Nuclear Operating Company

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

April 30, 2014
NOC-AE-14003128
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 LER 2014-001-01:
Overpower Condition Relating to the Ultrasonic Flow Measurement System

Pursuant to 10 CFR 50.73, STP Nuclear Operating Company (STPNOC) submits the attached supplement to Licensee Event Report (LER) 2014-001-00, "South Texas Project (STP) Unit 1 Overpower Condition Relating to the Ultrasonic Flow Measurement System," which provides an update regarding the evaluations being performed pertaining the overpower event.

On March 24, 2014, STPNOC, submitted LER 2014-001-00 pursuant to 10 CFR 50.73(a)(2)(i)(B), as a Condition prohibited by Technical Specifications. This LER documented an apparent overpower event that occurred in STP Unit 1 as a result of changes in feedwater piping inside diameter affecting the Ultrasonic Flow Measurement System.

Subsequent to the submittal of the LER, two independent evaluations are being performed to more closely determine the actual plant power conditions. The purpose of these evaluations is to determine if the ultrasonic flow meters were performing to their rated accuracy. Upon completion of the evaluation, a second supplement to this LER will be submitted in approximately 9 weeks documenting the results of this condition. This time frame is needed due to the complexity of the evaluations.

There are no regulatory commitments in this letter.

If there are any questions, please contact Rafael Gonzales at (361) 972-4779, or me at (361) 972-7566.

G. T. Powell
Site Vice President

JRM/RJG

Attachment: Unit 1 LER 2014-001-01, South Texas Project (STP) Unit 1 Overpower Condition Relating to the Ultrasonic Flow Measurement System

STI: 33865418

IE22
NRR

cc:
(paper copy)

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NRC FORM 366 (02-2014) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 01/31/2017

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 and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@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 Page 2 for required number of digits/characters for each block)

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4. TITLE

South Texas Project (STP) Unit 1 Overpower Condition Relating to the Ultrasonic Flow Measurement System

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
									N/A	N/A
01	23	2014	2014	- 001	- 01	04	30	2014	FACILITY NAME N/A	DOCKET NUMBER N/A

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*			
1	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
10. POWER LEVEL	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
101.8	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
	☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT	TELEPHONE NUMBER *(Include Area Code)*
Jim Morris	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
D	SJ	FI	AMAG	N					

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☒ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☐ NO		6	24	2014

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

This LER Supplement is being submitted to provide an update regarding the evaluations being performed pertaining the overpower event, and to inform the Nuclear Regulatory Commission (NRC) that a second supplement will be submitted June 24, 2014.

The initial LER reported an event that occurred in South Texas Project (STP) Unit 1. It was discovered that the ultrasonic flow Feedwater correction factors had been trending in a non-conservative direction since installation resulting in an overpower of approximately 1.8% (max) for the period of 2.5 years. Pipe wall thickness measurements were then taken in the Unit 1 Feedwater piping in the vicinity of the Ultrasonic Flow Measurement System (UTF), and it was determined that pipe wall thicknesses were less than the original values resulting in increased flow diameters. The overpower condition in Unit 1 resulted in reactor trip instrumentation being inoperable longer than allowed by Technical Specifications (TS), thus reportable under 50.73(a)(2)(i)(B) Condition prohibited by TS. The Root Cause for this event is that the STP License Amendment Request implementation process did not require a formal, documented review of plant specific requirements and recommendations from vendor supplied documents that are used as a basis for a license amendments. The corrective action to prevent recurrence of this event is to develop or revise a Licensing procedure accordingly to require a formalized, documented review.

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NARRATIVE

I. DESCRIPTION OF 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.

B. PLANT OPERATING CONDITIONS PRIOR TO EVENT

Unit 1 was operating in Mode 1 at 100% indicated power, (101.8% actual).

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

The Unit 1 overpower value of approximately 1.8% was above the Trip Setpoint Total Allowable value for the Power Range Nuclear Instruments (PRNI) High Trip. The Unit 1 overpower value exceeded the PRNI High Total Allowable value by 0.1%. This exceedence has been attributed to gradual pipe erosion which has taken place since the UTF was commissioned in 1999. Thus, this instrumentation was inoperable longer than the associated allowed outage time of 72 hours.

A reportability evaluation was performed that recommended that this issue be considered REPORTABLE against 50.73(a)(2)(i)(B) – as "Any operation or condition which was prohibited by the plant's Technical Specifications", i.e. Reactor Trip PRNI High Set-points Exceeding the Total Allowable Value of TS 2.2.1, and the associated allowable outage time of LCO 3.3.1.

D. NARRATIVE SUMMARY OF THE EVENT

The Unit 1 Correction Factors for the UTF had been trending in the non-conservative direction since initial installation. After measuring the feed water piping, it was identified that feed water pipe internal diameter measurements were outside the allowances of the UTF calculation. Preliminary analysis indicates that STP Unit 1 exceeded operating limits for thermal output for at least 2.5 years. This condition occurred because pipe internal diameters were not periodically monitored, and the results of the monitoring were not used as a basis to update the calculation.

This condition also occurred in STP Unit 2. This is not reportable in Unit 2 since all the Technical Specification requirements were met and did not exceed the Total Allowable Value of TS 2.2.1.

E. METHOD OF DISCOVERY

After measuring the feed water piping in December 2013, it was identified that feed water pipe internal diameter measurements were outside the allowances of the respective UTF calculation. Preliminary analysis indicates that STP Unit 1 exceeded operating limits for thermal output for at least 2.5 years.

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II. EVENT-DRIVEN INFORMATION

A. SAFETY SYSTEMS THAT RESPONDED

There were no safety systems that responded to this event.

B. DURATION OF SAFETY SYSTEM INOPERABILITY

One of the PRNI instruments was inoperable for the past 2.5 years. This exceeded the 72 hour TS associated allowable outage time.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT
An assessment of the safety consequences and implications is as follows:

Nuclear Safety: Accident Analyses were reviewed to ensure a 2% overpower condition did not consume the Nuclear Safety Margin, and the review concluded that margin remains. Therefore, the overpower conditions of approximately 1.8% in Unit 1 does not result in the nuclear power plant being in an unanalyzed condition that significantly degrades plant safety.

The above information is reflected in the PRA in the following way:

- Initiating Events

There is no impact on the frequency of initiating events. However, the overpower condition may effect some reactor trip set points such as Power Range, Neutron Flux High and Low, Over-temperature ΔT, and Overpower ΔT were set at a higher power level than assumed in the safety analysis.

- Mitigating Systems

There is no effect on the PRA mitigating systems directly, but because the plant operated at a higher power there was an associated increase in the decay heat. This small increase in decay heat is not significant, and does not impact the function of these systems.

- PRA Success Criteria and Human Actions

The identified overpower condition has a potential impact on PRA success criteria and operator action timing. The impact to these items is not significant because the overpower condition is very small. Therefore any increase in core damage or large early release risk due to this condition is considered very small.

Security Safety: This condition has no effect on the physical security program at STP. There is no interface between the described condition and security's execution of processes and procedures which implement the requirements of 10 CFR 73.55.

Emergency Preparedness: The described problem has no impact on emergency preparedness equipment and/or systems and on their capability to perform the various required functions.

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Radiological Safety: The event did not affect and could not affect the radiological safety of workers. The event was determined to be a level 5 reactivity event and does not affect radioactive process fluids, sources of radiation, safe shutdown of the reactor or an EECS function. Therefore, the event could not cause or increase the likelihood or severity of unintentional exposure to workers.

Safety of station personnel: The event did not affect and could not affect the radiological safety of workers. The event was determined to be a level 5 reactivity event and does not affect radioactive process fluids, sources of radiation, safe shutdown of the reactor or an ECCS function. Therefore, the event could not cause or increase the likelihood or severity of unintentional exposure to workers.

Safety of the public: The event did not affect and could not affect the radiological safety of public, nor could it cause the release of radioactive material. This level 5 reactivity event does not affect radioactive process fluids, sources of radiation, safe shutdown of the reactor or an ECCS function. Therefore, the event could not cause, nor increase the likelihood or severity, of unintentional exposure to the public. A risk assessment was performed for this event. There was no initiating event or impact to the capability of mitigating systems or other plant equipment to perform required safety functions. Therefore, there is no incremental core damage or large early release risk associated with this event.

Operability/functionality of equipment: The decrease in feed water pipe wall thickness resulted in an increased diameter and corresponding flow area which, in the absence of any other documentation, should have resulted in a higher mass flow rate and corresponding increased secondary calorimetric indication of power. Since the diameter is a constant in the CROSSFLOW computer, the CROSSFLOW computer "under reported" power. The "under reported" power led to calibrating the PRNI, the Overtemperature Delta-Temperature (OTΔT), and the Overpower Delta-Temperature (OTΔT) trip settings non-conservatively. The diameter change led to the conclusion that overpower was approximately 1.8% for Unit 1.

III. CAUSE OF THE EVENT

The cause of the event has been attributed to an absence of prescriptive procedural requirements for a formal technical review of license changes. STP License Amendment Request implementation process does not require a formal, documented review of plant specific requirements and recommendations from vendor supplied documents that are used as a basis for a license amendment.

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IV. CORRECTIVE ACTIONS

Once STP was aware of a potential problem, the vendor, Advance Measurement and Analysis Group (AMAG) was contracted to conduct pipe wall measurements on the Feedwater pipe in the vicinity of the UTF. This action was performed in December 2013, and was to validate STP pipe inner diameter measurements. The pipe internal diameter measurements performed by AMAG confirmed that pipe internal diameters were outside uncertainty assumptions. The UTF system was declared unreliable, removed from service, and both units were reduced in power to 3838 mWt. Design changes were issued for the affected units, and the new pipe wall diameters were entered. Unit 1 was returned to full power on 1/17/14.

The following Corrective Action to Prevent Recurrence has been put in place:

Develop or revise a Licensing procedure to require a formal, documented review of plant specific requirements and recommendations from vendor supplied documents to support license amendments.

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

V. PREVIOUS SIMILAR EVENTS

There have been no similar reportable events at STP within the last three years related to this issue.

VI. ADDITIONAL INFORMATION

A second supplemental LER report is planned to be submitted to provide additional information regarding the overpower event. A more detailed study is being performed by two independent vendors to provide a more detailed analysis of the overpower condition. One assessment evaluates plant data for a possible change in performance of Unit 1 due to pipe wall erosion in the area of the CROSSFLOW (CF) ultrasonic feedwater flow measurement instruments. The other evaluation uses thermal performance software and plant data to determine if the UFM ultrasonic flow meters in use at South Texas Project Units 1 and 2 were performing to an accuracy of ± 0.6% or better with a 95% confidence interval. Due to the complexity of these evaluations the submission date of second supplement is projected to be June 24, 2014.