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5413 Shearon Harris Rd
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919-362-2502

10 CFR 50.73

May 28, 2015
Serial: HNP-15-044

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

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

Subject: Licensee Event Report 2015-003-00, Reactor Vessel Head Nozzle Repairs

Ladies and Gentlemen:

Duke Energy Progress, Inc., submits the enclosed Licensee Event Report 2015-003-00 in accordance with 10 CFR 50.73 for Shearon Harris Nuclear Power Plant, Unit No. 1. This report describes a condition where inservice inspection examinations of the reactor vessel closure head nozzles identified conditions indicative of primary water stress corrosion cracking. The nozzles were repaired prior to startup from the refueling outage.

This document contains no new regulatory commitments.

Please refer any questions regarding this submittal to Dave Corlett, Regulatory Affairs Manager, at (919) 362-3137.

Sincerely,

Benjamin C. Waldrep

Enclosure: Licensee Event Report 2015-003-00

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

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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)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Shearon Harris Nuclear Power Plant, Unit 1	05000400	1 OF 3

4. TITLE

Reactor Pressure Vessel Head Penetration Nozzle Indications Requiring Repair Attributed to Primary Water Stress Corrosion Cracking

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
04	07	2015	2015	- 003 -	00	05	28	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)*			
6	☐ 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)*
Dave Corlett, Manager, Regulatory Affairs	919.362.3137

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
B	AB	RPV	CB&I	N					

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

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

On April 7, 2015, and April 9, 2015, the reactor vessel head penetration nozzles were being examined while the Harris Nuclear Plant was shut down for a scheduled refueling outage. Ultrasonic examinations identified indications that required repair in three head penetration nozzles. The indications were approximately 0.233, 0.260, and 0.297 inches long in nozzles 14, 18, and 23 respectively, and axial in orientation. The maximum through-wall extent was approximately 32%. An inspection of the exterior surfaces of the reactor head confirmed there was no leakage. The indications were repaired using the inside diameter temper bead welding process. The repairs restored compliance with the American Society of Mechanical Engineers code requirements.

The cause of the indications was attributed to primary water stress corrosion cracking. Per the requirement of 10 CFR 50.55a(g)(6)(ii)(D)(5), examinations are required to be performed on the reactor vessel head every refueling outage to identify flaws and ensure appropriate repairs are performed. This is similar to the conditions reported in Harris Licensee Event Reports 2013-001-00 and 2013-003-00.

NARRATIVE

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

On April 7, 2015, and April 9, 2015, the Harris Nuclear Plant was shut down for a scheduled refueling outage in mode six, at 0% power. The reactor pressure vessel head [RPV] penetration nozzles [NZL] in the reactor coolant system [AB] were being examined as required by 10 CFR 50.55a(g)(6)(ii)(D). Ultrasonic examinations identified indications that required repair in head penetration nozzles 14, 18, and 23.

There were no systems, structures, or components that were inoperable at the start of the event that contributed to the event.

This condition is reportable in accordance with 10 CFR 50.73(a)(2)(ii)(A), as an event or condition that resulted in the condition of the nuclear power plant, including its principal barriers, being degraded.

Event Description

Ultrasonic test data revealed three indications that required repair. The indications were approximately 0.233, 0.260, and 0.297 inches long in nozzles 14, 18, and 23 respectively, and axial in orientation. The indications were repaired using the inside diameter temper bead welding process. The elapsed time from discovery on April 7 and 9 until the nozzles were repaired on April 30, 2015 was approximately 23 days.

The remaining control rod drive mechanism nozzles were also examined using nondestructive methods, and a surface examination of the vent line was performed. A bare metal visual examination of the top of the reactor vessel closure head was completed with no indications of leakage.

The reactor pressure vessel closure head was manufactured by Chicago Bridge and Iron, Serial Number T40.

Causal Factors

The cause of the flaws in nozzle 14, 18, and 23 was attributed to Primary Water Stress Corrosion Cracking (PWSCC). PWSCC occurs under conditions of high tensile stresses (either operating or residual), conducive environment (temperature and chemistry), and susceptible material. There is widespread industry operating experience that documents PWSCC of Alloy 600 dissimilar metal weld configurations.

Corrective Actions

Nozzles 14, 18, and 23 were repaired utilizing the inside diameter temper bead welding process. Per the requirement of 10 CFR 50.55a(g)(6)(ii)(D)(5), if flaws attributed to PWSCC have been identified, examinations are required to be performed on the reactor vessel head every refueling outage to identify flaws and ensure appropriate repairs are performed.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
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Shearon Harris Nuclear Power Plant, Unit 1	05000400	2015	- 003	- 00	3 OF 3

NARRATIVE

Safety Analysis

The ultrasonic testing results revealed that the flaws were 16%, 32%, and 23% through-wall extent in nozzles 14, 18, and 23 respectively, and axial in orientation. An inspection of the exterior surfaces of the reactor head confirmed there was no leakage. The safety significance of the flaw's presence during operation was minimal. An industry safety assessment of PWSCC in reactor vessel head penetrations concluded that a program of periodic nonvisual non-destructive examinations at appropriate intervals supplemented by periodic bare metal visual examinations provides adequate protection against safety-significant failures. It is reasonable to conclude that an inspection program in accordance with the requirements of ASME Code Case 729-1 as modified by the additional limitations set forth in 10 CFR 50.55a(g)(6)(ii)(D), provide assurance against any credible PWSCC degradation event that would challenge nuclear safety.

Additional Information

LERs 2013-001-00 and 2013-003-00 reported previously identified and repaired flaws on the Harris reactor vessel closure head nozzles. The reported indications in those LERs also exhibited characteristics of PWSCC.

This report contains no regulatory commitments.