



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

December 12, 2001
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File No.: G25
10CFR50.73
STI: 31386770

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 01-002
Pressurizer Safety Valves Setpoints Discovered Outside Required Tolerances

Pursuant to 10CFR50.73, South Texas Project submits the attached Unit 1 Licensee Event Report 01-002 regarding the discovery that three Pressurizer Safety Valve "as found" lift setpoints were outside the Technical Specification setpoint tolerance. This event did not have an adverse effect on the health and safety of the public.

Corrective Action 2 is the only licensee commitment in this letter. If there are any questions on this submittal, please contact either W. R. Bealefield, Jr. at (361)-972-7696 or me at (361)-972-7849.

A handwritten signature in black ink, appearing to read "E. D. Halpin", is written over a horizontal line.

E. D. Halpin
Plant General Manager

Attachment: LER 01-002 (South Texas, Unit 1)

IE22

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Attention: Document Control Desk
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LICENSEE EVENT REPORT (LER)

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

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, NEOF-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.

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4. TITLE
Pressurizer Safety Valve Setpoints Discovered Outside Required Tolerances

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
10	13	2001	2001 - 02 - 00			12	12	2001	FACILITY NAME	DOCKET NUMBER
										05000
										05000

9. OPERATING MODE 6	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)	
10. POWER LEVEL 000	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)	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 William R. Bealefield, Jr.	TELEPHONE NUMBER (Include Area Code) 361-972-7696
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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
X	AB	RV	C710	NO					

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

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

On October 13, 2001 Unit 1 was shutdown in Mode 6 in refueling outage 1RE10. Information was received from an offsite vendor that during pressurizer safety valve "as found" set point testing, valve N1RCPSV3451 had a lift pressure of 2406 psig which is low outside of the Technical Specification required setpoint of 2485 psig +/-2% (2435.3 to 2534.7). Valve N1RCPSV3452 had an "as found" lift pressure of 2411 psig. On October 15, 2001 the vendor reported that safety valve N1RCPSV3450 had an "as found" lift pressure of 2422 psig. These test results constitute a violation of Technical Specification 3.4.2.2, Reactor Coolant System – Operating. The root causes of the valves failing the "as found" lift tests include: (a) the inherent differences between the "as left" test conditions and the "as found" test conditions, plus nozzle loading effects which are inducing stresses and misalignments in the valves, and (b) the narrow tolerance band of +/- 2% which is too restrictive considering the valve nozzle loading effects and these inherent differences. Corrective actions include installation of replacement valves with "as left" lift settings of 2485 psig +/- 1%, and requesting a Technical Specification change to optimize setpoint tolerances for the Pressurizer Safety Valves "as found" lift setpoints.

The "as found" Pressurizer Safety Valve setpoints did not violate any safety analysis limits and did not adversely impact Reactor Coolant System overpressurization or Departure from Nucleate Boiling Ratio analysis.

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

DESCRIPTION OF EVENT

On October 13, 2001 Unit 1 was shutdown in Mode 6 in the unit's tenth refueling outage. During "as found" setpoint testing of Pressurizer Safety Valves that had been removed from Unit 1 during 1RE10, all three valves initially lifted low outside of the Technical Specification 3.4.2.2 required tolerance of 2485 psig +/- 2% (2435.3 to 2534.7 psig). This is a violation of STP's Technical Specifications.

South Texas Project (STP) owns nine Pressurizer Safety Valves. Three are installed in each unit and the remaining three are replacement spares. During each refueling outage, all three installed valves are removed and replaced with the three spares which have been previously tested and certified to lift at 2485 psig +/- 1%. The three valves that were removed from the unit are sent off site for testing and refurbishment in preparation for installation in the other unit during it's next refueling outage. The testing was performed at NWS Technologies in Spartanburg, South Carolina with the following results:

Date	Valve Identification Number	As Found Lift Pressure	As Found % Out Of Tolerance
10/13/01	N1RCPSV3451	2406 psig	-3.18%
10/13/01	N1RCPSV3452	2411 psig	-2.98%
10/15/01	N1RCPSV3450	2422 psig	-2.54%

Replacement safety valves that had previously been tested and set at the required "as left" tolerance of 2485 psig +/- 1% were installed in place of the above valves during the 1RE10 outage.

South Texas Project and the nuclear power industry have had numerous problems in the past associated with Pressurizer Safety Valves lifting outside of the allowed tolerance band during testing. Several Condition Adverse to Quality Condition Reports have been written to address valves being out of as found lift tolerance. Several corrective actions were implemented based on the Condition Report evaluations and on input from the nuclear industry. As appropriate, these improvements are included in the NWS Technologies STP specific test procedure and/or in STP procedures.

Corrective actions and improvements implemented in accordance with the STP Corrective Action Program have been effective in reducing the number of Pressurizer Safety Valve test failures but not in eliminating all failures,

Since the three valves removed during 1RE10 failed in the low direction and since all failures since 1998 have been in the low direction, only the possible causes of failing in the low direction were evaluated. The EPRI "Safety and Relief Valve Testing and Maintenance Guide", TR-105872 lists the following ten possible causes for the failure mode "lifts low":

1. Aging-

Aging is not considered to be a cause of the STP valves lifting low, because STP Pressurizer Safety Valves are removed from the system each refueling outage for testing.

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DESCRIPTION OF EVENT(continued)

2. Auxiliary lift device failure or associated inputs-
The STP Pressurizer Safety Valves are not tested using this method.

3. Excessive seat leakage-
Of the six valves that have failed the as found lift test since 1998, only two failed the seat tightness test. Since the lift setpoint could still be determined for all six valves and since only two of these valves failed the seat tightness test, excessive seat leakage is not considered to be a cause of the valves lifting low.

4. Foreign material-
Foreign material has not been found in any STP Pressurizer Safety Valve during testing or inspections.

5. Loop seal-
Although STP's design includes a loop seal for the Pressurizer Safety Valves, this has no effect on the failed tests because the valves are not tested while installed in the system. The as found lift tests and the as left certification lift tests are performed at a test facility using steam in accordance with WCAP-12910, therefore loop seal is not a cause of the valves lifting low.

6. Nozzle loading-
While the exact physical mechanism that is occurring inside of the valves isn't known, it is surmised that stresses and slight misalignments are induced into the valves during installation and during plant heatup due to the variations in thermal growth of the pressurizer and the valve inlet and outlet piping. Interviews with personnel involved in removing and reinstalling the valves indicate that it is very difficult to align some of the valves in both units.

Westinghouse has previously performed nozzle load testing with Pressurizer Safety Valves from Diablo Canyon. The Diablo Canyon Section XI Engineer reported that increases in nozzle loading sometimes caused seat leakage and variations in valve lift points even when the induced load was less than the limits recommended by the valve manufacturer. Based on the Diablo Canyon nozzle loading testing results and the fact that STP's failure rates seem to be unit and installed location specific, it is believed that nozzle loading is contributing to STP's valve lift test failures.

7. Pilot failure-
The STP Pressurizer Safety Valves do not have pilot valves.

8. Procedural-
Corrective actions taken as a result of previous Condition Reports related to valve test failures have incorporated lessons learned and vendor recommendations into maintenance and test procedures. No procedural deficiencies were noted during the investigation of this event.

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DESCRIPTION OF EVENT(continued)

9. Spring relaxation-

A weakened valve spring would be indicated if valve lifts were repeatedly low. As found data shows that after a failed lift in the low direction, the subsequent lift pressures tended to increase and get closer to the required setpoint, therefore spring relaxation is not considered to be a cause of the valves lifting low.

10. Test conditions-

Several improvements have been made in the test procedure as a result of previous corrective actions to ensure that valve temperatures are stable prior to performing the as found lift tests. Although it does not appear that unstable test conditions have caused the valves to lift low, the repeatability of testing is affected to some degree because the required as found test conditions can not be made identical to the actual as left conditions that existed during the previous certification tests. During the as left certification tests, the valve internals and exhaust area get heated by the steam passing through the valve during each of the lifts. This decreases thermal gradients and associated stresses in the valve. A minimum of three lifts, and generally more than three lifts, are performed as part of the as left certification testing. In contrast to the as left test conditions, the as found lift test is required to be the first lift test performed after removing the valve from the system. Data taken during the as found testing on the three valves in this event shows that the exhaust temperatures increased from approximately 233 degrees F to approximately 279 degrees F after the first lift for each valve. Historical as found test data shows that after a failed lift in the low direction on the initial test, the following lift pressures tended to increase and get closer to the required setpoint. Therefore test conditions are considered as contributing to STP's valve lift test failures.

EVENT SIGNIFICANCE

The design function of the Pressurizer Safety Valves is to ensure the Reactor Coolant System stays below 110% of design pressure in accordance with ASME Boiler and Pressure Vessel code, Section III. Ensuring the Reactor Coolant System pressure is maintained below 110% of design pressure ensures that the Reactor Coolant System as a primary safety barrier does not become degraded. since the as found setpoints were lower than the allowed values in the Technical Specifications, the condition did not have an adverse impact on over pressurization.

If the Pressurizer Safety Valves lift pressures are too low, they may lift earlier than anticipated during a reactor over power event. This may result in a lower Reactor Coolant System pressure which may adversely impact the calculated Departure from Nucleate Boiling Ratio (DNBR). A review of reactor over power events, such as rod withdrawal from power, shows that the analysis assumes the Pressurizer Power Operated Relief Valves lift at 2335 psig. Events that lift the Pressurizer Safety Valves are not the limiting DNB events. Sufficient DNB margin exists to accommodate a Pressurizer Safety Valve lift at 2406 psig, the lowest as found lift point reported in this event. Therefore, the as found Pressurizer Safety Valve setpoints did not violate any safety analysis limits.

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EVENT SIGNIFICANCE(continued)

The condition of having these three Pressurizer Safety Valves lift setpoints outside of the Technical Specification required lift setpoint tolerance is reportable under 10CFR50.73(a)(2)(i)(B) "Any operation or condition prohibited by the plants Technical Specifications." NUREG-1022, Revision 2, Event Reporting Guidelines, Section 3.2.2 provides the following guidance concerning multiple test failures: "the existence of similar discrepancies in multiple valves is an indication that the discrepancies arose over a period of time and the failure mode should be evaluated to make this determination. If so, the condition existed during plant operation and the event is reportable under 50.73(a)(2)(i)(B)".

The out of tolerance condition is assumed to have occurred during operation. As discussed in the evaluation of this event above, the Pressurizer Safety Valve settings did not adversely impact reactor coolant system over pressurization or DNBR analysis.

CAUSE OF EVENT

Root Causes:

1. The root cause of the valves failing the as found lift test is the inherent differences between the valve as left test conditions and as found test conditions and nozzle loading effects which are inducing stresses and misalignments in the valves.
2. The tight tolerances of +/- 2% for the testing make it difficult to consistently pass the test under the existing conditions for these type valves.

CORRECTIVE ACTIONS

1. During the Unit 1 refueling outage, 1RE10, replacement Pressurizer Safety Valves were installed which had been set to the Technical Specification as left setting tolerance of +/- 1%.
2. STPNOC will submit a License Amendment Request for Technical Specification change to T.S. 3.4.2.2 to optimize the Pressurizer Safety Valve as found lift setpoint tolerances considering valve nozzle loading effects and the inherent differences between the valve as left test conditions and as found test conditions. This License Amendment Request will be submitted by June 30, 2002.

ADDITIONAL INFORMATION

It is not considered practical to reduce nozzle loading by realigning the Pressurizer Safety Valve piping or to increase the as found setpoint accuracy by exactly replicating the previous as left test conditions during the as found tests.

The South Texas Project pressurizer Safety Valves are model HB-BP-86 6N8 manufactured by Crosby Valve Company.