



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE N.E., SUITE 1200
ATLANTA, GEORGIA 30303-1200

May 10, 2023

Thomas Haaf
Site Vice President
Duke Energy Progress, LLC
5413 Shearon Harris Road
Mail Code HNP01
New Hill, NC 27562-9300

SUBJECT: SHEARON HARRIS NUCLEAR PLANT – INTEGRATED INSPECTION REPORT
05000400/2023001

Dear Thomas Haaf:

On March 31, 2023, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Shearon Harris Nuclear Plant. On May 8, 2023, the NRC inspectors discussed the results of this inspection with David Hoffman, Plant Manager, and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. We are treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or the significance or severity of the violation documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement; and the NRC Resident Inspector at Shearon Harris Nuclear Plant.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; and the NRC Resident Inspector at Shearon Harris Nuclear Plant.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

T. Haaf

2

Sincerely,



Signed by Fannon, Matthew
on 05/10/23

Matthew S. Fannon, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Docket No. 05000400
License No. NPF-63

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV

SUBJECT: SHEARON HARRIS NUCLEAR PLANT – INTEGRATED INSPECTION REPORT
05000400/2023001 Dated May 10, 2023

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A. Wilson
P. Boguszewski
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ADAMS ACCESSION NUMBER: ML23129A251

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DATE	05/09/23	05/09/23	05/10/23		

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**U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report**

Docket Number: 05000400

License Number: NPF-63

Report Number: 05000400/2023001

Enterprise Identifier: I-2023-001-0023

Licensee: Duke Energy Progress, LLC

Facility: Shearon Harris Nuclear Plant

Location: New Hill, NC

Inspection Dates: January 01, 2023 to March 31, 2023

Inspectors: J. Bell, Health Physicist
B. Bishop, Senior Project Engineer
P. Boguszewski, Senior Resident Inspector
S. Lichvar, Project Engineer
C. Smith, Resident Inspector

Approved By: Matthew S. Fannon, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee’s performance by conducting an integrated inspection at Shearon Harris Nuclear Plant, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC’s program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

List of Findings and Violations

Failure to Implement Procedure Resulted in Spent Fuel Pool Level Lowering Below Technical Specification Limit			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000400/2023001-01 Open/Closed	[H.12] - Avoid Complacency	71152A
A self-revealed Green finding and associated non-cited violation (NCV) of Technical Specification (TS) 6.8.1 “Procedures and Programs,” was identified when the licensee was installing a spent fuel pool (SFP) gate while SFP cooling was not appropriately aligned, resulting in SFP level lowering below the TS limit. Specifically, the licensee failed to implement a covered procedure specified in Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," Revision 2, February 1978.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
LER	05000400/2022-005-00	LER 2022-005-00 for Shearon Harris Nuclear Power Plant, Unit 1, Manual Reactor Trip due to "B" Condensate Pump Motor Failure	71153	Closed
LER	05000400/2022-005-01	LER 2022-005-01 for Shearon Harris Nuclear Power Plant, Unit 1, Manual Reactor Trip due to "B" Condensate Pump Motor Failure	71153	Closed
LER	05000400/2022-003-00	LER 2022-003-00 for Shearon Harris Nuclear Power Plant, Unit 1, Manual Reactor Trip due to Degrading Condenser Vacuum	71153	Closed

PLANT STATUS

Unit 1 operated at or near rated thermal power for the entire inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed activities described in IMC 2515, Appendix D, "Plant Status," observed risk significant activities, and completed on-site portions of IPs. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (4 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) Component cooling water on January 17, 2023
- (2) 'A' residual heat removal system on January 3, 2023
- (3) 'B' startup transformer, 'A' emergency diesel generator, and 'A' fuel oil transfer pump during 'A' startup transformer maintenance on February 23, 2023
- (4) 'A' residual heat removal pump, 'B' motor-driven auxiliary feedwater pump, and train 'A' process instrumentation control cabinets during 'B' residual heat removal pump maintenance on March 28, 2023

Complete Walkdown Sample (IP Section 03.02) (1 Sample)

- (1) 'A' emergency diesel generator during 'A' startup transformer maintenance the week of January 18, 2023

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (6 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

- (1) Diesel generator building, elevation 261' on January 11, 2023
- (2) Main control room, panels, and raised floor on January 11, 2023
- (3) Turbine building, elevation 261' on January 25, 2023

- (4) Reactor auxiliary building (RAB), elevation 261' on January 26, 2023
- (5) RAB, elevation 286' 1-A-SWGRA and 1-B-SWGRA on January 27, 2023
- (6) RAB, elevation 286', 'A' cable spreading room 1-A-CSRA on January 27, 2023

Fire Brigade Drill Performance Sample (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated the onsite fire brigade training and performance during an announced fire drill on January 19, 2023

71111.06 - Flood Protection Measures

Flooding Sample (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated internal flooding mitigation protections in the main steam tunnel during the week of March 27, 2023

71111.11Q - Licensed Operator Regualification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

- (1) The inspectors observed and evaluated licensed operator performance in the control room during manual control of reactor coolant system pressure on January 10, 2023.

Licensed Operator Regualification Training/Examinations (IP Section 03.02) (1 Sample)

- (1) The inspectors observed and evaluated a scenario involving a loss of heat sink on March 20, 2023.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (1 Sample)

The inspectors evaluated the effectiveness of maintenance to ensure the following structures, systems, and components (SSCs) remain capable of performing their intended function:

- (1) Emergency service water system during the week of March 27, 2023

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

- (1) Elevated green risk during 'B' residual heat removal system maintenance on January 3, 2023
- (2) Yellow risk and associated risk-informed completion time during planned 'A' startup transformer maintenance the week of January 16, 2023

- (3) Yellow risk during planned 'A' startup transformer maintenance on February 23, 2023
- (4) Elevated green risk during 1CC-99 maintenance on March 22, 2023
- (5) Elevated green risk during 'B' residual heat removal pump maintenance on March 28, 2023

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (5 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

- (1) P-13 setpoints out of tolerance (nuclear condition report [NCR]02456850) on February 6, 2023
- (2) PLP-137 not consistent with industry guidance (NCR02460131), associated with spent fuel pool Diverse and Flexible Coping Strategies (FLEX) level indication on February 13, 2023
- (3) 'A' EDG lube oil thermostat not controlling properly (NCR020243221) on February 28, 2023
- (4) Pinhole leak in 1SW-1057, 'A' essential services chill water chiller condenser inlet pressure tap (NCR02448657) on March 30, 2023
- (5) Gas void found in containment spray piping (NCR02457523) on January 25, 2023

71111.18 - Plant Modifications

Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (1 Sample)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Temporary modification, engineering change (EC) 421798, rod position indication non-urgent alarm bypass (ALB-13/6-2) on March 8, 2023

71111.24 - Testing and Maintenance of Equipment Important to Risk

The inspectors evaluated the following testing and maintenance activities to verify system operability and/or functionality:

Post-Maintenance Testing (PMT) (IP Section 03.01) (6 Samples)

- (1) 'B' steam generator block valve testing after maintenance on January 3, 2023
- (2) 'A' startup transformer post maintenance testing on January 24, 2023
- (3) OPT-1531, Dedicated Shutdown Diesel Operability Run, after maintenance on February 1, 2023
- (4) OPT-1512, Essential Chilled Water Turbopak Units, after maintenance on March 13, 2023
- (5) OPT-1538, Emergency Safeguards Sequencer System Test, after 'B' train maintenance on March 1, 2023
- (6) OP-111, Residual Heat Removal System, after maintenance on March 28, 2023

Surveillance Testing (IP Section 03.01) (3 Samples)

- (1) OST-1005, Control Rod and Rod Position Indicator Exercise, Modes 1-3, on February 1, 2023
- (2) OST-1119, Containment Spray Operability Train 'B', on March 2, 2023
- (3) MST-IO239, Containment Pressure (P-0953) Operational Test, on March 9, 2023

Inservice Testing (IST) (IP Section 03.01) (1 Sample)

- (1) 'B' motor driven auxiliary feedwater pump inservice testing on January 5, 2023

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

IE01: Unplanned Scrams per 7000 Critical Hours Sample (IP Section 02.01) (1 Sample)

- (1) Unit 1 (January 1, 2022 through December 31, 2022)

IE03: Unplanned Power Changes per 7000 Critical Hours Sample (IP Section 02.02) (1 Sample)

- (1) Unit 1 (January 1, 2022 through December 31, 2022)

IE04: Unplanned Scrams with Complications (USwC) Sample (IP Section 02.03) (1 Sample)

- (1) Unit 1 (January 1, 2022 through December 31, 2022)

71152A - Annual Follow-up Problem Identification and Resolution

Annual Follow-up of Selected Issues (Section 03.03) (3 Samples)

- (1) 'A' spent fuel pool level lowered due to installation of spent fuel pool gate (NCR 02432246)
- (2) Manual reactor trip, loss of B feedwater train (NCR 02439654)
- (3) Manual reactor trip due to degrading condenser vacuum (NCR 02425550)

71153 - Follow Up of Events and Notices of Enforcement Discretion

Event Report (IP section 03.02) (2 Samples)

The inspectors evaluated the following licensee event reports (LERs):

- (1) LER 05000400/2022-005-00/01, Manual Reactor Trip due to "B" Condensate Pump Motor Failure (ADAMS Accession No. ML22332A494) The inspectors reviewed the updated LER submittal. The inspectors determined that it was not reasonable to foresee or correct the cause discussed in the LER therefore no performance deficiency was identified. The inspectors did not identify a violation of NRC requirements. This LER is closed.
- (2) LER 05000400/2022-003-00, Manual Reactor Trip due to Degrading Condenser Vacuum (ADAMS Accession No. ML22179A261) The inspectors determined that it

was not reasonable to foresee or correct the cause discussed in the LER therefore no performance deficiency was identified. The inspectors did not identify a violation of NRC requirements This LER is closed.

INSPECTION RESULTS

Failure to Implement Procedure Resulted in Spent Fuel Pool Level Lowering Below Technical Specification Limit			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000400/2023001-01 Open/Closed	[H.12] - Avoid Complacency	71152A
<p>A self-revealed Green finding and associated non-cited violation (NCV) of Technical Specification (TS) 6.8.1 "Procedures and Programs," was identified when the licensee was installing a spent fuel pool (SFP) gate while SFP cooling was not appropriately aligned, resulting in SFP level lowering below the TS limit. Specifically, the licensee failed to implement a covered procedure specified in Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," Revision 2, February 1978.</p>			
<p><u>Description:</u> Harris Nuclear Plant has four SFPs which are connected via transfer canals and can be separated from each other by the installation of gates. The 1 and 4 south transfer canal connects the 'A' and 'B' SFPs. On June 22, 2022, the licensee was preparing to perform a pre-outage activity that required draining of the 1 and 4 south transfer canal. As the licensee was installing a gate that separated 'A' SFP from the 1 and 4 south transfer canal, 'A' SFP level immediately began lowering. In total, level lowered by approximately 1.4 feet. The licensee recognized this was an unexpected response and promptly lifted the gate which restored level in 'A' SFP. During the event, SFP level lowered to 22 feet of water above spent fuel. TS 3.9.11 requires 23 feet of water to be maintained above spent fuel seated in storage racks.</p> <p>Upon investigation, Duke Energy determined that the unexpected lowering of SFP level was caused by inappropriate alignment of SFP cooling pumps during the pre-outage activity. During the event, the 'A' SFP pump was taking suction off the 'A' SFP and discharging into the 'B' SFP. When the gate was installed, it severed the communication between the 'A' and 'B' SFPs and caused the operating SFP pump to start rapidly draining the 'A' SFP.</p> <p>Prior to the gate installation, as a part of work preparation, OP-116 was reviewed and incorrectly determined to not be applicable for the pre-outage activity. OP-116 Section 8.12.2 required, in part, that if "'A' and 'B' SFPs are to be separated by installing gates to drain the Unit 1 and 4 transfer canal, then the following alignment exists: for SFP 'A', SFP Pump 'A' is aligned to cool SFP 'A' (both to and from SFP 'A') and for SFP 'B', SFP Pump 'B' is aligned to cool SFP 'B' (both to and from SFP 'B')". This alignment was not implemented prior to the pre-outage activity.</p> <p>Corrective Actions: Upon recognizing SFP level was lowering, the licensee promptly lifted the gate to restore level in 'A' SFP.</p> <p>Corrective Action References: NCR 02432246</p>			
<p><u>Performance Assessment:</u></p>			

Performance Deficiency: The inspectors determined that the licensee's failure to implement procedure, OP-116, Section 8.12.2, Step 3, to align SFP cooling to both 'A' and 'B' SFPs for the planned maintenance activity was a performance deficiency and was within Duke Energy's ability to foresee and correct.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Human Performance attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, the licensee failed to implement procedure steps to properly align SFP cooling. This failure resulted in SFP level decreasing below the allowed TS limit and ultimately reduced water available for shielding and cooling spent fuel which protects the fuel cladding barrier.

Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The inspectors performed a review of this finding using the guidance provided in IMC 0609, Appendix A, Exhibit 3, "Barrier Integrity Screening Questions," and determined this finding is of very low safety significance (Green) because it did not: (1) affect decay heat removal capabilities from the SFP causing the pool temperature to exceed the maximum analyzed temperature limit specified in the site-specific licensing basis; (2) involve fuel handling; (3) result in loss of SFP water decreasing below minimum analyzed level limit specified in the site-specific licensing basis; or (4) affect SFP neutron absorber or fuel placement in the SFP.

Cross-Cutting Aspect: H.12 - Avoid Complacency: Individuals recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Individuals implement appropriate error reduction tools. Specifically, the licensee lacked the appropriate risk sensitivity to a maintenance evolution involving spent fuel and safety-related equipment; and failed to exercise procedure adherence prior to work execution.

Enforcement:

Violation: Shearon Harris TS 6.8.1, "Procedures and Programs," requires, in part, that written procedures be established, implemented, and maintained covering the applicable procedures recommended in Appendix A to Regulatory Guide 1.33, "Quality Assurance Program Requirements," Revision 2, February 1978. Regulatory Guide 1.33, Appendix A, Section 3, lists instructions for energizing, filling, venting, and startup of safety related systems including fuel storage pool purification and cooling system as applicable procedures. The licensee established OP-116 for fuel pool cooling startup, shutdown, and operation of SFP cooling in alternate cooling alignments. Specifically, OP-116 directed the licensee to properly align 'A' SFP pump to cool 'A' SFP.

Contrary to the above, on June 22, 2022, the licensee failed to comply with OP-116, Section 8.12.2, Step 3 and did not appropriately align SFP cooling. This failure resulted in SFP level lowering below the allowed TS limit.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On May 8, 2023, the inspectors presented the integrated inspection results to David Hoffman, Plant Manager, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.05	Fire Plans	CSD-HNP-PFP-DGB	Diesel Generator Building Pre-fire Plan	Revision 002
		CSD-HNP-PFP-RAB-261	Reactor Auxiliary Building Elevation 261 Pre-fire Plan	Revision 2
		CSD-HNP-PFP-RAB-286	Reactor Auxiliary Building Elevation 286 Pre-fire Plan	Revision 1
		CSD-HNP-PFP-RAB-305-324	Reactor Auxiliary Building Elevation 305 and 324 Pre-fire Plan	Revision 4
		CSD-HNP-PFP-TB	Turbine Building Pre-fire Plan	Revision 4
71111.15	Drawings	5-G-0117	Containment Spray Piping Reactor Auxiliary Building Plan - EI 236.00 Unit 1	Revision 13
		5-G-0140	Chemical & Volume Control Reactor Aux Bldg. Plans Unit 1	Revision 24
	Engineering Evaluations	EC 422195	Void Evaluation for OST-1107 Location 29 (RWST to CSIP Suction)	Revision 0
		EC 422616	Evaluation of Gas Void from Location 29 of OST-1107 Using WCAP-17276-P Simplified Equation	Revision 0
71111.24	Procedures	OP-111	Residual Heat Removal System	Revision 65
		OPT-1512	Essential Chilled Water Turbopaks Units Quarterly Inspection	51
		OPT-1531	Dedicated Shutdown Diesel Generator Operability Run	Revision 7
		OPT-1538	Emergency Safeguards Sequencer System Test - Train B	Revision 9