The Light company
Houston Lighting & Power

P.O. Box 1700 Houston, Texas 77001 (713) 228-9211

October 05, 1989
ST-HL-AE-3250
File No.: G26
10CFR50.73

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

South Texas Project Electric Generating Station
Unit 2
Docket No. STN 50-499
Licensee Event Report 89-021 Regarding
a Reactor Trip Due to a Defective
Feedwater Pump Speed Controller Card Edge Connector

Pursuant to 10CFR50.73, Houston Lighting & Power (HL&P) submits the attached Licensee Event Report 89-021 regarding a reactor trip due to a defective feedwater pump speed controller card edge connector. This event did not have any adverse impact on the health and safety of the public.

If you should have any questions on this matter, please contact Mr. C. A. Ayala at (512) 972-8628.

R. W. Chewning
Vice President
Nuclear Operations

RWC/BEM/nl

Attachment: LER 89-021, South Texas, Unit 2

IE22
1/1

cc:

Regional Administrator, Region IV
Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

George Dick, Project Manager
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Jack E. Bess
Senior Resident Inspector-Unit 1
c/o U. S. Nuclear Regulatory Commission
P. O. Box 910
Bay City, TX 77414

J. I. Tapia
Senior Resident Inspector-Unit 2
c/o U. S. Nuclear Regulatory Commission
P. O. Box 910
Bay City, TX 77414

J. R. Newman, Esquire
Newman & Holtzinger, P.C.
1615 L Street, N.W.
Washington, DC 20036

R. L. Range/R. P. Verret
Central Power & Light Company
P. O. Box 2121
Corpus Christi, TX 78403

R. John Miner (2 copies)
Chief Operating Officer
City of Austin Electric Utility
721 Barton Springs Road
Austin, TX 78704

R. J. Costello/M. T. Hardt
City Public Service Board
P. O. Box 1771
San Antonio, TX 78296

Rufus S. Scott
Associate General Counsel
Houston Lighting & Power Company
P. O. Box 1700
Houston, TX 77001

INPO
Records Center
1100 Circle 75 Parkway
Atlanta, GA 30339-3064

Dr. Joseph M. Hendrie
50 Bellport Lane
Bellport, NY 11713

D. K. Lacker
Bureau of Radiation Control
Texas Department of Health
1100 West 49th Street
Austin, TX 78756-3189

NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
South Texas, Unit 2	0 5 0 0 0 4 9 9	1 OF 0 3

TITLE (4) Reactor Trip Due to a Defective Feedwater Pump Speed Controller Card Edge Connector

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	DOCKET NUMBER(S)
												0 5 0 0 0
0 9	0 5	8 9	8 9	—	0 2 1	—	0 0	1 0	0 5	8 9		0 5 0 0 0

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
1	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
1 0 0	20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Charles Ayala - Supervising Licensing Engineer	AREA CODE 5 1 2 9 7 2 - 8 6 2 8

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 K	S C	W 1 2 0	No							

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

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

On September 5, 1989, Unit 2 was in Mode 1 at 100 percent power. At approximately 1607 hours, control room operators observed speed oscillations on the turbine driven Steam Generator Feedwater Pump (SGFP) 21. The operators attempted to regain speed control; however, the pump did not respond and subsequently tripped on overspeed. The resultant loss of steam generator level caused a reactor trip and auxiliary feedwater system actuation. No safety injection actuation occurred. The plant was stabilized in Mode 3. The cause of this event was a defective SGFP 21 speed controller card edge connector which was disturbed by a maintenance technician during troubleshooting of a card associated with SGFP 22 in the same card frame. The defective connector was repaired, the card frame alignment checked, the remaining printed circuit cards and edge connectors were inspected and the contact surfaces were cleaned. The printed circuit cards in the speed controller circuits on Unit 1 were also inspected and cleaned.

NL.LER89021.U2

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South Texas, Unit 2	0 5 0 0 0 4 9 9	8 9	— 0 2 1	— 0 0	0 2 OF 0 3

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

DESCRIPTION OF EVENT:

On September 5, 1989, Unit 2 was in Mode 1 at 100 percent power. At approximately 1607 hours, control room operators observed speed oscillations on the turbine driven Steam Generator Feedwater Pump (SGFP) 21. The operators attempted to regain speed control; however, the pump did not respond. In anticipation of a feedwater pump trip, the operators began reducing turbine load and reactor power. The pump subsequently tripped on overspeed. The resultant loss of steam generator level caused a reactor trip and auxiliary feedwater actuation. The reactor power at the time of the trip was 84 percent. The turbine tripped on the reactor trip and the feedwater isolation valves closed on low reactor coolant system average temperature. Approximately 90 seconds following the reactor trip, the operators closed the main steam isolation valves to prevent excessive cooldown. No safety injection actuation occurred and the plant was stabilized in Mode 3. The NRC was notified pursuant to 10CFR50.72 at 1833 hours.

Prior to this event, SGFP 22 had exhibited erratic speed control. The speed control circuitry for all three SGFP's is housed in a common card frame. While technicians were troubleshooting the speed control problem, they removed one of the printed circuit cards for SGFP 22. During the card removal, a defective edge connector on a circuit card associated with SGFP 21 caused erratic speed controller output and the erratic pump behavior observed by the operators. Due to the design of the control circuit, loss of continuity of the speed demand signal caused the controller to drive the SGFP governor valves open resulting in an overspeed trip. During post-trip troubleshooting, the effects of disturbances of the card frame on SGFP 21 speed controller output was verified.

The defective card edge connector was repaired, the card frame alignment checked, the remaining printed circuit cards and edge connectors were inspected and the contact surfaces were cleaned. No other defective edge connectors were found. Following these repairs, the erratic controller card behavior could not be duplicated. Unit 2 was restarted on September 6, 1989 at 0454 hours.

CAUSE OF EVENT:

The cause of this event was a defective SGFP speed controller card edge connector which was unknowingly disturbed during troubleshooting of a circuit card for a differential SGFP in the same card frame. This resulted in the SGFP 21 trip.

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
South Texas, Unit 2	0 5 0 0 0 4 9 9	8 9	— 0 2 1	— 0 0	0 3 OF 0 3

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

ANALYSIS OF EVENT:

Reactor trip and Engineered Safety Features actuation is reportable pursuant to 10CFR50.73(a)(2)(iv). The plant was brought to a stable shutdown in Mode 3 with no unexpected post-trip transients. No safety injection actuation occured as a result of this event.

CORRECTIVE ACTION:

The following actions have been taken:

1. The defective Unit 2 card edge connector was repaired, the card frame alignment checked, and remaining printed circuit cards and edge connectors were inspected and contact surfaces cleaned.

2. As a result of this event, the Unit 1 SGFP speed control circuits have been inspected for defective card edge connections and their contact surfaces have been cleaned. No other card edge connector defects were found.

ADDITIONAL INFORMATION:

There have been no previous events reported regarding reactor trips due to defective printed circuit card edge connectors.

A study has been initiated to address reliability of the secondary plant in response to the recent Unit 2 trips. This review will include the SGFP control system.

The defective card edge connector was located in an Electro Hydraulic Controller manufactured by Westinghouse. The card edge connector is style number 393A821003 as shown on Westinghouse bulletin I.L.1150-789.

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