follows:
  - Train "A" Reactor Trip Time = Sensor Time "A" + process time "B" + Train "A" UV to RTB trip time "C" + RTB open to loss of gripper

voltage time "D" = Total (Train "C" + "D" are combined in table to calculate "X" (Enclosure 2 page 2)

- Train "B" Reactor Trip Time = Sensor Time "A" + process time "B" + Train "B" UV to RTB trip time "C" + RTB open to loss of gripper voltage time "D" = Total (Train "C" + "D" are combined in table to calculate "Y" (Enclosure 2 page 2)

- Worst case total response time: Enclosure 2 page 2 - 0.235 sec

Train A: "C" 0.07 + "D" 0.020 = Train UV to Gripper Total "X" 0.090
Train B: "C" 0.07 + "D" 0.025 = Train UV to Gripper Total "Y" 0.095

Power Range Hi Flux - Positive	A	B	Total	Total + X = Total Tr. A	Total + y = Total Tr. b
41U	N/A	0.115	0.115	0.205	0.210
42U	N/A	0.100	0.100	0.190	0.195
43U	N/A	0.10	0.10	0.190	0.195
44U	N/A	0.14	0.14	0.230	0.235

Unit 2 data – Enclosure 3

- Enclosure 3 Page 1 signal processing time (representative) - 0.009 sec
- Enclosure 3 Page 2 UV to RTB trip time (worst case) - 0.091 sec
- Enclosure 3 Page 3 RTB opening to loss of gripper voltage (worst case) – 0.019 sec
- Total response time: 0.009 + 0.091 + 0.019 sec = 0.119 sec

RAI 2:

The LAR states that FNP had reviewed pre – operational test data and confirmed the response time of the nuclear instrumentation system (NIS) and solid state protection system (SSPS) for the PFRT. This response time has to be evaluated against the allocated time for processing the PFRT trip signal from the NIS to the SSPS. To support the NRC staff's review, please identify this allocated time, and provide a copy of any reference material documenting the basis for this allocation.

SNC Response:

The measured time(s) are provided above. A copy of the reference materials are included as Enclosures 2 and 3 to this letter. The total function response time limit is ≤ 0.65 second as documented in our original submittal dated September 9, 2011 (ML112521438).

RAI 3:

LAR Section 3 of Enclosure 2 states that the reactor coolant system (RCS) overpressure specific analyses performed for FNP, which addressed the potential for control rod bank withdrawal during power operation (RWAP), takes credit for a PFRT function at or below 9% of rated thermal power (RTP) with a lag time constant of 2 seconds and a trip delay of 0.65 seconds. This demonstrated that the RCS overpressure limit listed in the TSs is not exceeded. Previous RWAP RCS overpressure analyses have assumed an initial power level of 10 % RTP, minus calorimetric uncertainty. To support the NRC staff's review, please provide the following information:

a. As stated above, the analysis performed for FNP takes credit for a Safety Analysis Limit (SAL) at or below 9% of RTP for the PFRT. Please explain how the SAL relates to the Allowable Value (AV) and Nominal Trip Setpoint (NTS). Also, please provide the basis for establishing the AV of 5.4% RTP and the NTS of 5% RTP.

b. Explain if sufficient margin exists to the NTS when considering uncertainties to ensure that the 9% of RTP SAL would be protected by the current NTS and AV.

SNC Response:

The Nominal Trip Setpoint (NTS) of 5.0% RTP and the Allowable Value (AV) 5.4% for Function 3, Power Range Neutron Flux- High Positive Rate contained in TS Table 3.3.1-1 were not calculated from the 9.0% RTP Safety Analysis Limit (SAL), since there were no analyses that took explicit credit for this function. The NTS and AV were determined generically, by considering the typical uncertainties associated with this function, i.e., no margins or Total Allowance (TA) for this channel were determined. The Power Range Neutron Flux- High Positive Rate reactor trip function is now explicitly credited in the Rod Withdrawal at Power analysis to address RCS overpressurization as discussed in NSAL-09-1. Therefore the TA for this channel was reviewed to determine if sufficient margin to the NTS exists when considering uncertainties to ensure that the 9% RTP SAL would be protected by the current NTS and AV. It has been confirmed that sufficient TA for this channel exists such that sufficient margin to the NTS exists when considering uncertainties to ensure that the 9% RTP SAL would be protected.

RAI 4:

Surveillance Requirement 3.3.1.14 requires verifying that the reactor trip system response times are within limits every 18 months on a STAGGERED TEST BASIS. Explain how the proposed 18-month surveillance frequency provides sufficient safety margins for the system channel response time.

SNC Response:

SR 3.3.1.14 verifies that the individual channel/train actuation response times are less than or equal to the maximum values assumed in the accident analysis. Response time testing acceptance criteria are included in FNP FSAR, Chapter 7. Individual component response times are not modeled in the analyses. The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the trip setpoint value at the sensor to the point at which the equipment reaches the required functional state (i.e., control and shutdown rods fully inserted in the reactor core). For channels that include dynamic transfer functions (e.g., lag, lead/lag, rate/lag, etc.), the response time test may be performed with the transfer function set to one or with the time constants set to their nominal value. The results must be compared to properly defined acceptance criteria. The response time may be measured by a series of overlapping tests such that the entire response time is measured. Response time may be verified by actual response time tests in any series of sequential, overlapping, or total channel measurements; or by the summation of allocation sensor, signal processing, and actuation logic response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) in place, onsite, or offsite (e.g., vendor) test measurements, or (3) using vendor engineering specifications. WCAP-13632-P-A Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for specific sensors identified in the WCAP. Response time verification for other sensor types must be demonstrated by test.

WCAP-14036-P Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," provides the basis and methodology for using allocated signal processing and actuation logic response times in the overall verification of the protection system channel response time. The allocations for sensors, signal conditioning, and actuation logic response times must be verified prior to placing the component in operational service and reverified following maintenance that may adversely affect response time. In general, electrical repair work does not impact the response time provided the parts used for repair are of the same type and value. Specific components identified in the WCAP may be replaced without verification testing. One example where response time could be affected is replacing the sensing assembly of a transmitter. As appropriate, each channel's response must be verified every 18 months on a STAGGERED TEST BASIS. Testing of the final actuation devices is included in the testing.

Response times cannot be determined during unit operation because equipment operation is required to measure response times. Experience has shown that these components usually pass this surveillance when performed at the 18 month Frequency. This is consistent with the rest of the Reactor Trip System signals Response Time Tests. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

Joseph M. Farley Nuclear Plant
Response to NRC Request for Additional Information on License Amendment Request for Technical Specification Table 3.3.1-1 in Response to Westinghouse NSAL 09-01, Rod Withdrawal at Power

Enclosure 2

Unit 1 Data

Enclosure 2 - Page 1

TABLE 2

REACTOR PROTECTION TIME RESPONSE

DATA ACCUMULATION

Train A - "C" .07 + "D" .020 = Train U.V. to Gripper Total "X" .090

Train B - "C" .07 + "D" .025 = Train U.V. to Gripper Total "Y" .095

NOTE: All times in seconds. Steps keyed to Table 1.

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	Trip Parameter	A + B = Total			Total + X = Total Tr. A	Total + Y = Total Tr. B	Allowed	Allowed-each Total ≥0	Initials
2104	1. Source range hi flux								
	a. NC-31P	N/A	.0376	.0376	.1276	.1326	N/A		3-16-77
	b. NC-32P	N/A	.075	.075	.165	.170	N/A		3-16-77
2027	2. Intermediate range hi flux								
	a. NC-35P	N/A	.0225	.0225	.1125	.1175	N/A		3-16-77
	b. NC-36P	N/A	.0125	.0125	.1025	.1075	N/A		3-16-77
0027	3. Power range low setpoint hi flux								
	a. NC-41P	N/A	.0100	.0100	.100	.105	0.5	Yes	3-16-77
	b. NC-42P	N/A	.0175	.0175	.1075	.1125	0.5	Yes	3-16-77
	c. NC-43P	N/A	.0125	.0125	.1025	.1075	0.5	Yes	3-18-77
	d. NC-44P	N/A	.0095	.0095	.0995	.1045	0.5	Yes	3-18-77

Enclosure 2 - Page 2

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TABLE 2

REACTOR PROTECTION TIME RESPONSE

DATA ACCUMULATION

Trip Parameter	A + B = Total	Total + X = Total Tr. A	Total + Y = Total Tr. B	Allowed	Allowable Total 2.0	Initials
a. Power range high setpoint hi flux						
a. NC-41R	N/A .000 .000	.100	.1050	0.5	Yes	A 3-16-77
b. NC-42R	N/A .0125 .0125	.1025	.1875	0.5	Yes	A 3-16-77
c. NC-43R	N/A .0100 .0100	.100	.1050	0.5	Yes	A 3-18-77
d. NC-44R	N/A .0100 .0100	.100	.1050	0.5	Yes	A 3-18-77
b. Power range hi flux rate (positive)						
a. NC-41U	N/A .0115 .0115	.205	.210	N/A		A 3-17-77
b. NC-42U	N/A .000 .000	.190	.195	N/A		A 3-16-77
c. NC-43U	N/A 0.10 0.10	.190	.195	N/A		A 3-18-77
d. NC-44U	N/A 0.14 0.14	.230	.235	N/A		A 3-18-77
c. Power range hi flux rate (negative)						
a. NC-41K	N/A .08 .08	.17	.175	0.5	Yes	A 3-17-77
b. NC-42K	N/A .076 .076	.166	.171	0.5	Yes	A 3-17-77

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Enclosure 3

Unit 2 Data

Enclosure 3 - Page 1

INSTRUMENT GROUP 1 TRAIN A FUNCTION: Power Range Trips

DATA SHEET 1 OF 22 REACTOR TRIP & ESF LOGIC DATE 3-20-81

PROTECTION SET I REV. 0 PERFORMED BY P.C/D.H./L.E

CHANNEL UNDER TEST	TEST JACK	TEST POINT	LOCATION	RECORDER CHANNELS CHANNEL	DEVICE	CONNECTION	SIGNAL INPUT	TIME RESPONSE
N41 (Low)	N/A	N/A	N41	1 2	INPUT UV COIL	TP301 TB508-1(+) TB508-2(-)	Step change up of 10% from 20% to 30%	.012 sec
N41 (Hi)	N/A	N/A	N41	1 2	INPUT UV COIL	TP301 TB508-1(+) TB508-2(-)	Step change up of 10% from 104% to 114%	.012 sec
N41 (Neg Rate)	N/A	N/A	N41	1 2	INPUT UV COIL	TP302 TB508-1(+) TB508-2(-)	Step change down of 20% from 20% to 0%	.043 sec
N41 (Pos Rate)	N/A	N/A	N41	1 2	INPUT UV COIL	TP302 TB508-1(+) TB508-2(-)	Step change up of 20% from 0% to 20%	.009 sec

SPECIAL INSTRUCTIONS:

(1) Trip TS/412L (C1-424) and TS/412M (C1-424) to defeat ΔT trips.
(2) Input connection is located on the inside front of the power range d drawer under test
(3) One additional NI channel must be tripped for each power range trip.

058-5-003

Rtype G08.005

FNP-2-STP-256.11A
Rx Trip & ESFAS Logic RTT, Instr Gp 1
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RX TRIP LOGIC

TABLE 3
RESPONSE TIME
LOSS OF UV VOLTAGE TO BREAKERS TRIP

	1ST RUN CYCLES	2ND RUN CYCLES	3RD RUN CYCLES	AVERAGE CYCLES	AVERAGE SECONDS
RTB B	5.9	5.3	5.3	5.5	0.091 (0.0913)
BYB A	5.75	5.3	5.3	5.45	0.091 (0.0906)

Enclosure 3 - Page 3

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DATA SHEET 10

RESPONSE TIME
BREAKER OPENING TO LOSS OF SG VOLTAGE

Power Cabinets 1AC/2AC/1BD/2BD

	RTA	BYB	RTB	BYA
Run #1	14.5 ms	12.0 ms	9.5 ms	9.5 ms
2	16.0	15.0	19.0	17.0
3	14.5	12.0	17.0	15.0
Ave.	15.0 ms	13.0 ms	15.2 ms	13.8 ms

Linda T. Hagan 9-29-80

Power Cabinets 1BD/2BD

	RTA	BYB	RTB	BYA
Run #1				
2				
3				
Ave.				

TDDS #4

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