The Light company
Houston Lighting & Power South Texas Project Electric Generating Station P. O. Box 289 Wadsworth, Texas 77483

May 15, 1990
ST-HL-AE-3462
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 90-005 Regarding a Reactor Trip
Due to Failure of a Main Turbine Electrohydraulic Control Line

Pursuant to 10CFR50.73, Houston Lighting & Power Company (HL&P) submits the attached Licensee Event Report (LER 90-005) regarding a reactor trip due to failure of a main turbine electrohydraulic control line. 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 or myself at (512) 972-7921.

G.E. Vaughn by J.H. Kinsey

G. E. Vaughn
Vice President
Nuclear Generation

BEM/nl

Attachment: LER 90-005 (South Texas, Unit 2)

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cc:

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L4/NRC/

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 Failure of a Main Turbin Electrohydraulic Control Line

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 4	1 4	9 0	9 0	0 0 5	0 0	0 5	1 5	9 0		0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	1 0 0	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
		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)	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
	AREA CODE
Charles Ayala - Supervising Licensing Engineer	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	

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 April 14, 1990, Unit 2 was in Mode 1 at 100 percent power. At 1704 hours, a simultaneous reactor and turbine trip occurred on low turbine electrohydraulic control (EHC) fluid pressure. The plant was brought to a stable shutdown in Mode 3 with no unexpected post-trip transients. The cause of this event was failure of the EHC supply line to a main turbine governor valve. The line failed due to fatigue stress of a weld caused by governor valve-induced vibration. The valve vibration was caused by valve plug rotation. Interim corrective action has been taken to repair the EHC supply piping and add additional supports. The valve used to throttle flow during full power operation will be modified to add anti swirl baffles and anti rotation pins on the plug to stem connection during the first refueling outage.

A1/LER005U2.L01

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	9 0	— 0 0 5	— 0 0	0 2 OF 0 3

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

DESCRIPTION OF EVENT:

On April 14, 1990, Unit 2 was in Mode 1 at 100 percent power. At 1704 hours, a simultaneous reactor and turbine trip occurred on low turbine electrohydraulic control (EHC) fluid pressure. Workers in the area of the main turbine governor valves reported the rupture of an EHC line to one of the governor valves. A feedwater isolation occurred on low Reactor Coolant System average temperature and an Auxiliary Feedwater System actuation occurred on low steam generator level as expected. The main steam isolation valves were closed to limit the cooldown and the steam generator power operated relief valves (PORV) were used to control temperature. The plant was stabilized in Mode 3.

Investigation of this event revealed that the weld on the EHC supply line to the governor valve had failed at the tube side toe of the weld where it connected to a tee in the supply header. The weld was cut out, rewelded and dye penetrant examined for integrity. At the time, it was believed that the failure had resulted from recent maintenance activities on the governor valve.

On April 25, 1990, following restart of the unit, dye penetrant inspection of the new weld showed a new linear indication. Dye penetrant inspections of other welds of EHC piping on Unit 2 were then performed and additional linear indications were found. Metallurgical examination of the original failure site indicated fatigue failure with origins at multiple locations around the circumference of the pipe. Observation of the Unit 2 EHC piping during plant operation indicated that significant vibration occurred concurrent with vibration of the governor valve. The cyclic stress from the governor valve-induced vibration could have resulted in the earlier fatigue failure. Temporary supports were added which greatly reduced the vibration amplitude. Inspections of Unit 1 EHC piping did not reveal any cracks.

CAUSE OF EVENT:

The cause of the reactor trip was a loss of EHC pressure due to a supply line failure. The line failed due to fatigue stress of a weld caused by governor valve induced vibration.

The cause of the governor valve vibration has been determined to be valve plug rotation.

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	9 0	— 0 0 5	— 0 0	0 3 OF 0 3

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

ANALYSIS OF EVENT:

Unplanned Reactor Trip System actuation is reportable pursuant to 10CFR50.73(a)(2)(iv). The plant was brought to a stable shutdown in Mode 3. There were no unexpected post trip transients.

CORRECTIVE ACTION:

The new linear indications found on the EHC supply piping have been evaluated and repaired as required.

In the interim, to compensate for the cause of the vibration and limit its effects the following actions are being taken:

1. As a conservative measure, additional supports have been added to the EHC lines on Unit 2 to dampen any unusual vibration.

2. The governor valve control logic has been changed such that the valve which vibrated during operation is now maintained fully open at full load and another valve is modulated to vary turbine load.

The valve used to throttle flow during full power operation will be modified to add anti swirl baffles and anti rotation pins on the plug to stem connection during the first refueling outage. The remaining valves will be modified as schedule permits.

ADDITIONAL INFORMATION:

There have been no previous events reported regarding reactor trips due to failed EHC piping.

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