Nuclear Operating Company

South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

July 16, 2007
NOC-AE-07002185
10CFR50.73

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

South Texas Project
Unit 1
Docket No. STN 50-498
Licensee Event Report 2007-002,
Entry into TS 3.0.3 for Greater than 1 Hour due to Inoperable Degraded Voltage Relays

Pursuant to 10 CFR 50.73, the STP Nuclear Operating Company (STPNOC) submits the attached Unit 1 Licensee Event Report 2007-002 to address an entry into Technical Specification (TS) 3.0.3 for greater than 1 hour due to the inoperability of the Unit 1 Train B Class 1E 4160 V Degraded Voltage Relays.

This event did not have an adverse effect on the health and safety of the public.

There are no commitments contained in this event report. Resulting corrective actions will be implemented in accordance with the Corrective Action Program.

If there are any questions regarding this submittal, please contact Jim Morris at (361) 972-8652 or me at (361) 972-8902.

K. Coates

Ken Coates
Plant General Manager

jrm/

Attachment: South Texas Unit 1 LER 2007-002

IE22

STI: 32183728

NRR

cc:
(paper copy)

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NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
South Texas, Unit 1	05000498	1 OF 4

4. TITLE

Entry into TS 3.0.3 for Greater Than 1 Hour due to Inoperable Degraded Voltage Relays

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									NA	05000
05	17	2007	2007	- 002 -	00	07	16	2007	FACILITY NAME: NA	DOCKET NUMBER: 05000

9. OPERATING MODE

1

10. POWER LEVEL

100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☒ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
James R. Morris (Licensing Engineer)	(361) 972-8652

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	JE	27	G184	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

At 0800 on May 17, 2007, with Unit 1 at 100% power, surveillance testing was commenced on the Train B 4160 V ESF Bus Degraded Voltage Relays. Shortly thereafter, a broken lug was discovered in the Train B 4160 V ESF Bus relay protection and metering cabinet, which affected DC control power to all four Train B degraded voltage relays, and would have prevented the relays from actuating. At 0839, all four Train B degraded voltage relays were declared inoperable and TS 3.0.3 was entered.

At 0939 hours, Operations personnel entered the plant shutdown procedure (no power reduction occurred) in accordance with TS 3.0.3, and at 1041 hours TS 3.0.3 was exited following successful replacement of the lug, which restored DC power to the four degraded voltage relays.

This event resulted in no personnel injuries, no offsite radiological releases, and no damage to other safety-related equipment.

The root cause of the lug failure was determined to be low cycle fatigue failure induced by the opening and closing of the associated cubicle door.

Corrective actions include replacement of the failed lug and inspection of the other Unit 1 and 2 4160 V ESF Buses for similar wiring conditions. Additionally, the Unit 1 Train B 4160 V ESF switchgear cubicle 2 wire bundle between the door and cubicle will be replaced and a support bracket will be installed during the next refueling outage.

LICENSEE EVENT REPORT (LER)

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
South Texas, Unit 1	05000498	2007	002	00	2 OF 4

NARRATIVE

I. DESCRIPTION OF REPORTABLE EVENT

A. REPORTABLE EVENT CLASSIFICATION

This event is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by Technical Specifications (TS). TS 3.0.3 was entered due to the Degraded Voltage Relays for the Train B Class 1E 4160 V Bus being inoperable, and the condition was not corrected within 1 hour.

B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

At the time of discovery, Unit 1 was operating at 100%.

C. STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT

No equipment that was inoperable at the initiation of the event contributed to the event.

D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES

At 0800 on May 17, 2007, with Unit 1 at 100% power, surveillance testing was commenced on the Train B 4160 V ESF Bus Degraded Voltage Relays. Shortly thereafter, a broken lug was discovered in the Train B 4160 V ESF Bus relay protection and metering cabinet, (specifically in cubicle 2 of the cabinet at terminal 6 of 27-E Test Device 9) which affected DC control power to all four Train B degraded voltage relays, and would have prevented the relays from actuating. At 0839, all four Train B degraded voltage relays were declared inoperable and TS 3.0.3 was entered. (Note that TS 3.3.2, "Engineered Safety Features Actuation System," Action 20 allows for only one degraded voltage relay to be inoperable. Since TS 3.3.2 does not allow for more than one relay to be inoperable, entry into TS 3.0.3 was required.)

Station personnel immediately began efforts to repair the broken lug. At 0939 hours, Operations personnel entered the plant shutdown procedure (no power reduction occurred) in accordance with TS 3.0.3, and at 1041 hours TS 3.0.3 was exited following successful replacement of the lug, which restored DC power to all four degraded voltage relays.

E. THE METHOD OF DISCOVERY OF EACH COMPONENT OR SYSTEM FAILURE, OR PROCEDURAL OR PERSONNEL ERROR

The broken lug was discovered upon opening of the cubicle door to the Train B 4160 V ESF Bus relay metering and protection cabinet.

II. COMPONENT OR SYSTEM FAILURES

A. FAILURE MODE, MECHANISM, AND EFFECTS OF EACH FAILED COMPONENT

Inspection of the broken lug determined that the failure of the lug was due to low cycle fatigue induced by the opening and closing of the associated cubicle door.

B. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

The low cycle fatigue failure of the lug was due to physical configuration of the wiring bundle between the associated cubicle and door. The configuration of Unit 1 Train B 4160 V cubicle 2 is unique. This cubicle does not have a support bracket for the cable bundle between the cubicle and door, and it appears that this configuration has existed since original equipment manufacture and installation. A lack of support bracket led to increased stresses on the lug and its low cycle fatigue failure.

Cubicles 2 and 3 of the 4160 V ESF switchgear are opened a minimum of 4 times per quarter to perform surveillance testing. This repeated opening and closing of the doors subjects the cubicle wiring to stresses that can result in lug failure.

C. SYSTEMS OR SECONDARY FUNCTIONS THAT WERE AFFECTED BY FAILURE OF COMPONENTS WITH MULTIPLE FUNCTIONS

None.

D. FAILED COMPONENT INFORMATION

Refer to Block 13 above.

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

No safety system responses were required or occurred.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

The Train B 4160 V ESF Degraded Voltage Relays were inoperable from 0839 until 1041 on May 17, 2007. STP Unit 1 was in TS 3.0.3 for the same duration.

C. SAFETY CONSEQUENCES AND IMPLICATIONS

The event did not have an adverse affect on the health and safety of the public.

The incremental conditional core damage probability for the failed Train B 4160 V ESF Bus Degraded Voltage Relays is 8 E-9, which is considered a very small increase in plant risk.

This event resulted in no personnel injuries, no offsite radiological releases, and no damage to other safety-related equipment.

IV. CAUSE OF THE EVENT

The low cycle fatigue failure of the lug is due to physical configuration of the associated wiring bundle between the cubicle and door (lack of support bracket).

V. CORRECTIVE ACTIONS

- STPNOC replaced the failed lug and restored the degraded voltage relays to operability.
- The corresponding Unit 1 Train A and C 4160 V ESF Bus relay and metering cubicles, as well as those for Unit 2 Trains A, B, and C were inspected for similar wiring conditions. Although no similar failures were found, two additional damaged lugs were identified. Neither of these lugs is associated with the 27E device where the previous failures in Train B 4160 V ESF switchgear cubicle 2 have occurred, and in both instances the damaged lugs are associated with non-safety related functions.
- The Unit 1 Train B 4160 V ESF switchgear cubicle 2 wire bundle between the door and cubicle will be replaced and a support bracket will be installed during the next refueling outage. Installation of the support bracket should prevent future similar lug failures.

VI. PREVIOUS SIMILAR EVENTS

There have been two previous lug failures of this type at STP, both in Train B 4160 V ESF Bus cubicle 2:

- On August 20, 1998, a broken lug was found on terminal 4, which resulted in the loss of a single relay. The other cubicles in both units were inspected and no discrepancies were found.
- On November 4, 2004, a broken lug was found on terminal 2, which also resulted in the loss of a single relay. Again, the other cubicles in both units were inspected and no discrepancies were found.

VII. ADDITIONAL INFORMATION

Following the second lug failure discussed in Section VI above, a work order was initiated to install a support bracket for the wiring bundle. However, due to apparent human / organizational communication issues, this work was not performed. Investigation of the human and organizational aspects associated failure to complete this work is still in progress. As stated in Section V above, a support bracket will be installed during the next refueling outage.