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July 12, 2013
Serial: HNP-13-056

10 CFR 50.73

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

Shearon Harris Nuclear Power Plant, Unit 1
Docket No. 50-400

Subject: Licensee Event Report 2013-001-00

Ladies and Gentlemen:

Duke Energy Progress, Inc., formerly known as Carolina Power & Light Company, submits the enclosed Licensee Event Report (LER) 2013-001-00 in accordance with 10 CFR 50.73 for the Shearon Harris Nuclear Power Plant, Unit 1. The LER describes a condition where an indication was identified in one of the reactor vessel head penetration nozzles during a review of ultrasonic test data from Shearon Harris Nuclear Plant refueling outage 17 (RO17) in 2012. The report also describes four similar reactor vessel indications that were found during RO17 that were identified and repaired, but not recognized as being reportable at that time.

This document contains no regulatory commitments. Please refer any questions regarding this submittal to Dave Corlett at (919) 362-3137.

Sincerely,

A handwritten signature in blue ink, appearing to read "Ernest J. Kapopoulos, Jr.", written in a cursive style.

Ernest J. Kapopoulos, Jr.

Enclosure: LER 2013-001-00

cc: Mr. J. D. Austin, NRC Sr. Resident Inspector, Harris Nuclear Plant
Ms. A. T. Billoch Colón, NRC Project Manager, Harris Nuclear Plant
Mr. V. M. McCree, NRC Regional Administrator, Region II

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|---|--------|-----------|---|--------------------|---|-------------------------------------|-----------|--|-------------------------------------|---|------|---|---|---|---|
| NRC FORM 366 (10-2010) | | | | | U.S. NUCLEAR REGULATORY COMMISSION | | | | | APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013 <small>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 Section (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.</small> | | | | | |
| LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block) | | | | | | | | | | | | | | | |
| 1. FACILITY NAME Shearon Harris Nuclear Power Plant, Unit 1 | | | | | 2. DOCKET NUMBER 05000400 | | | 3. PAGE 1 of 4 | | | | | | | |
| 4. TITLE Reactor Pressure Vessel Head Penetration Nozzle Indications 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 | | | | | |
| 05 | 15 | 2013 | 2013 – 001 – 00 | | | 07 | 12 | 2013 | None | None | | | | | |
| 9. OPERATING MODE 1 | | | 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) <table style="width: 100%; border: none;"> <tr> <td style="width: 33%; vertical-align: top;"> <input type="checkbox"/> 20.2201(b) <input type="checkbox"/> 20.2201(d) <input type="checkbox"/> 20.2203(a)(1) <input type="checkbox"/> 20.2203(a)(2)(i) <input type="checkbox"/> 20.2203(a)(2)(ii) <input type="checkbox"/> 20.2203(a)(2)(iii) <input type="checkbox"/> 20.2203(a)(2)(iv) <input type="checkbox"/> 20.2203(a)(2)(v) <input type="checkbox"/> 20.2203(a)(2)(vi) </td> <td style="width: 33%; vertical-align: top;"> <input type="checkbox"/> 20.2203(a)(3)(i) <input type="checkbox"/> 20.2203(a)(3)(ii) <input type="checkbox"/> 20.2203(a)(4) <input type="checkbox"/> 50.36(c)(1)(i)(A) <input type="checkbox"/> 50.36(c)(1)(ii)(A) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.46(a)(3)(ii) <input checked="" type="checkbox"/> 50.73(a)(2)(i)(A) <input type="checkbox"/> 50.73(a)(2)(i)(B) </td> <td style="width: 33%; vertical-align: top;"> <input type="checkbox"/> 50.73(a)(2)(i)(C) <input checked="" type="checkbox"/> 50.73(a)(2)(ii)(A) <input type="checkbox"/> 50.73(a)(2)(ii)(B) <input type="checkbox"/> 50.73(a)(2)(iii) <input type="checkbox"/> 50.73(a)(2)(iv)(A) <input type="checkbox"/> 50.73(a)(2)(v)(A) <input type="checkbox"/> 50.73(a)(2)(v)(B) <input type="checkbox"/> 50.73(a)(2)(v)(C) <input type="checkbox"/> 50.73(a)(2)(v)(D) </td> </tr> <tr> <td style="vertical-align: top;"> <input type="checkbox"/> 50.73(a)(2)(vii) <input type="checkbox"/> 50.73(a)(2)(viii)(A) <input type="checkbox"/> 50.73(a)(2)(viii)(B) <input type="checkbox"/> 50.73(a)(2)(ix)(A) <input type="checkbox"/> 50.73(a)(2)(x) <input type="checkbox"/> 73.71(a)(4) <input type="checkbox"/> 73.71(a)(5) <input type="checkbox"/> OTHER <small>Specify in Abstract below or in NRC Form 366A</small> </td> </tr> </table> | | | | | | | | | <input type="checkbox"/> 20.2201(b) <input type="checkbox"/> 20.2201(d) <input type="checkbox"/> 20.2203(a)(1) <input type="checkbox"/> 20.2203(a)(2)(i) <input type="checkbox"/> 20.2203(a)(2)(ii) <input type="checkbox"/> 20.2203(a)(2)(iii) <input type="checkbox"/> 20.2203(a)(2)(iv) <input type="checkbox"/> 20.2203(a)(2)(v) <input type="checkbox"/> 20.2203(a)(2)(vi) | <input type="checkbox"/> 20.2203(a)(3)(i) <input type="checkbox"/> 20.2203(a)(3)(ii) <input type="checkbox"/> 20.2203(a)(4) <input type="checkbox"/> 50.36(c)(1)(i)(A) <input type="checkbox"/> 50.36(c)(1)(ii)(A) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.46(a)(3)(ii) <input checked="" type="checkbox"/> 50.73(a)(2)(i)(A) <input type="checkbox"/> 50.73(a)(2)(i)(B) | <input type="checkbox"/> 50.73(a)(2)(i)(C) <input checked="" type="checkbox"/> 50.73(a)(2)(ii)(A) <input type="checkbox"/> 50.73(a)(2)(ii)(B) <input type="checkbox"/> 50.73(a)(2)(iii) <input type="checkbox"/> 50.73(a)(2)(iv)(A) <input type="checkbox"/> 50.73(a)(2)(v)(A) <input type="checkbox"/> 50.73(a)(2)(v)(B) <input type="checkbox"/> 50.73(a)(2)(v)(C) <input type="checkbox"/> 50.73(a)(2)(v)(D) | <input type="checkbox"/> 50.73(a)(2)(vii) <input type="checkbox"/> 50.73(a)(2)(viii)(A) <input type="checkbox"/> 50.73(a)(2)(viii)(B) <input type="checkbox"/> 50.73(a)(2)(ix)(A) <input type="checkbox"/> 50.73(a)(2)(x) <input type="checkbox"/> 73.71(a)(4) <input type="checkbox"/> 73.71(a)(5) <input type="checkbox"/> OTHER <small>Specify in Abstract below or in NRC Form 366A</small> |
| | | | | | | | | | | | | <input type="checkbox"/> 20.2201(b) <input type="checkbox"/> 20.2201(d) <input type="checkbox"/> 20.2203(a)(1) <input type="checkbox"/> 20.2203(a)(2)(i) <input type="checkbox"/> 20.2203(a)(2)(ii) <input type="checkbox"/> 20.2203(a)(2)(iii) <input type="checkbox"/> 20.2203(a)(2)(iv) <input type="checkbox"/> 20.2203(a)(2)(v) <input type="checkbox"/> 20.2203(a)(2)(vi) | <input type="checkbox"/> 20.2203(a)(3)(i) <input type="checkbox"/> 20.2203(a)(3)(ii) <input type="checkbox"/> 20.2203(a)(4) <input type="checkbox"/> 50.36(c)(1)(i)(A) <input type="checkbox"/> 50.36(c)(1)(ii)(A) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.46(a)(3)(ii) <input checked="" type="checkbox"/> 50.73(a)(2)(i)(A) <input type="checkbox"/> 50.73(a)(2)(i)(B) | <input type="checkbox"/> 50.73(a)(2)(i)(C) <input checked="" type="checkbox"/> 50.73(a)(2)(ii)(A) <input type="checkbox"/> 50.73(a)(2)(ii)(B) <input type="checkbox"/> 50.73(a)(2)(iii) <input type="checkbox"/> 50.73(a)(2)(iv)(A) <input type="checkbox"/> 50.73(a)(2)(v)(A) <input type="checkbox"/> 50.73(a)(2)(v)(B) <input type="checkbox"/> 50.73(a)(2)(v)(C) <input type="checkbox"/> 50.73(a)(2)(v)(D) | |
| <input type="checkbox"/> 50.73(a)(2)(vii) <input type="checkbox"/> 50.73(a)(2)(viii)(A) <input type="checkbox"/> 50.73(a)(2)(viii)(B) <input type="checkbox"/> 50.73(a)(2)(ix)(A) <input type="checkbox"/> 50.73(a)(2)(x) <input type="checkbox"/> 73.71(a)(4) <input type="checkbox"/> 73.71(a)(5) <input type="checkbox"/> OTHER <small>Specify in Abstract below or in NRC Form 366A</small> | | | | | | | | | | | | | | | |
| 10. POWER LEVEL 98% | | | | | | | | | | | | | | | |
| 12. LICENSEE CONTACT FOR THIS LER | | | | | | | | | | | | | | | |
| FACILITY NAME Dave Corlett, Manager, Regulatory Affairs | | | | | | | | TELEPHONE NUMBER (Include Area Code) 919.362.3137 | | | | | | | |
| 13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT | | | | | | | | | | | | | | | |
| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX | | | | | | |
| B | AB | RPV | CB&I | N | | | | | | | | | | | |
| 14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO | | | | | | 15. EXPECTED SUBMISSION DATE | | | MONTH | DAY | YEAR | | | | |
| | | | | | | | | | | | | | | | |
| ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) <p>On May 15, 2013, while at 98% power in Mode 1, HNP commenced a Technical Specification required shut down to Mode 6 to repair a flaw that was identified in nozzle 49 of the reactor pressure vessel head. Nozzle 49 was subsequently repaired on May 31, 2013, utilizing the inside diameter temper bead welding process. In 2012, four nozzles (5, 17, 38, 63) were identified with similar indications that exhibited characteristics of PWSCC, and were subsequently repaired using the inner diameter temper bead welding process. However, nozzle 49 was not identified as having an indication at that time. Because the indication in nozzle 49 was identified while at power, a shut down was required by Technical Specifications.</p> <p>The cause of the flaws in nozzle 49 and the other four nozzles was attributed to PWSSC. The root cause evaluation determined that the missed identification of the indication in nozzle 49 was due to the lack of mitigating programmatic governances to specify process independence and fatigue/distraction controls. The planned corrective action to prevent recurrence is to create mitigating programmatic governance for providing oversight for complex automated Non-Destructive Examination (NDE) inspections through the generation of new procedure(s).</p> | | | | | | | | | | | | | | | |

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| NRC FORM 366A (10-2010) | | LICENSEE EVENT REPORT (LER) CONTINUATION SHEET | | | U.S. NUCLEAR REGULATORY COMMISSION | |
| 1. FACILITY NAME | 2. DOCKET | 6. LER NUMBER | | | 3. PAGE | |
| Shearon Harris Nuclear Power Plant, Unit 1 | 05000400 | YEAR | SEQUENTIAL NUMBER | REV NO. | 2 of 4 | |
| | | 2013-001-00 | | | | |
| <p>NARRATIVE</p> <p>Energy Industry Identification System (EIS) codes are identified in the text as [XX]. There were no systems, structures, or components that were inoperable at the start of the event that contributed to the event.</p> <p><u>Event Description</u></p> <p>On May 13, 2013, an independent third party review of ultrasonic data of the reactor pressure vessel head penetration nozzles [RPV-NZL] [Manufacturer: Chicago Bridge and Iron, Serial Number: T40] obtained during Harris Nuclear Plant (HNP) spring 2012 refueling outage 17 (RO17), identified a condition that required further evaluation. The ultrasonic test data was being reviewed in preparation for RO18. After further review, on May 15, 2013, the indication was determined to be characteristic of primary water stress corrosion cracking (PWSCC) and similar to other flaws that were identified and repaired during the RO17 in 2012. Because the indication was identified while at power, Technical Specification 3.4.6.2 required a reactor shut down due to potential reactor coolant system pressure boundary leakage.</p> <p>On May 15, 2013, while at 98% power in Mode 1, HNP commenced a Technical Specification required shutdown to Mode 6 to repair the flaw in nozzle 49. A bare metal visual inspection of the exterior surfaces of the reactor head and penetration was performed in accordance with ASME Section XI Code Case N-729-1, with no indication of through-wall leakage. Ultrasonic test data indicated that the flaw was approximately 0.314 inches long, situated mostly in the penetration nozzle material, and axial in orientation with penetration of about 25% of the nozzle material. An analysis of the data prior to the shutdown could not determine the exact extent of the indication in nozzle 49, noting that it straddled the J-groove weld area and may have extended into the weld.</p> <p>The nozzle was subsequently repaired utilizing the inside diameter temper bead welding process. From time of discovery on May 15, 2013, at 18:49, until the nozzle was repaired on May 31, 2013, at 20:55 was a total of approximately 16 days.</p> <p>Similar reactor vessel head indications were found in 2012. Four nozzles (5, 17, 38, and 63) were identified with indications that exhibited characteristics of PWSCC and were repaired using the inner diameter temper bead welding process. None of the PWSCC indications exceeded 75% through-wall and no evidence of leakage was observed based on bare metal visual examinations. This condition was not initially recognized as being reportable in 2012 per 10 CFR 50.73(a)(2)(ii)(a), for any event or condition that resulted in the condition of the nuclear power plant, including its principal barriers, being degraded, and this event report serves as the formal report to the NRC.</p> <p><u>Cause of Event</u></p> <p>The cause of the flaws in nozzle 49 and the other four nozzles was attributed to PWSCC. The root cause evaluation determined that the missed identification of the indication in nozzle 49 was due to the lack of mitigating programmatic governances to specify process independence and fatigue/distraction controls. Contributing causes include lack of independent vendor analyses of data, potential fatigue, potential distractions by the noisy, active environment, and formal pre-job briefs were not performed and</p> | | | | | | |

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

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NARRATIVE (continued)

documented as required.

Safety Consequences

There was a flaw in a fission product barrier which caused HNP to not meet code requirements. A bare metal visual inspection of the exterior surfaces of the reactor head and penetration did not indicate any through-wall leakage, thus there was not a breach in a fission product barrier, and structural integrity of the reactor vessel was not significantly compromised. The flaw was not through-wall and no leakage of reactor coolant occurred. The flaw was such that it would not have propagated under any of the design basis events (earthquake, loss of coolant accident, etc.). Containment was intact as an additional fission product barrier. Therefore, there was no significant impact to the health and safety of the public.

Per the 2004 Edition of ASME Section XI Acceptance Criteria in Table IWB -3663-1 General Note (a), "Linear surface flaws of any size in the partial penetration nozzle to vessel (J-groove weld) are not acceptable." Section 3.2.4 of NUREG-1022, Event Reporting Guidelines, identifies that defects in the reactor coolant system pressure boundary that cannot be dispositioned as acceptable per ASME Section XI are reportable per 10 CFR 50.73. Therefore this event is reportable in accordance with 10 CFR 50.73(a)(2)(ii)(a), for a condition that a principal barrier was degraded, and 10 CFR 50.73 (a)(2)(i)(A), completion of any nuclear plant shut down required by the plant's technical specification.

Corrective ActionsCompleted Corrective Actions

- Nozzles 5,17,38,49 & 63 were repaired utilizing the inner diameter temper bead welding process.
- Conducted a 100% review of all RO17 ultrasonic data and confirmed that no additional indications exist which were not properly analyzed and no additional indications required repair
- Updated Shearon Harris ISI Program to require volumetric exams to be performed on the reactor vessel head every refueling outage.

Planned Corrective Actions

- Create mitigating programmatic governance for providing oversight for complex automated Non-Destructive Examination (NDE) inspections through the generation of new procedure(s).
- Revise the vendor contract for RO18 to require analysts to perform independent analyses of ultrasonic data, develop work-hour restrictions, and incorporate requirements for an environment conducive to independence and analysis.
- Reinforce the need to review and follow the requirements of applicable oversight procedures pertaining to the current assignment with the responsible individuals.

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NARRATIVE (continued)

Previous Similar Events

No previous, similar Licensee Event Reports were identified.

Commitments

This report contains no regulatory commitments.