Nuclear Operating Company

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

November 25, 2010
NOC-AE-10002621
File No.: G25
10 CFR 50.73
STI: 32787963

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 1-2010-004:
North Switchyard Bus De-Energization Resulting in
Loss of Offsite Power ESF Actuation on Train 1B

Pursuant to 10 CFR 50.73, the STP Nuclear Operating Company (STPNOC) submits the attached Unit 1 Licensee Event Report (LER) 1-2010-004 to address the de-energization of the north switchyard bus resulting in a loss of offsite power engineered safety features actuation of train 1B.

This condition is considered reportable under 10CFR 50.73(a)(2)(iv)(A), any event or condition that resulted in valid actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section.

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

There are no commitments contained in this Licensee Event Report. Corrective actions will be implemented in accordance with the STP Corrective Action Program.

If there are any questions on this submittal, please contact either J. R. Morris at (361) 972-8652 or me at (361) 972-7158.

L. W. Peter
Plant General Manager

JRM

Attachment: LER 1-2010-004: North Switchyard Bus De-Energization Resulting in Loss of Offsite Power ESF Actuation on Train 1B

IE22
NRR

cc:
(paper copy)

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NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2010

Estimated burden per response to comply with this mandatory collection request: 80 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)

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4. TITLE

North Switchyard Bus De-Energization Resulting in Loss of Offsite Power ESF Actuation on Train 1B

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
									South Texas Unit 2	05000499
09	30	2010	2010	- 004 -	0	11	25	2010	FACILITY NAME: N/A	DOCKET NUMBER: N/A

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)
Jim 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
A	FK	BKR	Mitsu.	Y					

14. SUPPLEMENTAL REPORT EXPECTED

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

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

At 1904 on September 30, 2010, with South Texas Project (STP) Units 1 and 2 both at 100% power, the north bus in the STP switchyard unexpectedly de-energized. The de-energization of the north bus resulted in a loss of power to Standby Transformer 1 which was supplying power to the Train 1B engineered safety features (ESF) 4160V bus. The loss of offsite power (LOOP) to the 1B ESF bus resulted in a LOOP ESF actuation and starting the 1B train Standby Diesel Generator and subsequent automatic actuation of 1B safety train equipment.

The direct cause was attributed to a wiring error during maintenance on 345kV switchyard circuit breaker Y530 performed by a contractor employed by the Transmission & Distribution Service Provider (TDSP). The root cause of the event was insufficient management oversight and reinforcement of expectations and standards for managing switchyard activities.

Corrective actions include procedure changes to better integrate TDSP activities into the STP work control process procedures and the assignment of a management owner to act as interface between STP and the TDSP regarding switchyard maintenance and other activities.

There were no personnel injuries, no offsite radiological releases, and no damage to safety-related equipment.

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

I. DESCRIPTION OF EVENT

A. REPORTABLE EVENT CLASSIFICATION

This event is reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A), any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section.

B. PLANT OPERATING CONDITIONS PRIOR TO EVENT

South Texas Project (STP) Unit 1 was in Mode 1 at 100% power.

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

No other structures, systems, or components were inoperable at the start of the event that contributed to the event.

D. NARRATIVE SUMMARY OF THE EVENT

On September 26, 2010, South Texas Substation 345 kV circuit breaker Y530 was removed from service for planned replacement. This was the third of three scheduled breaker replacements during September and the previous two had been completed satisfactorily. The breaker replacements were performed by CenterPoint Energy (the Transmission and Distribution Service Provider) personnel and contractors. Although the work scope had been provided to the STP Switchyard Coordinator, details of the work/work packages were not provided to STP, nor discussed.

On the morning of September 27, while lifting the old circuit breaker from its foundation, an associated pull box was damaged. That afternoon, the new breaker was placed on its foundation and installation of the 345 KV connections and termination of control cables was started.

On September 29, the damaged pull box was removed and replaced with an existing pull box that had been eliminated as part of the job. It was during retermination of the wires in the replaced pull box that the wiring error occurred. This wiring was associated with a current transformer for sensing a differential to protect the North switchyard bus.

Although wiring work was part of the breaker replacement process, the re-wiring of the relaying (bottom side) of the pull box was not in the original CenterPoint work plan. However, it became necessary when the pull box was damaged. The scope of this wiring work was not communicated to all appropriate personnel, and therefore, was not known to the CenterPoint Energy crew that performed the subsequent commissioning tests.

Neither the STP Switchyard Coordinator nor any STP personnel were present during the timeframe the wiring error was made. The STP Switchyard Coordinator had discussed the Y530

replacement with CenterPoint personnel on September 27 and understood that CenterPoint personnel assigned to the STP switchyard were to provide oversight for the contractors.

On September 30, 2010 at 1904, breaker Y530 was closed in on the North switchyard bus. The incorrect wiring of the current transformer resulted in a false differential condition being sensed, which cleared the North Switchyard bus. This resulted in a loss of power to Standby Transformer 1 (lockout), thus de-energizing Unit 1 13.8 kV Standby Bus 1G which was supplying power to the Train 1B ESF 4160V bus. The loss of offsite power (LOOP) to the 1B ESF bus resulted in a LOOP ESF actuation and starting the 1B Standby Diesel Generator and subsequent automatic actuation of 1B safety train equipment.

At 1909, the north switchyard bus was restored by auto-closing of the north bus switchyard circuit breakers as the fault cleared.

At 2211, normal power was restored to 4160V ESF Bus E1B, and the Standby Diesel Generator was subsequently secured.

At 2234, breaker Y530 was closed onto the North Switchyard bus after the incorrect wiring of the subject pull box had been identified and corrected by CenterPoint switchyard personnel.

At 2321, the required offsite circuit through Standby Transformer 1 was declared operable following restoration of all switchyard breakers to normal alignment and satisfactory completion of associated surveillances.

On October 1, 2010, at 0035, an 8-hour notification of the event (#46298) was made to the NRC Headquarters Operations Officer in accordance with 10 CFR 50.72(b)(3)(iv).

E. METHOD OF DISCOVERY

The clearing of the North Switchyard bus and corresponding Loss of Offsite Power ESF Actuation of the Unit 1 Train B ESF equipment due to the incorrect wiring of the Y530 circuit breaker was self-revealing when the Y530 breaker was placed in service.

II. EVENT-DRIVEN INFORMATION

A. SAFETY SYSTEMS THAT RESPONDED

The Unit 1 Train B Standby Diesel Generator automatically started due to the loss of normal offsite power to the Train B ESF bus, and all Mode II (LOOP) Train B ESF loads were sequenced on to the ESF bus as expected.

Train A and Train C ESF buses remained energized by normal offsite power throughout this event, and no Train A or Train C ESF equipment actuated as a result of the loss of power to the Standby Transformer.

B. DURATION OF SAFETY SYSTEM INOPERABILITY

No ESF equipment was inoperable as a result of this event.

While the North Bus was de-energized, Action (e) of Technical Specification (TS) 3.8.1.1, "AC Electrical Power Sources", was temporarily entered due to two independent offsite circuits being inoperable (switchyard North bus and ESF bus E1B not connected to its offsite source). Upon re-energization of the North bus approximately 5 minutes later, Action (e) was exited and Action (a) of Technical Specification (TS) 3.8.1.1, "AC Electrical Power Sources", was entered due one independent offsite circuit being inoperable. Action (a) was exited approximately 4 hours later when Standby Transformer 1 was returned to service.

Unit 2 entered Tech Spec 3.8.1.1, Action (a) when the loss of the North bus occurred and exited the Action when the North bus was re-energized (duration was approximately 5 minutes.)

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

There was no impact to radiological safety, safety of the public, or safety of station personnel for the loss of the North Switchyard Bus and subsequent Unit 1 Loss of Offsite Power ESF Actuation on Train 1B. All safety related equipment responded as expected. The North Switchyard Bus was recovered within 5 minutes and the Standby Transformer 1 was returned to service approximately 4 hours later.

A risk evaluation was performed for this event to estimate the Incremental Conditional Core Damage Probability (ICCDP) and Incremental Conditional Large Early Release Probability (ICLERP) associated with this event. A base case was analyzed for train B idle, consistent with the work week. A sensitivity case was analyzed for the North Switchyard Bus and Standby Transformer 1 de-energized (initial event conditions). The second sensitivity case analyzed was for the Standby Transformer 1 remaining de-energized (for approximately 4 hours) following the recovery of the North Switchyard bus (within 5 minutes). The base case ICCDP and ICLERP results for this event represent a small change in core damage risk and large early release risk based on the guidance contained in NRC Inspection Manual Chapters 0612 and 0609. The value for ICCDP was less than 1E-6 / yr and the LERF value was less than 1E-7/yr. It is reasonable to conclude that the loss of power event to the North Switchyard bus and Standby Transformer 1 had very low safety significance.

This event resulted in Maintenance Rule Functional Failure (MRFF) under the Maintenance Rule because it caused the actuation of safety systems.

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

III. CAUSE OF THE EVENT

The direct cause was attributed to a wiring error during maintenance on 345kV switchyard circuit breaker Y530 performed by a contractor employed by the Transmission & Distribution Service Provider (TDSP).

The root cause of the event was insufficient management oversight and reinforcement of expectations and standards for managing switchyard activities.

IV. CORRECTIVE ACTIONS

Corrective actions will be implemented in accordance with the STP Corrective Action Program.

1. The switchyard management procedure will be revised to better integrate the attributes of the work process program procedure and provide more detailed instructions for utilization of the STP Switchyard Coordinator in providing oversight and directing of switchyard activities.
2. The work process program procedure and its applicable guidelines will be revised to better integrate switchyard work performed by the Transmission and Distribution Service Provider (CenterPoint).
3. A STP management owner for switchyard activities will be assigned and will act as the STPNOC management point of contact for interface with CenterPoint regarding switchyard maintenance and other activities.
4. The assigned STP management owner for switchyard activities shall implement (formalize) recurring observations and assessments of switchyard activities.

V. PREVIOUS SIMILAR EVENTS

There have been no similar events at STP within the last three years.

Unit 1 LER 2003-001 (submitted March 20, 2003) describes a partial loss of offsite power due to the loss of the North Switchyard bus; however, the cause of the 2003 event was not due to incorrect wiring during maintenance as in this Licensee Event Report. The 2003 event was caused due to the failure of the North Bus Shunt Reactor while placing it in service. The C Phase of the Shunt Reactor Circuit Switcher did not close, which set up a current imbalance in the Shunt Reactor, causing a time over-current relay to trip the North Bus circuit breakers. The exact cause of the Shunt Reactor malfunction could not be identified and the Shunt Reactor functioned as designed during repeat testing.

VI. ADDITIONAL INFORMATION

None.