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SVP-19-025 10 CFR 50.73

April 25, 2019

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 265/2018-001-01 "Two Main Steam Isolation Valves (MSIVs) Closure Times Exceeded"

Enclosed is Licensee Event Report (LER) 265/2018-001-01, "Two Main Steam Isolation Valves (MSIVs) Closure Times Exceeded," for Quad Cities Nuclear Power Station Unit 2.

This report is submitted in accordance with 10 CFR 50.73 (a)(2)(i)(B) which requires the reporting of any operation or condition that 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 Mark Humphrey at (309) 227-2800.

Respectfully,

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

NRC FORM 366 (04-2018) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2020

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-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an 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.

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/)

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4. TITLE

Two Main Steam Isolation Valves (MSIVs) Closure Times Exceeded

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	N/A
03	19	2018	2018	- 001	- 01	04	25	2019	FACILITY NAME N/A	DOCKET NUMBER N/A

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*			
4	☐ 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)
	☐ 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)
000	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(i)
	☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(ii)
		☐ 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)*
Rachel Luebbe – Regulatory Assurance	(309)-227-2813

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO ICES	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO ICES
E	SB	HCU	A613	Y					

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 15 single-spaced typewritten lines)*

On March 19, 2018, during refueling outage Q2R24 at 0745 hours, the Unit 2 Main Steam Isolation Valve (MSIV) as-found closure time test results indicated that the closure time for two MSIVs exceeded the Technical Specification (TS) upper limit of less than or equal to five seconds. These two MSIVs were the inboard valves on the A and C Main Steam Lines. The safety significance of this event was minimal.

The cause of the slow closure timing events was due to an inadequate procedure on how to apply Super O-Lube to the valve stem bottom O-ring of the airpack manifold.

Corrective actions include replacement of the two air pack manifolds and revising the MSIV airpack manifold maintenance procedure regarding the amount of Super O-Lube to be applied.

This condition is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), which requires reporting of any operation or condition that was prohibited by the plant's TS.

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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

Two Main Steam Isolation Valves (MSIVs) Closure Times Exceeded

A. CONDITION PRIOR TO EVENT

Unit: 2 Event Date: March 19, 2018 Event Time: 0745 hours
Reactor Mode: 4 Mode Name: Cold Shutdown Power Level: 0%

B. DESCRIPTION OF EVENT

On March 19, 2018, while Unit 2 was in Mode 4 for refueling outage Q2R24, Operations was performing surveillance, "MSIV Closure Timing," in accordance with Technical Specification (TS) Surveillance Requirement (SR) 3.6.1.3.6. During the surveillance, two of the eight Unit 2 Main Steam [SB] Isolation Valves [ISV] (MSIVs) failed to close within the required cold shutdown TS limit of greater than or equal to three seconds and less than or equal to five seconds. The two affected MSIVs were the inboard MSIVs on the A and C Main Steam lines. The closure times for those two MSIVs were 5.3 and 5.6 seconds, respectively. The other six MSIVs all closed within the required TS time.

This condition is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), which requires reporting of any operation or condition that was prohibited by the plant's TS.

C. CAUSE OF EVENT

The cause of the slow closure timing for the MSIVs was due to an inadequate procedure on how to apply Super O-Lube to valve stem bottom O-ring of the airpack manifold. The slow closure times were due to excess Super O-Lube on the airpack manifold solenoids. The maintenance procedure for applying the Super O-Lube was not specific on the amount of lubricant to be used on the bottom O-ring.

D. SAFETY ANALYSIS

System Design

The MSIVs are 20-inch air/spring operated, balanced "Y"-type globe valves. The safety function of the MSIVs is to prevent reactor coolant [AD] inventory loss and protect plant personnel in the event of steam line breakage outside the isolation valves, and to complete the primary containment [NH] boundary after a Loss of Coolant Accident (LOCA). There are four main steam lines and each steam line has two isolation valves, one inside (inboard MSIV) and one outside (outboard MSIV) of primary containment. The valves are designed to close and to be leak-tight during the worst conditions of pressure, temperature, and steam flow following a break in the main steam line outside the containment. The MSIVs are leak tested in accordance with 10 CFR 50 Appendix J program.

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Updated Final Safety Analysis Report (UFSAR) Section 6.2.4.1 provides the valve closure time for the main steam line being based on the main steam line break accident discussed in Section 15.6. UFSAR Section 15.6 states that the maximum MSIV closure time of 10.5 seconds limits the total amount of liquid and steam lost from the primary system to prevent the core from being uncovered, and ensures the radiological doses are well below the guidelines set forth in 10 CFR 100. The TS upper limit MSIV closure time of less than or equal to five seconds provides margin to ensure sufficient coolant remains in the reactor vessel to provide adequate core cooling.

Proper adjustment of the MSIV closure times prevents operation outside of the operational and design limits.

Safety Impact

Technical Specification 3.6.1.3.6 and the In-Service Testing program require the MSIVs to close in a three to five second time range. Five seconds is fast enough to prevent a gross release of fission products, and three seconds is slow enough to minimize the severity of the pressure transient resulting from isolating the main steam lines during full power operation. Slow MSIV stroke times would challenge the steam release limits of a steam line break outside of containment should the corresponding outboard valve simultaneously fail to close.

The two Unit 2 MSIVs failed to close within the required Technical Specification limit of less than or equal to five seconds. The closure times for those two MSIVs were 5.3 and 5.6 seconds, respectively. However, the two MSIVs closed inside the UFSAR limit of less than or equal to 10.5 seconds. Although the required five second Technical Specification limit was not met for these two MSIVs, the MSIVs were capable of performing the required UFSAR safety function during the operating cycle prior to Q2R24.

Furthermore, since the MSIVs were not required to be operable or available at the time of discovery, this condition did not create any actual plant or safety consequences as the unit was not in an accident or transient condition requiring the use of the main steam line isolation valves during this period of time.

Risk Insights

The closure times for the two MSIVs were 5.3 and 5.6 seconds and recorded as slow, but the MSIVs did fully close. The MSIV success criterion in the Plant Probabilistic Risk Assessment (PRA) model, however, does not depend on closure time. Therefore, a difference of a fraction of a second between actual MSIV closure time and the acceptance criterion for the Technical Specification closure time has no effect on the PRA model. As a result, there is no effect on Core Damage Frequency (CDF) or Large Early Release Frequency (LERF).

In conclusion, the failure of the two MSIVs to close within the required time would not have caused the station to exceed the inventory and dose release limits. Furthermore, the impact on risk of this event is negligible. Therefore, the overall safety significance of this event was minimal.

E. CORRECTIVE ACTIONS

Immediate:

1. Both MSIVs had their airpack manifolds replaced during the outage, Q2R24 in 2018.
2. Both MSIVs were adjusted for proper as-left closure times and retested satisfactorily.

Follow-up:

1. The MSIV lubrication surveillance will be revised to provide additional information on the amount of Super O-Lube to be used in the airpack manifold solenoid O-Rings.

NRC FORM 366A (04-2018)) U.S. NUCLEAR REGULATORY COMMISSION

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LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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NARRATIVE

F. PREVIOUS OCCURRENCES

The station events database, LERs, and INPO ICES were reviewed for similar events at Quad Cities. Based on the cause of this event and associated corrective actions, the event listed below, assisted with the resolution of this event.

- LER 2017-002-01 Four Main Steam Isolation Valves (MSIVs) Closure Times Exceeded (03/27/2017) – Four Unit 1 MSIVs closed slowly due to an inadequate procedure on how to apply Super O-Lube to the airpack manifold bottom O-Ring and environmental conditions in the MSIV Room. Therefore, LER 2017-002-01 provided useful insights associated with this event.

G. COMPONENT FAILURE DATA

The airpack manifold solenoid is manufactured by Automatic Valve Nuclear (formerly AVCO) [A613] model #C6930-010.

This event has been reported to ICES.