The Light company
Houston Lighting & Power

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

August 11, 1989
ST-HL-AE-3197
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 89-017 Regarding
a Reactor Trip and Partial Loss of
Offsite Power Due to a Main Transformer Failure

Pursuant to 10CFR50.73, Houston Lighting & Power (HL&P) submits the attached Licensee Event Report 89-017 regarding a reactor trip and partial loss of offsite power due to a main transformer failure. 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 W.E. Vaughn

G. E. Vaughn
Vice President
Nuclear Operations

GEV/BEM/eg

Attachment: South Texas, Unit 2
LER 89-017

IE22
1/1

cc:

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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 and Partial Loss of Offsite Power Due to a Main Transformer Failure

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 7	1 3	8 9	8 9	—	0 1 7	—	0 0	0 8	1 1	8 9		0 5 0 0 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)	0 9 9	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
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	
X											

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 July 13, 1989, Unit 2 was in Mode 1 at 99 percent power. At 2002 hours, an internal fault occurred in the Unit 2 Main Step-Up Transformer 2A. The protective relays tripped the turbine and actuated the switchyard and generator breakers to clear the fault. The reactor tripped on the turbine trip. The plant was brought to an orderly cooldown with no unexpected primary system post trip transients. The investigation of the transformer failure is ongoing. The most probable cause was failure of the high side, phase A bushing. The transformer will be returned to the manufacturer for repair and the bushing and transformer will be analyzed further to determine the cause of this event.

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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 1 7	— 0 0	0 2 OF 0 3

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

DESCRIPTION OF EVENT:

On July 13, 1989, Unit 2 was in Mode 1 at 99 percent power. At 2002 hours, an internal fault occurred in the Unit 2 Main Step-Up Transformer (MST) 2A. The main transformer differential relay and primary side pilot wire differential relays actuated the main transformer lockout relay which tripped the generator breaker, the offsite power feeds from the switchyard, the Auxiliary Transformer, and the main turbine. The reactor tripped on the turbine trip. Loss of power to the Auxiliary Transformer resulted in a loss of power to the Engineered Safety Features Train A bus and the non safety-related auxiliary busses which feed the reactor coolant pumps. The Engineered Safety Features Train A Standby Diesel Generator 21 started and loaded as expected. The Auxiliary Feedwater System actuated on low steam generator level. Primary system temperature was maintained with auxiliary feedwater flow and steam generator power operated relief valves on natural circulation. Power was subsequently restored to the auxiliary busses via the Standby Transformers. The NRC was notified pursuant to 10CFR50.72 at 2303 hours on July 13, 1989.

Subsequent investigation revealed that MST 2A had an internal fault in the area of the phase A high voltage bushing. The fault was cleared in approximately 2.5 cycles; however, major damage occurred to the transformer. The upper tank ruptured expelling most of the oil into the oil sump. Analysis of the transformer oil indicated that it did not contain significant quantities of polychlorinated biphenyl (PCB) and did not represent an environmental hazard. There was no fire or personnel injuries. Internals of the transformer, particularly the no load tap changer and the phase A high voltage bushing were severely damaged. Arcing tracks were noted from the tail piece of the bushing upwards to the grounding sleeve and the top of the tank in the bushing area. The core and windings appeared to be in good condition. The high voltage bushings were removed and will be analyzed to determine the cause of the failure. The transformer will be returned to the manufacturer for repair and failure analysis.

The South Texas Project utilizes two main transformers in parallel per unit. MST 2B has been inspected and tested and determined to be undamaged from this event. Following the disconnection of MST 2A Unit 2 was restarted on July 19, 1989 and is capable of operating at up to approximately 65 percent power.

CAUSE OF EVENT:

The most probable cause of this event was the failure of the phase A high voltage bushing in MST 2A. Investigation of the transformer and bushing is ongoing. If further information regarding the cause of this event becomes available, a supplement to this LER will be provided.

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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 1 7	--- 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 are reportable pursuant to 10CFR50.73(a)(2)(iv). The reactor was brought to an orderly shutdown with no unexpected primary system post trip transients. The ESF systems functioned as designed. ESF Trains B and C are normally powered from Standby Transformer 2 and were not affected by this event. There were no adverse safety or radiological consequences as a result of this event.

CORRECTIVE ACTION:

Main Step-up Transformer 2A will be returned to the manufacturer for repair and further failure analysis. Since the cause of the failure is unknown, no further corrective actions are being taken at this time. Should further investigation identify additional significant corrective actions, they will be addressed in a revision to this LER.

ADDITIONAL INFORMATION:

The failed transformer was a McGraw Edison, three phase, 700/784 MVA, 25 kV to 362.25 kV device.

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