



SVP-20-037

10 CFR 50.73

May 28, 2020

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 265/2020-002-00 "Electromatic Relief Valve 3D Did Not Actuate Due to Out of Specification Plunger"

Enclosed is Licensee Event Report 265/2020-002-00 "Electromatic Relief Valve 3D Did Not Actuate Due to Out of Specification Plunger," for Quad Cities Nuclear Power Station, Unit 2.

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

There are no regulatory commitments contained in this letter.

Should you have any questions concerning this report, please contact Sherrie Grant at (309) 227-4833.

Respectfully,

A handwritten signature in black ink, appearing to read "K. S. Ohr".

Kenneth S. Ohr  
Site Vice President  
Quad Cities Nuclear Power Station

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



**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/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollects.Resource@nrc.gov](mailto:Infocollects.Resource@nrc.gov), and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; e-mail: [ofra\\_submission@omb.eop.gov](mailto:ofra_submission@omb.eop.gov). The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

<b>1. Facility Name</b> Quad Cities Nuclear Power Station, Unit 2	<b>2. Docket Number</b> 05000265	<b>3. Page</b> 1 OF 4
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**4. Title**  
Electromatic Relief Valve 3D Did Not Actuate Due to Out of Specification Plunger

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
03	30	2020	2020	002	00	05	28	2020	n/a	05000
									Facility Name	Docket Number
									n/a	05000

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

**12. Licensee Contact for this LER**

<b>Licensee Contact</b> Rachel Luebbe – Regulatory Assurance	<b>Telephone Number (Include Area Code)</b> 309-227-2813
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**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
B	SB	RV	G080	Y	n/a				

<b>14. Supplemental Report Expected</b>	<b>15. Expected Submission Date</b>	<b>Month</b>	<b>Day</b>	<b>Year</b>
<input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date) <input checked="" type="checkbox"/> No				

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

On March 30, 2020, with the unit in shutdown, Quad Cities Nuclear Power Station (QCNPS) Unit 2, Electromatic Relief Valve (ERV) 2-0203-3D, 2D 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 an out of specification plunger received from the vendor. The failure will be prevented by determining and implementing appropriate purchase requirements to ensure new plungers meet the vendor specifications for this part.

This is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), any 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.



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

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Quad Cities Nuclear Power Station Unit 2	05000-265	2020	- 002	- 00

**NARRATIVE**

**PLANT AND SYSTEM IDENTIFICATION**

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

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

**EVENT IDENTIFICATION**

Electromatic Relief Valve 3D Did Not Actuate due to Out of Specification Plunger

**A. CONDITION PRIOR TO EVENT**

Unit: 2                      Event Date: March 30, 2020                      Event Time: 0530 hours CDT  
Reactor Mode: 4            Mode Name: Cold Shutdown                      Power Level: 0%

There were no other structures, systems or components (SSC) inoperable during this event time period that could have contributed to this event.

**B. DESCRIPTION OF EVENT**

On March 30, 2020, with Unit 2 in shutdown for refueling outage Q2525, during performance of the Technical Specification (TS) Surveillance Requirement (SR) 3.5.1.10, the 2-0203-3D Electromatic Relief Valve (ERV)[RV] failed to actuate. TS SR 3.5.1.10 requires each Automatic Depressurizing System (ADS)[BF] valve actuator stroke when manually actuated. All other ADS valves on Unit 2 were found to stroke successfully. The 2-0203-3D actuator was replaced and stroked successfully prior to completion of refueling outage Q2R25 restoring the system to operable.

The failed actuator for the 2-0203-3D ERV had been originally installed in March 2018 after having been rebuilt in February 2018 in preparation for the Q2R24 refueling outage. The actuator had been rebuilt in accordance with site maintenance rebuild procedure. On April 5, 2018, during an Auto Blowdown Functional Test operating surveillance, the 2-0203-3D ERV did not initially actuate as expected with the ERV remaining in the closed position. An Issue Report (IR) was generated, and troubleshooting was performed to smooth the actuator plunger sides to correct the actuator sticking. It was subsequently cycled three times successfully and was returned to service.

Following the 2020 failure, the removed 2-0203-3D ERV actuator was disassembled and inspected to determine the cause of the failure. The initial observations and stroking of the actuator with the cover removed noted that the upper guide bracket was tilted down on the left end. As the actuator was stroked and returned to the standby state, the tilt of the upper guide bracket would vary from stroke to stroke causing the sticking of the actuator to be intermittent. Observation of the plunger during testing noted that it would intermittently rub with the lever arm on the left side. The plunger width was found to be different from the top to mid-length indicating the legs are splaying. This plunger width was outside the manufacturer's tolerance for plunger width. The measured width of 2.592" is 0.027" larger than the manufacturer's tolerance for plunger width of 2.565".



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Quad Cities Nuclear Power Station Unit 2	05000-265	2020	- 002	- 00

**NARRATIVE**

This is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), any 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 2-0203-3D ERV was found to be inoperable for the entire cycle.

**C. CAUSE OF EVENT**

The cause of the failure was an out of specification plunger received from the vendor. The bent upper guide bracket was able to perform acceptably while installed during previous operating cycles but would only begin binding when initiated by the plunger.

**D. SAFETY ANALYSIS**

**System Design**

The 2-0203-3D 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 breaker 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 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 3.5.10 states the actuator of each of the ADS Electromatic valves (ERVs) and the dual function safety/relief valves (S/RVs) is stroked to verify that the pilot valve strokes when manually actuated. This 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 valve were assumed operable in the LOCA analysis. One ADS valve from the five valves modeled in the LOCA analyses 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 five ADS valves are needed to perform the required safety function.

An engineering evaluation concluded that the plant design/licensing bases were met for the past cycle (Q2C25) with the one failed ERV. Because of the number of successful stroke tests performed on the other ERVs, the out of specification plunger was determined not to be an issue with other ERVs. The target rock valve design is significantly different from the ERVs and therefore, this issue does not apply to the Target Rock valve.

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



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**NARRATIVE**

**E. CORRECTIVE ACTIONS**

Immediate:

- The 3D ERV and actuator were replaced and successfully tested.

Follow Up:

- Determine and implement appropriate purchase requirements to ensure new plungers meet the vendor specifications.
- In conjunction with the vendor, review plunger out of specification width for Part 21 implications.
- Enhance Maintenance ERV actuator rebuild procedure to include the following:
  - Improved upper guide bracket inspection criteria
  - New alignment criteria
  - Additional PMT strokes
  - New plunger to switch plate check
  - Ensure plunger width is within manufacturing specification or replace plunger

**F. PREVIOUS OCCURRENCES**

A review of previous QCNPS events reveals a similar event in 2010 in which the valve main disc would not open during its inspection. Similar to this event, the 2010 event resulted in the loss of one ERV for the entire cycle.

- LER (254/2010-001-00) Electromatic Relief Valve Main Disc Failure – The cause of this ERV failure was determined to be improper torqueing during manufacturing valve assembly. This allowed a gap between the disc retainer and the main disc guide. This failure was in the body of the valve, where our current failure is contained in the valve actuator assembly.

**G. 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.