



**Benjamin C. Waldrep**  
Vice President  
Harris Nuclear Plant  
5413 Shearon Harris Road  
New Hill NC 27562-9300

919.362.2000

10 CFR 50.73

August 17, 2015  
Serial: HNP-15-069

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 2015-005-00

Ladies and Gentlemen:

Duke Energy Progress, Inc. submits the enclosed Licensee Event Report 2015-005-00 in accordance with 10 CFR 50.73 for Shearon Harris Nuclear Power Plant, Unit 1. This report describes a condition where high energy line break doors were blocked open between the Main Steam Tunnel and the Reactor Auxiliary Building under administrative controls to support maintenance, resulting in the plant being in an unanalyzed condition that could have prevented fulfillment of a safety function. The doors were closed and restrictions were put in place to prevent the condition from occurring again in the future.

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

Sincerely,

A handwritten signature in black ink that reads "Ben C. Waldrep". The signature is written in a cursive, flowing style.

Benjamin C. Waldrep

Enclosure: Licensee Event Report 2015-005-00

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



**Benjamin C. Waldrep**  
Vice President  
Harris Nuclear Plant  
5413 Shearon Harris Road  
New Hill NC 27562-9300

919.362.2000

10 CFR 50.73

August 17, 2015  
Serial: HNP-15-069

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 2015-005-00

Ladies and Gentlemen:

Duke Energy Progress, Inc. submits the enclosed Licensee Event Report 2015-005-00 in accordance with 10 CFR 50.73 for Shearon Harris Nuclear Power Plant, Unit 1. This report describes a condition where high energy line break doors were blocked open between the Main Steam Tunnel and the Reactor Auxiliary Building under administrative controls to support maintenance, resulting in the plant being in an unanalyzed condition that could have prevented fulfillment of a safety function. The doors were closed and restrictions were put in place to prevent the condition from occurring again in the future.

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 2015-005-00

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



**LICENSEE EVENT REPORT (LER)**

(See Page 2 for required number of digits/characters for each block)

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.

|   |                                     |                          |
|---|-------------------------------------|--------------------------|
| <b>1. FACILITY NAME</b><br>Shearon Harris Nuclear Power Plant, Unit 1 | <b>2. DOCKET NUMBER</b><br>05000400 | <b>3. PAGE</b><br>1 OF 4 |
|---|-------------------------------------|--------------------------|

**4. TITLE**  
Unrecognized Impact of Opening of Barrier Doors on High Energy Line Break Analysis

| 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 |
| 06            | 16  | 2015 | 2015          | 005               | 00      | 08             | 17  | 2015 | None                         |               |
|               |     |      |               |                   |         |                |     |      | FACILITY NAME                | DOCKET NUMBER |
|               |     |      |               |                   |         |                |     |      | None                         |               |

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

**12. LICENSEE CONTACT FOR THIS LER**

|   |  |
|---|--|
| LICENSEE CONTACT<br>John Caves, Manager, Regulatory Affairs | TELEPHONE NUMBER (Include Area Code)<br>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 |
|-------|--------|-----------|---------------|--------------------|-------|--------|-----------|---------------|--------------------|
|       |        |           |               |                    |       |        |           |               |                    |

|   |                                     |       |     |      |
|---|-------------------------------------|-------|-----|------|
| <b>14. SUPPLEMENTAL REPORT EXPECTED</b>   | <b>15. EXPECTED SUBMISSION DATE</b> | MONTH | DAY | YEAR |
| <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO |                                     |       |     |      |

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

On June 16, 2015, while Harris Nuclear Plant (HNP) was operating at 100% in mode 1, two doors between the Reactor Auxiliary Building (RAB) and Main Steam Tunnel (MST) were opened to support a maintenance activity. These doors are credited in the high energy line break (HELB) equipment qualification and internal flooding analyses for HNP; however the opening of these doors is not addressed in these analyses. If a HELB occurred in the MST during a time in which these doors are open, the Essential Services Chilled Water system could become inoperable.

The root cause of this event was determined to be that HNP Engineering failed to develop and implement control measures for hazard barriers credited for mitigating HELB events. Immediate corrective action was taken to close the doors and issue a Standing Instruction that prohibits these doors from being blocked open during modes 1 through 4. Corrective action is planned to develop and implement an engineering change that evaluates the required passive design features needed to support HELB analysis and overall licensing bases. This engineering change will identify required passive design features and establish the necessary process to ensure barriers are appropriately identified and controlled.



**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

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](mailto: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 | 6. LER NUMBER |                   |         | 3. PAGE |    |   |
|--|-----------|---------------|-------------------|---------|---------|----|---|
| Shearon Harris Nuclear Power Plant, Unit 1 | 05000400  | YEAR          | SEQUENTIAL NUMBER | REV NO. | 2       | OF | 4 |
|  |           | 2015          | - 005             | - 00    |         |    |   |

**NARRATIVE**

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

BACKGROUND

On June 16, 2015, Harris Nuclear Plant (HNP) was operating at 100% in mode 1. Maintenance work was scheduled in the Main Steam (MS) [SB] Tunnel and doors 1FP-D0010 [DR] and 1FP-D0011 [DR] (henceforth referred to as D10 and D11) were closed, separating the MS Tunnel (MST) from the Reactor Auxiliary Building (RAB) [NF] 261' elevation. The high energy line break (HELB) equipment qualification (EQ) analysis for HNP assumes these two doors are closed to prevent a potentially harsh environment in the MST from adversely impacting equipment in the RAB. D10 and D11 are also credited as fire protection doors.

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)(i)(B), "any operation or condition which was prohibited by the plant's Technical Specifications." This event is also reportable under 10 CFR 50.73(a)(2)(ii), "any event or condition that resulted in: (B) the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety." It is also reportable under 10 CFR 50.73(a)(2)(v), "any event or condition that could have prevented the fulfillment of the safety function or structures or systems that are needed to: (B) remove residual heat; (D) mitigate the consequences of an accident," and 10 CFR 50.73(a)(2)(vii), "any event where a single cause or condition caused at least one independent train or channel to become inoperable in multiple systems or two independent trains or channels to become inoperable in a single system designed to: (B) remove residual heat; (D) mitigate the consequences of an accident."

EVENT DESCRIPTION

On June 16, 2015, HNP doors D10 and D11 were blocked open for maintenance in the MST as an egress route out of the MST in case of an emergency. Doors D10 and D11 were open for approximately 3 hours. The NRC Senior Resident Inspector questioned the main control room (MCR) regarding the condition.

It was determined that doors D10 and D11 are assumed to be closed in the HELB EQ analysis and are therefore credited as high energy line break and internal flooding barriers. The opening of these doors resulted in HNP being in an unanalyzed condition.

An analysis was performed to determine the worst case environmental conditions in the RAB 261' elevation if a HELB in the MST had occurred concurrent with D10 and/or D11 blocked open. The analysis projected that both trains of air handlers AH-20 [AHU], and both trains of WC-2 chillers [CHU] and their respective pumps would be inoperable. This results in the inoperability of the Essential Services Chilled Water (ESCW) [KM] system, a common cause inoperability of independent trains and a condition that could have prevented fulfillment of a safety function.

HNP Technical Specification 3.7.13 requires two independent ESCW loops to be operable in modes 1-4. If two independent ESCW loops are inoperable, HNP Technical Specification 3.0.3 requires that action must be taken within 1 hour. Technical Specification 3.0.3 criteria was not met during this event since two independent chilled water loops were deemed inoperable when D10 and D11 were blocked open, resulting in HNP being in a condition prohibited by the plant's Technical Specifications.

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

| 1. FACILITY NAME                           | 2. DOCKET | 6. LER NUMBER |                   |         | 3. PAGE |    |   |
|--|-----------|---------------|-------------------|---------|---------|----|---|
| Shearon Harris Nuclear Power Plant, Unit 1 | 05000400  | YEAR          | SEQUENTIAL NUMBER | REV NO. | 3       | OF | 4 |
|  |           | 2015          | - 005             | - 00    |         |    |   |

**NARRATIVE**

D10 and D11 were opened on several occasions over the past three years. A review of this past data determined that the timeframe between June 2014 and June 2015 contained the longest aggregate duration over a 12-month period for D10 and D11 being open during modes 1 through 4. During this time interval, D10 and D11 were open for a combined total of approximately 20 hours.

CAUSAL FACTORS

The root cause of this event was that HNP Engineering failed to develop and implement control measures for hazard barriers credited for mitigating HELB events. Consequently, there is a lack of established control measures for HELB barriers during plant maintenance and modification activities.

The primary contributing cause was that HNP Engineering failed to adequately evaluate NRC Regulatory Issue Summary (RIS) 2001-09, "Control of Hazard Barriers." When the HNP evaluation of RIS 2001-09 was performed, inappropriate credit was taken for existing barrier controls under the Security, Radiological Protection, and Fire Protection programs.

SAFETY ANALYSIS

No high energy line break occurred during the time period that D10 and D11 were open, thus there were no safety consequences associated with the actual event. Similarly, there were no adverse impacts to public health and safety or to plant employees.

As outlined in NUREG-1038, "HNP Safety Evaluation Report related to the operation of Shearon Harris Nuclear Power Plant," Section 9.2.7, "Essential Services Chilled Water System," the ESCW system is an auxiliary system necessary for safe reactor operation or shutdown. It serves both safety-related and nonsafety-related systems, which include the control room air conditioning system, the spent fuel pool pump ventilation system, and RAB subsystems. The RAB subsystems include the RAB nonnuclear-safety ventilation system, the RAB engineered safety feature equipment cooling system, the RAB switchgear rooms ventilation system, and the RAB electrical equipment protection rooms ventilation system.

In the event of a HELB, either a MS line break (MSLB) or Feedwater [SJ] line break (FWLB), in the MST concurrent with doors D10 and/or D11 blocked open, ingress of the MSLB or FWLB fluid into the RAB 261' could cause the area to become harsh in terms of environmental quality for temperature, pressure, humidity, and flooding. It is possible that both safety trains of air handler AH-20 could be rendered inoperable due to flooding. It is also possible that both trains of the WC-2 chillers could be rendered inoperable due to moisture intrusion, which would result in the ESCW system being declared inoperable.

The actual impact of this event to safety-related equipment during a postulated plant event or accident is unknown. However, based upon the potential impact to the ESCW system as described above, this event and other instances where the doors were blocked open are considered to be a safety system functional failure.

CORRECTIVE ACTIONS

Completed Actions

- 1) Doors D10 and D11 were shut immediately.
- 2) Operations issued Standing Instruction 2015-024, which prohibits doors D10 or D11 being blocked open during modes 1-4 without permission from a shift supervisor. Prior to authorization by a shift supervisor of blocking open any plant doors, hatches, or breached penetrations, an evaluation of the impact of the associated boundary being breached with regard to the Current License Basis (CLB) is to be completed. This includes considerations for the fire protection program, radiation controlled area

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

| 1. FACILITY NAME                           | 2. DOCKET | 6. LER NUMBER |                   |         | 3. PAGE |  |  |
|--|-----------|---------------|-------------------|---------|---------|--|--|
| Shearon Harris Nuclear Power Plant, Unit 1 | 05000400  | YEAR          | SEQUENTIAL NUMBER | REV NO. | 4 OF 4  |  |  |
|  |           | 2015          | - 005             | - 00    |         |  |  |

**NARRATIVE**

boundaries, the flooding analysis and the HELB analysis. Access through the doors in the steam tunnel in an emergency is still allowed, but the doors must be closed upon exiting. This instruction addresses the extent of both the cause and condition for this event.

Planned Actions

- 1) Develop and implement an engineering change that evaluates the required passive design features to support HELB analysis and overall licensing bases. This product will identify required passive design features and establish the necessary process to ensure barriers are appropriately identified and controlled.
- 2) Conduct a formal briefing with HNP Engineering to communicate the importance of internalizing and maintaining a strong technical conscience when reviewing operating experience, conclusions of the root cause evaluation, and the effects of a MST HELB on RAB equipment when either D10 or D11 is blocked open.
- 3) Establish a new preventative maintenance frequency for doors D10 and D11 so that functional verification (opening the doors) is not required during modes 1-4. Alternatively (if necessary), provide justification for functional verification in modes 1-4 based on RIS 01-009 requirements.

PREVIOUS EVENTS

There have been no related reportable events at HNP. HNP became aware of the issue on June 16, 2015.

COMMITMENTS

This report contains no regulatory commitments.