

# The Light company

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

October 17, 1990  
ST-HL-AE-3596  
File No.: 002.04  
10CFR50.73

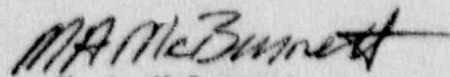
U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555

South Texas Project Electric Generating Station  
Unit 1  
Response to Notice of Violations 9028-01 and 9028-02  
Failure to Follow Procedures for Independent  
Verification and Failure to Provide Adequate Acceptance Criteria

Houston Lighting & Power has reviewed the Notices of Violations issued as a result of NRC Inspection Report 90-028 dated September 1, 1990, and submits the attached responses.

Notice of Violation 9028-01 occurred during the post trip recovery effort for Unit 1 LER 90-006. The response for this violation is completely covered in the attached LER 90-006 regarding a manual reactor trip due to full closure of a FWIV during partial stroke testing.

If you should have any questions on this matter, please contact Mr. A. K. Khosla at (512) 972-7579 or myself at (512) 972-8530.

  
M. A. McBurnett  
Manager  
Nuclear Licensing

AKK/sgs

Attachment: Reply to Notices of Violations 9028-01 and 9028-02  
LER 90-006 (South Texas, Unit 1)

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PDR ADJCK 05000498  
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Houston Lighting & Power Company  
South Texas Project Electric Generating Station

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File No. G02.04  
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Revised 10/08/90

I. Statement of Violations:

1. Failure to Follow Procedures for Independent Verification

10 CFR Part 50, Appendix B, Criterion V, requires, in part, that activities affecting quality be accomplished in accordance with documented instructions.

Plant Procedure 1PSP03-AF-0001, Revision 6, "Auxiliary Feedwater Pump 11 Inservice Test," Step 5.13.1, states, "CLOSE and LOCK Test Line Isolation Valve AF0040 and initial Data Sheet (-2)," and Step 5.13.2, states "As a (sic) independent verification have a second individual verify AF0040 is CLOSED and LOCKED and initial Data Sheet (-2).

Plant Procedure OPGP03-ZO-0004, Revision 11, "Plant Conduct of Operations," Step 4.4.11, requires that independent verifications shall be performed as prescribed by approved procedures or instructions in accordance with OPGP03-ZA-0010, "Plant Procedure Compliance, Implementation, and Reviews."

Plant Procedure OPGP03-ZA-0010, Revision 11, "Plant Procedure Compliance Implementation, Review," Step 3.3.2.1, states that the act of performing the independent verification must be completely separate and independent of the initial alignment, installation, or verification.

Contrary to the above, on July 26, 1990, Steps 5.13.1 and 5.13.2 of Plant Procedure 1PSP03-AF-0001, Revision 6, "Auxiliary Feedwater Pump 11 Inservice Test," were performed concurrently and were, therefore, not completely separate and independent. This resulted in a failure to detect that Test Line Isolation Valve AF0040 was erroneously aligned in a locked open position. This error was discovered following a reactor trip on August 6, 1990, when auxiliary feedwater from Auxiliary Feedwater Pump No. 11 was circulated back to the auxiliary feedwater storage tank through the locked open valve instead of adding water to Steam Generator A as designed.

This is a Severity Level IV violation. (Supplement I) (498/9028-01)



2. Failure to Provide Adequate Acceptance Criteria

10 CFR Part 50, Appendix B, Criterion V requires, in part, that procedures include appropriate acceptance criteria for determining that important activities have been satisfactorily accomplished.

South Texas Project Technical Specifications, paragraph 6.8.1.a, requires that procedures for activities identified in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978, be established, implemented, and maintained. Paragraph 3 to Regulatory Guide 1.33 requires that instructions for energizing, filling, venting, draining, startup, shutdown, and changing modes of operation be prepared for the chemical and volume control system (including letdown/purification system).

Contrary to the above, on August 6, 1990, neither Operations Procedure 1POP02-CV-0004, "Chemical Volume and Control System Subsystem," Revision 8, or any administrative procedure contained adequate acceptance criteria for determining that the activities to place a mixed bed demineralizer in service had been satisfactorily accomplished.

This is a Severity Level IV violation. (Supplement I) (498/9028-02)

II. Houston Lighting & Power Position:

1. HL&P concurs that this violation occurred and attaches LER 90-006 in response to this violation.
2. HL&P concurs that this violation occurred.

III. Reason for Violation:

1. See attached LER 90-006.
2. The cause of this event was the procedure for placing the demineralizer in service did not require a sample or provide an acceptance criteria for boron concentration prior to demineralizer use. Additionally, the procedure for borating the demineralizer was also less than adequate.

IV. Corrective Actions:

1. See attached LER 90-006, corrective actions 4-8.
- 2a. The procedure for placing demineralizers in service has been revised to require demineralizer sampling and to specify acceptance criteria when placing a demineralizer in service.
- b. The procedure for borating demineralizers has been changed to require the demineralizer outlet isolation valve to be closed for the demineralizer that is not being flushed for sampling. This will assure that only one demineralizer is flushed and sampled at a time. The procedure has also been revised to ensure a representative sample is obtained from the demineralizer being borated.

V. Date of Full Compliance:

HL&P is in full compliance at this time.

# The Light company

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

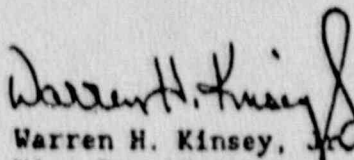
August 31, 1990  
ST-HL-AE-3547  
File No.: G26  
10CFR50.73

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

South Texas Project Electric Generating Station  
Unit 1  
Docket No. STN 50-498  
Licensee Event Report 90-006 Regarding  
a Manual Reactor Trip Due to Full Closure of a  
Feedwater Isolation Valve During Partial Stroke Testing

Pursuant to 10CFR50.73, Houston Lighting & Power Company (HL&P) submits the attached Licensee Event Report (LER 90-006) regarding a manual reactor trip due to full closure of a feedwater isolation valve during partial stroke testing. 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. S. M. Head at (512) 972-7136 or myself at (512) 972-7921.

  
Warren H. Kinsey, Jr.  
Vice President  
Nuclear Generation

SMH/amp

Attachment: LER 90-006 (South Texas, Unit 1)

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888

Houston Lighting & Power Company  
South Texas Project Electric Generating Station

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File No.: G26  
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Revised 12/15/89

L4/NRC/



## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)  
South Texas, Unit 1

DOCKET NUMBER (2)

0 5 0 0 0 4 9 8

PAGE (3)

1 OF 0 6

TITLE (4)  
Manual Reactor Trip Due to Full Closure of a  
Feedwater Isolation Valve During Partial Stroke TestingEVENT DATE (5)  
MONTH DAY YEAR  
0 7 3 0 9 0 9 0 0 0 6 0 0 0 8 3 1 9 0

LER NUMBER (6)

SEQUENTIAL NUMBER

REVISION NUMBER

REPORT DATE (7)

MONTH DAY YEAR

OTHER FACILITIES INVOLVED (8)

FACILITY NAMES

DOCKET NUMBER (9)

0 5 0 0 0 0 0 0

0 5 0 0 0 0 0 0

OPERATING MODE (10)

1

POWER LEVEL (11)

11010

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.71 (Check one or more of the following) (12)

20.602(b)

20.605(a)

X

50.736(2)(iv)

73.71(b)

20.606(a)(1)(i)

50.38(a)(1)

50.736(2)(iv)

73.71(a)

20.606(a)(1)(ii)

50.38(a)(2)

50.736(2)(iv)

OTHER (Specify in Abstract below and in Text, NRC Form 306A)

20.606(a)(1)(iii)

50.736(2)(i)

50.736(2)(iv)(A)

20.606(a)(1)(iv)

50.736(2)(ii)

50.736(2)(iv)(B)

20.606(a)(1)(v)

50.736(2)(iii)

50.736(2)(iv)(C)

LICENSEE CONTACT FOR THIS LER (13)

NAME

Scott M. Head - Supervising Licensing Engineer

TELEPHONE NUMBER

AREA CODE

5 1 2

9 7 2 - 7 1 3 6

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (14)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (15)

YES (If yes, complete EXPECTED SUBMISSION DATE)

X NO

EXPECTED SUBMISSION DATE (16)

MONTH

DAY

YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single space typewritten lines) (17)

On July 30, 1990, Unit 1 was in Mode 1 at 100% power. At approximately 1946, Feedwater Isolation Valve 1A fully closed during a partial stroke surveillance test. The resultant loss of feedwater flow caused a decrease in steam generator level and the reactor was manually tripped. The unit was stabilized with the exception of level in Steam Generator 1A which did not recover due to a mispositioned recirculation test valve in the Train A Auxiliary Feedwater System (AFW). The recirculation test valve was returned to the required position and Steam Generator 1A level was recovered. The Feedwater Isolation Valve closure was caused by a technician inadvertently contacting the wrong terminal with a test jumper. The cause of the mispositioned recirculation test valve could not be conclusively established; however, it is likely that the valve was not correctly repositioned during a surveillance test prior to the event, and this error was not discovered due to a lack of adequate independent verification. Corrective actions include: issuance of training bulletins concerning use of jumpers; evaluation of alternative designs to obviate the need to perform the partial stroke test with jumpers; and, issuance of a memorandum to operations personnel to reinforce the requirements pertaining to independent verification.

A1/LER006U1.L01



## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

US NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO 3150-0104

EXPIRES 8/31/95

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (3)			PAGE (4)		
		YEAR	SEQUENTIAL NUMBER	DIVISION NUMBER			
South Texas, Unit 1	050004989	0	06	00	2	OF	06

TEXT IF MORE SPACE IS REQUIRED, USE REVERSE OF NRC Form 250A (1/77)

DESCRIPTION OF EVENT:

On July 30, 1990, Unit 1 was in Mode 1 at 100% power. At 1946, Feedwater Isolation Valve (FWIV) 1A fully closed during performance of a partial stroke surveillance test. Steam Generator (SG) 1A level began decreasing and the reactor was manually tripped since an automatic reactor trip was imminent due to low steam generator water level. The turbine tripped, Feedwater Isolation occurred on low Reactor Coolant System average temperature, and Auxiliary Feedwater (AFW) flow initiated on low-low-steam generator level as expected. No other Engineered Safety Feature actuations occurred during this event. Emergency Operating Procedures were entered and the plant was stabilized with the exception that level did not recover in Steam Generator 1A as expected. Operations personnel determined that a recirculation valve on the "A" train of AFW was mispositioned causing the flow to return to the Auxiliary Feedwater Storage Tank (AFWST). The recirculation valve was repositioned to recover SG 1A level. The NRC was notified of this event at 2135 hours.

The FWIV's are hydraulically operated with a nitrogen charge in the upper cylinder. The valve is closed by opening one or both of two solenoid valves in parallel which dumps hydraulic fluid back to a reservoir; this allows the nitrogen charge to drive the valve closed. The partial stroke test verifies that both solenoids open and the FWIV closes to the 90% position. Solenoid position is sensed by reed switches connected to the test circuitry. The solenoids and reed switches are located within the valve yoke and are difficult to maintain at power. If a reed switch is not functioning correctly, as is the case with FWIV 1A, an "alternate" partial stroke test procedure using jumpers is employed which allows testing each solenoid individually.

The "alternate" partial stroke test procedure specifies use of alligator clips to connect jumpers. Prior to the event, a technician had installed the jumpers in a relay cabinet as specified in the test procedure. However, prior to actually conducting the stroke test, the alligator clip of a landed jumper slipped off and fell to the floor. In the process of relanding the jumper, contact was inadvertently made with an adjacent terminal, causing FWIV 1A to close.

During the post-trip recovery process, Operations personnel observed that Steam Generator 1A level continued to decrease even though the associated AFW flow was approximately 600 gpm. The "A" train AFW pump was secured after receiving a low discharge pressure alarm. Cross connect valves were opened in an attempt to feed Steam Generator 1A from a different AFW train; however, this proved unsuccessful. Subsequently, the "A" train recirculating test valve was discovered to be locked open instead of being in the required "locked closed" position. This condition diverted AFW flow back to the AFWST, thereby preventing AFW flow from entering Steam Generator 1A. The recirculation test valve was repositioned and AFW flow was established to Steam Generator 1A.

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## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (3)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
South Texas, Unit 1	050004989	0	06	00	3 OF	06

TEXT (if more space is required, see additional NRC Form 206A's) (17)

An investigation determined that the last known time the recirculation valve was manipulated was on July 26 during a monthly AFW inservice pump test. There is no record of any other activities that would have caused the valve to be operated between July 26 and the date of the event. There is also no evidence of maliciousness or tampering. However, it was determined that a less than adequate independent verification was performed on the part of the two operators assigned to manipulate the valve during the July 26 test. Independent verification is the act of checking a condition, such as valve position, separately from establishing the condition or component position. Contrary to this philosophy, it was determined that both operators were present at the valve at the time it was to be closed, thus violating the intent of independent verification. It has been concluded, therefore, that the valve was apparently not correctly positioned by one operator (possibly due to the orientation of the valve), and that this condition was not discovered by the second operator due to a lack of adequate independent verification.

CAUSE OF EVENT:

The direct cause of the manual reactor trip was a failed-closed feedwater isolation valve. The failed-closed feedwater isolation valve was caused by a technician inadvertently contacting the wrong terminal with a test jumper. A contributing factor was that the test procedure specified use of alligator clips, which are prone to fall off the terminals used during the test. Additional contributing factors are that the FWIV's solenoid valve reed switches were not functioning, and the design is such that they are difficult to maintain at power. With the reed switches not functioning, a successful partial stroke test could not be performed without the use of jumpers.

The cause of the mispositioned AFW recirculation valve could not be conclusively established; however, it is likely that the valve was not correctly positioned by one operator and that this error was not discovered due to a lack of adequate independent verification on the part of a second operator.

ANALYSIS OF EVENT:

Reactor Protection System and Engineered Safety Features actuations are reportable pursuant to 10CFR50.73.(a)(2)(iv). All safety systems responded as expected, with the exception of Auxiliary Feedwater System Train A. Steam Generator 1A level decreased significantly and remained low for approximately one hour because AFW flow was diverted back to the AFWST due to a locked-open recirculation test valve. A minimum wide range level of 31% was achieved at approximately 50 minutes after the trip. An adequate heat sink was maintained during the event by maintaining AFW flow to "B", "C", and "D" steam generators.

A1/LE006U1.L01



## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMS NO. 3150-010W  
EXPIRES 8/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (3)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
South Texas, Unit 1	050004989	0	06	00	4 OF 06

TEXT IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC Form 206A-1 (1/77)

Technical Specification 3.7.1.2 requires at least four independent steam generator auxiliary feedwater pumps and associated flow paths to be operable in Modes 1, 2, and 3 including three motor-driven and one turbine-driven pumps. Under the worst case Design Basis Accident scenarios, including single failure, one train of AFW is adequate to cool the RCS even if the "A" train of AFW is out-of-service. In recognition of this fact, the Technical Specification allows an unlimited outage time for the "A" train of AFW with the stipulation that action be immediately initiated to return the "A" train to service. Upon discovering the cause of the inoperability of "A" train, action was immediately taken to return the train to service. Since the Design Basis Accident can be adequately mitigated with the "A" AFW train out-of-service, this particular event had minimal safety consequences.

If the mispositioned valve had occurred on one of the other AFW trains, the worst case scenario is a main steam line break or a feedwater line break that is assumed to remove the cooling capacity of the AFW train on the affected steam generator. For these events the following cases were analyzed:

**Train B Valve Mispositioned:** For this scenario, the worst case situation would arise if the break were located in the "C" train. The AFW design is such that if the single failure is assumed to be in the "A" actuation train of the Solid State Protection System, then neither the "A" or "D" trains of AFW would be automatically actuated. However, one of the early steps in performance of the Emergency Operation Procedures is verification of AFW actuation. AFW flow would be manually initiated by control room personnel, thus providing cooling flow to the steam generators.

**Train C Valve Mispositioned:** This scenario is similar to the "B" train scenario described above.

**Train D Valve Mispositioned:** For this case, the "D" train is unavailable due to the valve being mispositioned. In addition, one train of AFW is assumed unavailable due to the break and one train of AFW is unavailable due to a single failure, i.e., a standby diesel generator failed to start under loss of alternating current. This would still leave one train of AFW available to provide cooling to the RCS.

Since it is possible to readily provide flow to at least one steam generator with a locked open recirculation valve on any AFW train, the safety consequences of a locked open valve on any one AFW train are minimal.

The above cases have been analyzed in the Auxiliary Feedwater System Reliability Evaluation provided in Appendix 10A of the Updated Final Safety Analysis Report. Specifically, this reliability study included the assumption that a recirculation valve would be mispositioned with a frequency of 1 in 200 manipulations. STP experience is consistent with this assumption.

A1/LER006U1.L01



## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

TEXT (If more space is required, use additional NRC Form 366a (9/1/83))

CORRECTIVE ACTION:

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

- 1) A training bulletin will be issued by September 12, 1990 to I&C Technicians which will discuss this event and reemphasize individual responsibilities in regard to critical testing manipulations.
- 2) The partial stroke surveillance test procedures as well as other surveillance procedures that use jumpers will be reviewed to develop enhancements that can minimize the potential for reactor trips or Engineered Safety Features actuations. This review will be completed by December 7, 1990.
- 3) An evaluation will be performed to determine if an alternative design can be developed which would allow for partial stroke testing of the FWIVs without the use of jumpers. This evaluation will be completed by January 31, 1991.
- 4) Valve lineups were performed immediately and independently verified on various valves in the major flow paths in the following safety-related systems for both Unit 1 and Unit 2: Auxiliary Feedwater, Containment Isolation, Main Feedwater, Containment Spray, and Safety Injection. Valve lineups were also performed on accessible Engineered Safety Feature valves in the Locked Valve Program and Standby Readiness Lineups were performed on the Standby Diesel Generators on both Unit 1 and Unit 2. No deficiencies were identified during these lineup checks.
- 5) The operators involved in the AFW valve manipulation were counseled as to the appropriate methods for performing independent verification.
- 6) A memorandum has been forwarded to the operating staff reemphasizing the need to "self verify" all manipulations to ensure that the desired result has in fact occurred.
- 7) A memorandum has been forwarded to the operating staff reemphasizing the importance of and requirements for independent verification and the proper methods of verifying valve positions.
- 8) This event will be included in operator continuing training, with emphasis placed on the ramifications of misaligning the Auxiliary Feedwater System and the requirements for Independent Verification. This action will be completed by November 30, 1990.

A1/LE006U1.L01

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO 3150-0104  
EXPIRES 8/31/95

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

TEXT IF MORE SPACE IS REQUIRED, use additional NRC Form 308A's (117)

ADDITIONAL INFORMATION:

There has been a previously reported event (LER 2-89-019) concerning a reactor trip caused by a FWIV failing closed; however, the event was not associated with a test jumper but was caused by a failure in the test circuitry.

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