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

April 5, 2010
NOC-AE-10002544
File No.: G25
10 CFR 50.73

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 1-2010-001
Unit Shutdown Required by Technical Specifications

Pursuant to 10 CFR 50.73, STP Nuclear Operating Company (STPNOC) submits the attached Unit 1 Licensee Event Report 1-2010-001 regarding a plant shutdown required by Technical Specifications as a result of more than one control rod inoperable but trippable. This condition is reportable under 10 CFR 50.73(a)(2)(i)(A).

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 processed 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 1-2010-001, Unit Shutdown Required by Technical Specifications

STI: 32644644

IE22
NRR

cc:
(paper copy)

Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
612 East Lamar Blvd., Suite 400
Arlington, Texas 76011-8064

Mohan C. Thadani
Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint North (MS 8B 1A)
11555 Rockville Pike,
Rockville, MD 20852

Senior 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)

Kevin Howell
Catherine Callaway
Jim von Suskil
NRG South Texas LP

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

Mohan Thadani
U. S. Nuclear Regulatory Commission

J. J. Nesrsta
R. K. Temple
Kevin Pollo
E. Alarcon
City Public Service

C. Mele
City of Austin

Jon C. Wood
Cox Smith Matthews

Richard A. Ratliff
Texas Department of Health Services

Alice Rogers
Texas Department of Health Services

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
Unit Shutdown Required by Technical Specifications

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
02	03	2010	2010	- 001 -	0	04	05	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)	☐ 20.2203(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)
☐ 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)
☐ 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

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
NA									

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)*

On February 3, 2010, with Unit 1 at 100% power, monthly shutdown and control rod testing was being performed. Previously on January 6, 2010, control rod C-5 had been determined to be inoperable, but trippable. During testing on February 3, a second control rod (B-12) was determined to be inoperable, but trippable. Attempts to realign the control rod with its bank were unsuccessful. Consequently, TS 3.0.3 was entered and the Unit was shutdown to Mode 3.

This event is reportable per 10 CFR 50.73(a)(2)(i)(A), "The completion of any nuclear plant shutdown required by the plant's Technical Specifications."

The cause of this event was insufficient removal and dispersion of the corrosion products originating from the normal fabrication and passivation process of the new CRDM latch assemblies associated with the Unit 1 Replacement Reactor Vessel Head.

All shutdown and control rods remained fully trippable during this event. There were no personnel injuries, no offsite radiological releases, and no damage to other 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)(i)(A). South Texas Project (STP) Technical Specification 3.1.3.1.c allows power operation to continue with more than one inoperable but trippable control rod for up to 72 hours. If the rods are not restored to operable (or are expected to not be returned to operable) within the allowed time, TS 3.0.3 is applied, which requires that the plant be in HOT STANDBY within the following six hours, and be in COLD SHUTDOWN within the following 30 hours. On February 3, 2010, with the Unit at 100% power, monthly shutdown and control rod testing was being performed. Previously on January 6, 2010, control rod C-5 was determined to be inoperable, but trippable. During testing on February 3, a second control rod (B-12) was determined to be inoperable, but trippable. Attempts to realign the control rod with its bank were unsuccessful. Consequently, TS 3.0.3 was entered and the Unit was shutdown to Mode 3.

B. PLANT OPERATING CONDITIONS PRIOR TO EVENT

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 which contributed to the event.

D. NARRATIVE SUMMARY OF THE EVENT

On January 6, 2010, Unit 1 conducted monthly shutdown and control rod surveillance testing at 100% power. When Shutdown Bank D was inserted and withdrawn, Shutdown Bank D rod C-5 did not withdraw. Attempts to realign rod C-5 were unsuccessful and reactor power was reduced to less than 75% to comply with Technical Specification (TS) 3.1.3.1 actions. Rod C-5 remained trippable.

On January 14, 2010, Unit 1 conducted shutdown and control rod surveillance testing at approximately 74% power with the full out position set at 259 steps for the remainder of the rods not tested on January 6 (Shutdown Bank E and Control Banks A, B, C, and D). No rod misstepping or rod position anomalies were noted for these rod banks.

On January 19, 2010, with Unit 1 operating in Mode 1 at approximately 75% power, the full out position of all Unit 1 rods was changed to 249 steps in accordance with a revision to the Core Operating Limits Report and per plant procedure. The shutdown and control banks were inserted to 249 steps. This allowed Unit 1 to be returned to full power operations, since the inoperable rod was now within 12 steps of its group demand position, as required by TS 3.1.3.1.

On February 3, 2010, Unit 1 again conducted monthly shutdown and control rod surveillance testing at 100% power. When Shutdown Bank A was inserted and withdrawn, rod B-12 did not withdraw when demanded. The Operating crew entered TS 3.1.3.1 action c (for more than one rod inoperable but trippable), but attempts to realign rod B-12 with its bank were unsuccessful. Subsequently, TS 3.0.3 was entered and the unit was shutdown to Mode 3.

During shutdown, the operating crew noted a misalignment of rod H-2 in Control Bank C at approximately 20% power. No other rod misstepping or rod position anomalies were noted for other rod banks. Rod B-12 remained trippable.

Following Unit 1 shutdown, further rod testing identified additional CRDM anomalies, including the failure of Shutdown Bank B rod N-7 to withdraw from rod bottom.

Extensive troubleshooting and testing performed by station personnel, as well as analysis and review of data by Westinghouse personnel indicates that the rod misstepping was due to the accumulation of corrosion products in the CRDM latch housing which prevented full movement of the CRDM movable gripper pole. The corrosion products are the result of the normal passivation process associated with the Unit 1 Replacement Reactor Vessel Head. This process establishes protective layer on metal surfaces and reduces corrosion product formation.

Rod exercising was conducted to remove corrosion products from the latch assemblies and flush corrosion products from the latch housings. In summary, 13 rod drops, 6 exercises (3 for traces and 3 for cleanup) for all banks and SBB exercising (to free up N-7) were performed for a total of approximately 5000 withdrawl and 1500 inward steps. SBB was stepped approximately an additional 1300 steps to free up N-7.

This event had no adverse impact on the health and safety of the public.

E. METHOD OF DISCOVERY

Control Rods C-5 and B-12 were determined to be inoperable, but trippable during monthly surveillance testing.

II. EVENT-DRIVEN INFORMATION

A. SAFETY SYSTEMS THAT RESPONDED

No safety systems were required to respond during this event.

B. DURATION OF SAFETY SYSTEM INOPERABILITY

Shutdown control rod C-5 was declared inoperable (but trippable) on January 6, 2010. Technical Specification 3.1.3.1 allows continued operation with one control rod inoperable but trippable. Shutdown control rod B-12 was declared inoperable but trippable on February 3, 2010, and the Unit was subsequently shutdown in accordance with TS 3.0.3. The duration of inoperability for rod C-5 was approximately 28 days. Rod B-12 was declared inoperable on February 3, 2010 at 1244 hours and Unit 1 subsequently entered Mode 3 1739 hours. The duration of concurrent inoperability for rods C-5 and B-12 was approximately 5 hours.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

Technical Specification Requirements:

Technical Specification 3.1.3.1 requires in Modes 1 and 2 that all full-length shutdown and control rods shall be operable and positioned within 12 steps (indicated position) of the group

step counter demand position.

Design Description:

The rod control system is a solid state system that controls the electrical power to the Control Rod Drive Mechanisms (CRDMs). The CRDMs are magnetic jacking mechanisms that move each shutdown and control rod within the reactor core by sequencing power to the three magnetic coils of each CRDM, producing a jacking or stepping rod motion.

The rod control system is designed to maintain reactor coolant system temperature within +/- 1.5 F of programmed temperature, by regulating reactivity within the core. Additionally, the rod control system is designed to automatically respond to design transients (such as step changes in turbine load, or power runbacks) and allows for temperature control by either manual operator action or automatic control by the rod control circuitry.

The rod control system is a non-safety related system. However, the design safety function of the shutdown and control rods themselves is to insert negative reactivity into the core in response to a reactor trip signal. The rod misstepping experienced by rods C-5 and B-12 did not affect their ability to trip.

Extent of Condition:

Lessons learned from rod misstepping experienced in Unit 1 will be applied to startup and power operations following replacement of Unit 2's reactor vessel head.

Risk Assessment:

The event is considered to have low safety significance. All shutdown and control rods remained fully trippable during this event. Although the rod insertion limit was not met for Shutdown Bank rod B-12 (not at full out position), and potentially not met for Control Bank C Rod H-2 (misalignment observed affecting bank overlap at approximately 20% power), shutdown margin was satisfied and core power distribution limits were not challenged. Equipment considered in the Configuration Risk Management Program (CRMP) was not affected by this event and remained available to support the plant shutdown. This event is not considered an at-power initiating event; the reactor was manually shutdown to Mode 3 in a controlled manner. Although this event is not an initiating event, the Conditional Core Damage Probability (CCDP) associated with a general reactor trip event, approximately 1E-07, can be used to bound the potential risk impact due to the plant shutdown to Mode 3.

III. CAUSE OF THE EVENT

The cause of this event was insufficient removal and dispersion of corrosion products originating from the normal fabrication and passivation process for the new CRDM latch assemblies associated with the Unit 1 Replacement Reactor Vessel Head. Analysis results indicate that the passivation process has not yet reached equilibrium and that the control rod drive mechanisms will be susceptible to corrosion product effects for an additional period of time.

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

IV. CORRECTIVE ACTIONS

Prior to Unit 1 restart, each shutdown and control rod was moved through its full length of travel multiple times, including 10 rod drops from the full out position.

Shutdown and control rod exercising is being performed on a more frequent basis until sufficient performances indicate that passivation has been achieved such that rod misstepping is resolved.

V. PREVIOUS SIMILAR EVENTS

On January 5, 2006, Unit 2 control rod D-4 misaligned by approximately 7 steps. The rod was declared inoperable but trippable and TS 3.1.3.1 Action b.2 was entered. The grippers were exercised (no rod motion) and the control rod was successfully realigned with its bank. The monthly shutdown and control rod surveillance test was then performed satisfactorily as a post-maintenance test.

VI. ADDITIONAL INFORMATION

None.