

Southern Nuclear Operating Company  
Post Office Box 1295  
Birmingham, Alabama 35201  
Telephone (205) 868-5086



J. D. Woodard  
Executive Vice President

Southern Nuclear Operating Company  
*the southern electric system*

January 24, 1995

Docket No.: 50-364

10 CFR 50.73

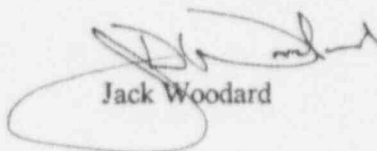
U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555

Joseph M. Farley Nuclear Plant-Unit 2  
Licensee Event Report No. 94-004-00  
Reactor Trip Due To Loss of Turbine  
Digital Electro-Hydraulic Control Overspeed Protection

Gentlemen:

Joseph M. Farley Nuclear Plant Licensee Event Report No. 94-004-00 is being submitted in accordance with 10 CFR 50.73. If you have any questions, please advise.

Respectfully submitted,



Jack Woodard

MGE/clt:lertbdeh.doc

Enclosure

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

9501310225 950124  
PDR ADOCK 05000364  
S PDR

IC22  
11

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) 05000364				PAGE (3) 1 OF 4	
--	--	--	--	--	--	-------------------------------	--	--	--	--------------------	--

TITLE (4)  
Reactor Trip Due To A Loss of Turbine DEHC Overspeed Protection

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	5	9	4	-	0	0	4	0	0	0	1	2	4	9	5	I. M. Farley Unit 1 050003648		

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 2.217 (Check one or more of the following) (11)

OPERATING MODE (9) 1	20.402(b)	20.405(c)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 100	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
	20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	
	20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(vii)(A)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(vii)(B)	
	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME R.D. Hill, General Manager - Nuclear Plant	TELEPHONE NUMBER AREA CODE: 334 899-5156
--	---

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				

SUPPLEMENTAL REPORT EXPECTED (14)

YES (if yes, complete EXPECTED SUBMISSION DATE)  NO  X

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

At 1534, on December 25, 1994, with Unit 2 in mode 1 operating at 100 percent power, the reactor tripped due to a turbine trip in response to a loss of digital electro-hydraulic control (DEHC) overspeed protection. Investigations indicated the primary overspeed protection (OPC) controller (DROP 2) failed in a manner which prevented the redundant OPC controller (DROP 52) from assuming control of the turbine DEHC overspeed protection function within the required time frame. This resulted in turbine trip due to a loss of both OPC controllers. Six cards associated with the DEHC system (three associated with the DROP 2 processor) have been replaced and forwarded to the vendor for evaluation.

The unit was returned to power operation at 2123 on December 26, 1994.

Subsequently, on January 13, 1995, with Unit 1 in mode 1 operating at 100 percent power, the reactor tripped due to a turbine trip in response to a loss of DEHC overspeed protection. An evaluation of this Unit 1 event indicated that both reactor trips could have been caused by the vulnerability of the DEHC OPC processors and their associated power supplies to minor voltage transients. Modifications have been performed to the Unit 1 DEHC in order to reduce the vulnerability to minor voltage transients. Preparations to perform DEHC modifications on Unit 2 are currently in progress.

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.

FACILITY NAME (1)  Joseph M. Farley Nuclear Plant - Unit 2	DOCKET NUMBER (2)  0   5   0   0   0   3   6   4	LER NUMBER (6)			PAGE (3)	
		YEAR 9   4	SEQUENTIAL YEAR -   0   0   4	REVISION NUMBER -   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 1534, on December 25, 1994, with Unit 2 in mode 1 operating at 100 percent power, the reactor tripped due to a turbine trip in response to a loss of digital electro-hydraulic control (DEHC) overspeed protection.

Cause of Event

A root cause investigation indicated that the primary overspeed protection (OPC) controller (DROP 2) within the DEHC system [JJ] 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. There were no apparent indications that would attribute this event to an intermittent failure in the 63AST-2 auto stop oil pressure switch[63] (Reference LER 94-003, Unit Two). Three individual logic cards within the DEHC system which processes an electrical output from the 63AST-2 pressure switch were suspect. Additionally, three cards associated with the DROP 2 processor which receives input from the three referenced logic cards were suspect. These six cards were replaced.

Subsequently, on January 13, 1995, with Unit 1 in mode 1 operating at 100 percent power, the reactor tripped due to a turbine trip in response to a loss of DEHC overspeed protection. A root cause investigation of this Unit 1 event indicated 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. As part of the investigation process, the power supplies associated with the OPC processors were tested. Additionally, Farley Nuclear Plant specific software and hardware revision levels were assembled in a test system by the vendor. Conditions observed during on-site testing under certain voltage transients were re-created in the test system. Test results concluded that the OPC processors and their associated power supplies were vulnerable to minor voltage transients and under certain conditions were unable to transfer OPC control within the required time frame.

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.

Facility Name: Joseph M. Farley Nuclear Plant - Unit 2; Docket Number: 0500036494; LER Number: 004-00; Page: 3 of 4

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

Further review of data associated with the Unit 2 December 25, 1994 reactor trip indicates that both the 12/25/94 Unit 2 trip and the 1/13/95 Unit 1 trip could have been caused by the vulnerability of the DEHC OPC processors and their associated power supplies to minor voltage transients.

Safety Assessment

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

All systems operated as designed.

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.

Six cards associated with the DEHC system have been replaced and forwarded to the vendor for evaluation. To date, testing of the suspect cards has been unable to re-create a card failure. A conclusive determination that the Unit 2 trip on December 25, 1994 and the previous Unit 2 trip on December 18, 1994 were related, has not been reached at this time.

DROP 52 has been placed in the primary OPC controller status, and DROP 2 has been placed in the redundant OPC controller status.

Modifications have been performed to the Unit 1 DEHC. Preparations to perform Unit 2 DEHC modifications are currently in progress. These modifications will reduce the vulnerability of the DEHC OPC processors and their associated power supplies to minor voltage transients.

Additional Information

The turbine's mechanical overspeed trip device was operable during this event.

An independent review team has been assembled to conduct a review of the information surrounding this event and the December 18, 1994 event (LER 94-003, Unit Two).

**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.

FACILITY NAME (1)  Joseph M. Farley Nuclear Plant - Unit 2	DOCKET NUMBER (2)  0   5   0   0   0   3   6   4	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL YEAR	REVISION NUMBER			
		9   4	-   0   0   4	-   0   0	4	OF	4

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

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

Reactor Trip Due To Turbine Control System Intermittent Failure: LER 94-03, Unit 2.

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.

Reactor trip caused by a voltage transient on the DEHC inverter: LER 89-015, Unit Two.