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

May 10, 2007
NOC-AE-07002154
File No.: G25
10 CFR 50.73

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
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Rockville, MD 20852-2738

South Texas Project
Unit 2
Docket No. STN 50-499
Licensee Event Report 2007-001
Auxiliary Feedwater Pump Inoperable Longer Than Allowed By Technical Specifications

Pursuant to 10 CFR 50.73, the STP Nuclear Operating Company (STPNOC) submits the attached Unit 2 Licensee Event Report 2007-001 to address an incident of failure to restore Auxiliary Feedwater Pump 23 to service in the time required by Technical Specifications. The condition affecting the operability of Auxiliary Feedwater Pump 23 was associated with the Long Path Recirculation Isolation Valve 2-AF-0092 leaking by its seat such that the design bases flow to the steam generator was not achieved.

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 Ken Taplett at (361) 972-8416 or me at (361) 972-8902.

Ken L. Coates
Plant General Manager

kjt

Attachment: Unit 2 LER 2007-001, Auxiliary Feedwater Pump Inoperable Longer Than Allowed Under Technical Specifications

cc:

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NRC FORM 366 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION

I. APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@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 information collection does not display a currently valid OMB control number, the NRC may not

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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4. TITLE
Auxiliary Feedwater Pump Inoperable Longer Than Allowed Under Technical Specifications

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME N/A	DOCKET NUMBER
03	14	2007	2007	- 001 -	00	05	10	2007	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE	1
10. POWER LEVEL	84

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR ': (Check all that apply)

	20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)
	20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)		50.73(a)(2)(x)
	20.2203(a)(1)		50.36©(1)(i)(A)		50.73(a)(2)(iv)(A)		73.71(a)(4)
	20.2203(a)(2)(i)		50.36©(1)(ii)(A)		50.73(a)(2)(v)(A)		73.71(a)(5)
	20.2203(a)(2)(ii)		50.36©(2)		50.73(a)(2)(v)(B)		OTHER – None
	20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)		Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)		
	20.2203(a)(2)(v)	X	50.73(a)(2)(i)(B)		50.73(a)(2)(vii)		
	20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)		
	20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)		

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Ken Taplett, (Licensing Engineer)	361-972-8416

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
D	BA	HCV	A391	Y					

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO				

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

On March 5, 2007, Unit 2 Auxiliary Feedwater Pump 23 was started for a post maintenance test. During the test, it was noted that the pump discharge flow was not as expected. Investigation determined that the closed Long Path Recirculation Isolation Valve 2-AF-0092 was leaking by its seat. It was determined that there was no lubrication of the portion of the valve stem just below the actuator. When the valve actuator was disassembled, the stem nut was found broken into two pieces. The valve was repaired and lubricated on March 9, 2007.

The operational impact of this condition was that the design bases flow to the steam generator was not achieved for this condition such that Auxiliary Feedwater Pump 23 and its associated flow path were inoperable. On March, 14, 2007 it was determined that this condition existed for a period of time longer than the allowed outage time of the Technical Specifications.

The cause of the stem nut failing is that no periodic preventive maintenance existed to lubricate the stem.

Corrective actions include (1) repair and lubrication of 2-AF-0092, (2) verification of the functionality of the long path recirculation isolation valves for each AFW System train in both units, (3) cleaning, lubrication and inspection of auxiliary feedwater system long path recirculation isolation valves in both units, (4) review of the adequacy of current preventive maintenance scope and frequencies of risk-significant valves in the auxiliary feedwater system and (5) revision of surveillance procedures to include testing to verify that the auxiliary feedwater flow path long path recirculation isolation valves do not have seat leakage.

This event resulted in no personnel injuries, no offsite radiological releases, and no damage to other safety-related equipment. The event was of very low safety significance.

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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)(B). Technical Specification 3.7.1.2 requires that four independent steam generator auxiliary feedwater pumps and associated flow paths be operable. However, an auxiliary feedwater pump (AFW) and its associated flow path were inoperable longer than the allowed outage time. Consequently, STP Unit 2 was in a condition prohibited by Technical Specifications.

B. PLANT OPERATING CONDITIONS PRIOR TO EVENT

STP Unit 2 was in Mode 1 at 84% power conducting coast down operations in preparation for an upcoming refueling outage.

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

No other inoperable structures, systems, or components contributed to the event.

D. NARRATIVE SUMMARY OF THE EVENT

On March 5, 2007, Unit 2 AFW Pump 23 was started for a post maintenance test. During the test, it was noted that the pump discharge flow was not as expected. Investigation determined that the closed Long Path Recirculation Isolation Valve 2-AF-0092 was leaking by its seat. The operational impact of this condition is that the design bases flow to the steam generator was not achieved.

During troubleshooting of this condition, an installed "knocker hand wheel" was used to verify that valve 2-AF-0092 was closed. After this operation of the valve, leakage past the valve seat increased further. Investigation determined that there was no lubrication on the portion of the valve stem just below the actuator. When the valve actuator was disassembled, the stem nut was found broken into two pieces.

A preventive maintenance requirement to lubricate the portion of the valve stem just below the actuator was cancelled in 1993. It was incorrectly thought that the valve had a sealed gear case and lifetime lubrication so that any loss of lubrication from the stem would be gradual and any unusual operation of the valve would be noted and reported prior to failure.

The valve stem moves up and down when engaged by the rotating stem nut during valve operation. Rotational movement of the valve stem is restrained by an anti-rotation device. During inspection prior to the start of maintenance on March 5, 2007, it was noted that the anti-rotation device was digging into a metal guide when the valve was in its final position.

2-AF-0092 is stroked during monthly surveillance tests. It was concluded that the valve must not have fully closed during the last surveillance test on February 9, 2007, and could have been in this condition since a surveillance test performed on January 10, 2007. The rolled metal on the anti-rotation device and the lack of lubrication on the valve stem combined to make the valve feel closed. The unusual pump discharge flow noted on March 5, 2007 was not checked, and therefore not noted, during the surveillance tests performed on February 9, 2007 and January 10, 2007. Further, it was determined that the stem nut failed due to brittle

overload when the valve was closed during troubleshooting in March using the "knocker hand wheel."

2-AF-0092 was repaired and AFW Pump 23 and its associated flow path were restored to service on March 9, 2007. On March, 14, 2007 it was determined that the inoperable condition of the valve existed for a period of time longer than the allowed outage time of the Technical Specifications.

E. METHOD OF DISCOVERY OF EACH COMPONENT FAILURE, SYSTEM FAILURE, OR PROCEDURAL ERROR

This condition was identified during post maintenance testing of the Unit 2 AFW Pump 23.

II. COMPONENT OR SYSTEM FAILURES

A. FAILURE MODE, MECHANISM, AND EFFECTS OF EACH FAILED COMPONENT

Long Path Recirculation Isolation Valve 2-AF-0092 was inspected. The inspection revealed that the valve stem just below the actuator had no lubrication. The additional torque caused by friction between the stem nut and the stem caused enough friction between the anti-rotation device and its guide that it made the metal roll when the valve was almost closed. The rolled metal on the anti-rotation guide and the lack of lubrication on the valve stem combined to make the valve feel closed even though it wasn't. The effect was a failure of 2-AF-0092 to fully shut when manually operated. After subsequent disassembly of the actuator, the stem nut was found to be broken into two pieces. This condition resulted in an increased flow past the valve seat. The failure was a Maintenance Rule Functional Failure.

B. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

The amount of friction between the threads of the valve stem and the stem nut increased because the valve stem was not lubricated adequately. As the amount of friction between the threads increased, the amount of torque on the stem and stem nut increased. When the stem tried to turn, it was restrained by the anti-rotation device being restrained from turning by the guide on the valve yoke. When the anti-rotation device was pushed hard against the guide, galling occurred between the metals of the device and guide which increased the torque needed to move the stem down even more.

The additional torque stresses due to lack of stem lubrication combined with the increased tensile stress due to using the "knocker hand wheel" and due to having to overcome the rolled metal on the anti-rotation device guide were enough to cause brittle overload failure of the stem nut.

Extent of condition testing and evaluation determined that this event did not have a common cause.

C. SYSTEMS OR SECONDARY FUNCTIONS THAT WERE AFFECTED BY FAILURE OF COMPONENTS WITH MULTIPLE FUNCTIONS

None

D. FAILED COMPONENT INFORMATION

The stem nut for Long Path Recirculation Isolation Valve 2-AF-0092 is the primary component failure. The information on this component is coded in Block 13 above.

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

No safety system responses were required or occurred

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

AFW Pump 23 and its associated flow path were inoperable from February 9, 2007 for a period of 28 days and approximately 12 hours and may have been inoperable since January 10, 2007 until March 9, 2007 for a period of 57 days and approximately 14.5 hours.

Technical Specification 3.7.1.2 requires that four independent steam generator auxiliary feedwater pumps and associated flow paths be operable. With one motor-driven auxiliary feedwater pump (AFW Pump 23 is a motor-driven pump) inoperable, the motor-driven pump is required to be restored to operable status within 28 days.

C. SAFETY CONSEQUENCES AND IMPLICATIONS

AFW Pump 23 and its associated flow path were non-functional due to excessive bypass flow from February 9, 2007 to March 9, 2007 and could have been non-functional since January 10, 2007.

The design flow rate for an AFW Pump is 500 gallons per minute (gpm). With the observed bypass flow across valve 2-AF-0092, AFW Pump 23 was capable of delivering approximately 469 gpm to the steam generator assuming the steam generator power-operated relief valve could be opened to remove decay heat after a reactor trip. When evaluating risk for this event, the Incremental Change in Core Damage Probability was calculated with no credit given for the AFW Pump 23 degraded flow capability. In addition, a sensitivity case was calculated to demonstrate the risk reduction when crediting degraded AFW Pump 23 flow capability. The results are as follows:

Exposure Dates	Exposure Time (Days)	Exposure Time (Hours)	Base Case ICCDP	Sensitivity Case 1 ICCDP
2/9/07 to 3/9/07	28.5	683.7	1.16E-06	3.0E-07
1/10/07 to 3/9/07	57.6	1383.3	2.34E-06	6.0E-07

Deterministic calculations have shown that the degraded flow (469 gpm) from the AFW Pump 23, that represents the actual flow path condition during the inoperable period of time, was capable of removing reactor decay heat and sensible heat for RCS cool downs. The conservative sensitivity case shows that the core damage risk is reduced below 1E-06. Therefore, this event was of very

low safety significance.

This event resulted in no personnel injuries, no offsite radiological releases, and no damage to other safety-related equipment.

IV. CAUSE OF THE EVENT

The cause of Long Path Recirculation Isolation Valve 2-AF-0092 not fully closing on February 9, 2007 and the stem nut failing on March 6, 2007 is that no periodic preventive maintenance existed to lubricate the stem.

V. CORRECTIVE ACTIONS

1. Long Path Recirculation Isolation Valve 2-AF-0092 was repaired and lubricated on March 9, 2007.

2. The long path recirculation isolation valves for each AFW System train in both units were tested satisfactorily to verify they did not have enough seat leakage to adversely impact their functionality.

3. The remaining three auxiliary feedwater flow path long path recirculation isolation valves in Unit 2 were cleaned, lubricated and inspected. The auxiliary feedwater flow path long path recirculation isolation valves in Unit 1 will be cleaned, lubricated and inspected by July 24, 2007.

4. Surveillance procedures were revised to include testing to verify that the auxiliary feedwater flow path long path recirculation isolation valves do not have excessive seat leakage.

5. Plant Generation Risk and Graded Quality Assurance High and Medium Risk-ranked components in the AFW System will be reviewed by May 31, 2007 to determine the adequacy of current preventive maintenance scope and frequencies.

VI. PREVIOUS SIMILAR EVENTS

STP reviewed Equipment History for previous failure of valve stem nuts. Of seven valves identified with either failed or severely damaged stem nuts, none were ranked as High or Medium Risk-Significant. The Equipment History review determined eight conditions where valves had stems or stem nuts that lacked lubrication. Only one of these valves is ranked as risk significant and this valve has preventive maintenance for performing lubrication.

The Equipment History review identified six occasions where main steam power-operated relief valves failed to close or were hard to operate. An apparent cause evaluation determined that part of the cause was that the lubricant used in the valve actuator would break down and harden at the high temperatures experienced by the valves. It was concluded that the lubricant in the auxiliary feedwater system valves was not expected to separate and harden in the milder environment in which these valves operate.

VII. ADDITIONAL INFORMATION

STP plans to conduct a review of risk significant components to determine which components do not have active preventive maintenance activities. The critical attributes that made the component

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risk significant will be considered when determining whether preventive maintenance activities should be created.