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Southern Nuclear Operating Company

the southern electric system

Dave Morey
Vice President
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January 17, 1995

Docket No.: 50-364

10 CFR 50.73

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Joseph M. Farley Nuclear Plant - Unit 2
Licensee Event Report No. 94-003-00
Reactor Trip Due To Turbine Control System Intermittent Failure

Gentlemen:

Joseph M. Farley Nuclear Plant Licensee Event Report No. 94-003-00 is being submitted in accordance with 10 CFR 50.73. If you have any questions, please advise.

Respectfully submitted,

Dave Morey

MGE/clt:lertbfai.doc

Enclosure

cc: Mr. S. D. Ebnetter
Mr. B. L. Siegel
Mr. T. M. Ross

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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503

FACILITY NAME (1) Joseph M. Farley Nuclear Plant - Unit 2 DOCKET NUMBER (2) 050003641 OF PAGE (3) 4

TITLE (4) Reactor Trip Due To Turbine Control System Intermittent Failure

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)																							
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES																							
1	2	1	8	9	4	9	4	-	0	0	3	-	0	0	0	1	1	7	9	5	N/A											

OPERATING MODE (9) 1

POWER LEVEL (10) 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 7: (Check one or more of the following) (11)

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME R.D. Hill, General Manager - Nuclear Plant TELEPHONE NUMBER 205 899-5156

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
B	J J	D C C	W 1 2 0	Y					
B	J J	6 3	J 3 0 2	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

At 03:52 on December 18, 1994, with Unit 2 in Mode 1 operating at 100 percent reactor power, the reactor tripped due to low-low level in the 2C steam generator (SG). The low-low SG level occurred as a result of a load transient initiated by the digital electro-hydraulic control (DEHC) system closing all four governor valves. The rapid load reduction resulted in SG level shrink sufficient enough to generate a reactor trip signal

A root cause investigation which included a review of the DEHC system and plant computer data attributed the event to an intermittent failure in the 63AST-2 auto stop oil pressure switch circuit that provides an electrical input to the DEHC governor control auto stop latch circuitry. The suspect pressure switch was replaced. Additionally, a temporary recorder was installed to monitor auto stop oil pressure. The unit was returned to power operation on 12/19/94 at 1806.

Subsequently, on December 25, 1994, with Unit 2 in mode 1 operating at 100 percent power, the reactor tripped due to a turbine trip caused by an intermittent failure of the DEHC overspeed protection circuitry. A root cause investigation of this subsequent event indicated that although the sequence of events of the referenced reactor trips were different, both reactor trips were most likely caused by an intermittent DEHC system processor failure. Subsequently, six cards associated with the DEHC system have been replaced and forwarded to the vendor for evaluation.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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		9 4	- 0 0 3	- 0 0	2	OF	4

TEXT (If more space is required, use additional NRC Form 366A's)(17)

Plant and System Identification

Westinghouse -- Pressurized Water Reactor

Energy Industry Identification System codes are identified in the text as [XX].

Description of Event

At 03:52 on December 18, 1994, with Unit 2 in Mode 1 operating at 100 percent reactor power, the reactor tripped due to low-low level in the 2C steam generator (SG). The low-low SG level occurred as a result of a load transient initiated by the digital electro-hydraulic control (DEHC) system [JJ] closing all four governor valves. The rapid load reduction resulted in SG level shrink sufficient enough to generate a reactor trip signal.

Cause of Event

A root cause investigation which included a review of DEHC system and plant computer data attributed the event to an intermittent failure in the 63AST-2 auto stop oil pressure switch [63] circuit. This circuit provides an electrical input to three individual logic cards in the DEHC governor control auto stop latch circuitry. A two out of three logic condition from these cards is required to initiate a governor valve closure sequence on loss of auto stop oil. There were no apparent indications of a DEH processor [DCC] failure. The suspect pressure switch was replaced. Additionally, a temporary recorder was installed to monitor the auto stop oil pressure. Subsequent to startup, additional bench testing of the suspect pressure switch was unable to re-create the apparent intermittent failure.

Subsequently, on December 25, 1994, with the Unit 2 reactor in mode 1 operating at 100 percent power, the reactor tripped due to a turbine trip. This turbine trip was caused by an intermittent failure of the DEHC overspeed protection (OPC) circuitry. It is apparent that the primary OPC controller (DROP 2) failed in a manner which prevented the redundant OPC controller (DROP 52) from assuming control of the DEHC overspeed protection function within the required time frame. This resulted in a turbine trip due to a loss of both OPC controllers. Although the sequence of events of the reactor trips on 12/18/94 and 12/25/94 were different, the DEHC processor data in conjunction with the proper response of auto stop oil pressure (as indicated by the temporary recorder) indicates that both reactor trips were most likely caused by an intermittent failure of a DEHC system processor. Subsequently, six cards associated with the DEHC system (three associated with the suspect processor) have been replaced and forwarded to the vendor for evaluation.

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TEXT (If more space is required, use additional NRC Form 366A's)(17)

There was no Solid State Protection System, DEH control system, or other work in progress that could have contributed to this event.

Safety Assessment

This event is reportable because of the actuation of the reactor protection system.

All systems operated as designed with the exception of the Source Range Nuclear Instruments. These instruments failed to automatically energize because Intermediate Range Nuclear Instrument N-36 did not go below 1.0 E-10 amps due to compensating voltage being out of adjustment.

This event would not have been more severe if it had occurred under different operating conditions.

Corrective Action

A root cause analysis investigation was performed for the referenced reactor trips.

The suspect pressure switch was replaced.

The Electro-Hydraulic fluid system was inspected for leakage and no leakage was evident.

The electrical circuits from the auto stop oil pressure switch to the DEH logic cards were checked and found in satisfactory condition.

Presently, a study is underway to determine if the pressure switch and associated circuitry could be modified to provide redundant pressure indications to the DEH control system.

Following the December 18, 1994 reactor trip, a temporary recorder was installed to monitor the auto stop oil pressure for any transients that might cause this type of event. Auto stop oil pressure responded per design during the subsequent reactor trip on December 25, 1994.

Following the December 25, 1994 reactor trip, data analysis determined that there were no apparent malfunctions internal to DROP 52. Subsequently, DROP 52 was placed in the primary OPC controller status. Following the replacement of cards associated with DROP 2, it was placed in the redundant OPC controller status. These cards have been forwarded to the vendor for evaluation.

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		9	0	0	4	4 OF 4

TEXT (If more space is required, use additional NRC Form 366A's)(17)

An independent review team has been assembled to conduct a review of the information surrounding this event and the December 25, 1994 event.

Additional Information

The following LER's involved reactor trips associated with DEHC system failures:

1. Manual reactor trip due to governor valve closure caused by a degraded DC voltage output from the primary Operator Auto Controller power supply in the main turbine DEHC system and a failure of the circuitry which should have transferred the power supply: LER 91-010, Unit One.
2. Reactor trip caused by a voltage transient on the DEHC inverter: LER 89-015, Unit Two.

On January 13, 1995, with the Unit 1 reactor operating at 100 percent power the reactor tripped due to a turbine trip. The turbine trip was caused by a failure in the Unit 1 DEHC system. A review of this trip and its relationship to the Unit 2 trips on December 18 and 25 is being conducted at the time of this LER submission.