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Southern Nuclear Operating Company
*the southern electric system*

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Docket No.: 50-364

10 CFR 50.73

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

Joseph M. Farley Nuclear Plant – Unit 2
Licensee Event Report No. 95-008-00
Reactor Trip During DEH Card Change Out

Ladies and Gentlemen:

Joseph M. Farley Nuclear Plant - Unit 2 Licensee Event Report No. 95-008-00 is being submitted in accordance with 10 CFR 50.73(a)(2)(iv). If you have any questions, please advise.

Respectfully submitted,

DM Morey

Dave Morey

DPH/clt:lr9508(2.doc

Enclosure

cc: Mr. S. D. Ebneter, Region II Administrator
Mr. B. L. Siegel, NRR Senior Project Manager
Mr. T. M. Ross, FNP Resident Inspector

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NRC FORM 366 (4-95) U.S.NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

# LICENSEE EVENT REPORT (LER)

| FACILITY NAME (1) | DOCKET NUMBER (2) | PAGE (3) |
|---|---|---|
| Joseph M. Farley Nuclear Plant - Unit 2 | 0 5 0 0 0 3 6 4 | 1 OF 4 |

TITLE (4)
Reactor Trip During DEH Card Change Out

| 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 NAME | |
| 1 1 | 2 8 | 9 5 | 9 5 | – 0 0 8 | – 0 0 | 1 2 | 1 9 | 9 5 | FACILITY NAME | |

| OPERATING MODE (9) | | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11) | | | |
|---|---|---|---|---|---|
| | 1 | 20.2201(b) | 20.2203(a)(2)(v) | 50.73(a)(2)(i) | 50.73(a)(2)(viii) |
| POWER LEVEL (10) | 1 0 0 | 20.2203(a)(1) | 20.2203(a)(3)(i) | 50.73(a)(2)(ii) | 50.73(a)(2)(x) |
| | | 20.2203(a)(2)(i) | 20.2203(a)(3)(ii) | 50.73(a)(2)(iii) | 73.71 |
| | | 20.2203(a)(2)(ii) | 20.2203(a)(4) | X 50.73(a)(2)(iv) | OTHER |
| | | 20.2203(a)(2)(iii) | 50.36(c)(1) | 50.73(a)(2)(v) | Specify in Abstract below |
| | | 20.2203(a)(2)(iv) | 50.36(c)(2) | 50.73(a)(2)(vii) | or in NRC Form 366A |

LICENSEE CONTACT FOR THIS LER (12)

| NAME | TELEPHONE NUMBER |
|---|---|
| R.D. Hill, General Manager - Nuclear Plant | AREA CODE 3 3 4 8 9 9 - 5 1 5 6 |

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 | YES | | | | | | | |
| | | | | | | | | | | | |

| SUPPLEMENTAL REPORT EXPECTED (14) | | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
|---|---|---|---|---|---|
| YES (If yes, complete EXPECTED SUBMISSION DATE) | NO | | | | |

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-space typewritten lines) (16)


At 1233, on November 28, 1995, 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 circuitry. Investigations indicated the turbine trip was caused by the loss of the primary overspeed protection controller (OPC) (DROP 52) while the backup OPC (DROP 2) was momentarily shutdown for card replacement. An electronic card was being inserted in the I/O (Input/Output) chassis to repair DROP 2. A design defect, associated with card replacement in the control circuitry, allowed a momentary interrupt condition to exist on the I/O bus at the time of the replacement card insertion. This interrupt condition caused the operating digital processing unit (DROP 52) to stop processing I/O data. DROP 52 attempted to transfer OPC control to DROP 2 which was momentarily shutdown for card replacement. This resulted in a turbine trip due to a momentary loss of both OPCs.

This event was caused by the presence of a latent design defect in the DEHC circuitry which did not provide for the bumpless transfer during card change out. Three cards, with the latest hardware revision correcting the design defect, were replaced on Unit 2. An additional two cards in the Input/Output (I/O) chassis shared by DROP 52 and DROP 2, associated with the original fault conditions on DROP 2, have been replaced. Applicable Unit 1 DEHC cards will be replaced when plant conditions permit. A review of the DEHC card upgrade history for all DEHC cards is in process to determine if other hardware revisions are required.

Plant and System Identification

Westinghouse -- Pressurized Water Reactor
Energy Industry Identification System codes are identified in the text as [XX].

Description of Event

At 1233, on November 28, 1995, 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 [JJ]. Investigations indicated the turbine trip was caused by the loss of the primary overspeed protection controller (OPC) (DROP 52) while the backup OPC (DROP 2) was momentarily shutdown for card replacement. As an electronic card was being inserted in the Input/Output (I/O) chassis to repair DROP 2, a design defect, associated with card replacement in the control circuitry, allowed a momentary interrupt condition to exist on the I/O bus at the time of the replacement card insertion. This interrupt condition caused the operating digital processing unit (DROP 52) to stop processing I/O data. DROP 52 attempted to transfer OPC control to DROP 2, which was momentarily shutdown for card replacement. This resulted in a turbine trip due to a loss of both OPCs.

On November 26, 1995, an alarm was received in the control room which indicated that DROP 2 had a fault. Due to the fault condition on DROP 2, the OPC control was automatically transferred to DROP 52. An investigation by the DEHC vendor and plant personnel determined that two cards of different types were suspect. The DEHC representative indicated that both of these cards could be changed out while the unit was on-line. One card in DROP 2 was replaced on November 27, 1995, with no problems encountered, and DROP 2 was returned to service in the backup mode. The card that was removed was placed in a DEHC simulator and monitored. Since no problem was identified with the removed card tested on the simulator, the following day, it was decided that the remaining suspect card should be replaced. On November 28, 1995, the remaining suspect card which shared communication between DROP 52 and DROP 2 was removed. As expected, only DROP 2 was affected by the removal of this card. In the process of inserting the replacement card, DROP 52 attempted to transfer OPC control to DROP 2 due to the momentary voltage transient. The plant technician noted the transfer and attempted to reset DROP 52 but could not reset DROP 52 prior to a turbine trip due to a loss of both OPCs for greater than 4 seconds. Subsequent to this event, an investigation by the DEHC vendor revealed that this same problem had occurred in 1989 on other customers' units and had been corrected by a design change to printed circuit cards. Farley Nuclear Plant was not informed of this change under Vendor Technical Information Program or the turbine generator business team correspondence.

Cause of Event

A root cause investigation determined that this event was caused by the presence of a latent design defect in the DEHC circuitry which did not provide for the bumpless transfer during card change out.

Safety Assessment

The health and safety of the public was unaffected by this condition.

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

All systems operated as designed with the exception of NI-36 which had been declared inoperable due to reading lower than expected prior to the trip. Following the reactor trip, the NI-36 detector was replaced.

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

Corrective Action

Three cards, with the latest hardware revision, correcting the design defect were replaced on Unit 2. Two additional cards associated with the original fault conditions on DROP 2 have been replaced on DROP 52 and on DROP 2.

Unit 1 cards will be replaced at the next outage of sufficient duration.

The DEHC card inventory has been submitted to the DEHC vendor and a review of the card upgrade history for all DEHC cards is in process to determine if other hardware upgrades are required.

FNP has discussed with the vendor the need for accuracy in response to questions regarding technical issues associated with the DEHC.

Additional Information

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

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

LER 95-001-00 (Unit 1) - Reactor Trip Due To A Loss of Turbine DEHC Overspeed Protection

LER 94-004-00 (Unit 2) - Reactor Trip Due To A Loss of Turbine DEHC Overspeed Protection

LER 94-003-00 (Unit 2) - Reactor Trip Due To Turbine Control System Intermittent Failure

LER 91-010-00 (Unit 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 89-015-00 (Unit 2) - Reactor Trip Caused By A Voltage Transient On The DEHC Inverter