



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

July 3, 2013  
NOC-AE-13003016  
10 CFR 50.73

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555-0001

South Texas Project  
Unit 1  
Docket No. STN 50-498  
Licensee Event Report 2013-001-00  
Delta Temperature / T-Average Channel A  
Inoperable for Longer than Allowed by Technical Specifications

Pursuant to 10 CFR 50.73(a)(2)(i)(B), STP Nuclear Operating Company (STPNOC) submits the attached South Texas Project (STP) Unit 1 Licensee Event Report (LER) 2013-001-00 regarding Channel A of the Delta Temperature / T-Average protection circuitry being inoperable for longer than permitted by Technical Specifications.

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

The attached LER provides preliminary information and will be followed by a supplement after completion of the associated investigation.

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

If there are any questions, please contact Jim Morris at (361) 972-8652, or me at (361) 972-7566.

A handwritten signature in black ink, appearing to read "G. T. Powell".

G. T. Powell  
Site Vice President

jrm

Attachment: Unit 1 LER 2013-001-00

IE22  
NRR  
STI 33721247

cc:

(paper copy)

Regional Administrator, Region IV  
U. S. Nuclear Regulatory Commission  
1600 East Lamar Boulevard  
Arlington, TX 76011-4511

Balwant K. Singal  
Senior Project Manager  
U.S. Nuclear Regulatory Commission  
One White Flint North (MS 8 B1)  
11555 Rockville Pike  
Rockville, MD 20852

NRC Resident Inspector  
U. S. Nuclear Regulatory Commission  
P. O. Box 289, Mail Code: MN116  
Wadsworth, TX 77483

C. M. Canady  
City of Austin  
Electric Utility Department  
721 Barton Springs Road  
Austin, TX 78704

(electronic copy)

A. H. Gutterman, Esquire  
Morgan, Lewis & Bockius LLP

Balwant K. Singal  
U. S. Nuclear Regulatory Commission

John Ragan  
Chris O'Hara  
Jim von Suskil  
NRG South Texas LP

Kevin Pollo  
Richard Peña  
City Public Service

Peter Nemeth  
Crain Caton & James, P.C.

C. Mele  
City of Austin

Richard A. Ratliff  
Robert Free  
Texas Department of State Health Services

<b>NRC FORM 366</b> (10-2010)		<b>U.S. NUCLEAR REGULATORY COMMISSION</b>		<b>APPROVED BY OMB NO. 3150-0104</b>		<b>EXPIRES: 10/31/2013</b>																																								
<b>LICENSEE EVENT REPORT (LER)</b> (See reverse for required number of digits/characters for each block)																																														
<b>1. FACILITY NAME</b> South Texas Unit 1				<b>2. DOCKET NUMBER</b> 05000498		<b>3. PAGE</b> 1 OF 5																																								
<b>4. TITLE</b> Delta Temperature / T-Average Channel A Inoperable for Longer than Allowed by Technical Specifications																																														
<b>5. EVENT DATE</b>			<b>6. LER NUMBER</b>			<b>7. REPORT DATE</b>			<b>8. OTHER FACILITIES INVOLVED</b>																																					
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER																																				
04	17	2013	2013	- 001	- 00	07	03	2013	N/A	N/A																																				
<b>9. OPERATING MODE</b> <div style="text-align: center; font-size: 24pt;">1</div>			<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> <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>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
											<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																																											
<b>10. POWER LEVEL</b> <div style="text-align: center; font-size: 24pt;">100</div>																																														
<b>12. LICENSEE CONTACT FOR THIS LER</b>																																														
FACILITY NAME Jim Morris, Licensing Engineer									TELEPHONE NUMBER (Include Area Code) 361-972-8652																																					
<b>13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT</b>																																														
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX																																					
X	JC	CHA	W120	Y																																										
<b>14. SUPPLEMENTAL REPORT EXPECTED</b>							<b>15. EXPECTED SUBMISSION DATE</b>		MONTH	DAY	YEAR																																			
<input checked="" type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input type="checkbox"/> NO									08	15	2013																																			
<b>ABSTRACT</b> <i>(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)</i> <p>On May 1, 2013, during performance of a routine surveillance, maintenance personnel determined that the Channel A Overpower Delta Temperature (OPDT) reactor trip setpoint Delta-Flux Penalty summing amplifier (NSA card) had failed low, effectively disabling the associated OPDT setpoint correction, which caused Delta Temperature / T-Average Channel A to be inoperable. Further investigation determined that there was evidence that the failure occurred on April 17, 2013. Thus, the Delta Temperature / T-Average channel was inoperable for approximately fifteen days, which is longer than permitted by Technical Specifications 3.3.1 and 3.3.2. The failed circuit card replacement was completed on May 2, 2013 and after satisfactory surveillance testing on May 3, 2013, Delta-Temperature / T-Average Channel A was declared operable.</p> <p>The risk significance of the event is considered very small. This event did not result in any offsite release of radioactivity or increase of offsite dose rates, and there were no personnel injuries or damage to any other safety-related equipment associated with this event.</p> <p>Investigation into the cause of the failure is still in progress. A supplement to this LER will be submitted following completion of the investigation, which will identify cause(s) and follow-up corrective actions.</p>																																														

# **LICENSEE EVENT REPORT (LER) CONTINUATION SHEET**

NRC FORM 366A  
(10-2010)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
South Texas Unit 1	05000498	YEAR	SEQUENTIAL NUMBER	REV NO.	2 OF 5
		2013	- 001	- 00	

## **NARRATIVE**

### **I. DESCRIPTION OF EVENT**

#### **A. REPORTABLE EVENT CLASSIFICATION**

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

#### **B. PLANT OPERATING CONDITIONS PRIOR TO EVENT**

Unit 1 was operating 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**

The event resulted from the Delta Temperature / T-Average Channel A [EIS: JC, CHA] being inoperable for longer than permitted by Technical Specifications due to a summing amplifier circuit card failure. There were no other structures, systems, or components that were inoperable at the start of the event that contributed to the event.

#### **D. NARRATIVE SUMMARY OF THE EVENT**

With Unit 1 at 100% power on April 17, 2013, Operations personnel performed a shiftly Channel Check and all 4 channels for Overpower Delta Temperature (OPDT) indicated 108%. On April 18, 2013 shift logs indicated that the OPDT trip setpoint had changed from 108% to 109% for OPDT Channel A. This was within channel check criteria of 6% between channels.

From plant computer historical trend, channel RCS OPDT Channel A had a step increase on April 17, 2013 from 107.9% to 109.1% at 19:52. There were no other abnormal indications.

The Control Room initiated a Condition Report on April 23 addressing this issue with an initial operability evaluation as OPERABLE.

On May 1, 2013, during performance of the 100% Power Delta Temperature Gain Alignment surveillance procedure, Instrumentation and Controls (I&C) maintenance determined that the Channel A Overpower Delta Temperature (OPDT) reactor trip setpoint Delta-Flux Penalty summing amplifier (NSA card) had failed low, effectively disabling the associated OPDT setpoint correction. Note that the Delta Temperature / T- Average channel had already been declared inoperable for performance of this surveillance.

The failed circuit card replacement was completed on May 2, 2013 and after satisfactory surveillance testing on May 3, 2013, at 04:41 Delta-T / T-Average Channel A was declared operable.

History of the failed NSA card revealed that this circuit card had been in service for the life of the plant. The failed NSA card was sent to the Metrology Laboratory for failure analysis. The laboratory determined that the NSA circuit card output Operational Amplifier was defective. Review of the failure

# **LICENSEE EVENT REPORT (LER) CONTINUATION SHEET**

NRC FORM 366A  
(10-2010)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
South Texas Unit 1	05000498	YEAR	SEQUENTIAL NUMBER	REV NO.	3 OF 5
		2013	- 001	- 00	

## **NARRATIVE**

history for NSA circuit cards did not identify an adverse trend. This failure is determined to be a random electronic component failure.

An NSA card receives up to four differential input signals, sums these inputs with an internal bias, and provides an output (-10vdc to +10vdc) proportional to the summed inputs and the bias. Card summing circuits provide an adjustable gain range to weigh each signal independently. There are adjustable high and low output limits. This type of card is used to create the Upper/Lower Delta Power signal that is used in calculating the Overtemperature Delta Temperature (OTDT) and Overpower Delta Temperature (OPDT) Reactor trip setpoints.

A delta flux penalty is a function of the indicated difference between top and bottom detectors of the power range neutron ion chambers. If a flux tilt of sufficient magnitude exists in the core this would produce an area of hotter temperatures within the core that would not be detected by the Delta T measurement. This delta flux penalty will influence the OTDT setpoint but should not affect the OPDT setpoint.

The Upper/Lower Delta Power Summing Amplifier card (NSA card) failed such that the output went below its normal low limit of -10vdc. During testing the output read -11.175vdc. This output feeds a Function Generator (NCH) card. An NCH card is used to generate an output which is a predetermined function of the input signal. This particular NCH card is used to generate a flux penalty for the OPDT setpoint. Since STP does not have a penalty for delta flux, the output of this NCH is zero volts for any input within its range. The normal low input range to this NCH is -10vdc. In this particular case, with the failure of the NSA card, the input dropped to -11.175vdc. This exceeded the low range of the NCH card and provided an output which caused the OPDT indication to read 109% rather than 108%.

This same -11.175vdc from the failed NSA card is fed into the OTDT setpoint. Since Upper/Lower Delta Power NSA card failed low, the calculation for OTDT would not have any flux penalties applied. The result was that the OTDT setpoint did not exhibit any change as a result of the NSA card failure.

This OPDT setpoint change of 1% was determined to be the time of failure of the NSA card. It was therefore determined that the Actions for Technical Specifications 3.3.1 and 3.3.2 (Reactor Trip System Instrumentation and Engineered Safety Features Actuation System Instrumentation, respectively) had not been entered and the actions implemented within the time allowed (channel required to be placed in trip condition within 72 hours or shutdown the unit within the following 6 hours).

This card appeared to have failed on April 17, 2013 based on a review that was performed for the OPDT computer points. For Channel A, the indicated value changed from 108% to 109% at 19:52 on April 17, 2013. The other three channels indicated 108%, which is typically the maximum value that can be calculated by the OPDT equation. The safety function/protection was still performed by the remaining three Delta Temperature / T-Average Channels.

# **LICENSEE EVENT REPORT (LER) CONTINUATION SHEET**

NRC FORM 366A  
(10-2010)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
South Texas Unit 1	05000498	YEAR	SEQUENTIAL NUMBER	REV NO.	4 OF 5
		2013	- 001	- 00	

## **NARRATIVE**

### **E. METHOD OF DISCOVERY**

The inoperability of Delta Temperature / T-Average Channel A was discovered during the performance of routine surveillance testing.

## **II. EVENT-DRIVEN INFORMATION**

### **A. SAFETY SYSTEMS THAT RESPONDED**

No safety systems were required to respond to this event.

### **B. DURATION OF SAFETY SYSTEM INOPERABILITY**

Based on plant computer historical data, Delta Temperature / T-Average Channel A was inoperable from April 17, 2013 at 19:52 until May 3, 2013 at 04:41, or approximately fifteen days, which is greater than the 72-hour allowed action time to place the channel in the tripped condition plus the associated 6-hour time to shutdown the unit.

### **C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT**

A risk assessment performed for this event indicates the Incremental Core Damage Probability is less than 1E-06 and the Incremental Large Early Release Probability is less than 1E-07. The risk significance of the event is considered very small.

The remaining three channels of Delta Temperature / T-Average remained available during this event.

This event did not result in any offsite release of radioactivity or increase of offsite dose rates, and there were no personnel injuries or damage to any other safety-related equipment associated with this event.

## **III. CAUSE OF THE EVENT**

The cause of the event was a failure of the Delta Flux summing amplifier card within the OPDT circuit which caused the Delta Temperature / T-Average channel to become inoperable.

## **IV. CORRECTIVE ACTIONS**

The failed circuit card replacement was completed on May 2, 2013 and after satisfactory surveillance testing on May 3, 2013, at 04:41 Delta-Temperature / T-Average Channel A was declared operable.

Investigation into the cause of the failure is still in progress. A supplement to this LER will be submitted following completion of the investigation, which will identify cause(s) and follow-up corrective actions.

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**NRC FORM 366A  
(10-2010)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
South Texas Unit 1	05000498	YEAR	SEQUENTIAL NUMBER	REV NO.	5 OF 5
		2013	- 001	- 00	

**NARRATIVE****V. PREVIOUS SIMILAR EVENTS**

There have been no similar reportable events at STP within the last three years that have occurred for the same reason as this event. There have been instances of operations or conditions prohibited by the plant's Technical Specifications that resulted from unidentified failures of components. These events include:

- Unit 2 LER 2013-003, A Mode change prohibited by TS 3.0.4 was made with the Limiting Conditions for Operation unknowingly not met for an Inoperable Essential Cooling Water Pump.
- Unit 1 LER 2012-001, Nuclear Instrumentation channel was inoperable longer than allowed by the LCO, due to inadequate guidance for performing channel checks.
- Unit 2 LER 2010-006, Technical Specifications not met for Reactor Coolant System unidentified leakage, for an unrecognized condition caused by lack of procedural guidance.
- Unit 2 LER 2010-001, Essential Cooling Water System leak due to a crack in a heat exchanger return line near a vent valve connection that was not recognized.

**VI. ADDITIONAL INFORMATION**

None