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10 CFR 50.73

RA19-037

June 27, 2019

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

LaSalle County Station, Unit 1
Renewed Facility Operating License No. NPF-11
NRC Docket No. 50-373

Subject: Licensee Event Report 2019-002-00, Turbine Stop Valve Limit Switch Failure due to Lubricant Degradation

In accordance with 10 CFR 50.73(a)(2)(i)(B), Exelon Generation Company, LLC (EGC) is submitting Licensee Event Report (LER) Number 2019-002-00 for LaSalle County Station, Unit 1.

There are no regulatory commitments in this letter. Should you have any questions concerning this report, please contact Mr. Daniel Mearhoff, Regulatory Assurance Manager, at (815) 415-2800.

Respectfully,

Phil Hansett
Plant Manager
LaSalle County Station

Enclosure: Licensee Event Report

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – LaSalle County 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
LaSalle County Station, Unit 1	05000373	1 OF 3

4. Title
Turbine Stop Valve Limit Switch Failure due to Insufficient Lubrication

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
05	03	19	2019	- 002	- 00	06	27	19	NA	NA
									Facility Name: NA	Docket Number: NA

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)
John Van Fleet, Operations Director	(815) 415-2200

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	TA	33	N007	Yes	NA	NA	NA	NA	NA

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

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

On March 23, 2019, during quarterly scram functional surveillances of turbine stop valves (TSV), the limit switch associated with TSV number 3 failed to return to shelf state when the lever arm was released. The failed component was replaced and sent offsite for component testing and failure analysis. The component failure analysis completed on May 3, 2019 determined the cause was attributed to insufficient lubrication in the shaft to bushing section of the limit switch. This established firm evidence that the failure mechanism and past inoperability condition may have existed since its last successful surveillance on December 15, 2018.

The affected component 1C71-N006C is the TSV-3 Closure RPS channel A2 scram limit switch. This device is required by Technical Specifications to support LCO 3.3.1.1 function 8 (RPS) and LCO 3.3.4.1 (EOC-RPT). Each TSV position is monitored by two limit switches (for TSV-3, A2 and B1 channels). This condition resulted in the TSV-3 input to RPS A2 as well as one channel of the EOC-RPT trip being INOPERABLE. The appropriate LCO Conditions and Required Actions were entered and tracked. The RPS and EOC-RPT functions were maintained due to the redundant channels remaining OPERABLE. There were no reportability thresholds applicable to this issue at the time of the event, and there was no loss of safety function. The condition is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) for operation or condition prohibited by Technical Specifications.

Immediate corrective actions were taken to replace the component and restore the associated channel to OPERABLE. Additional actions included performance of a component failure analysis and to complete scheduled limit switch replacements of the current model with a new limit switch model that has greater heat tolerance.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
LaSalle County Station, Unit 1	05000373	2019	- 002	- 00

NARRATIVE

PLANT AND SYSTEM IDENTIFICATION

LaSalle County Station Unit 1 is a General Electric Boiling Water Reactor with 3546 Megawatts Thermal Rated Core Power.

The affected system was the main turbine system. The affected component was the turbine stop valve (TSV) limit switch 1C71-N006C [Namco model EA740]. This is the limit switch for the TSV number 3 Closure Reactor Protection System (RPS) A2 channel.

CONDITION PRIOR TO EVENT

Unit(s): 1	Date:	May 3, 2019	Time:	0000 CDT
Reactor Mode(s): 1	Mode(s) Name:	Power Operation	Power Level:	100 percent

DESCRIPTION

On March 23, 2019, while performing surveillance testing for the Unit 1 turbine stop valve scram and EOC-RPT function relay 1C71A-K10C failed to de-energize as expected, indicating a potential issue with the associated limit switch for TSV-3 (1C71-N006C). The valve otherwise functioned normally, closed and fast closed as expected. The test was performed a second time on stop valve number 3 to monitor its contacts more closely. The second time of testing, relay K10C did not actuate. The station entered applicable technical specification (TS) required action (RA) statements due to the failure of the K10C relay.

- TS 3.3.1.1 RA A.1, Place the channel in trip within 12 hours or RA A.2, Place associated trip system in trip within 12 hours.
- TS 3.3.4.1 RA A.1, Restore channel to operable within 72 hours or TS 3.3.4.1 RA A.2, Place channel in trip within 72 hours.

Troubleshooting performed identified that the limit switch actuating arm failing to return to the relaxed position following movement of the TSV actuating rod assembly and the associated collar which interacts with the 1C71-N006C limit switch. On March 24, 2019, electrical maintenance technicians completed limit switch replacement on TSV-3. This TSV was re-tested satisfactorily, and instrumentation for TSV-3 was declared operable. The station exited applicable TS LCO 3.3.1.1 and TS LCO 3.3.4.1 time-clocks.

The limit switch is normally held in the actuated position during unit operation and is only allowed to return to the relaxed, shelf state position, once per quarter. The limit switch had been tested satisfactorily on December 15, 2018 during its quarterly surveillance. This limit switch was previously replaced on September 9, 2018 due to similar performance behavior noted on this model of limit switch [Namco EA740], that was attributed to temperature-induced lubrication degradation.

The limit switch that had been removed from service on March 23, 2019, was sent for off-site failure analysis. The failure analysis was completed on May 3, 2019, indicating the firm evidence of the failure mechanism.

CAUSE

The failure analysis functionality testing verified the limit switch malfunction. The limit switch was sluggish and failed to return to shelf state. Based on the internal component inspections, the failure was caused by binding between the shaft and the cam bushing due to a lack of lubrication.

REPORTABILITY AND SAFETY ANALYSIS

The 1C71-N006C is the TSV #3 Closure RPS A2 SCRAM limit switch which actuates 1C71A-K010C. This device is required to be OPERABLE per LCO 3.3.1.1 function 8 (RPS) and LCO 3.3.4.1 (EOC-RPT). TSV-3 was fully closed, which should have resulted in the 1C71-N006C switch being open. Each TSV position is monitored by two limit switches (for TSV-3, A2 and B1 channels). This condition results in the TSV-3 input to RPS A2 as well as one channel of the EOC-RPT trip being INOPERABLE. The appropriate LCO Conditions and Required Actions were entered and tracked. The RPS and EOC-RPT Functions were maintained due to the redundant channels remaining OPERABLE. There was no loss of safety function. The event identification of the limit switch failure did not meet the reporting thresholds in accordance with 10 CFR 50.72.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

(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. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
LaSalle County Station, Unit 1	05000373	2019	- 002	- 00

NARRATIVE

Upon receipt of the failure analysis on May 3, 2019, the station identified that a past inoperability period existed as far back as the last successful surveillance on the TSV-3 limit switch (1C71-N006C) performed on December 15, 2018, until corrective action was taken in response to the surveillance test failure on March 24, 2019. The inoperability period was greater than allowed by TS LCO 3.3.3.1 and 3.3.4.1, as indicated below. This event is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by the plant's TS.

- LCO 3.3.1.1 requires that the RPS instrumentation for each function is OPERABLE, and Condition A applies to one or more required channels being inoperable requires that the channel or its associated trip system is placed in trip within 12 hours. In this case, the station had exceeded the completion time of 12 hours, when the malfunctioning channel was found inoperable during March 2019 surveillance testing. In addition, LCO 3.3.1.1 Condition D was not entered for the Completion Time of Condition A not met.

- LCO 3.3.4.1 requires that the end of cycle recirculation pump trip (EOC-RPT) instrumentation is OPERABLE, which includes two channels of TSV closure and TCV fast closure or Minimum Critical Power Ratio (MCPR) limits are applied.

CORRECTIVE ACTIONS

Corrective actions taken in response to the conditions were:
- A work order was completed to replace the component, and to restore the associated channel to OPERABLE.
- A long-term action to replace the affected population of limit switches [Namco model EA740] with a more heat tolerant model [Namco model EA700] was ongoing when the event occurred. The extent of this condition is the eight (four switches per unit) RPS limit switches located within the Main TSV limit switch enclosures. Replacements of the affected limit switches on Unit 2 were complete. Replacements for Unit 1 limit switches are scheduled for the next scheduled refueling outage.
- The removed limit switch was sent to an off-site testing facility to obtain a component failure analysis.

PREVIOUS OCCURRENCES

This condition is related to similar behavior noted on this model of limit switch (TSV-3) prior to its replacement on September 9, 2018. Previous experience with this model of limit switch [Namco EA740] resulted in station actions to begin replacement of this model of limit switch with a version [Namco EA700] that has a higher temperature lubrication tolerance.

Unit 1 LER 373-2019-001-00
During quarterly surveillances of TSV limit switch 1C71-N006C, the component exhibited degraded performance on May 20, 2018 and a failure on September 9, 2018. The component was replaced; and subsequent component failure analysis determined the cause was attributed to degradation of the switch lubricant due to exposure from a high temperature environment, which established firm evidence that the sluggish performance exhibited in May 2018 was related to the failure in September 2018 and that a past inoperability condition existed. Immediate corrective actions were taken to replace the component and restore the associated channel to OPERABLE. Additional actions included performance of a causal investigation, identification of a new limit switch model that has greater heat tolerance, with a component replacement schedule starting in 2019.

COMPONENT FAILIRE DATA

Manufacturer: NAMCO Controls Corporation
Device: Unit 1 Turbine Stop Valve limit switch (Model: EA740-80001)
Component ID: 1C71-N006C, Unit 1 Turbine Stop Valve Position Switch (Cat. ID 0000037836)
Serial No. 1817AA424680