Nuclear Operating Company

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

January 27, 2003
NOC-AE-03001460
File No.: G25
10CFR50.73
STI: 31546798

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 No. STN 50-498
Licensee Event Report 02-004

Steam Generator Power Operated Relief Valve Failed to Close on Demand

Pursuant to 10CFR50.73(a)(2)(i)(B) and 10CFR 50.73(a)(2)(vii), the South Texas Project submits the attached Unit 1 Licensee Event Report 02-004 concerning the failure of Steam Generator Power Operated Relief Valve 1B to close on demand due to the tripping of the actuator hydraulic pump motor's thermal overload relay. The investigation found that the thermal overload heater, which had been installed by a plant modification, was undersized for this motor in this application.

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

Corrective actions number 4, 5 and 6 are the only commitments contained in this event report.

If there are any questions on this submittal, please contact W. R. Bealefield, Jr. at (361) 972-7696 or me at (361) 972-7849.

E. D. Halpin
Plant General Manager

Attachment: LER 02-004 (South Texas, Unit 1)

IE22

cc:
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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 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)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
South Texas Unit 1	05000 498	1 OF 4

4. TITLE

Steam Generator Power Operated Relief Valve failed to close on demand

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
11	20	2002	2002	- 04 -	00	01	27	2003	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE	3
10. POWER LEVEL	000

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(c)(1)(i)(A)	50.73(a)(2)(iv)(A)	73.71(a)(4)		
20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)		
20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A		
20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)			
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) X	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)
William R. Bealefield, Jr.	361-972-7696

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

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 November 20, 2002, Unit 1 was in Mode 3 at 0% power. Unit 1 was being maintained in Mode 3 due to equipment failure in the Circulating Water system which required the main condenser to be taken out of service. The Steam Generator (SG) Power Operated Relief Valves (PORV) were being used to control decay heat removal from the primary plant. Plant operators attempted to close PORV 1B in manual control and the valve failed to close. Investigation revealed that the thermal overload on the breaker supplying power to the actuator hydraulic pump for the PORV 1B had tripped. The thermal overload was reset and PORV 1B fully closed. Due to obsolescence of various Class 1E Motor Control Center (MCC) sub-components, the Class 1E MCC buckets are being replaced with new buckets and sub-components. The MCC components for the PORV 1B were replaced in 2000 under the plant modification process. The replacement bucket for the PORV 1B contained a heater element rated at 114% of the motor's maximum operating current. The STP design requirement for this heater in this application is a rating between 125% and 140% of motor maximum operating current. Two PORV's in Unit 2 also had replacement buckets with heater elements undersized for this application. The breakers with under sized heater elements have been replaced. Additional training will be provided for engineering personnel on procurement practices.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
South Texas Unit 1	05000 498	2002	01	00	2 OF 4

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

DESCRIPTION OF EVENT

On November 20, 2003, Unit 1 was in Mode 3 at 0% power and normal operating temperature and pressure. Unit 1 was being maintained in Mode 3 due to an equipment failure in the Circulating Water system which required the main condenser to be taken out of service which removed the normal heat sink for decay heat removal. The Steam Generator (SG) Power Operated Relief Valves (PORV) were being used to control decay heat removal from the primary plant. Plant operators attempted to close the PORV 1B in manual control and the valve failed to close. PORV 1B control was placed in automatic and setpoint adjusted to 1225 psig. PORV 1B still would not close. Investigation revealed that the thermal overload for the breaker supplying power to the actuator hydraulic pump for PORV 1B had tripped. The thermal overload was reset and the valve fully closed in automatic control.

Due to obsolescence of various Class 1E Motor Control Center (MCC) sub-components, the Class 1E MCC buckets are being replaced with new buckets and sub-components. The term bucket used in this event report refers to the physical enclosure that contains the breaker and its sub-components. The MCC bucket replacement is being done under the station modification process with the intent to replace the buckets with equivalent components. Replacement is scheduled to span a nine-year period which started in October 1999. The MCC bucket and sub-components protecting the PORV 1B hydraulic motor is a replacement unit provided by Nuclear Logistics Inc. (NLI) as part of the overall MCC bucket replacement modification.

The contract between STP and NLI specifies the new bucket components are to be equivalent to the old components. The original heater elements were supplied by Telemecanique (ITE) and the replacements were supplied by General Electric (GE). The replacement bucket contained a heater element rated at 114% of the hydraulic motor's nameplate maximum operating current. The design criteria require the heater element in this application to have a rating between 125% and 140% of the motor nameplate maximum operating current.

Each MCC is upgraded by replacing the existing bucket with an equivalent bucket built by NLI complete with all new internal components including the overload heaters. STP provides NLI with the following information before manufacturing of the replacement bucket is commenced:

- setpoint index record for each MCC bucket-breaker and relay settings
- motor data
- ITE heater sizes
- the heater sizing criteria of 125% to 140% for motors with a Service Factor (SF) of 1.15.

There is no direct equivalency document comparing ITE and GE heater elements. The replacement heater elements were sized by NLI in accordance with GE guidelines and motor starter heater tables using the STP sizing criteria. STP reviews the Bill of Materials (BOM) drawings prepared by NLI prior to bucket production. STP engineering checked the heater element sizing using the same GE guidelines and table NLI used to select heater elements. Both STP and NLI matched the heater element with the corresponding nameplate amperage thinking this would provide a 125% margin. However the GE table instructions state that using this technique will provide a maximum of 125%.

Both STP and NLI used the GE guidelines and table incorrectly to determine heater sizing.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* (17)

The undersized heater element for the PORV 1B motor was replaced with an element providing 127% margin.

A review of other MCC bucket replacements identified two buckets for Unit 2 PORV's that also contained undersized heater elements. A review of other MCC bucket replacements, accomplished under the plant modification, identified several other heater elements that were undersized for the particular application.

EVENT SIGNIFICANCE

This event resulted in no personnel injuries, radiation exposure, offsite radiological releases or damage to safety-related equipment.

For this event, the change in core damage frequency for Unit 1 is 1.94E-09 per year. The change in core damage frequency for Unit 2 is 2.27E-08. The change in large early release frequency with the PORVs out of service is 4.12E-12 for Unit 1 and 5.55E-11 for Unit 2. These results are below the 1E-06 core damage frequency per year threshold and the 1E-07 large early release frequency per year threshold identified in Regulatory Guide 1.174 for risk significance.
This event is of minimal safety significance.

This event is reportable because the three PORVs (one in Unit 1 and two in Unit 2) had their thermal overload heaters sized such that they might not prevent spurious tripping of the power supply for the actuator motors when required to operate in automatic, thus preventing their safety function from being fulfilled. Since the undersized thermal overload heaters had been in service since 2000 for Unit 1 and 1999 for Unit 2, this condition is reportable under 10CFR 50.73(a)(2)(i)(B), "operation or condition prohibited by technical specifications," and 10CFR 50.73(a)(2)(vii), "common cause inoperability of independent trains or channels."

CAUSE OF EVENT

Root Causes:

There are two root causes resulting in failed barriers for this event.

1. The General Electric guidelines were not interpreted correctly by South Texas Project personnel and Nuclear Logistics Inc personnel. This resulted in selection of a GE heater element one size smaller than intended.
2. The setpoint index did not include directions to use an oversized heater element for the PORV actuator motor.

CORRECTIVE ACTIONS

1. Replaced the breaker for PORV 1B.
   Completed November 29, 2002.

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

2. Replaced the breakers for the Unit 2 PORVs with units having a 127% margin.
   Completed November 26, 2002.

3. Replaced the thermal overload heaters in other MCCs affected by the MCC modification.
   Completed December 7, 2002.

4. Design engineering personnel will be trained on the correct usage of the GE guidelines and table for selecting overload heater elements.
   This corrective action will be completed by February 15, 2003.

5. Training will be developed for engineering personnel on "Procurement of Engineered Materials."
   This corrective action will be completed by August 31, 2003.

6. The setpoint index will be updated for safety-related components to add information necessary for sizing breaker components.
   This corrective action will be completed by December 18, 2003.

ADDITIONAL INFORMATION

This event was determined to be reportable on November 28, 2002.

A search of the STP Equipment History found that there have been six other incidents related to MCC breaker overloads. None of these other incidents was reportable under 10CFR 50.73.