

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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 (MNB 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)

South Texas Unit 1

DOCKET NUMBER (2)

05000 498

PAGE (3)

1 OF 4

TITLE (4)

Failure to Meet the Requirements of Technical Specifications Due to the Inoperability of a Standby Diesel Generator as a Result of a Failed Lug

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 NAME	DOCKET NUMBER
04	08	95	95	-- 005 --	00	05	08	95	FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
4			20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)	
POWER LEVEL (10)			20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)	
0			20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		<input checked="" type="checkbox"/> OTHER	
			20.405(a)(1)(iii)		<input checked="" type="checkbox"/> 50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)	
			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)		SPECIAL REPORT	

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 NPDs	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).

☒ NO

EXPECTED SUBMISSION DATE (15)

MONTH

DAY

YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On May 2, 1995, Unit 1 was in Mode 1 at 100% power. It was determined that a violation of Technical Specification 3.0.4 occurred in that a mode change was made on Unit 1 with a technically inoperable Standby Diesel Generator. At 0745 hours, on April 8, 1995, approximately three hours following a change into Mode 4, Standby Diesel Generator 12 output breaker opened. The diesel was manually tripped and declared inoperable. Based on subsequent post-failure analysis, it was determined that the symptoms which were observed prior to the mode change (high field voltage and high stator temperature) were consistent with an incipient lug failure. Since indications showed that the degraded conditions existed prior to the mode change and the Standby Diesel Generator would not have been capable of performing its safety function, it was concluded that the diesel was technically inoperable at the time of the mode change. The cause of this condition was a failed slip ring connector/lug. Corrective actions include replacing the broken slip ring connector and an additional slip ring connector, inspecting all other slip ring connectors on Standby Diesel Generator 12, reviewing the 100% power stator temperature and field voltage for the remaining Standby Diesel Generators for any deficiencies and discussing the lessons learned with appropriate personnel.

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TEXT CONTINUATION

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South Texas, Unit 1	05000 498	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		95	-- 005 --	00	

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

DESCRIPTION OF EVENT

On May 2, 1995, Unit 1 was in Mode 1 at 100% power. It was determined that a violation of Technical Specification 3.0.4 occurred in that a mode change was made on Unit 1 with a technically inoperable Standby Diesel Generator.

In early April, 1995, preparations were in progress for returning Standby Diesel Generator 12 to service following maintenance performed during the Unit 1 refueling outage. During subsequent maintenance test diesel operations, voltage regulation abnormalities were encountered. Following extensive troubleshooting, it was determined it was necessary to rework the generator slip ring. This activity was accomplished on April 6, 1995. Following a successful Post-Maintenance-Test, at 1900 hours on April 7, 1995, the diesel was started to perform a final test before declaring the diesel operable. During this operation, higher than expected field voltage and stator temperature indications were present. Evaluation, which included discussions with the vendor, led to the conclusion that the conditions encountered were representative of the newly reconditioned slip rings and were to be expected. Standby Diesel Generator 12 was therefore declared operable. Diesel operation was continued as part of a 24-hour surveillance.

Approximately ten hours into the operation (0459 hours), a transition to Mode 4 was made. At 0745 hours, on April 8, 1995, after approximately 13 hours of operation, the diesel generator output breaker opened. The diesel was manually tripped and declared inoperable pending resolution of the output breaker unexpectedly opening.

Investigation revealed the ring connector/lug from one set of three poles to the slip ring was broken. The connector/lug was replaced and the diesel successfully operated for 24-hours. Standby Diesel Generator 12 was declared operable on April 10, 1995.

The broken ring lug was sent offsite for analysis to determine the cause of the failure. The lug failed due to ductile overload. The lug had been bent upward, away from the rotor, and then downward causing it to crack. The centrifugal force exerted on the lug due to rotation of the rotor most likely caused the failure of the lug. It was not discoverable until after a period of uninterrupted diesel generator operation created the conditions needed for the failure.

Analysis revealed that the symptoms indicated (high field voltage and high stator temperature) were consistent with an incipient lug failure. As a result, the Standby Diesel Generator would not have been capable of performing its safety function for long periods of continuous operation. It is therefore concluded that the diesel was technically inoperable at the time of the mode change. This constitutes a violation of Technical Specification 3.0.4.

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

CAUSE OF EVENT:

The cause of this condition was a failed slip ring connector/lug.

ANALYSIS OF EVENT:

Failure to meet the requirements of Technical Specifications is reportable pursuant to 10CFR50.73 (a)(2)(i)(B). Standby Diesel Generator 12 was operable per the indications available prior to the mode change. As such, mode change from Mode 5 to Mode 4 was made. However, post-failure analysis has determined the degraded lug most likely caused the higher than normal stator temperature and field voltages present during operation. Therefore, the Standby Diesel Generator was not capable of performing its design function, and as such, Standby Diesel Generator 12 was technically inoperable. With Standby Diesel Generator 12 technically inoperable, plant heatup to Mode 4 is reportable as an operation prohibited by Technical Specifications. In addition, the Standby Diesel Generator trip has been classified as a valid failure, since the diesel generator would not have operated satisfactorily in the emergency mode and if challenged, would not have performed its safety function. This Licensee Event Report is also being submitted as a Special Report to meet the requirements of Technical Specification 6.9.2 and Regulatory Guide 1.108.

At the time of this situation, both Standby Diesel Generators 11 and 13 were operable. The plant was in day 34 of a 41 day refueling outage and decay heat was low. A minimum of 32 hours existed before all the steam generators would have boiled dry, assuming station blackout conditions and no flow provided through the Turbine Driven Auxiliary Feedwater Pump. In addition, another diesel generator had been brought onsite to support the outage, which would have been capable of providing backup power, if needed. Furthermore, the unit was in Mode 4 with minimal potential impact from Design Basis hazards. Standby Diesel Generator 12 was returned to service within the 72-hour allowed outage time specified by Technical specification 3.8.1.1. As a result, the consequences of the event from a nuclear safety standpoint were minimal.

CORRECTIVE ACTIONS:

The following corrective actions have been taken or will be taken as a result of this event:

1. The broken slip ring connector and an additional slip ring connector were replaced; all other slip ring connectors on Standby Diesel Generator 12 were inspected. Only one connector was found degraded.
2. The 100% power stator temperature and field voltage for Standby Diesel Generator 11, 13, 21, 22, and 23 have been reviewed. No abnormal indications are present.

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

CORRECTIVE ACTIONS: (Continued)

3. A training bulletin will be issued to appropriate personnel discussing pertinent aspects of this occurrence including the ramifications of symptoms, such as high stator cooling temperatures and field currents. This training bulletin will be issued by June 1, 1995.
4. A discussion will be provided during maintenance crew briefings regarding the potential of damaging electrical lugs and, in particular, the Standby Diesel Generator slip ring lugs. This action will be completed by June 15, 1995.
5. Standby Diesel Generator operator logs will be enhanced to identify ALERT levels for stator and field conditions that could be indicative of potential failure. This action will be completed by June 1, 1995.

ADDITIONAL INFORMATION:

Including this event, there has been one valid failure in the past twenty (20) valid tests and three valid failures in the last one hundred (100) tests for Standby Diesel Generator 12. This does not exceed either trigger values of two valid failures in twenty valid tests or four valid failures in 100 valid tests; therefore, the testing frequency remains at monthly for Standby Diesel Generator 12.

There have been no similar events reported to the Nuclear Regulatory Commission.