DUKE ENERGY®

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919.362.2000

10 CFR 50.73

July 1, 2015
Serial: HNP-15-057

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

Shearon Harris Nuclear Power Plant, Unit 1
Docket No. 50-400/Renewed License No. NPF-63

Subject: Licensee Event Report 2015-004-00

Ladies and Gentlemen:

Duke Energy Progress, Inc. submits the enclosed Licensee Event Report 2015-004-00 in accordance with 10 CFR 50.73 for Shearon Harris Nuclear Power Plant, Unit 1. This report describes a condition where the 'A' train Emergency Service Water pump mechanically failed during the performance of safety injection surveillance testing. The root cause evaluation is ongoing and this LER will be supplemented following completion of the evaluation.

This document contains no regulatory commitments. Please refer any questions regarding this submittal to John Caves at (919) 362-2406.

Sincerely,

Benjamin C. Waldrep

Enclosure: Licensee Event Report 2015-004-00

cc: Mr. J. D. Austin, NRC Sr. Resident Inspector, HNP
Ms. M. Barillas, NRC Project Manager, HNP
Mr. V. M. McCree, NRC Regional Administrator, Region II
Mr. M. Riches, NRC Resident Inspector, HNP

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Ladies and Gentlemen:

Duke Energy Progress, Inc. submits the enclosed Licensee Event Report 2015-004-00 in accordance with 10 CFR 50.73 for Shearon Harris Nuclear Power Plant, Unit 1. This report describes a condition where the 'A' train Emergency Service Water pump mechanically failed during the performance of safety injection surveillance testing. The root cause evaluation is ongoing and this LER will be supplemented following completion of the evaluation.

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Benjamin C. Waldrep

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Mr. V. M. McCree, NRC Regional Administrator, Region II
Mr. M. Riches, NRC Resident Inspector, HNP

NRC FORM 366 (02-2014) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 01/31/2017

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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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)

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4. TITLE

Failure of 'A' Train Emergency Service Water Pump

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	04	2015	2015	- 004 -	00	07	01	2015	None	
									FACILITY NAME	DOCKET NUMBER
									None	

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*			
5	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
10. POWER LEVEL	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
000	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☒ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
	☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☒ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT	TELEPHONE NUMBER *(Include Area Code)*
John Caves, Manager, Regulatory Affairs	919.362.2406

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	BI	P	INGERSOLL -RAND	Y					

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☒ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☐ NO		08	20	2015

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On May 4, 2015, while Harris Nuclear Plant, Unit 1 was shut down for a scheduled refueling outage in mode 5, the Operations Surveillance Test for Safety Injection, Engineered Safety Feature Response Time on Train B, was being performed. During this test the 'A' Emergency Service Water (ESW) pump failed, resulting in a loss of flow and pressure to the 'A' ESW header. Immediate corrective action was taken to secure the corresponding charging/safety injection pump and emergency diesel generator and to realign the Normal Service Water to the 'A' ESW header.

Root and contributing causes will be determined in the root cause evaluation, which is still ongoing. The final results of the root cause evaluation will be provided in a supplement to this report.

The 'A' ESW pump was rebuilt with new couplings, coupling fasteners, and bearings prior to plant start up that commenced on May 13, 2015.

NARRATIVE

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

BACKGROUND

On May 4, 2015, while Harris Nuclear Plant, Unit 1 (HNP) was shut down for a scheduled refueling outage in mode 5, at 0% power, the Operations Surveillance Test for Safety Injection, Engineered Safety Feature Response Time on Train B, was being performed. Prior to the event, both Emergency Service Water (ESW) trains (A and B) [BI] were in service and equipment actuation had been completed. The 'A' ESW train was the protected train. There were no systems, structures, or components that were inoperable at the start of the event that contributed to the event.

This event is reportable under 10 CFR 50.73(a)(2)(v), "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to:"… "(B) Remove residual heat;"…"(D) Mitigate the consequences of an accident." This event is also reportable under 10 CFR 50.73(a)(2)(i)(B), "Any operation or condition which was prohibited by the plant's Technical Specifications."

EVENT DESCRIPTION

While performing the surveillance test, a failure of the 'A' ESW pump (1SW-E005) [P] occurred, resulting in a loss of flow and pressure on the 'A' ESW header. The 'A' ESW pump, an Ingersoll Rand model 35 LKX 2 stage, had been running for approximately 40 minutes. Immediate action was taken by the operators to stop the corresponding 'A' charging/safety injection pump [P] and emergency diesel generator [DG], to secure the critical cooling loads. Approximately ten minutes following the 'A' ESW pump failure, Normal Service Water (NSW) [BI] was realigned to the 'A' ESW header in accordance with the plant abnormal operating procedure. It was subsequently determined by attempting to rotate the pump shaft by hand that the 'A' ESW pump had mechanically failed. When the vertical 2-stage centrifugal pump was inspected, it was found that the shaft coupling halves [CPLG] had separated at one of the line shaft joints due to the failure of all 12 coupling capscrew fasteners. This resulted in shaft separation and loss of motive force to the pump impellers. There is evidence that some of the capscrews failed some time earlier than the loss of flow and pressure. Therefore, the degraded coupling and increased bending stress existed for an indeterminate amount of time prior to discovery.

ESW and NSW are the primary interconnected subsystems of the Service Water System [BI], which provides cooling water to remove heat from plant auxiliary systems and equipment. The ESW portion of the system removes essential plant heat loads associated with reactor auxiliary components for dissipation in the plant ultimate heat sink during emergency operation. During normal plant operation, including start-up and shutdown, NSW provides all cooling water requirements to the ESW portion of the system. ESW primarily provides cooling water to emergency diesel generators (EDG) as well as component cooling water [CC], which then cools the residual heat removal (RHR) system [BP].

A calculation of runtime for the 'A' ESW pump determined it had run for approximately 264 hours since HNP entered mode 5 for the refueling outage. The runtime calculation for the 'A' ESW pump is less than its established 30-day mission time for mitigating the consequences of an accident. In addition to the event on May 4, 2015, there were periods of time during the refueling outage where the 'B' ESW pump was inoperable for planned maintenance and 'B' emergency diesel generator (EDG) was inoperable for planned maintenance. During these times, the 'A' ESW train was being relied upon as a support system to meet the requirements of HNP Technical Specification (TS) 3.9.8.1 and TS 3.9.8.2 for RHR and coolant

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NARRATIVE

circulation and TS 3.8.1.2 for an operable diesel generator. Therefore, the safety functions of the RHR system and the diesel generator may not have been fulfilled with the 'A' ESW train being inoperable due to the inoperability of the 'A' ESW pump coincident with 'B' ESW train being inoperable due to planned maintenance.

CAUSAL FACTORS

The root cause evaluation is ongoing. Once the evaluation is complete, a supplemental report will be issued containing the root cause for this event.

SAFETY ANALYSIS

The root cause evaluation is ongoing. Once the evaluation is complete, a supplemental report will be issued containing the safety analysis for this event.

CORRECTIVE ACTIONS

Completed Actions

The 'A' ESW pump has been completely rebuilt with new couplings, coupling fasteners, and bearings. Maintenance and Engineering personnel have applied additional rigor and verifications during the pump reinstallation to minimize any lateral stresses on the pump which could adversely affect the alignment. Post-maintenance testing has been performed to ensure the maintenance was well executed and pump performance met acceptance criteria.

Planned Actions

Planned actions will be determined following completion of the ongoing root cause evaluation.

PREVIOUS EVENTS

A review of previous events will be performed and included in the supplement to this LER following completion of the root cause evaluation which will determine the cause of the event.

COMMITMENTS

This report contains no regulatory commitments.