Exelon Generation®

SVP-18-057 10 CFR 50.73

August 2, 2018

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

Quad Cities Nuclear Power Station, Unit 1
Renewed Facility Operating License No. DPR-29
NRC Docket No. 50-254

Subject: Licensee Event Report 254/2018-003-00 "Two Reactor Protection System Channels Impacted by Single Main Stop Valve Limit Switch Failure"

Enclosed is Licensee Event Report (LER) 254/2018-003-00, "Two Reactor Protection System Channels Impacted by Single Main Stop Valve Limit Switch Failure", for Quad Cities Nuclear Power Station, Unit 1.

This report is submitted in accordance with 10 CFR 50.73(a)(2)(vii) for an event where a single cause or condition caused two independent trains or channels to become inoperable in a single system designed to mitigate the consequences of an accident.

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

# 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 |
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| Quad Cities Nuclear Power Station Unit 1 | 05000254 | 1 OF 3 |

**4. Title**

Two Reactor Protection System Channels Impacted by Single Main Stop Valve Limit Switch Failure

| 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 |
| 06 | 09 | 2018 | 2018 | - 003 | - 00 | 08 | 02 | 2018 | 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)* | | | |
|---|---|---|---|---|
| 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) |
| 100 | ☐ 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)(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) |
|---|---|
| Richard Swart – Regulatory Assurance | (309) 227-2810 |

**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 |
|---|---|---|---|---|---|---|---|---|---|
| X | JD | 33 | N007 | Y | 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 | | 10 | 25 | 2018 |

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

On June 9, 2018, at 1240 hours, Quad Cities Nuclear Power Station (QCNPS) main turbine Main Stop Valve number 1 (MSV1) failed to provide the appropriate Reactor Protection System (RPS) relay actuations during periodic surveillance activities. The associated limit switch failed to properly actuate relays in subchannels of both the A and B RPS Trip System channels. Operations entered Technical Specification (TS) 3.3.1.1. Condition B due to one inoperable channel in each trip system.

Fuses associated with the subchannels in both the A and B RPS channels were removed to meet the TS Action Statement. The limit switch was replaced on June 10, 2018, and associated RPS channels were tested satisfactory at 0538 hours. Switch inspection indicated occasional binding. Additional causal evaluation is in progress and results will be provided in a supplement.

The safety significance of this event was minimal. The associated RPS logic requires signals from 3 of 4 valves, and the other 3 valves were providing proper signals per surveillance results. All other RPS inputs were functional. This report is submitted in accordance with the requirements of 10 CFR 50.73(a)(2)(vii) for a single condition that caused two independent channels to become inoperable in a single system designed to shut down the reactor and maintain it in a safe shutdown condition.

NARRATIVE

## PLANT AND SYSTEM IDENTIFICATION

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

Emergency Diesel Generators [DG]

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

## EVENT IDENTIFICATION

Two Reactor Protection System Channels Impacted by Single Main Stop Valve Limit Switch Failure

## A. CONDITION PRIOR TO EVENT

Unit: 1 Event Date: June 9, 2018 Event Time: 1240 hours
Reactor Mode: 1 Mode Name: Power Operation Power Level: 100%

There were no structures, systems, or components (SSCs) out of service or inoperable that contributed to the event.

## B. DESCRIPTION OF EVENT

On June 9, 2018, at 1240 hours, Quad Cities Nuclear Power Station (QCNPS) Unit 1 was performing a Turbine Stop Valve Closure Scram Instrumentation Functional Test. Main Stop Valve (MSV)[V] number 1 (MSV1), also referred to as Turbine Stop Valve number 1, did not produce the appropriate alarm or relay actuations in the Reactor Protection System (RPS)[JD] channels A or B. Operations entered Technical Specification (TS) 3.3.1.1. Condition B due to one inoperable channel in each trip system.

Operations subsequently removed fuses associated with the associated RPS sub-channels at 1838 on June 9, 2018 to satisfy the requirements of the TS Action Statement.

A new limit switch [33] was installed on the MSV number 1. Post maintenance testing on this new switch was satisfactory at 0538 on June 10, 2018. The RPS logic for all four MSVs was verified satisfactory at this time.

This event is reportable as a licensee event report (LER) in accordance with 10 CFR 50.73(a)(2)(vii) for a single condition that caused two independent channels to become inoperable in a single system designed to shut down the reactor and maintain it in a safe shutdown condition.

## C. CAUSE OF EVENT

An inspection of the degraded limit switch showed occasional binding attributed to insufficient or dried out lubricant, and a hardened o-ring on the operating shaft. Additional causal evaluation activities are in process, and results will be provided in a supplement to this report.

## D. SAFETY ANALYSIS

No actual safety consequences resulted from the failed limit switch since no related turbine generator trip requiring an RPS scram was experienced by QCNPS during this time. No automatic functions took place as a result of the failed limit switch.

Although the limit switch for MSV1 would not have provided input to its associated RPS logic, the limit switches on the remaining three MSVs were verified to be properly functioning. Since any three MSVs can cause a scram from the RPS system logic, the scram would have occurred if required.

The MSV system design has all four valves closing on a turbine generator trip signal, supporting proper RPS function should it have been required. Individual MSV closures are only associated with surveillance testing.

A Probabilistic Risk Assessment (PRA) review indicated that the individual MSV limit switches are not explicitly represented in the QCNPS Full Power Internal Events PRA models. Due to system redundancy, combinations of multiple failures would be required for an RPS failure. Since component failure events were found to have failure probabilities less than 1E-06 per demand, such combinations of failure events have a negligible contribution to Core Damage Frequency risk.

This event is not considered a Safety System Functional Failure per NEI 99-02 Revision 7.

## E. CORRECTIVE ACTIONS

Immediate Actions: The limit switch was replaced and tested with satisfactory results. RPS circuit fuses were replaced.

Follow Up Actions: Causal evaluation will be performed to determine an apparent cause for the occasional binding of the limit switch.

## F. PREVIOUS OCCURRENCES

No previous similar events have occurred at the site based on a search of station LERs and IRs.

## G. COMPONENT FAILURE DATA

Failed equipment: position indicating limit switch
Component manufacturer: NAMCO
Component model number: EA 700-90964
Component type: Snap-Lock cam operated switch

An ICES report will be submitted.