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

February 18, 2004
NOC-AE-04001681
10CFR50.73

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

South Texas Project
Unit 1
Docket Nos. STN 50-498
Licensee Event Report 1-03-007
Failure of Main Steam Power Operated Relief Valve 1B

Pursuant to 10CFR50.73(a)(2)(i)(B), the South Texas Project submits the attached Unit 1 Licensee Event Report 1-03-007 regarding the failure of the Main Steam Power Operated Relief Valve (PORV) 1B.

This event did not have an adverse effect on the health and safety of the public. There are no commitments contained in this event report. Resulting corrective actions will be handled in accordance with STP Corrective Action Program.

If there are any questions on this submittal, please contact S. M. Head at (361) 972-7136 or me at (361) 972-7849.

E. D. Halpin
Plant General Manager

Jal/

Attachment: LER 1-03-007 (South Texas, Unit 1)

IE28

LER 1-03-007.doc

STI: 31698328

cc:
(paper copy)

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

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 conduct or sponsor, and a

LICENSEE EVENT REPORT (LER)

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

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4. TITLE

Failure of Main Steam Power Operated Relief Valve 1B

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	DOCKET NUMBER
										05000
12	23	2003	2003	- 07 -	00	02	17	2004	FACILITY NAME	DOCKET NUMBER 05000

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)(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)	X OTHER
20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)	Part 21
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)
Joe Loya	361-972-7922

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
B	SB	BKR	NLI	YES					

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 December 17, 2003, while performing the Main Steam System Valve Operability Test on Unit 1 Main Steam (MS) Power Operated Relief Valve (PORV) 1B, the PORV hydraulic pump failed to start as required. MS PORV 1B was declared inoperable and initial investigation determined that the thermal overloads on the pump supply breaker (MCC E1B1/A3) had tripped.

A detailed fault tree analysis was performed and the newly implemented PREP (Preventing Recurring Equipment Problems) process was utilized to troubleshoot the condition. During troubleshooting, the failure scenario could not be repeated. When the breaker (MCC E1B1/A3) was disassembled, a 3/8-inch piece of wiring insulation was found inside the contactor at "C" phase with evidence of arching on the insulation. This insulation caused intermittent contact of phase "C" which resulted in an over-current trip of the thermal overloads preventing the hydraulic pump from starting. The most likely source of the insulation is during the manufacturing and assembly of the breaker prior to arrival at South Texas Project (STP). It was concluded that failure of the breaker could have occurred during seismic events. Therefore, it was determined that MS PORV 1B had been inoperable originally from the breaker installation on 03/11/00 up until the replacement of its motor starter unit on 12/19/03.

This event resulted in no personnel injuries, no offsite radiological releases, and no damage to safety-related equipment. There were no challenges to plant safety.

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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 resulted in a condition which was prohibited by the plant's Technical Specifications and is reportable pursuant to 10CFR50.73(a)(2)(i)(B). Additionally, since the root cause of the failure occurred during a 10CFR50 Appendix B vendor's manufacturing process, this event is reportable pursuant to Part 21 of 10CFR.

B. PLANT OPERATING CONDITIONS PRIOR TO EVENT

STP Unit 1 was in Mode 1 operating at 100% power.

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

The breaker for the hydraulic pump for MS PORV 1B had a piece of foreign material located inside the breaker that under seismic conditions could have prevented the valve from operating in automatic thus preventing its safety function from being fulfilled. Therefore, it was determined that MS PORV 1B had been inoperable originally from the breaker installation on 03/11/00 up until replacement of its motor starter unit on 12/19/03.

D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES

On December 17, 2003, while performing the Main Steam (MS) System Valve Operability Test Procedure, the MS PORV 1B hydraulic pump did not start as specified by procedure. This section of the surveillance verifies that the PORV will stroke closed on a loss of electrical power, and that when power is restored to the hydraulic pump, the pump should start due to the low hydraulic pressure following the closed stroke.

Following the closed stroke, the PORV hydraulic pump breaker (MCC E1B1/A3) was closed. When the breaker was closed, the operator stationed at the PORV hydraulic pump reported that the hydraulic pump did not start as required.

The operator at breaker MCC E1B1/A3 informed the control room that the thermal overloads were tripped. The control room instructed the operator to open breaker MCC E1B1/A3, re-set the thermal overloads and close breaker MCC E1B1/A3. When the breaker was re-closed, the operator at the PORV hydraulic pump reported that the hydraulic pump started as required per procedure.

On November 3, 2003, a similar event with breaker MCC E1B1/A3 occurred. The hydraulic pump motor, hydraulic pump, hydraulic manifold and PORV control circuit were tested and inspected. The testing included installing a Viper Test Computer and re-performing the applicable surveillance steps six times in an attempt to re-create the failure in order to determine the cause(s) of the event. The event could not be duplicated and no problems were identified during testing of the above mentioned components.

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

Based on the inability to re-create the intermittent failure and industry experience, which identified another facility with similar symptoms that were corrected by replacing the hydraulic pump, the decision was made to replace the PORV hydraulic pump. The hydraulic pump was replaced, testing was completed satisfactorily and MS PORV 1B was returned to an operable status.

During the November 3, 2003 investigation, the event was included in a case study during the Failure Modes Effects and Analysis training. A fault tree was developed, and several possible causes were identified. The most likely cause being an intermittent mechanical binding of the PORV hydraulic pump. The replaced hydraulic pump was being prepared to be shipped off-site for failure analysis when the PORV failure occurred.

When MS PORV 1B hydraulic pump failed to start, the newly implemented Preventing Recurring Equipment Problems (PREP) process was employed to troubleshoot the failure. As stated above, the failure of this event occurred at the same step as the failure on November 3, 2003. A fault tree was performed and a troubleshooting plan was developed to identify the failure mode. As during the troubleshooting of the November 3, 2003 event, the breaker (MCC E1B1/A3), hydraulic pump motor, hydraulic pump, hydraulic manifold and PORV control circuit were tested and inspected. The testing included installing a Viper Test Computer and re-performing the applicable surveillance steps six times in an attempt to re-create the failure in order to determine the cause(s) of the event. The event could not be duplicated and no problems were identified during testing of the above mentioned components.

Following the above mentioned tests, the next step in the troubleshooting plan was to remove the MCC E1B1/A3 breaker bucket, replace the breaker components with new components and inspect the removed components to identify the failure mode. During the disassembly of the breaker contactor, a 3/8-inch piece of wiring insulation was found inside the contactor at "C" phase with evidence of arcing on the insulation. This insulation caused intermittent contact of phase "C" which resulted in an over-current trip of the thermal overloads due to "single phasing" and prevented the hydraulic pump from starting.

Since the "single phasing" condition of the SG PORV 1B power supply would of prevented the actuator motors from operating in automatic when required, on December 23, 2003 MS PORV 1B was declared inoperable and reportable pursuant to 10CFR50.73(a)(2)(i)(B), "Any operation or condition which was prohibited by the plant's Technical Specifications."

The breaker in cubicle MCC E1B1/A3 was installed in March 2000 as part of a breaker up-grade. The breaker was provided by Nuclear Logistics Incorporated (NLI). The breaker was assembled prior to arrival on-site and is installed in the cubicle as a single pre-assembled unit. Since installation, the only breaker work performed on MCC E1B1/A3 was the replacement of the breaker thermal overloads in November 2002.

The small clearances in the breaker contactor along with the absence of any maintenance that would result in the intrusion of a 3/8-inch piece of insulation into the contactor make it highly unlikely that the insulation entered the breaker contactor following the breaker's arrival on-site at STP. Therefore, the root cause of this event was determined to be Manufacturing Fabrication Deficiency involving the breaker bucket in cubicle MCC E1B1/A3 that was provided Nuclear Logistics (NLI). A test conducted by NLI concluded that the 3/8-inch piece of wiring insulation most likely entered the contactor during the breaker assembly prior to its arrival at STP.

In addition to the two intermittent failures previously discussed, it was determined that the failure of the breaker would have occurred during seismic events. This breaker passed over 40 surveillance tests before the first failure was observed in November 2003. For each surveillance test, the breaker is "racked in" approximately six times. Each time the breaker is "racked in" the cubicle is shaken. It is believed the shaking of the cubicle caused the piece of insulation to travel the torturous path necessary to impede contacts.

Research on similar industry events regarding foreign material preventing the associated breaker from operating was performed. This study resulted with events with breakers of a different size, different vendor and different foreign material. The results of this study indicate that a generic issue does not exist.

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

This condition was identified during a routine surveillance test run of MS PORV 1B hydraulic pump.

II. EVENT DRIVEN INFORMATION

A. SAFETY SYSTEMS THAT RESPONDED

Not Applicable.

B. DURATION OF SAFETY SYSTEM INOPERABILITY

Given that the event resulted in a condition that could have prevented the fulfillment of a safety function under seismic conditions, it was determined that MS PORV 1B had been inoperable originally from the breaker installation on 03/11/00 up until its replacement on 12/19/03. Duration of inoperability was approximately 1379 days.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

This event resulted in no personnel injuries, no offsite radiological releases, and no damage to safety-related equipment. There were no challenges to plant safety.

Since it was determined that the failure of the breaker would have occurred during seismic events, the Incremental Conditional Core Damage Probability (ICCDP) was calculated by guaranteeing failure of PORV 1B for seismic events only. The ICCDP associated with Unit 1 MS PORV 1B being non-functional during seismic events for 33001.5 hours is 2.0 E-9. This event is categorized as low risk significance by PRA.

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III. CAUSE OF THE EVENT

The root cause of this event was a Manufacturing Fabrication Deficiency involving the breaker bucket in cubicle MCC E1B1/A3 that was provided Nuclear Logistics (NLI). A test conducted by NLI concluded that the 3/8-inch piece of wiring insulation most likely entered the contactor during the breaker assembly prior to its arrival at STP.

IV. CORRECTIVE ACTIONS

A. All breakers being installed during the Unit 2 spring 2004 refueling outage will have their starter contactors inspected for foreign material prior to installation.

B. Develop a procedure for inspecting breaker starter contactors for foreign material prior to installation.

C. Formally request NLI address the findings of this condition report's investigation, and provide objective evidence to STP that this issue has been addressed, describing to STP in writing what programmatic changes will be incorporated into their work practices to ensure this type event will not occur again.

V. PREVIOUS SIMILAR EVENTS

None

VI. ADDITIONAL INFORMATION

None