Exelon Generation®

SVP-19-074 10 CFR 50.73

October 23, 2019

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 254/2019-002-00 "Phase to Ground Fault in Isolated Phase Bus Duct Led to Generator Trip and an Automatic SCRAM"

Enclosed is Licensee Event Report 254/2019-002-00 "Phase to Ground Fault in Isolated Phase Bus Duct Led to Generator Trip and an Automatic SCRAM," for Quad Cities Nuclear Power Station, Unit 1.

This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A) for an event or condition that resulted in automatic actuation of the reactor protection system (RPS) causing a SCRAM, and containment isolation signals affecting containment isolation valves in more than one system.

There are no regulatory commitments contained in this letter.

Should you have any questions concerning this report, please contact Rachel Luebbe at (309) 227-2813.

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/)

1. Facility Name	2. Docket Number	3. Page
Quad Cities Nuclear Power Station Unit 1	05000254	1 OF 4

4. Title

Phase to Ground Fault in Isolated Phase Bus Duct Led to Generator Trip and an Automatic SCRAM

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
08	25	2019	2019	- 002	- 00	10	24	2019	n/a	05000
									Facility Name: n/a	Docket Number: 05000

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
B	EL	IPBU	G080	Y	N/A				

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

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

On August 25, 2019, at 1102 hours CDT, Quad Cities Nuclear Power Station (QCNPS) Unit 1 experienced an automatic reactor SCRAM from 100 percent power. The SCRAM was the result of a generator trip that occurred when leakage current measured by the Generator Stator Ground Detection Relay exceeded its threshold and actuated the Generator Primary Lock Out Relay (86 Device). Following the Reactor SCRAM, water was found in the "A" Isolated Phase Bus Duct (IPBD) between the Unit Aux Transformer (UAT) and the wall of the Turbine Building. It was determined that water entered through a degraded access cover gasket located on the IPBD and the resulting condensation within the duct caused current leakage through one or more of the insulators that support the bus. The corrective actions include replacement of the insulators that were impacted by the water, replacing the degraded gaskets and implementing additional preventative maintenance activities on the IPBD system.

This is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A) for an event or condition that resulted in automatic actuation of the reactor protection system (RPS) and containment isolation signals for Groups 2 and 3 affecting containment isolation valves in more than one system.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Quad Cities Nuclear Power Station Unit 1	05000254	2019	- 002	- 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

Phase to Ground Fault in Isolated Phase Bus Duct Led to Generator Trip and an Automatic SCRAM

A. CONDITION PRIOR TO EVENT

Unit: 1 Event Date: August 25, 2019 Event Time: 1102 hours
Reactor Mode: 1 Mode Name: Power Operation Power Level: 100%

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 August 25th, 2019, at 07:43, the Main Control Room (MCR) started receiving repeated alarms from the Main Generator [TB] Stator Ground Detection Relay. Each time the alarm would clear within 1 second. A total of 8 alarms were recorded between 07:43 and 08:40.

Operators were dispatched to the relay but given the rapid clearing of the alarm condition, with no alarm flags present, it was believed the relay was acting erratically and not indicating an actual ground. The concern was mitigated when the alarms subsided.

Approximately 2 hours later at 10:43, the ground relay trouble alarm was again received and cleared, alarming once again at 10:52 before alarming and initiating the Generator trip at 11:02. The Generator trip resulted in a trip of the Main Turbine and the subsequent automatic SCRAM of Unit 1. Group 2 and Group 3 containment isolations [JM] were caused by lowering Reactor Water Level, which subsequently recovered to normal level via the Feedwater [SJ] system.

Several additional relays annunciated during the event indicating the trip was likely caused by a valid ground condition.

C. CAUSE OF EVENT

During subsequent troubleshooting it was determined that the ground was located in the Isolated Phase Bus Duct (IPBD)[EL] that carries the "A" phase conductor going from the Generator to the Unit Aux Transformer (UAT). The ground was specifically located in the outdoor run of the "A" IPBD, between the UAT and the Turbine Building wall. Inspections identified standing water and evidence that the water (rain) had entered the duct through degraded gaskets located on two hinged covers. The covers are typically not accessed and are not included in the existing preventive maintenance (PM) scope for the IPBD system. The lack of a PM for the hinged cover gaskets is the root cause for this event.

NARRATIVE

D. SAFETY ANALYSIS

System Design

The IPBD system associated with the UAT utilizes bare aluminum conductors that transfer electrical energy from the Main Generator to the UAT. There is a single conductor for each phase of the circuit and each conductor is housed in a grounded aluminum duct that effectively isolates each phase from the other. The conductors are positioned in the center of each bus duct to maintain sufficient air gap between the conductor and the bus duct walls. Insulators mounted to the top of the bus duct are used to position and support the conductor. Each insulator consists of a porcelain material that provides very high resistance to current flow and maintains the electrical separation between the conductor and the bus duct. The bus ducts are designed to be protected from water intrusion to prevent condensation from forming on the insulators and degrading their insulative qualities.

Safety Impact

The safety significance of this event was minimal. Reactor Water Level lowered following the automatic SCRAM and was recovered via the Feedwater system. No relief valves were actuated during the event as Reactor pressure was controlled by the Turbine Bypass valves. All post-SCRAM equipment functioned properly.

The automatic SCRAM resulted in an event notification in accordance with 10 CFR 50.72(b)(2)(iv)(B) and 10 CFR 50.72(b)(3)(iv)(A). (ENS 54239, 1551 hours (ET), 8/25/19)

Risk Insights

The equipment responsible for monitoring and detecting the presence of a phase to ground fault on the Main Generator circuit performed exactly as intended and proactively tripped the Generator as designed. There were no inoperable systems or Technical Specification action statements in place at that time to complicate the event. The operators responded to the event by performing the required actions safely and in accordance with procedures and training.

This event is a Maintenance Rule Functional Failure (MRFF). This event is not a Safety System Functional Failure (SSFF).

E. CORRECTIVE ACTIONS

Immediate Corrective Actions:

1. The insulators affected by the water intrusion were replaced
2. The degraded gaskets on the hinged covers for the "A" IPBD were replaced

Follow-up Corrective Actions:

1. Additional PM activities related to gaskets and inspections will be implemented on the IPBDs

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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NARRATIVE

F. PREVIOUS OCCURRENCES

No similar events were identified where a degraded gasket in the IPBD or non-segregated bus duct system allowed moisture intrusion or contributed to a fault.

G. COMPONENT FAILURE DATA

Failed Equipment – "A" Isolated Phase Bus Duct

Component Manufacturer – General Electric

Component Model - Miniflux

Component Type – Self-Cooled

This event has been reported to ICES/IRIS.