



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

July 26, 2023
NOC-AE-23003977
10 CFR 50.73
STI: 35493028
File No. G26

Attention: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

South Texas Project
Unit 1
Docket No. STN 50-498
Licensee Event Report 2023-001-01
Supplement to Unit 1 Pressurizer Power Operated Valve Failed to Open

Reference: Letter; K. Harshaw (STP) to Document Control Desk (NRC); "Licensee Event Report 2023-001-00 Unit 1 Pressurizer Power Operated Valve Failed to Open;" June 12, 2023; (NOC-AE-23003967) (ML23163A248).

On June 12, 2023, STP Nuclear Operating Company (STPNOC) submitted the referenced Licensee Event Report. This letter is a supplement to the report to provide the updated results of the causal evaluation. The updated information is denoted by revision bars located in the right-hand margin. The report is submitted in accordance with 10 CFR 50.73.

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 on this submittal, please contact Zachary Dibbern at 361-972-4336 or me at 361-972-4778.

A handwritten signature in black ink, appearing to read "K. Harshaw", is written over a horizontal line.

Kimberly A. Harshaw
Executive Vice President and
Chief Nuclear Officer

Attachment: LER 2023-001-01, Unit 1 Pressurizer Power Operated Valve Failed to Open

cc:

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
1600 E. Lamar Boulevard
Arlington, TX 76011-4511

Attachment

LER 2023-001-01

Unit 1 Pressurizer Power Operated Valve Failed to Open



LICENSEE EVENT REPORT (LER)

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

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1. Facility Name South Texas Unit 1	<input checked="" type="checkbox"/> 050 <input type="checkbox"/> 052	2. Docket Number 00498	3. Page 1 OF 6
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4. Title
Unit 1 Pressurizer Power Operated Relief Valve Failed To Open

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Revision No.	Month	Day	Year	Facility Name	Docket Number
03	18	2023	2023	001	01	07	26	2023	N/A	<input type="checkbox"/> 050
									N/A	<input type="checkbox"/> 052

9. Operating Mode 4	10. Power Level 000
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11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)

<input type="checkbox"/> 10 CFR Part 20	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 10 CFR Part 50	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 73.1200(a)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 73.1200(b)
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	<input type="checkbox"/> 73.1200(c)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 73.1200(d)
<input type="checkbox"/> 20.2203(a)(2)(i)	<input checked="" type="checkbox"/> 10 CFR Part 21	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input checked="" type="checkbox"/> 10 CFR Part 73	<input type="checkbox"/> 73.1200(e)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.77(a)(1)	<input type="checkbox"/> 73.1200(f)
<input type="checkbox"/> 20.2203(a)(2)(iii)		<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(2)(i)	<input type="checkbox"/> 73.1200(g)
<input type="checkbox"/> 20.2203(a)(2)(iv)		<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(ii)	<input type="checkbox"/> 73.1200(h)
<input type="checkbox"/> 20.2203(a)(2)(v)		<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)		

OTHER (Specify here, in abstract, or NRC 366A).

12. Licensee Contact for this LER

Licensee Contact Zachary E. Dibbern, Licensing Engineer	Phone Number (Include area code) (361) 972-4336
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13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to IRIS	Cause	System	Component	Manufacturer	Reportable to IRIS
D	AB	PSV	Crosby	Y	N/A	N/A	N/A	N/A	N/A

14. Supplemental Report Expected

<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)
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15. Expected Submission Date

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16. Abstract (Limit to 1326 spaces, i.e., approximately 13 single-spaced typewritten lines)

On March 18, 2023, at 0933, during the shutdown of Unit 1 reactor for 1RE24, while in Mode 4 and performing surveillance procedure steps for Pressurizer Power Operated Relief Valve (PORV) PCV-0656A, the valve failed to open. The surveillance was successfully reperformed later that shift and the valve was declared operable. The capability of the PORV to meet its design function for manual control of RCS pressure if it had been called upon to perform its safety functions from 11/3/2021 to 3/18/2023, was not assured. Therefore, PORV 0656A was considered to have been inoperable during this time. On 1/4/2023, from 0757 until 1431, the PORVs could not have fulfilled their safety function for manual control of RCS pressure under postulated design basis conditions, because the second PORV 0655A was unavailable due to scheduled maintenance. The event was determined to be reportable per 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by Technical Specifications and per 10 CFR 50.73(a)(2)(v)(D) as a condition that could have prevented fulfillment of a safety function. The cause of the event was determined to be inadequate guidance in the PORV maintenance procedure and inadequate implementation of a design change package. Corrective actions include revising and updating procedures and documentation.



**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

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1. FACILITY NAME South Texas Unit 1	<input checked="" type="checkbox"/> 050	2. DOCKET NUMBER 00498	3. LER NUMBER		
	<input type="checkbox"/> 052		YEAR 2023	SEQUENTIAL NUMBER 001	REV NO. 01

NARRATIVE

I. Description of Event

A. Reportable Event Classification

This event is reportable per 50.73(a)(2)(i)(B) as a condition prohibited by Technical Specification and per 50.73(a)(2)(v)(D) as a condition that could have prevented fulfillment of a safety function.

Reporting Criterion 50.73(a)(2)(i)(B) is "Any operation or condition which was prohibited by the plants Technical Specifications except when: (1) The Technical Specification is administrative in nature; (2) The event consisted solely of a case of a late surveillance test where the oversight was corrected, the test was performed, and the equipment was found to be capable of performing its specified safety functions; or (3) The Technical Specification was revised prior to discovery of the event such that the operation or condition was no longer prohibited at the time of discovery of the event."

The Technical Specification action statement for an inoperable PORV due to excessive seat leakage allows continued operation with the associated block closed because manual operation of the PORV is still available. In contrast, the action statement for a PORV inoperable for reasons other than excessive seat leakage states: "restore the PORV to OPERABLE status or close the associated block valve and remove power from the block valve; within the following 72 hours restore the PORV to OPERABLE status" ... "or be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours." In this event, the plant operated throughout the entire duration of Cycle 24 with PCV-0656A most likely not capable of meeting design requirements. This period exceeds the 72-hour allowed outage time of Technical Specification 3.4.4 Limiting Condition for Operations Action (b) for a PORV inoperable due to causes other than excessive seat leakage. Therefore, this event is considered reportable per 50.73(a)(2)(i)(B) as a condition prohibited by Technical Specifications.

Reporting Criterion 50.73(a)(2)(v) is "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to: (A) Shut down the reactor and maintain it in a safe shutdown condition; (B) Remove residual heat; (C) Control the release of radioactive material; or (D) Mitigate the consequences of an accident."

Only one pressurizer PORV is required for RCS pressure control to reach safe shutdown or to mitigate the consequences of a steam generator tube rupture. Pressurizer PORV PCV-0655A never experienced excessive seat leakage during Cycle 24. Plant computer data and Unit 1 control room logs were reviewed for the duration of Cycle 24 to identify any periods when PCV-0655A was declared inoperable. From January 4, 2023, at 0750 until January 5, 2023, at 0415, the 125 Volt DC Bus which is the power supply for PCV-0655A was inoperable for surveillance testing. On January 4, 2023, a performance discharge test was performed on the 125 Volt DC Bus in accordance surveillance procedures. During the surveillance, the 125 Volt DC Bus breaker was opened, leaving the 125 Volt DC Bus powered by the battery chargers. Computer history shows the breaker was opened at 0757 and was closed at 1431 on January 4, 2023. During those six and a half hours, PORV PCV-0655A would not have power to actuate the Solenoid Operated Valve (SOV) to open the PORV if there was a loss of offsite power and either Standby Diesel Generator #11 or the 125 Volt DC Bus was not promptly restored. Because the safety related design function of the PORVs is manual RCS pressure control with a loss of offsite power, from 0757 until 1431 on January 4, 2023, the PORVs could not have fulfilled their safety function for manual control of RCS pressure.

B. Plant Operating Conditions Prior To Event

Prior to the event on March 18, 2023, Unit 1 was In Mode 4 at 0% power.



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NARRATIVE

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, PORV PCV-0656A was inoperable due to observed excessive seat leakage.

D. Narrative Summary of the Event

Timeline (Note: All times Are Central Standard Time)

11/03/21 (1305) - Closed PZR PORV PCV-0656A Block Valve to determine if Pressurizer Safety Relief Valve HI temperature alarm was due to PZR PORV PCV-0656A seat leakage. Entered TS 3.4.9.3.

11/03/21 (1519) - Unit 1 entered Mode 3. TS 3.0.4.a was invoked for entering Mode 3 with PCV-0656A inoperable due to excessive seat leakage. Exited TS 3.4.9.3 and entered TS 3.4.4 Action (a) for PCV-0656A inoperable because of excessive seat leakage. The associated block valve remains closed with power on.

01/04/23 (0750) - Battery Bank E1A11 (power supply for PCV-0655A) declared inoperable and non-functional for planned maintenance.

01/04/23 (0950) - The Technical Specification 3.8.2.1.a Limiting Condition of Operation Action (a) and Technical Specification 3.8.3.1.h Action (e) for planned maintenance on Battery Bank E1A11 exceeded front stop completion time requiring entry into risk managed Technical Specifications.

01/04/23 (2345) - Declared ESF Battery E1A11 functional after being placed on 'float charge' with battery recharged.

03/17/23 (2251) - Unit 1 entered Mode 3 for 1RE24.

03/18/23 (0915) - Unit 1 entered Mode 4 for 1RE24. Entered Technical Specification 3.4.9.3 Action (c) for PCV-0656A inoperable. Technical Specification 3.4.4 for PCV-0656A is no longer applicable.

03/18/23 (0928) - Opened block valve for PCV-0656A. When opening block valve, PCV-0656A momentarily indicated an intermediate position.

03/18/23 (0933) - PCV-0656A failed to open during surveillance testing. Control board indication for Pressurizer PORV open command signal received at 0933:13.

03/18/23 (0937) - Control board indication for Pressurizer PORV open command signal cleared at 0937:10. Block Valve for PCV-0656A closed at 0937:22.

03/18/23 (0951) - PCV-0656A failed to stroke open during surveillance testing. The time of inoperability is tied to Mode 4 entry at 0915 on 03/18/2023. Remained in Technical Specification 3.4.9.3 Action (c).

03/18/23 (1218) - Opened block valve for PORV PCV-0656A to warm up lines for shutdown activities.

03/18/23 (1302) - Unit 1 entered Mode 5; entered Technical Specification 3.4.9.3 Action (d) for PCV-0656A inoperable and exited Technical Specification 3.4.9.3 Action (c).



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NARRATIVE

03/18/23 (1400) - Recommended surveillance test of PCV-0656A.

03/18/23 (1420) - PCV-0656A opened and closed successfully. Reactor Coolant System pressure changed from 365 psig to 359 psig.

03/18/23 (1432) - PCV-0656A opened and closed successfully from the Aux Shutdown Panel during surveillance testing.

03/18/23 (1500) - Completed PORV operability test satisfactorily.

03/30/23 (1336) - Maintenance craft discovered an opening orifice installed in the solenoid operated valve for PCV-0656A while performing a work order. This is the same solenoid operated valve assembly that was installed during 1RE23. Therefore, the opening orifice was in place during the entire operating cycle 24 and when PCV-0656A was tested on 03/18/23.

E. Method of Discovery

The failure of the Unit 1 Pressurizer Power Operated Relief Valve to open was self-revealing as it was discovered during surveillance testing.

II. Component Failures

A. Failure Mode, Mechanism, and Effects of Failed Component

The failed component in this event was the Unit 1 Pressurizer PORV (B1RCPCV0656A). The pressurizer PORV failed to open when operated from the control room hand switch. The mechanism by which the PORV failed to open was determined to be a combination of conditions including an installed orifice, clearance tolerance, and two-phase flow conditions. The effect of the failed component is that the pressurizer PORV was declared inoperable as it would have been unable to perform its safety function for manual control of RCS pressure from 11/03/2021 to 03/18/2023. This resulted in two trains of a component or system to be inoperable between the times 0757 and 1431 on January 4, 2023, which caused a loss of safety function to mitigate the consequences of an accident.

B. Cause of Component or System Failure

The cause of this event was determined to be the result of three conditions occurring simultaneously, which caused the pressurizer PORV to fail to open. The first condition was an opening orifice was installed in the solenoid operated valve; this slowed the opening of the pressurizer PORV by limiting the flow rate through the solenoid. The second condition was the clearance tolerance between the valve plug and valve cage were low out of specification. That reduced the upward force on the valve plug and there was flow past the plug ring between the valve plug and valve cage that exceeded the flow rate through the opening orifice. The third condition was that the pressurizer PORV's respective block valve was closed in accordance with technical specification Action A, which would most likely result in a two-phase flow condition that would result in water flashing to steam due to a pressure drop from tight clearances that would cause a choked flow condition at the opening orifice.

C. Systems or Secondary Functions That Were Affected by the Failure of Components with Multiple Functions

No additional systems or secondary functions were affected by this failure.



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D. Failed Component Information

System: Reactor Coolant System {AB}
Component: Valve, Solenoid Pressure {PSV}
Manufacturer: Crosby Valve Div/Geosource Inc {C710}
Model: DS-C-67970-13

III. Analysis of Event

A. Safety System Responses that Occurred

No safety system responses occurred because of this event.

B. Duration of Safety System Inoperability

The capability of the PORV to meet its design function for manual control of RCS Pressure if it had been called upon to perform its safety functions during the time window from November 3, 2021, to March 18, 2023, is not assured.

C. Safety Consequences and Implications

The increase in risk due to the inoperability of PCV-0656A during the time period from November 3, 2021, to March 18, 2023, represents a very small change in risk. A maximum exposure time is limited to one year resulting in a delta-CDF or ICDP of 1.69E-07 and delta-LERF or ILERP of 1.06E-09. These results represent very small changes in risk per Regulatory Guide 1.174. For general transients, site-specific analysis demonstrates that bleed and feed success criteria requires 1 pressurizer PORV, a centrifugal charging pump (CCP) and 1 train of high head safety injection (HHSI) to mitigate the primary temperature and pressure increase for the bounding general transient case scenario of a Total Loss of Main Feedwater Flow event.

This event did not result in any offsite release of radioactivity or increase of offsite dose rates and there were no personnel injuries or damage to other safety-related equipment. Therefore, there was no adverse effect on the health and safety of the public.

IV. Cause of Event

The causal evaluation for this event determined that there were two root causes.

The first root cause determined that the procedure for pressurizer PORV maintenance lacked the specific guidance to: (1) verify that the opening orifice was not installed and (2) measure and validate the clearance between the valve plug and valve cage to ensure the pressurizer PORV was assembled to the vendor manual specifications.

The second root cause determined there was inadequate implementation of the previous design change package (97-2766-6) that allowed the purchase of a replacement SOV with an opening orifice for the pressurizer PORVs that resulted in a loss of configuration management for an ASME Class 1 component when it was installed.



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NARRATIVE

V. Corrective Actions

The corrective action to prevent reoccurrence is to revise the procedure for pressurizer PORV maintenance so that the opening orifice is verified to have been removed, to specify an additional procedure to be included if the pressure boundary has been breached for maintenance, and to add steps to take and document as left measurements for valve parts and to verify tolerances with the vendor manual.

The additional corrective actions include:

1. STP Engineering to review the associated pressurizer PORV drawings and update accordingly.
2. Updating the Master Parts List databases and the Procurement Inventory Control System databases to be in alignment with the design change package (CR 97-2766-6).
3. Develop lessons learned for Engineering of design products and their effects of configuration control.
4. Develop lessons learned for Maintenance and Work Planners to ensure procedure adequacy in relation to vendor manuals.
5. Revise the STP procedure "Outage Preparation and Implementation Guideline" to evaluate the risk of operating a complete fuel cycle with a safety related component inoperable, despite allowance by a Technical Specification.
6. Perform a needs analysis on outage training for operations on Technical Specifications 4.0.5 and 4.4.10 and their application with Technical Specification 3.4.4 Action A during startup.

VI. Previous Similar Events

A previous similar event, PCV-0656A failed to open during surveillance testing, this was identified entering outage 1RE23 on October 9, 2021, at 0833. The failure was determined to be a result of mechanical rubbing between the valve plug and cage assembly with the cage assembly measurements being out of tolerance. Corrective actions from the previous event included replacing the solenoid, plug, cage, and seat. (CR 21-10369)