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

December 4, 2018
NOC-AE-18003608
10 CFR 50.73

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 2018-001-00
Unit 1 Main Steam Safety Valve As Left Settings Outside of Required Range
Contrary to Technical Specifications Due to Inadequate Procedure

Pursuant to reporting requirements 10 CFR 50.73(a)(2)(i)(B), STP Nuclear Operating Company hereby submits the attached South Texas Project Unit 1 Licensee Event Report 2018-001-00 for a condition prohibited by the plant Technical Specifications.

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

There are no commitments in this submittal.

If there are any questions, please contact Robyn Savage at 361-972-7438 or me at 361-972-7344.

James Connolly
Executive VP and CNO

nb/RS

Attachment: Unit 1 LER 2018-001-00, Unit 1 Main Steam Safety Valve As Left Settings Outside of Required Range Contrary to Technical Specifications Due to Inadequate Procedure

STI 34760243

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Attachment

Unit 1 LER 2018-001-00

Unit 1 Main Steam Safety Valve As Left Settings Outside of Required Range Contrary to Technical Specifications Due to Inadequate Procedure

NRC FORM 366 (04-2018) | U.S. NUCLEAR REGULATORY COMMISSION | APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2020

LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. Facility Name	2. Docket Number	3. Page
South Texas Unit 1	05000498	1 OF 6

4. Title

Unit 1 Main Steam Safety Valve As Left Settings Outside of Required Range Contrary to Technical Specifications Due to Inadequate Procedure.

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	05000
10	02	2018	2018	– 001	– 00	12	04	2018	Facility Name N/A	Docket Number 05000

9. Operating Mode	11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: *(Check all that apply)*			
1	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
10. Power Level	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
092	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(ii)
	☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(iii)
		☐ 50.73(a)(2)(i)(C)	☐ Other (Specify in Abstract below or in NRC Form 366A	

12. Licensee Contact for this LER

Licensee Contact	Telephone Number (Include Area Code)
Robyn Savage, Licensing Engineer	(361) 972-7438

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable To ICES		Cause	System	Component	Manufacturer	Reportable To ICES
D	SB	RV	Consol / Dresser	N		N/A	N/A	N/A	N/A	N/A

14. Supplemental Report Expected	15. Expected Submission Date	Month	Day	Year
☐ Yes (If yes, complete 15. Expected Submission Date) ☒ No		N/A	N/A	N/A

Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On October 2, 2018, Unit 1 was in Mode 1 in coast down operations at approximately 92% power prior to shut down for a refueling outage when Main Steam Safety Valves (MSSVs) surveillance testing and calibrations for the Loop B steam generator were completed.

Subsequent review of the surveillance test results for the MSSVs on October 8, 2018, identified an error in the as left setting calculation resulting in the discovery that the as left set pressure of two of the MSSVs on steam generator B were outside Technical Specification post test requirements of +/- 1 %. This resulted in the failure to meet Technical Specification requirements for the MSSVs with Unit 1 in Modes 1, 2 and 3 from October 2, 2018, until October 6, 2018. There were no pressure events to challenge the steam generator B MSSVs during that time.

The cause of the condition was determined to be the lack of procedure guidance due to an elevation correction equation having previously been inadvertently deleted. The test procedure was revised to account for the elevation correction adjustment. Previous test results were verified to include the required elevation correction.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
South Texas Unit 1	05000-498	2018	- 001	- 00

NARRATIVE

I. Description of Reportable Event

A. Reportable event classification

This event is reportable under:

§50.73(a)(2)(i)(B): "Any operation or condition which was prohibited by the plant's Technical Specifications…"

B. Plant operating conditions prior to event

Prior to the event on October 2, 2018, Unit 1 was operating in Mode 1 at 92% power in coast down operations in preparation for planned refueling outage 1RE21.

C. Status of structures, systems, and components that were inoperable at the start of the event and that contributed to the event

At the start of the event, the two steam generator B Main Steam {SB} Safety Valves (MSSV) {RV} were inoperable and there were no other structures, systems, or components inoperable that contributed to the event.

D. Background information

South Texas Unit 1 has five MSSVs on each main steam generator located outside containment, upstream of the main steam isolation valves. The two MSSVs related to this event are on the Loop B steam generator and referred to as N1MSPSV7420C and N1MSPSV7420D. In Modes 1, 2, and 3, the MSSVs ensure the secondary system pressure will be limited to less than 110% of steam generator design pressure to protect the steam generators and steam lines from overpressure. (Reference: South Texas Project Technical Specification 3.7.1.1 and associated Bases)

The specified valve lift settings and relieving capacities are in accordance with the requirements of Section III of the ASME Boiler and Pressure Code, 1971 Edition, where the as found settings shall be within +/- 3% of the lift settings specified in Technical Specification Table 3.7-2 and the as left settings shall be within +/- 1% following valve testing.

With two inoperable safety valves on any steam generator in Modes 1, 2, or 3, the Technical Specification 3.7.1.1 ACTION statement allows operation in Modes 1, 2, and 3 to proceed provided that within 24 hours, either the inoperable valve(s) are restored to OPERABLE status or the Power Range Neutron Flux High Trip Setpoint is reduced to 43% RATED THERMAL POWER per Table 3.7-1; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. The Technical Specification 3.7.1.1 LIMITING CONDITION FOR OPERATION ensures sufficient relieving capacity is available for the allowable RATED THERMAL POWER restrictions.

E. Narrative summary of the event

NOTE: all times are Central Standard Time

May 22, 2012 The MSSV Inservice test procedure was revised such that the set pressure calculation which accounted for head correction was inadvertently removed from the procedure guidance.

October 2, 2018 [15:46] MSSV N1MSPSV7420C was declared inoperable for surveillance testing and Technical Specification 3.7.1.1 ACTION was entered.

NARRATIVE

E. Narrative summary of the event (continued)

October 2, 2018 [16:05] MSSV N1MSPSV7420C measured an as found set pressure of less than +/- 3% but greater than the +/- 1% as left acceptance criteria requiring adjustment and retesting.

October 2, 2018 [16:23] MSSV N1MSPSV7420C was adjusted and re-tested. The retested set pressure was thought to be within +/- 1% as left acceptance criteria but the head correction factor was not applied. A later re-calculation using the correct formula determined that the as left acceptance criteria was not met.

October 2, 2018 [16:33] MSSV N1MSPSV7420C was incorrectly determined to be OPERABLE and Technical Specification 3.7.1.1 ACTION was exited.

October 2, 2018 [16:34] MSSV N1MSPSV7420D was declared inoperable for surveillance testing and Technical Specification 3.7.1.1 ACTION was entered.

October 2, 2018 [16:59] MSSV N1MSPSV7420D measured an as found set pressure of less than +/- 3% but greater than the +/- 1% as left acceptance criteria.

October 2, 2018 [17:14] MSSV N1MSPSV7420D was adjusted and re-tested. The retested set pressure was thought to be within +/- 1% as left acceptance criteria but the correction factor was not applied. A later re-calculation using the correct formula determined that the as left acceptance criteria was not met.

October 2, 2018 [17:29] MSSV N1MSPSV7420D was incorrectly determined to be OPERABLE and Technical Specification 3.7.1.1 ACTION was exited.

Technical Specification 3.7.1.1 LIMITING CONDITION FOR OPERATION states:

All main steam line Code safety valves associated with each steam generator shall be OPERABLE with lift settings as specified in Table 3.7-2. Table 3.7-2 establishes required lift settings for each MSSV within +/- 3% of the values AND within +/- 1% of the values following testing i.e., as left.

Technical Specification 3.7.1.1 ACTION requirements state:

With four reactor coolant loops and associated steam generators in operation and with one or more main steam line Code safety valves inoperable, operation in Modes 1, 2, and 3 may proceed provided that within 24 hours, either the inoperable valve is restored to OPERABLE status or the Power Range Neutron Flux High Trip Setpoint is reduced per Table 3.7-1; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Unit 1 did not meet Technical Specification 3.7.1.1 ACTION within 24 hours to restore the inoperable MSSVs to operable status (i.e., return the as left lift setpoints to within +/- 1% of the values in Table 3.7-2) OR reduce the Power Range Neutron Flux High Trip Setpoint per Table 3.7-1 within the required outage time. Likewise, Unit 1 did not enter HOT STANDBY or COLD SHUTDOWN within the required shutdown times. This resulted in Unit 1 operating in a condition prohibited by the plant's Technical Specifications.

October 5, 2018 [20:00] South Texas Unit 1 commenced shutdown as part of a planned refueling outage 1RE21.

October 6, 2018 [10:34] South Texas Unit 1 entered Mode 4 (HOT SHUTDOWN), shutting down for planned refueling outage 1RE21; Technical Specification 3.7.1.1 is no longer applicable.

NARRATIVE

E. Narrative summary of the event (continued)

October 8, 2018 [14:49] Engineering review of test data identified an error in the set pressure calculation used resulting in the two MSSVs being outside the Technical Specification required as left post test acceptance criteria of +/- 1%, a condition report was initiated.

October 31, 2018 [15:32] South Texas Unit 1 in Mode 5 (COLD SHUTDOWN), Power Range Neutron Flux High Trip Setpoint reduced to 42.5% of RATED THERMAL POWER to be in compliance with Technical Specification 3.7.1.1 and Technical Specification Table 3.7-1 (43% RATED THERMAL POWER) with two inoperable MSSVs, prior to Mode 3 entry.

November 6, 2018 [17:36] South Texas Unit 1 entered Mode 3 (HOT STANDBY) starting up from planned refueling outage 1RE21 maintaining compliance with Technical Specification 3.7.1.1 LIMITING CONDITION FOR OPERATION with Power Range Neutron Flux High Trip Setpoint reduced below 43% with 2 MSSVs inoperable.

November 7, 2018 [09:23] MSSV Inservice Test performed and found MSSV N1MSPSV7420C setpoint within +/- 1.5% of Table 3.7-2 value. MSSV N1MSPSV7420C was adjusted and re-tested and left within the +/- 1% as left acceptance criteria of Table 3.7-2.

November 7, 2018 [09:55] MSSV Inservice Test performed and found MSSV N1MSPSV7420D setpoint within +/- 1.5% of Table 3.7-2 value. MSSV N1MSPSV7420D was adjusted and re-tested and left within the +/- 1% as left acceptance criteria of Table 3.7-2.

November 7, 2018 [10:02] MSSVs N1MSPSV7420C and MSSV N1MSPSV7420D determined to be OPERABLE and Technical Specification 3.7.1.1 ACTION was exited.

F. Method of discovery

This event was discovered during engineering review of the test data where it was determined that an error in the as left calculation resulted in MSSVs N1MSPSV7420C and N1MSPSV7420D not being within +/- 1% as left acceptance criteria.

II. Component failures

A. Failure Mode, mechanism, and effects of failed component

Steam generator B MSSVs N1MSPSV7420C and N1MSPSV7420D were operable (i.e., as found setting within +/- 3%) prior to being adjusted during the calibration on October 2, 2018. MSSVs N1MSPSV7420C and N1MSPSV7420D were rendered inoperable when the valves failed to be adjusted to within the required +/- 1% as left settings. The final lift settings for the two MSSVs obtained on October 2, 2018, which were verified again on November 7, 2018 exceeded the +/-1% acceptance criteria by less than 0.5%. The remaining 3 MSSVs on steam generator B remained OPERABLE throughout this event.

The MSSVs are used in Modes 1, 2, and 3 to ensure the secondary system pressure will be limited to within 110% of its design pressure during a postulated turbine trip from 100% RATED THERMAL POWER coincident with an assumed loss of condenser heat sink (i.e., no steam bypass to the condenser). Both valves were initially adjusted to within +/-1.5% set pressure. When both valves were retested in November they were found to still be within +/-1.5% set pressure. The as found acceptance criteria is +/-3% set pressure. Had the MSSVs been challenged they would have performed their intended design function to protect the steam generator B and associated steam lines from overpressure while in Modes 1, 2, and 3.

NARRATIVE

B. Cause of component failure

There was no material condition associated with MSSVs N1MSPSV7420C and N1MSPSV7420D; the valves became inoperable when the set pressure correction factor, required due to the difference in elevation between the main steam line and the pressure gauge, was not applied during the test and the as left lift settings were not within Technical Specification limits.

C. Systems or secondary functions that were affected by failure of components with multiple functions

The MSSVs do not have several functions. No secondary functions were affected.

D. Failed component information

There was no component failure.

System: Main Steam System (Main/Reheat Steam System) {SB}
Component Type: Valve, Relief {RV}
Component Manufacturer: Consol / Dresser
Model No: 6-3707RAX-RT-25-XNC1012

III. Analysis of the event

A. Safety system responses that occurred

No safety systems were required to respond as a result of this event.

B. Duration of safety system inoperability

While South Texas Unit 1 was in the applicable Modes 1, 2, and 3 Technical Specification 3.7.1.1 applied:

MSSV N1MSPSV7420C was inoperable from October 2, 2018 [15:46] until October 6, 2018 [10:34] when South Texas Unit 1 entered Mode 4 (HOT SHUTDOWN) where Technical Specification 3.7.1.1 was no longer applicable (3 days 18 hours and 48 minutes).

MSSV N1MSPSV7420D was inoperable from October 2, 2018 [16:34] until October 6, 2018 [10:34] when South Texas Unit 1 entered Mode 4 (HOT SHUTDOWN) where Technical Specification 3.7.1.1 was no longer applicable (3 days 18 hours and 0 minutes).

During startup from the refueling outage South Texas Unit 1 restored compliance with Technical Specification 3.7.1.1 prior to Mode 3 (HOT STANDBY) entry where Technical Specification 3.7.1.1 was applicable. Compliance with the Limiting Condition for Operation was established when the Power Range Neutron Flux High Trip Setpoint was reduced below 43% with MSSVs N1MSPSV7420C and N1MSPSV7420D inoperable.

MSSVs N1MSPSV7420C and N1MSPSV7420D were declared operable on November 7, 2018 [10:02].

C. Safety consequences and implications

Safety consequences were determined by quantifying the risk accumulated during the period of time when Technical Specification 3.7.1.1 was exited for the first valve (post-test), October 2, 2018 [16:33], until Mode 4 entry on October 6, 2018 [10:34].

NARRATIVE

C. Safety consequences and implications (continued)

The approved Probabilistic Risk Assessment (PRA) model incorporated the pressure relief function of the MSSVs. There were five MSSVs on each steam generator and the model treated them all equivalently (setpoints are not modeled). As the design setpoint of the valves allows for a +/- 3% range and all Unit 1 MSSVs were within this range, and relieving capacity and capability were not impacted, the MSSVs were considered capable of fulfilling the functions described in the PRA model.

Because there is no impact on modeled functions, the Incremental Core Damage Probability (ICDP) and Incremental Large Early Release Probability (ILERP) are zero. A zero ICDP and ILERP concludes that this event accrued zero cumulative risk impact from October 2, 2018 [16:33] until October 6, 2018 [10:34].

Therefore, there was no adverse effect on the health and safety of the public.

IV. Cause of the event

The cause of the event was an inadvertent deletion of a critical head correction equation in the MSSV Inservice test procedure in 2012. The formula adjusted the steam line pressure input to account for the difference in elevation between the main steam line and the pressure gauge. The Test Coordinator is an STP engineer who oversees contractors performing the actual testing of the MSSVs. The Test Coordinator who performed these tests was not aware of the need to include the correction factor. However, the previous Test Coordinator had performed this test for a number of years and was aware of the required adjustment.

V. Corrective actions

1. MSSVs N1MSPSV7420C and N1MSPSV7420D setpoints were adjusted and left within the Technical Specification requirements.
2. A review of the last South Texas Unit 2 MSSV test data confirmed the correction factor was applied as required.
3. The MSSV Inservice test procedure was revised to incorporate steps to account for the head correction adjustment.

VI. Previous similar events

An operating experience review over the past five years was conducted for similar events regarding MSSVs. No similar events were found at South Texas Unit 1 or Unit 2.