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June 4, 1985

Docket Nos. 50-348
50-364

Director, Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Mr. S. A. Varga

Joseph M. Farley Nuclear Plant - Units 1 and 2
Response to NRC Draft Technical Evaluation
Report for Item 1.2 of Generic Letter 83-28

Gentlemen:

By letter dated May 10, 1985, the NRC issued a draft Technical Evaluation Report (TER) for Item 1.2 of Generic Letter 83-28. Attached is the Alabama Power Company response to the subject TER.

If there are any questions, please advise.

Yours very truly,

R. P. McDonald

RPM/RGW:ddb-D48
Attachment

cc: Mr. L. B. Long
Mr. E. A. Reeves
Mr. W. H. Bradford
Dr. J. N. Grace

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Attachment

NRC Concern:

The sequence of events and time history recording equipment should monitor sufficient digital and analog parameters, respectively, to assure that the course of the reactor trip can be reconstructed. The parameters monitored should provide sufficient information to determine the root cause of the reactor trip, the progression of the reactor trip, and the response of the plant parameters and systems to the reactor trip. Specifically, all input parameters associated with reactor trips, safety injections and other safety-related systems as well as output parameters sufficient to record the proper functioning of these systems should be recorded for use in the post-trip review. The parameters deemed necessary, as a minimum, to perform the post-trip review (ones that would determine if the plant remained within its design envelope) are presented in Tables 1.2-1 and 1.2-2. If the applicants' or licensees' SOE recorders and time history recorders do not monitor all of the parameters suggested in these tables, the applicant or licensee should show that the existing set of monitored parameters are sufficient to establish that the plant remained within the design envelope for the appropriate accident conditions; such as those analyzed in Chapter 15 of the plant Final Safety Analysis Report.

APCo Response:

The November 4, 1983 APCo response to Section 1.2 of Generic Letter 83-28 contained a narrative description of the Post-Mortem Review Program, however, a listing of the analog parameters monitored was not submitted. Table A contains a listing of the analog parameters monitored for the Post-Mortem Review Program.

Also included in the November 4, 1983 APCo submittal was a listing of the SOE parameters monitored at Farley Nuclear Plant. The SOE Program print capability has subsequently been expanded to include all solid state protection system part reactor trip inputs. These additional parameters are listed in Table B. These additional parameters, in conjunction with the SOE parameters submitted in the November 4, 1983 response, should address all the parameters identified in Table 1.2-1 of the Technical Evaluation Report with the exception of control rod position; containment radiation; containment sump level; safety injection flow and pump/valve status; MSIV position; auxiliary feedwater system flow and pump/valve status; and PORV position. The following information, although not associated with the Sequence of Events and Post-Mortem Review Programs, is submitted to support alternate trip review capabilities for those parameters.

1) Control Rod Position

Equivalent time history recording capability is provided by combination of the rod position and redundant measurements programs. The combination of these programs provides a rod vs. rod and rod vs. bank deviation comparison based upon a twelve (12) step cluster limit. This position monitoring and deviation comparison is performed at periodic intervals or upon detection of

1) Control Rod Position (continued)

a rod position change input from the Digital Rod Position Indication system. When a deviation condition exists, rod deviation annunciation and hard copy printout is supplied to the control room. Upon detection of a reactor trip event, deviation comparison is suppressed for ten (10) seconds to prohibit nuisance alarms due to rod travel through the core. Deviation comparison is then resumed at the end of this ten (10) second interval. The deviation comparison can be used by plant personnel to evaluate a stuck, dropped or misaligned rod condition.

"Rod on Bottom" indication is provided to the operator(s) by a periodically scanned digital input to the plant computer. This input is processed for changes in state approximately every two (2) seconds with changes logged to the alarm typewriter.

2) Containment Radiation

Containment radiation is monitored by radiation monitors R2, R7, R11, R12, R24 A and B, and R27 A and B. Monitors R2 and R7 are area radiation monitors which measure gross gamma activity in the surrounding area. Each monitor has a remote readout unit consisting of a readout meter and an audio and visual alarm, a control console in the main control room which provides meter readout, alarm lights, indicating lights and control switches, and a strip chart which maintains a record of the output of each monitor. Monitor R11 is a containment air particulate monitor which takes an air sample for the containment atmosphere and measures the air particulate gamma radioactivity. Monitor R12 measures the gaseous gamma radioactivity in containment by taking an air sample from the containment atmosphere after it passes through the air particulate monitor. Monitors R11 and R12 have multipoint recorders located in the control room. Monitors R24 A and B, containment purge exhaust flow gas monitors, are dual channel off-line radiogas monitors which utilize a beta sensitive scintillation detector. Main control board annuciators are provided and a recorder is provided for the train A and train B channels.

R27 A and B are high range containment area radiation monitors utilized for accident and post-accident monitoring. Each monitor consists of an ion chamber located in containment and a readout module in the control room. Each readout is a multi-range meter with alert and high alarm lights. The modules are located on the gaseous radiation monitoring system panel with a recorder provided for monitor indication.

Monitors R2, R7 and R27 A and B are inputs to the SPDS and will supply pre and post-trip review capabilities when the SPDS is operational. SPDS is currently scheduled to be operational during the eighth refueling outage for Unit 1 and the fifth refueling outage for Unit 2.

3) Containment Sump Level

The containment recirculation sump serves each of the redundant trains of the ECCS and containment spray systems. Indication of containment level near the recirculation sumps is provided on the main control board and recorded. The recorder is powered by an inverter which takes AC power from an emergency motor control center backed by a diesel generator. If AC power is lost to the inverter, a DC source instantly feeds power to the inverter until the AC source is restored. Containment sump level is scheduled for input to the SPDS with pre and post-trip review capabilities.

4) Safety Injection Flow and Pump/Valve Status

Charging pump discharge header flow and RHR loop flow on Trains A and B are input to the plant computer. RHR and charging pump breaker status is monitored by the plant computer through digital inputs which are processed for changes in state approximately every two (2) seconds with any changes in state logged to the alarm typewriter. Valve status is provided by main control board indication. Safety injection flow and pump/valve status is verified by emergency response procedures when necessary.

5) MSIV Position

Each main steam line at Farley Nuclear Plant has two main steam isolation valves installed in series (i.e., 3369 A, B and C are installed in series with downstream valves 3370 A, B, and C for each unit.) The upstream valve, 3369 A, B and C, positions are digital inputs to the plant computer. These inputs are processed for changes in state at approximately two (2) second intervals with changes in state logged to the alarm typewriter. Sequence of Events inputs from the MSIV's consist of turbine trip on valves 3369A, B or C, turbine trip on valves 3370A, B or C, and overspeed protection on valves 3370 A, B or C. Position indication for all the MSIV's is provided on the main control board.

6) Auxiliary Feedwater System Flow and Pump/Valve Status

All automatic valves in the Auxiliary Feedwater System are verified fully open whenever the system is placed in automatic control or when above 10% rated thermal power by procedures. Flow control valves 3227 A, B and C and 3328 A, B and C control solenoids are monitored by the plant computer and provide indication of an auto start full open condition. These digital inputs are periodically scanned and processed for changes in state approximately every two (2) seconds with any changes in state logged to the plant computer alarm typewriter. Steam admission and stop valve control solenoids are also monitored by the plant computer with changes in state logged to the alarm typewriter. Steam Generator Auxiliary Feedwater flows will be inputs to the SPDS with pre and post-trip capabilities.

7) PORV Indication

PORV position is provided by main control board indication. PORV leak-by is monitored by main control board temperature alarm indication. In addition, PRT level, temperature and pressure have main control board indication which can be monitored to determine the status of the PORV. Procedures are also in place which require that the PORV be verified fully closed with no evidence of leakage when pressurizer pressure falls below 2315 psig.

NRC Concern:

To support the post-trip analysis of the cause of the trip and the proper function of involved safety-related equipment, each analog time history data recorder should be capable of updating and retaining information from approximately five minutes prior to the trip until at least ten minutes after the trip.

APCo Response:

As stated in the November 4, 1983 APCo response, all parameters included in the Post-Trip Review are collected for two (2) minutes before and three (3) minutes after the trip event at ten (10) second intervals. The required PWR parameters for Post-Trip Review identified in the draft TER include (1) Neutron Flux, Power, 2) Containment Pressure, 3) Containment Sump Level, 4) Primary System Temperature, 5) Primary System Flow, 6) Steam Generator Pressure, 7) Steam Generator Level, 8) Feedwater Flow, and 9) Steam Flow. All of the identified parameters, with the exception of Containment Pressure and Containment Sump Level, are inputs to the Post-Mortem Review Program at FNP. In addition, all the identified parameters, with the exception of Primary System Flow and Steam Generator Pressure, are monitored by strip chart recorders. The recorders are powered by an inverter which is supplied AC power from an emergency motor control center. The motor control centers have an alternate DC power supply from the diesel generators. In the event of loss of AC power to the inverter, batteries instantaneously supply DC power to the inverter until the diesels come on-line. The diesels then supply DC power to the inverters until the AC source returns.

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TABLE A
PORT-MORTEM REVIEW
PROGRAM PARAMETERS

F0127A	RCP 3 SEAL INJECTION FLOW (FI-127A)
F0129A	RCP 2 SEAL INJECTION FLOW (FI-129A)
F0131A	RCP 1 SEAL INJECTION FLOW (FI-131A)
F0400A	RCL1 1 FLOW (FI-414)
F0401A	RCL1 2 FLOW (FI-415)
F0402A	RCL1 3 FLOW (FI-416)
F0403A	S/G 1 FEEDWATER IN 1 FLOW (FI-477B)
F0404A	S/G 1 FEEDWATER IN 2 FLOW (FI-476B)
F0405A	S/G 1 STEAM OUT 1 FLOW (FI-474B)
F0406A	S/G 1 STEAM OUT 2 FLOW (FI-475B)
F0420A	RCL2 1 FLOW (FI-424)
F0421A	RCL2 2 FLOW (FI-425)
F0422A	RCL2 3 FLOW (FI-426)
F0423A	S/G 2 FEEDWATER IN 1 FLOW (FI-487B)
F0424A	S/G 2 FEEDWATER IN 2 FLOW (FI-486B)
F0425A	S/G 2 STEAM OUT 1 FLOW (FI-484B)
F0426A	S/G 2 STEAM OUT 2 FLOW (FI-485B)
F0440A	RCL3 1 FLOW (FI-434)
F0441A	RCL3 2 FLOW (FI-435)
F0442A	RCL3 3 FLOW (FI-436)
F0443A	S/G 3 FEEDWATER IN 1 FLOW (FI-497B)
F0444A	S/G 3 FEEDWATER IN 2 FLOW (FI-496B)
F0445A	S/G 3 STEAM OUT 1 FLOW (FI-494B)
F0446A	S/G 3 STEAM OUT 2 FLOW (FI-495B)
L0400A	S/G 1 NARROW RANGE 1 LEVEL (LI-474)
L0401A	S/G 1 NARROW RANGE 2 LEVEL (LI-475)
L0402A	S/G 1 NARROW RANGE 3 LEVEL (LI-476)
L0403A	S/G 1 WIDE RANGE LEVEL (LI-477)
L0420A	S/G 2 NARROW RANGE 1 LEVEL (LI-484)
L0421A	S/G 2 NARROW RANGE 2 LEVEL (LI-485)
L0422A	S/G 2 NARROW RANGE 3 LEVEL (LI-486)
L0423A	S/G 2 WIDE RANGE LEVEL (LI-487)
L0440A	S/G 3 NARROW RANGE 1 LEVEL (LI-494)
L0441A	S/G 3 NARROW RANGE 2 LEVEL (LI-495)
L0442A	S/G 3 NARROW RANGE 3 LEVEL (LI-496)
L0443A	S/G 3 WIDE RANGE LEVEL (LI-497)
L0480A	PRESSURIZER 1 LEVEL (LI-459)
L0481A	PRESSURIZER 2 LEVEL (LI-460)
L0482A	PRESSURIZER 3 LEVEL (LI-461)
L0483A	PRESSURIZER LEVEL CONTROL S.P.
N0031A	SOURCE RANGE DET. 1 LOG Q
N0032A	SOURCE RANGE DET. 2 LOG Q
N0035A	INTER. RANGE LOW DET. 1 LOG Q
N0036A	INTER. RANGE LOW DET. 2 LOG Q
N0041A	POWER RANGE 1 TOP DET. Q QUAD. 4
N0042A	POWER RANGE 1 BOTTOM DET. Q QUAD. 4
N0043A	POWER RANGE 2 TOP DET. Q QUAD. 2
N0044A	POWER RANGE 2 BOTTOM DET. Q QUAD. 2
N0045A	POWER RANGE 3 TOP DET. Q QUAD. 1
N0046A	POWER RANGE 3 BOTTOM DET. Q QUAD. 1
N0047A	POWER RANGE 4 TOP DET. Q QUAD. 3
N0048A	POWER RANGE 4 TOP DET. Q QUAD. 3
N0049A	POWER RANGE CHANNEL 1 Q QUAD. 4
N0050A	POWER RANGE CHANNEL 2 Q QUAD. 2

N0051A	POWER RANGE CHANNEL 3 Q QUAD. 1
N0052A	POWER RANGE CHANNEL 4 Q QUAD. 3
P0398A	TURB FIRST STAGE 1 PRESS. (PI-446)
P0399A	TURB FIRST STAGE 2 PRESS. (PI-447)
P0400A	S/G 1 STEAM OUT 1 PRESS. (PI-474)
P0401A	S/G 1 STEAM OUT 2 PRESS. (PI-475)
P0402A	S/G 1 STEAM OUT 3 PRESS. (PI-476)
P0420A	S/G 2 STEAM OUT 1 PRESS. (PI-484)
P0421A	S/G 2 STEAM OUT 2 PRESS. (PI-485)
P0422A	S/G 2 STEAM OUT 3 PRESS. (PI-486)
P0440A	S/G 3 STEAM OUT 1 PRESS. (PI-494)
P0441A	S/G 3 STEAM OUT 2 PRESS. (PI-495)
P0442A	S/G 3 STEAM OUT 3 PRESS. (PI-496)
P0480A	PRESSURIZER 1 PRESS. (PI-455)
P0481A	PRESSURIZER 2 PRESS. (PI-456)
P0482A	PRESSURIZER 3 PRESS. (PI-457)
P0483A	PRESSURIZER 4 PRESS. (PI-444)
P0496A	STEAM LINE HEADER 1 PRESS. (PI-464)
P1000A	CONTAINMENT 1 PRESS. (PI-951)
P1001A	CONTAINMENT 2 PRESS. (PI-952)
Q0340A	GENERATOR GROSS M.W.
T0400A	RCL1 1 T-AVG (TI-412D)
T0401A	RCL1 2 T-AVG (TI-411A)
T0403A	RCL1 1 DELTA T (TI-412A)
T0404A	RCL1 2 DELTA T (TI-411B)
T0406A	RCL1 WIDE RANGE COLD LEG T (TR-410 PEN 1)
T0407A	RCL1 OVERPOWER DELTA T 1 S.P. (TI-412B)
T0410A	RCL1 OVERTEMP DELTA T 1 S.P. (TI-412C)
T0412A	RCP 1 MOTOR STATOR WINDING TEMP
T0418A	S/G 1 FEEDWATER IN 1 TEMP
T0419A	RCL1 WIDE RANGE HOT LEG TEMP (TR-413 PEN 1)
T0420A	RCL2 1 T-AVG (TI-422D)
T0421A	RCL2 2 T-AVG (TI-421A)
T-423A	RCL2 1 DELTA T (TI-422A)
T0424A	RCL2 2 DELTA T (TI-421B)
T0426A	RCL2 WIDE RANGE COLD LEG TEMP (TR-410 PEN 2)
T0427A	RCL2 OVERPOWER DELTA T 1 S.P. (TI-422B)
T0430A	RCL2 OVERTEMP DELTA T 1 S.P. (TI-422C)
T0432A	RCP 2 MOTOR STATOR WINDING TEMP
T0438A	S/G 2 FEEDWATER IN 1 TEMP
T0439A	RCL2 WIDE RANGE HOT LEG TEMP (TR-413 PEN 3)
T0440A	RCL3 1 T-AVG (TI-432D)
T0441A	RCL3 2 T-AVG (TI-431A)
T0443A	RCL3 1 DELTA T (TI-432A)
T0444A	RCL3 2 DELTA T (TI-431B)
T0446A	RCL3 WIDE RANGE COLD LEG TEMP (TR-410 PEN 3)
T0447A	RCL3 OVERPOWER DELTA T 1 S.P.
T0450A	RCL3 OVERTEMP DELTA T 1 S.P.
T0452A	RCP 3 MOTOR STATOR WINDING TEMP
T0458A	S/G 3 FEEDWATER IN 1 TEMP
T0481A	PRESSURIZER STEAM TEMP (TI-454)
T0496A	RC T-REF (TR-408 PEN 2)
T0497A	RCL AUCTIONEERED HIGH DELTA-T
T0499A	RCL AUCTIONEERED HIGH T-AVG

F0400D	RCL1 1 LO F PART RE
F0401D	RCL1 2 LO F PART RE
F0402D	RCL1 3 LO F PART RE
F0404D	STM GEN 1 LO FW F 1 PART RE
F0405D	STM GEN 1 LO FW F 2 PART RE
F0406D	STM LINE 1 HI F 1 SL ISOL PART
F0407D	STM LINE 1 HI F 2 SL ISOL PART
F0409D	LP 1 LO STM LINE P SI PART RE
F0420D	RCL2 1 LO F PART RE
F0421D	RCL2 2 LO F PART RE
F0422D	RCL2 3 LO F PART RE
F0424D	STM GEN 2 LO FW F 1 PART RE
F0425D	STM GEN 2 LO FW F 2 PART RE
F0426D	STM LINE 2 HI F 1 SL ISOL PART
F0427D	STM LINE 2 HI F 2 SL ISOL PART
F0429D	LP 2 LO STM LINE P SI PART RE
F0440D	RCL3 1 LO F PART RE
F0441D	RCL3 2 LO F PART RE
F0442D	RCL3 3 LO F PART RE
F0444D	STM GEN 3 LO FW F 1 PART RE
F0445D	STM GEN 3 LO FW F 2 PART RE
F0446D	STM LINE 3 HI F 1 SL ISOL PART
F0447D	STM LINE 3 HI F 2 SL ISOL PART
F0449D	LP 3 LO STM LINE P SI PART RE
L0400D	STM GEN 1 LO L 1 PART RE
L0401D	STM GEN 1 LO L 2 PART RE
L0403D	STM GEN 1 LO LO L 1 PART RE
L0404D	STM GEN 1 LO LO L 2 PART RE
L0405D	STM GEN 1 LO LO L 3 PART RE
L0420D	STM GEN 2 LO L 1 PART RE
L0421D	STM GEN 2 LO L 2 PART RE
L0423D	STM GEN 2 LO LO L 1 PART RE
L0424D	STM GEN 2 LO LO L 2 PART RE
L0425D	STM GEN 2 LO LO L 3 PART RE
L0440D	STM GEN 3 LO L 1 PART RE
L0441D	STM GEN 3 LO L 2 PART RE
L0443D	STM GEN 3 LO LO L 1 PART RE
L0444D	STM GEN 3 LO LO L 2 PART RE
L0445D	STM GEN 3 LO LO L 3 PART RE
L0480D	PRESSURIZER HI L 1 PART RE
L0481D	PRESSURIZER HI L 2 PART RE
L0482D	PRESSURIZER HI L 3 PART RE
N0001D	PWR RNG CH 1 HI Q HI SP PART RE
N0002D	PWR RNG CH 2 HI Q HI SP PART RE
N0003D	PWR RNG CH 3 HI Q HI SP PART RE
N0004D	PWR RNG CH 4 HI Q HI SP PART RE
N0006D	PWR RNG CH 1 HI Q LO SP PART RE
N0007D	PWR RNG CH 2 HI Q LO SP PART RE
N0008D	PWR RNG CH 3 HI Q LO SP PART RE
N0009D	PWR RNG CH 4 HI Q LO SP PART RE
N0020D	INTERM RNG 1 HI Q INITIATE RE
N0021D	INTERM RNG 2 HI Q INITIATE RE
N0025D	PWR RNG CHAN 1 HI Q RATE PART RE
N0026D	PWR RNG CHAN 2 HI Q RATE PART RE
N0027D	PWR RNG CHAN 3 HI Q RATE PART RE

N0028D	PWR RNG CHAN 4 HI Q RATE PART RE
N0030D	SOURCE RNG 1 HI Q INITIATE RE
N0031D	SOURCE RNG 2 HI Q INITIATE RE
P0396D	TB HYD OIL LO P 1 PART RE
P0397D	TB HYD OIL LO P 2 PART RE
P0398D	TB HYD OIL LO P 3 PART RE
P0404D	STEAM LINE DP1 LOW P1 SI PART RE
P0405D	STEAM LINE DP2 LOW P1 SI PART RE
P0406D	STEAM LINE DP3 LOW P1 SI PART RE
P0408D	STEAMLINE DP 4 LOW P1 SI PART RE
P0409D	STEAMLINE DP 5 LOW P1 SI PART RE
P0410D	STEAMLINE DP 6 LOW P1 SI PART RE
P0424D	STEAMLINE DP 1 LOW P2 SI PART RE
P0425D	STEAMLINE DP 2 LOW P2 SI PART RE
P0426D	STEAMLINE DP 3 LOW P2 SI PART RE
P0428D	STEAMLINE DP 4 LOW P2 SI PART RE
P0429D	STEAMLINE DP 5 LOW P2 SI PART RE
P0430D	STEAMLINE DP 6 LOW P2 SI PART RE
P0444D	STEAMLINE DP 1 LOW P3 SI PART RE
P0445D	STEAMLINE DP 2 LOW P3 SI PART RE
P0446D	STEAMLINE DP 3 LOW P3 SI PART RE
P0448D	STEAMLINE DP 4 LOW P3 SI PART RE
P0449D	STEAMLINE DP 5 LOW P3 SI PART RE
P0450D	STEAMLINE DP 6 LOW P3 SI PART RE
P0480D	PRESSURIZER HI P 1 PART RE
P0481D	PRESSURIZER HI P 2 PART RE
P0482D	PRESSURIZER HI P 3 PART RE
P0484D	PRESSURIZER LO P 1 PART RE
P0485D	PRESSURIZER LO P 2 PART RE
P0486D	PRESSURIZER LO P 3 PART RE
P0489D	PRESUZER LO P 1 SI PART RE
P0490D	PRESUZER LO P 2 SI PART RE
P0491D	PRESUZER LO P 3 SI PART RE
P1000D	CONTAINM HI P 1 SI PART RE
P1001D	CONTAINM HI P 2 SI PART RE
P1002D	CONTAINM HI P 3 SI PART RE
T0400D	RCL1 OVERPWR DT 1 PART RE
T0403D	RCL1 OVERTEMP DT 1 PART RE
T0420D	RCL2 OVERPWR DT 1 PART RE
T0423D	RCL2 OVERTEMP DT 1 PART RE
T0440D	RCL3 OVERPWR DT 1 PART RE
T0443D	RCL3 OVERTEMP DT 1 PART RE
V0320D	RCP BUS UNDER VOLT PART RE
V0321D	RCP BUS UNDER VOLT PART RE
V0322D	RCP BUS UNDER VOLT PART RE
Y0320D	RCP BUS UNDER FREQ PART RE
Y0321D	RCP BUS UNDER FREQ PART RE
Y0322D	RCP BUS UNDER FREQ PART RE
Y0391D	TB STOP VLV A CL PART RE
Y0329D	TB STOP VLV B CL PART RE
Y0393D	TB STOP VLV C CL PART RE
Y0394D	TB STOP VLV D CL PART RE