

# The Light company

Houston Lighting & Power

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

July 3, 1989  
ST-HL-AE-3159  
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 89-016 Regarding  
a Reactor Trip Due to a Deficient  
Turbine Steam Inlet Valve Test Procedure

Pursuant to 10CFR50.73, Houston Lighting & Power (HL&P) submits the attached Licensee Event Report 89-016 regarding a reactor trip due to a deficient turbine steam inlet valve test procedure. 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.

*G. E. Vaughn by Mark Bennett*

G. E. Vaughn  
Vice President  
Nuclear Operations

GEV/BEM/n1

Attachment: LER 89-016, South Texas, Unit 2

NL.LER89016.U2

A Subsidiary of Houston Industries Incorporated

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PDR ADOCK 05000499  
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*11*

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  
741 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. R. Lacker  
Bureau of Radiation Control  
Texas Department of Health  
1199 West 89th Street  
Austin, TX 78756-3189

## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) South Texas, Unit 2										DOCKET NUMBER (2) 0 5 0 0 0 4 9 9 1										PAGE (3) OF 0 3	
TITLE (4) Reactor Trip due to a Deficient Turbine Steam Inlet Valve Test Procedure																					
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 6	0 2	8 9	8 9	0 1	6	0 0	0 7	0 3	8 9						0 5 0 0 0						
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)																			
1		20.402(b)				20.406(e)				<input checked="" type="checkbox"/> 50.73(a)(2)(iv)				73.71(b)							
POWER LEVEL (10)		0 7 6				20.406(a)(1)(i)				50.36(e)(1)				50.73(a)(2)(iv)				73.71(e)			
		20.406(a)(1)(ii)				50.36(e)(2)				50.73(a)(2)(vii)				OTHER (Specify in Abstract below and in Text, NRC Form 366A)							
		20.406(a)(1)(iii)				50.73(a)(2)(ii)				50.73(a)(2)(viii)(A)											
		20.406(a)(1)(iv)				50.73(a)(2)(ii)				50.73(a)(2)(viii)(B)											
		20.406(a)(1)(v)				50.73(a)(2)(iii)				50.73(a)(2)(ix)											
LICENSEE CONTACT FOR THIS LER (12)																					
NAME										TELEPHONE NUMBER											
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 NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC											
D	T	A	3 3	N	0 0 7	N															
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)				MONTH		DAY		YEAR			
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)										<input checked="" type="checkbox"/> NO											
ABSTRACT (Limit to 1400 spaces, i.e. approximately fifteen single space typewritten lines) (16)																					
<p>On June 2, 1989, Unit 2 was in Mode 1 at 76 percent power. At 0354 hours, during the performance of the Main Turbine Steam Inlet Valve Operability Test, a reactor trip and turbine trip occurred on completion of two out of four logic for closed turbine inlet throttle valves. The plant was brought to an orderly shutdown with no unexpected transients. The event occurred after a limit switch on turbine inlet valve TV-1 stuck. When the valve was closed and reopened during the performance of the test, the limit switch stuck in the valve-closed position which prevented clearing of the trip bistable. This condition was not recognized as a result of a deficient test procedure. When a second valve was tested and stroked closed, the minimum trip logic was satisfied and the reactor trip occurred. The defective limit switch has been replaced. Corrective actions include a revision to the turbine inlet valve test procedures and review of other surveillance procedures for similar weaknesses. Additionally, the turbine inlet throttle valve limit switches, the only similar switches from this manufacturer which perform a safety-related actuation, will be replaced.</p>																					
NL.LER89016.U2																					

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104  
EXPIRES 8/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
South Texas, Unit 2	0500049989	—	016	—	00	02	OF 03

TEXT (If more space is required, use additional NRC Form 365A's) (17)

DESCRIPTION OF EVENT:

On June 2, 1989, Unit 2 was in Mode 1 at 76 percent power. At 0348 hours, turbine inlet throttle valve TV-1 was closed during performance of the Main Turbine Steam Inlet Valve Operability Test. At 0351 hours the valve was opened in accordance with the procedure. The valve position was verified locally and on the main control board per the instructions of the test procedure, however, the operator did not notice the "TURBINE STM STOP VLV RX PRETRIP" alarm, which actuated when the valve was closed and the bistable indication did not clear. The test procedure did not call for checking this alarm or the bistable status after completing the valve cycle. This indicated that the closed inlet valve input was still present at the Solid State Protection System (SSPS) reactor trip logic.

At 0354 hours, turbine inlet throttle valve TV-3 was closed per procedure. This completed the two of four turbine inlet throttle valve closed logic at the SSPS and generated a reactor turbine trip. Feedwater isolation occurred as expected and auxiliary feedwater actuated on low steam generator level. The main steam isolation valves were closed to conserve stored heat of the reactor coolant system. One steam generator power operated relief valve was opened to control temperature and pressure. The control rods inserted normally following the trip and no unexpected post-trip transients were noted.

Each steam inlet throttle valve has two limit switches for the closed position. One switch is safety-related and the other is non safety-related. The safety-related switch provides input to the reactor pre-trip annunciator and the SSPS bistable. The non safety-related switch provides valve position indication on the main control board. When valve TV-1 was opened, the safety-related limit switch remained in the valve-closed position which prevented the SSPS bistable from clearing. The non safety-related limit switch operated normally which gave the proper indication of the valve position to the operator. This resulted in the reactor and turbine trip when the closing of valve TV-3 completed the SSPS trip logic.

The NRC was notified of this event on June 2, 1989 at 0622 hours.

CAUSE OF EVENT:

Two causes of this event have been identified. The test procedure was deficient in that it did not require the operator to verify that the bistable had cleared following completion of the valve cycle. The second cause was a defective limit switch on valve TV-1 which stuck in the valve-closed position after the valve was opened. NAMCO, the manufacturer of the limit switch, has issued a recent service bulletin which identifies that older versions of this model of switch could stick due to the type of grease used.

NL.LER89016.U2

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/85

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

TEXT (If more space is required, use additional NRC Form 365A's) (17)

ANALYSIS OF EVENT:

Unplanned Reactor Trip System actuation is reportable pursuant to 10CFR50.73(a)(2)(iv). Following the reactor trip the plant was brought to an orderly shutdown with no unexpected transients.

Failure of this limit switch in the valve-closed position represents a failure to the safe mode which results in tripping of the respective bistable. These switches are mechanically moved to the valve-closed position and spring-returned to the valve-open position. As such, sticking would cause the switch to fail in the valve-closed position which is the safe mode with respect to reactor protection.

CORRECTIVE ACTION:

The following corrective actions are being taken as a result of this event:

1. The Main Turbine Steam Inlet Valve Operability Test procedures will be revised to require the operator performing the procedure to verify that the respective bistable clears when each valve is opened. This revision will be completed by July 28, 1989 prior to the next performance of the test.
2. A review of other surveillance procedures for weaknesses with regard to protective logic bistable status verification shall be completed by September 30, 1989.
3. The defective limit switch has been replaced.
4. Other NAMCO limit switches which were addressed by the recent bulletin were reviewed for application at SIFEGS. The only switches of this type utilized in a safety-related actuation function are those for the turbine inlet throttle valves. Each of these eight switches (four in each SIFEGS unit) will be replaced as parts and resources become available.

ADDITIONAL INFORMATION:

There have been no previous events reported regarding reactor trips due to sticking main turbine inlet valve limit switches. The failed limit switch is a NAMCO Model EA740.

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