

The Light company

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

July 7, 1994
ST-HL-AE-4832
File No.: G26
10CFR50.73

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

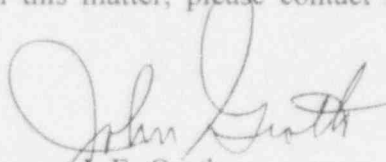
South Texas Project
Unit 2
Docket No. STN 50-499
Licensee Event Report 94-005

Inadvertent Test-Mode Start of Standby Diesel Generator 22 During the Cooldown Cycle

Pursuant to 10CFR50.73, Houston Lighting & Power submits the attached Unit 2 Licensee Event Report 94-005 regarding an inadvertent test-mode start of Standby Diesel Generator 22 during cooldown. This event did not have an adverse effect on the health and safety of the public.

The inadvertent test mode start would not prevent any of the Standby Diesel Generators from performing its safety function of coping with a loss of offsite power. The basis for this conclusion has been conveyed to the Nuclear Regulatory Commission at several meetings. Houston Lighting & Power has installed electronic noise suppressors on the Unit 2 Standby Diesel Generators and two of the Unit 1 Standby Diesel Generators which should lower the probability of additional test mode starts. To eliminate these starts, however, a modification to replace the fiber optics will be necessary. This modification involves extensive post maintenance test activities that cannot be expected to be accomplished within the Technical Specification 3.8.1.1 (72 hour) Limiting Condition for Operation (LCO) Action Statement. This modification will, therefore, be implemented at the next refueling outage. Should another test mode start occur on any of the South Texas Project Standby Diesel Generators, a supplement to this Licensee Event Report will be submitted to keep the Nuclear Regulatory Commission informed.

If you should have any questions on this matter, please contact Mr. J. M. Pinzon at (512) 972-8027 or me at (512) 972-8664.


J. F. Groth
Vice President,
Nuclear Generation

150007

JMP/esh

Attachment: LER 94-005 (South Texas, Unit 2)

Project Manager on Behalf of the Participants in the South Texas Project

LER-94/94005r0.u2

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07/07/94 (1:13pm)

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NRC FORM 366 (5-92)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95	
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)					
FACILITY NAME (1) South Texas Unit 2				DOCKET NUMBER (2) 05000 499	
PAGE (3) 1 OF 4					
TITLE (4) Inadvertent Test-Mode Start of Standby Diesel Generator 22 during the Cooldown Cycle					
EVENT DATE (5)			LER NUMBER (6)		REPORT DATE (7)
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
06	07	94	94	-- 005 --	00
					MONTH DAY YEAR
					07 07 94
					FACILITY NAME
					DOCKET NUMBER
					05000
					FACILITY NAME
					DOCKET NUMBER
					05000
OPERATING MODE (9) 1 THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)					
			20.402(b)		20.405(c) <input checked="" type="checkbox"/>
			20.405(a)(1)(i)		50.73(a)(2)(iv) 73.71(b)
			20.405(a)(1)(ii)		50.73(a)(2)(v) 73.71(c)
			20.405(a)(1)(iii)		50.73(a)(2)(vii) OTHER
			20.405(a)(1)(iv)		50.73(a)(2)(viii)(A) (Specify in Abstract below and in Text, NRC Form 366A)
			20.405(a)(1)(v)		50.73(a)(2)(viii)(B)
					50.73(a)(2)(x)
LICENSEE CONTACT FOR THIS LER (12)					
NAME Jairo Pinzon - Staff Engineer				TELEPHONE NUMBER (Include Area Code) (512) 972-8027	
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)					
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
SUPPLEMENTAL REPORT EXPECTED (14)					
YES(If yes, complete EXPECTED SUBMISSION DATE).				X NO	EXPECTED SUBMISSION DATE (15)
					MONTH DAY YEAR
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)					
<p>On June 7, 1994, Unit 2 was in Mode 1 at 35% power. Standby Diesel Generator 22 had satisfactorily completed the monthly Standby Diesel Generator Operability test, had been unloaded, and placed in cooldown. Approximately three minutes into the cooldown cycle, the Standby Diesel Generator trouble alarm annunciated, generator voltage and frequency returned to normal operating parameters and it was recognized that Standby Diesel Generator 22 had received an unexpected test mode start signal. The most likely cause of this event was a voltage spike generated by an emergency fuel oil solenoid deenergizing. The inadvertent test mode start would not prevent any of the Standby Diesel Generators from performing its safety function of coping with a loss of offsite power. A modification will be implemented to install isolation relays in place of the existing fiber optics used for class 1E to non-Class 1E isolation in the starting circuit. The isolation relays will be less susceptible to noise within the start circuit.</p>					

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
South Texas, Unit 2		05000 499	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
			94	-- 005 --	00	

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

DESCRIPTION OF EVENT:

On June 7, 1994, Unit 2 was in Mode 1 at 35% power. Standby Diesel Generator 22 had satisfactorily completed performance of the monthly Standby Diesel Generator Operability test, had been unloaded, and placed in the cooldown cycle. Approximately three minutes into the cooldown cycle, the Standby Diesel Generator trouble alarm annunciated, generator voltage and frequency returned to normal operating parameters and it was recognized that Standby Diesel Generator 22 had experienced an unexpected start (with no operator action) while in the cooldown cycle. The start was verified to originate from a test-mode start signal and not an emergency start signal. At 1630 hours, the Standby Diesel Generator was placed in the cooldown cycle for the second time, and was successfully secured after a five minute cooldown. This indicated that the voltage spike within the start circuit was intermittent or that it varied in magnitude sufficient to induce a start signal infrequently. The inadvertent start occurred when the first cooldown timer deenergized.

When the cooldown timers deenergized emergency fuel oil solenoid 20-F01 and energized emergency fuel oil solenoid 20-F02 (within the start circuit), a voltage spike was generated within the start circuit. Investigation indicates that the fiber optic isolation board allowed this voltage spike to induce a start. Previous modifications to reduce the magnitude of external voltage spikes were not intended or capable of eliminating voltage spikes generated within the start circuit.

CAUSE OF EVENT:

The most likely cause of this event was electrical noise generated by the emergency fuel oil solenoid deenergizing which was perceived by the fiber optic test circuit to be a "Start" signal.

ANALYSIS OF EVENT:

The inadvertent test mode start of Standby Diesel Generator 22 has been classified as an actuation of an Engineered Safety Feature and is reportable pursuant to 10CFR50.73(a)(2)(iv).

The Standby Diesel Generators are part of the Class 1E 4.16 KV AC Power System. The Class 1E 4.16 KV AC Power System is composed of three trains designed to provide a reliable source of power to the safety-related equipment essential to all modes of plant operation including emergency shutdown following any design basis event. Upon a loss of off-site power, each of the three Standby Diesel Generators supply backup power to the associated 4.16 KV bus to mitigate the consequences of postulated accidents. This inadvertent Standby Diesel Generator test mode start did not affect the ability of the Standby Diesel Generator to perform its intended safety function.

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South Texas, Unit 2	05000 499	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 4
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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

CORRECTIVE ACTIONS:

The following corrective actions have been taken to date to prevent unintentional starts (These corrective actions have been previously described in Unit 2 Licensee Event Report 94-003):

1. Equipment repair, which replaced parts found to be weak or non-functioning.
2. Electrical noise reduction was added to install:
 - a) filters to the DC power supplies to reduce the magnitude of external circuit electrical noise seen in the engine control panel, and
 - b) ceramic capacitors across the Allen Bradley "Run" relays to reduce the inductive response contributing to the noise induced starts.

This action has been completed on all Unit 2 and two (2) Unit 1 Standby Diesel Generators. The modification will be installed on the remaining Unit 1 Standby Diesel Generator during a scheduled train outage.

The electrical noise reduction modifications will lower the probability but not eliminate the possibility of additional unexpected test mode starts. To eliminate these starts Houston Lighting & Power will modify the test circuits to utilize isolation relays in place of the fiber optics presently used for Class 1E to non-Class 1E isolation in the starting circuit. The isolation relays will be less susceptible to noise within the start circuit. This modification involves extensive post maintenance test activities that cannot be expected to be accomplished within the Technical Specification 3.8.1.1 (72 hour) Limiting Condition for Operation (LCO) Action Statement. This modification will, therefore, be implemented at the next refueling outage. Should another test mode start occur on any of the South Texas Project Standby Diesel Generators, a supplement to this License Event Report will be submitted to keep the Nuclear Regulatory Commission informed.

ADDITIONAL INFORMATION:

The Standby Diesel Generators are type KSV-20-T, four stroke, turbocharged engines manufactured by Cooper Energy Services.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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South Texas, Unit 2	05000 499	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 4
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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

ADDITIONAL INFORMATION: (Continued)

During the past three years four events were reported regarding inadvertent starts of Standby Diesel Generators:

Unit 2 Licensee Event Report 93-015 was submitted documenting the inadvertent start of Standby Diesel Generator 22. The cause was attributed to a spurious failure of a transistor.

Unit 1 Licensee Event Report 93-023 was submitted documenting an inadvertent start of Standby Diesel Generator 12 during testing. The cause of this even was most likely the result of an electrical arc between the Standby Diesel Generator panel and test equipment.

Unit 2 Licensee Event Report 94-001 was submitted documenting an inadvertent start of Standby Diesel Generator 21. The inadvertent start was cause by a combination of two component failures: a weakened transistor in the Non-Class 1E fiber optic start circuits and a faulty power supply external to the start circuit that induced spikes into the fiber optic start circuits.

Unit 2 Licensee Event Report 94-003 was submitted documenting the inadvertent test-mode starts of Standby Diesel Generators 21, 22, and 13. The cause of these events was determined to the fiber optic boards' susceptibility to noise in conjunction with transient DC spikes.