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FirstEnergy Nuclear Operating Company

Perry Nuclear Power Plant
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Vice President

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October 4, 2019
L-19-202

10 CFR 50.73(a)(2)(v)(A)
10 CFR 50.73(a)(2)(v)(D)

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

SUBJECT:
Perry Nuclear Power Plant
Docket No. 50-440, License No. NPF-58
Licensee Event Report Submittal

Enclosed is Licensee Event Report (LER) 2019-004, "Loss of Feedwater Heating Results in Loss of Safety Function". There are no regulatory commitments contained in this submittal.

If there are any questions or if additional information is required, please contact Mr. Glendon Burnham, Manager – Regulatory Compliance, at (440) 280-7538.

Sincerely,

Frank R. Payne

Enclosure:
LER 2019-004

cc: NRC Project Manager
NRC Resident Inspector
NRC Region III Regional Administrator

Enclosure
L-19-202

LER 2019-004

NRC FORM 366
(04-2018)

U.S. NUCLEAR REGULATORY COMMISSION

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/

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 3/31/2020

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.

1. Facility Name	2. Docket Number	3. Page
Perry Nuclear Power Plant	05000-440	1 OF 3

4. Title:
Loss of Feedwater Heating Results in Loss of Safety Function

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	06	2019	2019	004	00	10	04	2019		05000
									Facility Name	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)
65	☐ 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)
	[redacted]	☐ 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)
George Dujanovic – Regulatory Compliance	440-280-5200

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

14. Supplemental Report Expected	15. Expected Submission Date	Month	Day	Year
☒ Yes (If yes, complete 15. Expected Submission Date) ☐ No		12	6	2019

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

On August 6, 2019, at 1335 hours, while performing feedwater heater alignments, a partial loss of feedwater heating occurred due to the isolation of the 5A and 6A feedwater heaters, resulting in lowering the temperature of feedwater to the reactor vessel by approximately 38 degrees F. This caused the Turbine First-Stage pressure to be outside of the normal calibration value, thereby changing instrumentation setpoints, and resulting in the INOPERABILITY of Reactor Protection System (RPS) instrumentation functions for Turbine Stop Valve Closure and Turbine Control Valve Fast Closure, End of Cycle Recirculation Pump Trip (EOC-RPT) instrumentation, and Control Rod Block instrumentation.

The Direct Cause is determined to be the continued rise of water level in the heater, after the emergency drain valve reached 100% demand, actuating the high-high isolation level switch.

The apparent cause is still under investigation, as the cause evaluation is not complete. A supplemental report will be submitted after completion and review of the evaluation.

The increase in risk for this event is considered very small in accordance with the Regulatory Guidance. This event is reported in accordance with 10 CFR 50.73(a)(2)(v)(A) and 10 CFR 50.73(a)(2)(v)(D) as an event or condition that could have prevented the fulfillment of a safety function.

NARRATIVE

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

INTRODUCTION

On August 6, 2019, with the plant in Mode 1 at approximately 65 percent rated thermal power, a partial loss of high pressure feedwater heating [SN] occurred when feedwater heaters 5A and 6A [HX] isolated on high-high level during the transfer of the 5A heater level control [LC] from startup to normal mode. In startup level control mode, the emergency drain controllers [LIC] are operating the normal drain valves [LCV] and the normal drain controllers are operating the emergency drain valves. The 5A and 6A heater isolations resulted in a lower feedwater temperature which impacted certain Reactor Protection System (RPS) [JC], End of Cycle Recirculation Pump Trip (EOC-RPT), and Control Rod Block instrumentation setpoints that are derived from the main turbine [TG] first stage pressure.

At 1729 hours, notification was made to the NRC Operations Center (Event Notification ENS 54203) in accordance with 10 CFR 50.72(b)(3)(v)(A) and 10 CFR 50.72(b)(3)(v)(D) as an event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to shutdown the reactor and place it in a safe condition, and mitigate the consequences of an accident. This event is being reported in accordance with 10 CFR 50.73(a)(2)(v)(A) and 10 CFR 50.73(a)(2)(v)(D) as an event or condition that could have prevented the fulfillment of a safety function.

EVENT DESCRIPTION

On August 6, 2019 at 1335 hours, feedwater heaters 5A and 6A automatically isolated on high-high level during an attempt to transfer from startup to normal mode on the 5A heater level controller. The transfer from startup to normal mode for the 5A heater occurred at 65 percent reactor power. The resultant isolation of the 5A and 6A heaters lowered feedwater temperature going to the reactor by approximately 38 degrees F.

Setpoints for the RPS Turbine Stop Valve [ISV] and Control Valve [FCV] fast closure scram bypass inputs, EOC-RPT instrumentation, and Control Rod Block Rod Withdrawal Limiter (RWL) come from pressure transmitters [PT] located on each of the turbine first-stage pressure taps. While in the power range of the reactor, turbine first stage pressure is essentially linear with increasing power. When the main turbine first-stage pressure is below that equivalent to 38 percent of rated thermal power; trip units [PM] in each RPS channel actuate relays [RLY] to bypass the Turbine Stop Valve and Control Valve closure scrams, the EOC-RPT function is enabled, and the Control Rod Block RWL is bypassed.

With a lower than normal turbine first-stage pressure due to an abnormal feedwater temperature, the relation of the main turbine first-stage pressure to reactor power is no longer in calibration; therefore, the setpoint for percent reactor thermal power at which the bypass functions occur will not be correct.

Operators entered into Limiting Conditions of Operation (LCO) for Technical Specifications (TS) 3.3.1.1, RPS Instrumentation Channels A, B, C, D, E, F, G, and H for Turbine Stop Valve Closure; TS 3.3.1.1, RPS Instrumentation Channels A, B, C, and D for Turbine Control Valve Fast Closure, Trip Oil Pressure Low; TS

NARRATIVE

3.3.4.1, End of Cycle Recirculation Pump Trip (EOC-RPT) Instrumentation; and TS 3.3.2.1, Control Rod Block Instrumentation for Rod Withdrawal Limiter (RWL).

According to procedure ONI-N36, Loss of Feedwater Heating, Revision 18, compliance with one of the following four actions is specified for unplanned reductions in feedwater temperature:

- Restore the feedwater temperature within the TS action time(s)
- Disable the bypass by removing the four trip units (C71-N652A, B, C, D) for RPS and EOC-RPT.
- Implement setpoint changes for the trip units within the TS action time(s)
- Reduce power to </= 38 percent within the TS Action Time(s)

At 1422 hours, the four trip units were removed to disable the bypass function and obtain compliance with the TS action time to restore Operability.

At 1631 hours feedwater heaters 5A and 6A were restored to service, and at 1915 hours the trip units were reinstalled to re-enable the bypass function.

CAUSE OF EVENT

The Direct Cause was determined to be the continued rise of water level in the heater, after the emergency drain valve reached 100% demand, actuating the high-high isolation level switch.

The apparent cause is still under investigation, as the cause evaluation is not complete.

EVENT ANALYSIS

A Probabilistic Risk Assessment (PRA) evaluation was performed for the August 6, 2019 loss of feedwater heating. A conservative analysis of this event results in delta Core Damage Frequency (CDF) and delta Large Early Release Frequency (LERF) values that are well below the acceptable thresholds discussed in Regulatory Guide 1.174. The increase in risk for this event is therefore considered very small in accordance with the Regulatory Guidance. This event is being reported in accordance with 10 CFR 50.73(a)(2)(v)(A) and 10 CFR 50.73(a)(2)(v)(D) as an event or condition that could have prevented the fulfillment of a safety function.

CORRECTIVE ACTIONS:

Corrective action included restoration of the feedwater heaters to back in-service. Further corrective actions will be developed based upon the apparent cause, once the investigation is completed.

Previous Similar Events

A review of LERs and the corrective action database for the past three years identified no similar events.