



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

September 6, 2011
NOC-AE-11002725
File No.: G25
10 CFR 50.73
STI: 32925927

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

South Texas Project
Unit 2
Docket No. STN 50-499
Licensee Event Report 2-2011-001
Exceeding ESF Bus Voltage Technical Specification Surveillance Acceptance Criteria

Pursuant to 10 CFR 50.73, STP Nuclear Operating Company (STPNOC) submits the attached Unit 2 Licensee Event Report (LER) 2-2011-001 regarding a condition when Class 1E 4.16 kV ESF Bus E2B exceeded the surveillance acceptance criteria longer than allowed by the associated Technical Specification Limiting Condition of Operation.

This condition is considered reportable under 10 CFR 50.73(a)(2)(i)(B), as an operation or condition prohibited by South Texas Project Technical Specifications.

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

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

If there are any questions on this submittal, please contact either Joe Loya at (361) 972-8005 or me at (361) 972-7158.

L. W. Peter
Plant General Manager

JAL

Attachment: LER 2-2011-001

IE22
MRR

cc:
(paper copy)

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NRC FORM 366 (10-2010)	U.S. NUCLEAR REGULATORY COMMISSION <h2 style="text-align: center;">LICENSEE EVENT REPORT (LER)</h2> <p style="text-align: center;">(See reverse for required number of digits/characters for each block)</p>	APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013 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 FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to InformationResources@nrc.gov , and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-1104), 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.
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1. FACILITY NAME South Texas Unit 2	2. DOCKET NUMBER 05000499	3. PAGE 1 OF 4
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4. TITLE
 Exceeding ESF Bus Voltage Technical Specification Surveillance Acceptance Criteria

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
05	05	2011	2011	001	0	09	06	2011	N/A	N/A

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR§: <i>(Check all that apply)</i> <table style="width:100%; border: none;"> <tr> <td><input type="checkbox"/> 20.2201(b)</td> <td><input type="checkbox"/> 20.2203(a)(3)(i)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(C)</td> <td><input type="checkbox"/> 50.73(a)(2)(vii)</td> </tr> <tr> <td><input type="checkbox"/> 20.2201(d)</td> <td><input type="checkbox"/> 20.2203(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(1)</td> <td><input type="checkbox"/> 20.2203(a)(4)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(i)</td> <td><input type="checkbox"/> 50.36(c)(1)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ix)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(ii)</td> <td><input type="checkbox"/> 50.36(c)(1)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iv)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(x)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iii)</td> <td><input type="checkbox"/> 50.36(c)(2)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(A)</td> <td><input type="checkbox"/> 73.71(a)(4)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iv)</td> <td><input type="checkbox"/> 50.46(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(B)</td> <td><input type="checkbox"/> 73.71(a)(5)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(v)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(C)</td> <td><input type="checkbox"/> OTHER</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(vi)</td> <td><input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(D)</td> <td style="font-size: small;">Specify in Abstract below or in NRC Form 366A</td> </tr> </table>	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A
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10. POWER LEVEL 100%																																					

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME Joe Loya, Licensing Engineer	TELEPHONE NUMBER (Include Area Code) 361-972-8005
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	EK	XFMR	ABB	NO					

14. SUPPLEMENTAL RESPONSE EXPECTED <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>MONTH</th> <th>DAY</th> <th>YEAR</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	MONTH	DAY	YEAR			
MONTH	DAY	YEAR						

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*
 On May 14, Class 1E 4.16 kV Bus E2B was declared inoperable due to load center (LC) voltage being greater than Engineering Safety Features (ESF) Power Availability surveillance procedure acceptance criteria. Per the Integrated Computer System (ICS), Class 1E 4.16 kV ESF Bus E2B was inoperable longer than allowed by Technical Specifications. The associated ESF buses were inoperable longer than allowed by Technical Specifications. Therefore, this condition is reportable as a condition prohibited by Technical Specifications.

The Root Causes are: 1) the range of voltage allowed by the bandwidth of the Load Tap Changers (LTC) on the Unit Auxiliary Transformer and the ESF B Transformers was not conservatively modeled; 2) The Failure Modes and Effects Analysis (FMEA) for the ESF Transformer LTC was inadequate; and 3) Management oversight did not have a method to identify, classify, control and monitor highly complex modifications.

The associated corrective actions are as follows: 1) Develop and issue an electrical design calculation methodology guideline or procedure; 2) Develop and issue a guideline or a procedure for completing a Failure Modes and Effects Analysis and 3) Define complex modifications in the design change procedure including defining the requirements for management oversight over providing adequate resources, development of project schedules, and ensuring site involvement in reviews of project documents.

There were no personnel injuries, no offsite radiological releases, and no damage to safety-related equipment associated with this condition. This condition did not have an adverse effect on the health and safety of the public.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
South Texas Unit 2	05000499	YEAR	SEQUENTIAL NUMBER	REV. NO	2 OF 4
		2011	001	00	

I. DESCRIPTION OF EVENT

A. REPORTABLE EVENT CLASSIFICATION

This event is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B), as an operation or condition prohibited by the plant's Technical Specifications.

B. PLANT OPERATING CONDITIONS PRIOR TO EVENT

South Texas Project (STP) Unit 2 was in Mode 1, with Reactor Power at approximately 100%.

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

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

D. NARRATIVE SUMMARY OF THE EVENT

On May 14, 2011, during the weekly performance of the Engineered Safety Features (ESF) power availability surveillance, B Train 480 Volt ESF Load Centers (LC) E2B1 and E2B2 were found with local indication for voltage at 520 Volts which exceeds the surveillance acceptance criterion of a maximum allowed bus voltage of 506 volts.

Based on the failed surveillance, the Class 1E 4160V Bus 2B was declared INOPERABLE at 21:32. The following Technical Specification action statements were entered:

- TS 3.8.3.1 action a was entered requiring re-energizing the associated bus within 8 hours or apply the requirements of the Configuration Risk Management Program (CRMP) or be in at least HOT STANDBY in the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- TS 3.8.1.1 ACTION a was entered which requires demonstration of the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.9.1.a within 1 hour and at least once per 8 hours thereafter, within 72 hours restore the offsite circuit to OPERABLE status or apply the requirements of the CRMP, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

On 05/15/11 13:26, the ESF Transformer 2B Load Tap Changer was placed in manual per plant procedures and lowered bus voltage.

On 05/15/11 15:21, the 4160 V BUS E2B was declared OPERABLE after adjusting both 4160 V E2B voltage and 480 V LC E2B voltage to within specified bands. TS 3.8.3.1 action a and TS 3.8.1.1 action a were exited including the requirements of the CRMP.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
South Texas Unit 2	05000499	YEAR	SEQUENTIAL NUMBER	REV. NO	3 OF 4
		2011	001	00	

Per Integrated Computer System (ICS) data, Class1E 4160 V ESF Bus E2B downstream 480 Volt Load Center Buses E2B1 and E2B2 were inoperable from approximately 06:15 on May 5 to approximately 06:15 on May 7 and from approximately 09:00 on May 8 to approximately 13:30 on May 15.

Since there is firm evidence that the associated ESF buses were inoperable longer than the allowed Technical Specification action statement duration of eight hours including the 6 hour requirement to be in HOT STANDBY, this is considered a condition prohibited by the plant's Technical Specifications.

E. METHOD OF DISCOVERY

The over-voltage condition was discovered by reviewing the local voltage indicators during the weekly performance of ESF Power Availability surveillance.

II. EVENT-DRIVEN INFORMATION

A. SAFETY SYSTEMS THAT RESPONDED

N/A

B. DURATION OF SAFETY SYSTEM INOPERABILITY

Per the ICS, Class 1E 4.16 kV ESF Bus E2B and downstream 480 Volt Load Center Buses E2B1 and E2B2 were inoperable from approximately:

- 06:15 on May 5 to approximately 06:15 on May 7
- 09:00 on May 8 to approximately 13:30 on May 15

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

Per engineering evaluation, there is reasonable assurance that the condition would not have prevented the affected safety-related switchgear and associated loads from performing their safety functions. Therefore, any increase in Core Damage Frequency or Large Early Release Frequency was insignificant. Consequently, there is no adverse effect on the health and safety of the public.

III. CAUSE OF THE EVENT

1. The range of voltage values allowed by the bandwidth of the Load Tap Changers (LTC) on the Unit Auxiliary Transformer and the ESF B Transformers was not conservatively modeled. An electrical set-point methodology for modeling LTCs did not exist at STP resulting in knowledge-based task performance by the user and reviewer. Program inputs/assumptions used in the computerized Electrical Transient Analyzer Program (ETAP) Calculation are not clear and were not adequately documented which impeded the capability to review the calculation.

2. Failure Modes and Effects Analysis (FMEA) for the ESF transformer LTC did not accurately identify the severity of all failure effects, and did not conclude that the method of failure detection was inadequate. An adequate FMEA would have identified the need for instrumentation and alarms. Full understanding of the potential failure modes would have identified the potential voltage range in which the LTC could fail and would have determined the voltage limits on the 480V bus could be exceeded.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
South Texas Unit 2	05000499	YEAR	SEQUENTIAL NUMBER	REV. NO	4 OF 4
		2011	001	00	

3. Management oversight did not have a method to identify, classify, control and monitor complex modifications.

IV. CORRECTIVE ACTIONS

A. Root Cause 1:

- a. Develop and issue an electrical design calculation methodology guideline or procedure for EC calculations EC-5000, EC-5001, EC-5002, EC-5008, and EC-5036.
- b. Provide Training on the requirements/availability of the electrical design calculation methodology guidance and the requirements of the calculation pre-job brief.

B. Root Cause 2:

- a. Develop and issue a guideline or a procedure for completing a Failure Modes and Effects Analysis using INPO and industry best practices.
- b. Provide Training on the completion of FMEA documentation using the guideline or procedure developed in correction action (IV.B.a).

C. Root Cause 3:

- a. To identify modifications that require the management oversight, develop and implement a definition for complex modifications in the design change package procedure including defining the requirements for management oversight which may include adequate resources, development of project schedules and site involvement in the rigorous reviews of project documents.
- b. Provide training for design engineering and staff augmented contract engineers on the Plant Investment Plan Guidelines for modifications that are complex or meet the definition of a complex modification.

V. PREVIOUS SIMILAR EVENTS

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

VI. ADDITIONAL INFORMATION

N/A