Constellation

SVP-22-030 10 CFR 50.73

May 20, 2022

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Quad Cities Nuclear Power Station, Unit 2
Renewed Facility Operating License No. DPR-30
NRC Docket No. 50-265

Subject: Licensee Event Report 265/2022-001-00 "Electromatic Relief Valve 3B Did Not Actuate Due to Incorrectly Oriented Plunger Well Plastic Guides"

Enclosed is Licensee Event Report 265/2022-001-00 "Electromatic Relief Valve 3B Did Not Actuate Due to Incorrectly Oriented Plunger Well Plastic Guides," for Quad Cities Nuclear Power Station, Unit 2.

This report is submitted in accordance with 10 CFR 50.73(a)(2)(i)(B) for an operation or condition which was prohibited by the plant's Technical Specification.

There are no regulatory commitments contained in this letter.

Should you have any questions concerning this report, please contact Sherrie Grant at (309) 227-2800.

Respectfully,

Brian Wake
Site Vice President
Quad Cities Nuclear Power Station

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station

NRC FORM 366 (08-2020) | U.S. NUCLEAR REGULATORY COMMISSION | APPROVED BY OMB: NO. 3150-0104 | EXPIRES: 08/31/2023

LICENSEE EVENT REPORT (LER)

(See Page 3 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
Quad Cities Nuclear Power Station Unit 2	05000 -0265	1 OF 4

4. Title
Electromatic Relief Valve 3B Did Not Actuate Due to Incorrectly Oriented Plunger Well Plastic Guides

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	21	2022	2022	- 001 -	00	05	20	2022	n/a	05000
									Facility Name: n/a	Docket Number: 05000

9. Operating Mode	10. Power Level
4- Cold Shutdown	0%

11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: *(Check all that apply)*

10 CFR Part 20	☐ 20.2203(a)(2)(vi)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(A)	10 CFR Part 73
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.69(g)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(4)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(i)	10 CFR Part 21	☒ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(1)(i)
☐ 20.2203(a)(2)(ii)	☐ 21.2(c)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(i)
☐ 20.2203(a)(2)(iii)	10 CFR Part 50	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)	☐ 73.77(a)(2)(ii)
☐ 20.2203(a)(2)(iv)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)	
☐ 20.2203(a)(2)(v)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)	

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

12. Licensee Contact for this LER

Licensee Contact	Phone Number (Include area code)
Rachel Luebbe	309-227-2813

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	SB	RV	G080	Y					

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

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

On March 21, 2022, with Unit 2 in shutdown, Electromatic Relief Valve (ERV) 2-0203-3B, 2B Main Steam Line Relief Valve, did not stroke in accordance with work package instructions. The valve was being tested to satisfy Technical Specification Surveillance Requirement (TS SR) 3.5.1.10, verify each Automatic Depressurizing System (ADS) valve actuator strokes when manually actuated. All other Unit 2 ADS valves were found to stroke satisfactorily.

The cause of the failure was unclear vendor guidance and insufficient procedural guidance regarding the orientation for the installation of the internal plunger well plastic guides. The guides were incorrectly installed during rebuild which caused actuator binding. The failure will be prevented by revising the site maintenance rebuild procedure with input from the manufacturer.

This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), an operation or condition which was prohibited by the plant's Technical Specification. TS 3.5.1 Condition H allows one ADS valve to be inoperable for a period of 14 days. This ADS valve was found to be inoperable for the entire cycle.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Quad Cities Nuclear Power Station	05000- 254	2022	- 001	- 00

NARRATIVE

PLANT AND SYSTEM IDENTIFICATION

General Electric – Boiling Water Reactor, 2957 Megawatts Thermal Rated Core Power

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

EVENT IDENTIFICATION

Electromatic Relief Valve 3B Did Not Actuate Due to Incorrectly Orientated Plunger Well Plastic Guides

CONDITION PRIOR TO EVENT

Unit: 2 Event Date: March 21, 2022 Event Time: 1030 CDT

Reactor Mode: 4 Mode Name: Cold Shutdown Power Level: 0%

No structures, systems or components were inoperable at the start of this event that contributed to the event.

A. DESCRIPTION OF EVENT

On March 21, 2022, with Unit 2 in shutdown for refueling outage Q2R26, and during performance of the Technical Specification (TS) Surveillance Requirement (SR) 3.5.1.10, the 2-0203-3B Electromatic Relief Valve (ERV)[SB] failed to actuate. TS SR 3.5.1.10 requires each Automatic Depressurizing System (ADS)[SB] valve actuator stroke when manually actuated. All other Unit 2 ADS valves were found to stroke successfully. The 2-0203-3B actuator was replaced and stroked successfully prior to completion of refueling outage Q2R26, restoring the system to operable.

The 2-0203-3B ERV failed actuator was originally installed in March 2020 after having been rebuilt earlier in the month in preparation for refueling outage Q2R25. The actuator had been rebuilt in accordance with revision 10 of site maintenance rebuild procedure. In the April 2020, all the Unit 2 ADS ERVs were successfully stroked multiple times prior to unit startup from Q2R25, confirming no actuator binding was observed on any of the Unit 2 ERVs. Revision 11 of the site maintenance rebuild procedure, which included corrective actions from the 2-0203-3D ERV failure, was implemented in August 2020 after startup from the Q2R25 refuel outage.

Initial assessment of the removed 2-0203-3B ERV was that solenoid actuator was burnt out and there was significant binding of the actuator. The actuator was sent to Constellation PowerLabs for further evaluation and cause determination, which was completed prior to startup from the Q2R26 refueling outage. An extent of condition review, including inspection of the other Unit 2 ERVs was performed as well as a review of the rebuild work instructions for the Unit 1 ERVs. No significant or similar issues with either unit's ERVs were found during the extent of condition review.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Quad Cities Nuclear Power Station	05000- 254	2022	- 001	- 00

NARRATIVE

This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), an operation or condition which was prohibited by the plant's Technical Specification. TS 3.5.1 Condition H allows one ADS valve to be inoperable for a period of 14 days. The 2-0203-3B ERV was found to be inoperable for the entire cycle.

B. CAUSE OF EVENT

The cause of the failure was unclear vendor guidance and insufficient procedural guidance regarding orientation for the installation of the internal plunger well plastic guides. The internal plunger well plastic guides were found to be incorrectly installed in the 2-0203-3B ERV actuator, which caused actuator binding. Contributing to the failure was that the upper guide bracket did not have proper straightness and was found warped. This resulted in the plunger legs being out-of-squareness and increased friction with the plunger well.

C. SAFETY ANALYSIS

System Design

The 2-0203-3B ERV is part of the ADS. The ADS consist of five valves (4 relief valves (ERVs) and one safety/relief valve (Target Rock valve)).

Per the Updated Final Safety Analysis Report (UFSAR) 6.3.3.1.4, "The ADS is designed to depressurize the reactor to permit either the Low Pressure Coolant Injection (LPCI) or Core Spray subsystem to cool the reactor core during a small break Loss of Coolant Accident (LOCA)." Pressure relief of the reactor vessel may be accomplished manually by the operator or without operator action by the automatic depressurization circuitry.

Safety Impact

Per TS Bases 3.5.1 Condition H.1, with one ADS valve out of service, the overall reliability of the ADS is reduced, because a single failure in the OPERABLE ADS valves could result in a reduction in depressurization capability. In addition, TS Bases for SR 3.5.1.10 states the actuator of each of the ADS ERVs and the dual function safety/relief valves (S/RVs) is stroked to verify that the pilot valve strokes when manually actuated. The SR, together with the valve testing performed as required by American Society of Mechanical Engineers (ASME) code for pressure relieving devices, verify the capability of each relief valve to perform its function.

Per UFSAR 6.3.3.1.4, Automatic Depressurization Subsystem, "All five available ADS valves were assumed operable in the LOCA analysis. One ADS valve from the five valves modeled in the LOCA analysis was assumed to fail for the single failure evaluation resulting in the operation of four valves being credited." Based on the ADS system design and accident/transient analysis, four of the five ADS valves are needed to perform the required safety function.

An engineering evaluation concluded that the plant design/licensing bases are met with one failed ERV. Therefore, this is not a Safety System Functional Failure (SSFF). The extent of condition inspection on the other Unit 2 ERVs showed no actuator binding and the review performed on the Unit 1 ERVs found

NARRATIVE

no reason for potential actuator binding. The Target Rock valve design is significantly different from the ERVs. As a result, the rebuild procedure is different and the plastic guide orientation issue does not apply to the Target Rock valve.

This event is a Maintenance Rule Functional Failure (MRFF).

D. CORRECTIVE ACTIONS

Immediate:

1. The site maintenance rebuild procedure was revised to address straightness of the upper guide bracket, using plunger and upper guide bracket as a single matched assembly, and information regarding the orientation of the plastic guides in August 2020.
2. The 3B ERV and actuator were replaced and successfully tested during Q2R26.
3. All other Unit 2 ERVs were inspected for a similar condition and successfully tested during Q2R26.

Follow up:

1. Review and enhance the site maintenance ERV rebuild procedure to ensure clear guidance on the installation of the plunger well plastic guides along with other procedure enhancements identified during the investigation. This procedure revision will be reviewed by the manufacturer to ensure correct positioning of various sub-components within the actuator.

E. PREVIOUS OCCURENCES

A review of previous QCNPS events revealed a similar event in 2020 in which the 3D ERV actuator was found to not actuate due to an out of specification plunger received from the vendor. The cause was different between the 3D ERV in 2020 and the 3B ERV in 2022.

LER (265/2020-002-00) Electromatic Relief Valve 3D Did Not Actuate Due to Out of Specification Plunger – The cause of this 3D ERV failure was determined to be an out of specification plunger provided by the manufacturer. The contributing cause was a bent upper guide bracket. The out of specification plunger combined with the bent upper guide bracket caused excessive binding in the actuator. In the current 3B ERV failure event, the actuator binding was caused by the internal plunger well plastic guides being incorrectly installed due to unclear vendor guidance regarding the orientation of the guides.

F. COMPONENT FAILURE DATA

Failed Equipment: Relief Valve Actuator
Component Manufacturer: General Electric
Component Model Number: 362B2632G001
Component Part Number: N/A

This event will be reported to IRIS.