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

November 9, 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 05000400/2023003

Dear Thomas Haaf:

On September 30, 2023, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Shearon Harris Nuclear Plant. On October 25, 2023, the NRC inspectors discussed the results of this inspection with Thomas Haaf and other members of your staff. The results of this inspection are documented in the enclosed report.

Two findings of very low safety significance (Green) are documented in this report. None of these findings involved a violation of NRC requirements.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement 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.”

Sincerely,

Signed by Fannon, Matthew
on 11/09/23

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 05000400/2023003 Dated November 09, 2023

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ADAMS ACCESSION NUMBER: ML23310A314

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number:	05000400
License Number:	NPF-63
Report Number:	05000400/2023003
Enterprise Identifier:	I-2023-003-0017
Licensee:	Duke Energy Progress, LLC
Facility:	Shearon Harris Nuclear Plant
Location:	New Hill, NC
Inspection Dates:	July 01, 2023, to September 30, 2023
Inspectors:	P. Boguszewski, Senior Resident Inspector J. Diaz-Velez, Senior Health Physicist J. Rivera, Health Physicist 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

Probabilistic Risk Assessment Model Not Reflective of As-Operated Plant			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green FIN 05000400/2023003-01 Open/Closed	[H.3] - Change Management	71111.13
An NRC identified Green finding was discovered when the licensee failed to maintain configuration control of the site Probabilistic Risk Assessment (PRA) model in accordance with Duke procedure AD-NF-NGO-0502, "Probabilistic Risk Assessment (PRA) Model Technical Adequacy." Specifically, Harris changed their operating philosophy, such that, the running equipment train is not necessarily the protected equipment train, without assessing the impacts this change had on their PRA model. This transition magnified a pre-existing discrepancy in the PRA model resulting in a non-conservative change in both baseline Core Damage Frequency (CDF) value and Risk Informed Completion Time (RICT) baseline values.			

Unit Auxiliary Transformer Current Transformer Wiring Error Resulted in Reactor Trip			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000400/2023003-02 Open/Closed	[H.7] - Documentation	71153
A self-revealed Green finding was identified when the licensee failed to follow established maintenance procedures. Specifically, the licensee failed to use unique labeling as required by procedure AD-MN-ALL-1000, "Conduct of Maintenance," when performing maintenance associated with the '1A-3' breaker cubicle, resulting in an undervoltage condition on the 'A' and 'C' reactor coolant pumps (RCPs) and subsequent reactor trip.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
LER	05000400/2022-007-01	LER 2022-007-01 for Shearon Harris Nuclear Power Plant, Unit 1, Automatic Reactor Trip due to Loss of Power from the 'A' Auxiliary Bus	71153	Closed
LER	05000400/2022-007-00	LER 2022-007-00 for Shearon Harris Nuclear Power Plant, Unit 1,	71153	Closed

		Automatic Reactor Trip due to Loss of Power from the 'A' Auxiliary Bus		
LER	05000400/2022-008-00	LER 2022-008-00 for Shearon Harris Nuclear Power Plant, Unit 1, Automatic Actuation of Auxiliary Feedwater System	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) (2 Samples)

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

(1) 'B' emergency diesel generator, 'B' motor driven auxiliary feedwater pump, and 'B' emergency service water pump during 'A' emergency diesel generator and 'A' emergency service water maintenance on July 19, 2023
(2) 'A' emergency service water during 'B' emergency service water maintenance on August 9, 2023

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (4 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) Reactor auxiliary building elevation 305' heating, ventilation, and air conditioning area on July 14, 2023
(2) Emergency service water 'A' and 'B' rooms on July 18, 2023
(3) Alternate seal injection pump room on August 30, 2023
(4) Reactor auxiliary building elevation 216' mechanical penetration area on August 30, 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 unannounced fire drill on September 14, 2023.

71111.11Q - Licensed Operator Requalification 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 a surveillance on the turbine driven auxiliary feedwater pump on September 7, 2023.

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

(1) The inspectors observed and evaluated a licensed operator scenario involving a main steam line break inside containment on August 8, 2023.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (2 Samples)

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

(1) Component cooling water system on September 11, 2023
(2) Unit auxiliary transformers on September 22, 2023

Quality Control (IP Section 03.02) (1 Sample)

The inspectors evaluated the effectiveness of maintenance and quality control activities to ensure the following SSC remains capable of performing its intended function:

(1) 'A' emergency diesel generator on the week of August 14, 2023

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (4 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 yellow risk due to 'A' emergency diesel generator and emergency service water maintenance on July 18, 2023
(2) Elevated green risk due to 'B' emergency diesel generator and emergency service water maintenance on August 9, 2023
(3) Incorrect risk profile during emergency diesel generator ventilation maintenance on September 30, 2023

(4) Elevated risk due to probabilistic risk assessment tool discrepancies on September 30, 2023

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (3 Samples)

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

(1) Essential services chilled water compressor oil leak on July 14, 2023, (Nuclear Condition Report [NCR] 2478250)
(2) Component cooling water system leak on September 11, 2023, (NCR 2477628)
(3) Unit auxiliary transformer breaker to 'A' auxiliary bus elevated temperatures on September 25, 2023, (NCR 02487746)

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) (9 Samples)

(1) 'A' automatic load sequencer after maintenance on July 11, 2023
(2) OPT-1512, "Essential Services Chilled Water Turbopak Units Quarterly Inspection," after maintenance on July 14, 2023
(3) OP-139, "Service Water System," following maintenance on strainer associated with 'A' emergency service water pump on July 18, 2023
(4) OST-1013, "'A' Emergency Diesel Generator Operability Test," after scheduled maintenance on July 20-21, 2023
(5) OST-1215, "'B' Emergency Service Water System Operability," after maintenance on August 9, 2023
(6) OST-1073, "'B' Emergency Diesel Generator Operability Test," after maintenance on August 10, 2023
(7) OST-1077, "Auxiliary Feedwater Valve," following valve maintenance on August 21, 2023
(8) OST-1119, "Containment Spray Operability Train B," after maintenance on 'B' containment spray pump discharge check valve on August 28, 2023
(9) OP-107, "Chemical Volume Control System," following seal replacement on 'C' charging/safety injection pump on September 8, 2023

Surveillance Testing (IP Section 03.01) (2 Samples)

(1) OST-1093, "CVCS/SI System Operability Train B Test," on September 8, 2023
(2) OST-1040, "Essential Services Chilled Water System Operability Quarterly Test," on September 25, 2023

Inservice Testing (IST) (IP Section 03.01) (2 Samples)

(1) OST-1076, "Auxiliary Feedwater Pump 1B-SB Operability Test," on July 5, 2023

(2) OST-1411, "Auxiliary Feedwater Pump 1X-SAB Operability Test," on September 7, 2023

Diverse and Flexible Coping Strategies (FLEX) Testing (IP Section 03.02) (1 Sample)

(1) Diverse and flexible coping strategies diesel generator surveillance testing on September 6, 2023

71114.06 - Drill Evaluation

Select Emergency Preparedness Drills and/or Training for Observation (IP Section 03.01) (1 Sample)

(1) An emergency preparedness drill involving a loss of onsite and offsite alternate current power on August 1, 2023

Drill/Training Evolution Observation (IP Section 03.02) (1 Sample)

The inspectors evaluated:

(1) An emergency preparedness training exercise involving a loss of coolant accident and failure of containment spray on August 14, 2023

RADIATION SAFETY

71124.06 - Radioactive Gaseous and Liquid Effluent Treatment

Walkdowns and Observations (IP Section 03.01) (5 Samples)

The inspectors evaluated the following radioactive effluent systems during walkdowns:

(1) REM-21WL-3541 - Waste Monitor Tank/Waste Evaporator Condensate Tank Radioactive Liquid Effluent Monitor
(2) REM-1MD-3528 - Turbine Building Floor Drains Radioactive Liquid Effluent Monitor
(3) RM-21AV-3509-1 - Plant Vent Stack 1 Gaseous Effluent Monitor
(4) REM-1WV-3546 - Waste Processing Building Vent Stack 5 Gaseous Effluent Monitor
(5) RM-1WV-3547-1 - Waste Processing Building Vent Stack 5A Gaseous Effluent Monitor

Sampling and Analysis (IP Section 03.02) (3 Samples)

The inspectors evaluated the following effluent samples, sampling processes and compensatory samples:

(1) Weekly Composite Sample from Turbine Building Floor Drains Effluent - 07/25/2023
(2) Weekly Iodine Sample from Waste Processing Building Vent Stack 5 Effluent - 07/25/2023
(3) Weekly Composite Sample from Cooling Tower Blowdown Effluent - 07/26/2023

Dose Calculations (IP Section 03.03) (2 Samples)

The inspectors evaluated the following dose calculations:

(1) Gaseous Release Permit G-2023-0123, Plant Vent Stack 1
(2) Liquid Release Permit L-2023-0028, Waste Monitor Tank B

71124.07 - Radiological Environmental Monitoring Program

Environmental Monitoring Equipment and Sampling (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated environmental monitoring equipment and observed collection of environmental samples.

Radiological Environmental Monitoring Program (IP Section 03.02) (1 Sample)

(1) The inspectors evaluated the implementation of the licensee's radiological environmental monitoring program.

GPI Implementation (IP Section 03.03) (1 Sample)

(1) The inspectors evaluated the licensee's implementation of the Groundwater Protection Initiative program to identify incomplete or discontinued program elements.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

MS06: Emergency AC Power Systems (IP Section 02.05) (1 Sample)

(1) Unit 1 (July 1, 2022 - June 30, 2023)

MS07: High Pressure Injection Systems (IP Section 02.06) (1 Sample)

(1) Unit 1 (July 1, 2022 - June 30, 2023)

MS09: Residual Heat Removal Systems (IP Section 02.08) (1 Sample)

(1) Unit 1 (July 1, 2022 - June 30, 2023)

PR01: Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual Radiological Effluent Occurrences (RETS/ODCM) Radiological Effluent Occurrences Sample (IP Section 02.16) (1 Sample)

(1) Unit 1 (September 1, 2022 - March 31, 2023)

71152A - Annual Follow-up Problem Identification and Resolution

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

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

(1) Automatic auxiliary feedwater actuation on September 30, 2023 (NCR 02447663)
(2) Auxiliary bus '1A' deenergized resulted in auto reactor trip on September 30, 2023 (NCR 02447620)
(3) Excessive hunting of the auxiliary feedwater pump turbine governor during surveillance testing on September 30, 2023 (NCR 02475271)

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 05000400/2022-007-00/01, "Automatic reactor trip due to loss of power from the 'A' Auxiliary bus," (ADAMS Accession No. ML23026A333). The inspection conclusions associated with this LER are documented in this report under Inspection Results Section [FIN 05000400/2023003-02]. This LER is Closed.
(2) LER 05000400/2022-008, "Automatic Actuation of Auxiliary Feedwater System," (ADAMS Accession No. ML22353A591). The inspection conclusions associated with this LER are documented in this report under Inspection Results Section. This LER is Closed.

INSPECTION RESULTS

<table>
<tr><td colspan="4">Probabilistic Risk Assessment Model Not Reflective of As-Operated Plant</td></tr>
<tr><td>Cornerstone</td><td>Significance</td><td>Cross-Cutting Aspect</td><td>Report Section</td></tr>
<tr><td>Mitigating Systems</td><td>Green
FIN 05000400/2023003-01
Open/Closed</td><td>[H.3] - Change Management</td><td>71111.13</td></tr>
<tr><td colspan="4">An NRC identified Green finding was discovered when the licensee failed to maintain configuration control of the site Probabilistic Risk Assessment (PRA) model in accordance with Duke procedure AD-NF-NGO-0502,"Probabilistic Risk Assessment (PRA) Model Technical Adequacy. Specifically, Harris changed their operating philosophy, such that, the running equipment train is not necessarily the protected equipment train, without assessing the impacts this change had on their PRA model. This transition magnified a pre-existing discrepancy in the PRA model resulting in a non-conservative change in both baseline Core Damage Frequency (CDF) value and Risk Informed Completion Time (RICT) baseline values.</td></tr>
<tr><td colspan="4">Description: Starting in June 2023, Harris adopted an operational methodology, intended to limit equipment swaps and the operational risk they pose, in which the protected train and the running train are not always the same. The traditional practice prior to this change was that the running train was identified as the protected train. This change resulted in a greater potential that large safety-related loads could be running on either or both safety trains upon</td></tr>
</table>

an initiating event. Large safety-related loads running prior to a required load shed corresponds to an increased risk of overloading an emergency diesel generator due to a safety-related breaker failing to open on an undervoltage of the associated safety bus.

On June 20, 2023, the site performed maintenance associated with the exhaust fan for the 'A' emergency diesel generator room. The scheduled risk profile for the week originally showed green risk during all planned maintenance. During work execution, when the associated Electronic Risk Assessment Tool (ERAT) function for the 'A' emergency diesel generator exhaust fan was taken out of service by operations, ERAT indicated a yellow risk condition. The actual risk profile was yellow for several hours during the maintenance window before operators recognized that actual plant risk was yellow. The site determined that this unintended entry into a yellow risk profile was due to an inaccurate published risk chart caused by an insufficient review of the work during the scheduling period and immediately prior to work start. After further analyzing the missed yellow risk window, Duke Energy determined that based on outside temperatures at the time of the maintenance, the 'A' emergency diesel generator was always available, and therefore, plant risk remained green throughout the maintenance window.

The NRC resident inspectors questioned the station's initial conclusions about the cause of the June 20, 2023, yellow versus green risk issue. While reviewing the scheduled risk profile versus the actual risk profile, the NRC resident inspectors noted that both the scheduled and actual risk model had the 'A' emergency diesel generator as unavailable. It was unclear, which inputs to the ERAT caused the planned maintenance window to transition from green to yellow risk. While inspecting the direct cause of the missed yellow risk window, the residents had discussions with multiple senior reactor operators (SRO) to better understand how the individual inputs into the ERAT impacted overall plant risk. Following discussions with SROs, the NRC inspectors noted that CSD-WC-HNP-0240-00, "HNP ERAT Guidance," Attachment 1, specified the need to identify the currently protected train, which ultimately factored into overall plant risk. The NRC inspectors also noted that CSD-WC-HNP-0240-00 directed operators to input the running trains for essential services chilled water and emergency service water with the clarifying statement that if both headers were in service to select the protected train. Knowing that the Duke Energy had recently changed their methodology on running versus protected train, the NRC inspectors questioned if these directions were still accurate, and if the licensee had properly reviewed this change for effects on their PRA model to ensure the model still reflected the as-operated plant.

Prompted by the NRC's concerns, Harris confirmed the discrepancies with their ERAT and performed an emergent PRA model update via an engineering change on July 18, 2023.

Corrective Actions: The licensee entered the issue into their corrective action program and emergently corrected the condition.

Corrective Action References: NCR 2476806

Performance Assessment:

Performance Deficiency: Duke Energy did not maintain configuration control of the Harris Nuclear PRA model in accordance with Duke procedure, AD-NF-NGO-0502,"Probabilistic Risk Assessment (PRA) Model Technical Adequacy." Specifically, Harris changed their operating philosophy, such that, the running equipment train is not necessarily the protected equipment train, which magnified a pre-existing discrepancy in the PRA model, without assessing the impacts on their PRA model. This change resulted in a non-conservative

change in both baseline CDF value and RICT baseline values. Procedure AD-NF-NGO-0502, Section 5.1, Steps 2 and 3, state that PRA configuration control must be maintained such that the model reflects the as-built, as-operated plant. Section 5.5, Step 9, states this type of plant change should be reviewed for a model update (model maintenance) and per Section 5.3.3, Step 5, the update to the PRA working model should be conducted commensurate with the safety significance. The licensee calculated the risk to be greater than 1E-6 in Engineering Change 422923, thus the change should have been a "High Priority" issue per CSD-NF-NGO-0502-01, "PRA Issue Tracker (PIT) and Model Storage Guidance."

Screening: The inspectors determined the performance deficiency was more than minor because if left uncorrected, it would have the potential to lead to a more significant safety concern. Engineering Change 422923 calculated the change in risk to be greater than 1E-6. If the NRC inspectors had not identified and communicated the concern, the calculated risk associated with 10 CFR 50.65 a(4) maintenance activities would have continued to be inaccurate and any RICT calculation likely would not be performed with the actual equipment line up due to this plant change and the existing tool logic.

Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix K, “Maintenance Risk Assessment and Risk Management SDP.” The inspectors determined that the finding was associated with the Mitigating Systems cornerstone using Inspection Manual Chapter 0609, Attachment 04, “Initial Characterization of Findings.” A regional Senior Reactor Analyst calculated incremental core damage probability (ICDP) for the maintenance using the licensee’s Engineering Change 422923 calculation for the change in risk calculated by their PHOENIX/CAFTA model. The change in quantitative risk was a delta CDF – 3.8E-06 / year and a delta LERF – 3.5E-07/ year. Since the maximum RICT is 30 days, the senior risk analyst set the calculated incremental core damage probability risk deficit (ICDPD) and incremental large early release probability deficit (ILERPD) using a 30-day exposure time to be 3.17 E-7 for ICDPD and 2.92 E-8 for ILERPD. Because the finding did not involve risk management action, IMC 0609 Appendix K Flowchart 1, "Assessment of Risk Deficit" was used. The inspectors determined the finding screened to very low safety significance (Green) since ICDPD was less than 1E-6 and ILERPD was less than 1E-7.

Cross-Cutting Aspect: H.3 - Change Management: Leaders use a systematic process for evaluating and implementing change so that nuclear safety remains the overriding priority. More specifically, Duke did not properly screen a change to their operational methodology resulting in unintended changes to the accuracy of their PRA tool.

Enforcement: Inspectors did not identify a violation of regulatory requirements associated with this finding.

Minor Violation	71152A

Inadequate Work Instructions Causes Turbine Driven Auxiliary Feedwater Pump Oscillations

Minor Violation: A self-revealed minor violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified when activities affecting quality were not prescribed by documented instructions of a type appropriate for the circumstances. Specifically, when performing maintenance on the turbine driven auxiliary feedwater pump governor, Duke maintenance procedure PM-M0086, "AFW Turbine Valve Inspection," did not contain sufficient reassembly details to ensure all subcomponents were sufficiently tightened to prevent the governor valve stem/plug assembly from rotating.

On June 7, 2023, while running the turbine driven auxiliary feedwater pump, the governor was observed to be hunting continuously, resulting in pump speed oscillations from 3600 - 3700 rpm. The site removed the pump from service and performed maintenance to correct the condition. Upon further investigation, it was determined that the oscillations were most likely the result of the governor valve stem/plug assembly rotating in service, causing a reduction in the overall length of the actuator stem/coupling/valve stem assembly and poor governor valve control.

Screening: The inspectors determined the performance deficiency was minor. The performance deficiency was screened in accordance with IMC 0612 Appendix B, “Additional Screening Guidance,” dated August 9, 2023, and was determined to be of minor significance because the performance deficiency did not meet any of the more than minor screening questions. More specifically, in the as-found condition, the turbine driven auxiliary feedwater pump remained available and capable of responding to an event.

Enforcement: The licensee has taken corrective actions to restore compliance. This failure to comply with 10 CFR Part 50, Appendix B, Criterion V constitutes a minor violation that is not subject to enforcement action in accordance with the NRC’s Enforcement Policy.

Unit Auxiliary Transformer Current Transformer Wiring Error Resulted in Reactor Trip			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000400/2023003-02 Open/Closed	[H.7] - Documentation	71153

A self-revealed Green finding was identified when the licensee failed to follow established maintenance procedures. Specifically, the licensee failed to use unique labeling as required by procedure AD-MN-ALL-1000, "Conduct of Maintenance," when performing maintenance associated with the '1A-3' breaker cubicle, resulting in an undervoltage condition on the 'A' and 'C' reactor coolant pumps (RCPs) and subsequent reactor trip.

Description: Shearon Harris Nuclear Power Plant has three RCPs, which circulate reactor coolant through the reactor vessel core. Below 49 percent power, a loss of two out of three RCPs will result in an automatic reactor trip. The 'A' and 'C' RCPs are normally powered from the 6.9 kV 'A' auxiliary bus. The 'A' auxiliary bus can be powered from either the 'A' startup transformer (SUT) or the 'A' unit auxiliary transformer (UAT). During plant power ascension following an outage the 'A' auxiliary bus is initially powered by the ‘A’ SUT and then transferred onto the ‘A’ UAT.

On October 30, 2022, with Shearon Harris Unit 1 operating at 16 percent power following a refueling outage, an automatic reactor trip occurred due to an undervoltage (UV) condition on the 'A' and 'C' RCPs. The UV condition occurred when operators were transferring power from the 'A' SUT to the 'A' UAT.

Upon investigation, the licensee identified that two of three current transformers (CTs) associated with the 'A' UAT to 'A' auxiliary bus feeder breaker, 1A-3, were not wired correctly. The CTs are a part of the current differential protective circuit for the auxiliary bus. The CTs use a common lead which is designed to connect all three CTs together to a common wire used in the differential protection circuit. The wiring error caused an actuation of the bus differential current protective relays, resulting in a lockout on the 'A' auxiliary bus when operators attempted to close the breaker.

The causal evaluation determined that the cause of the CT wiring error was due to a lack of unique labels on the lift/land sheets used to track wiring connections. The lift/land sheets are developed to ensure the as-found configuration is captured during lead terminations. AD-MN-ALL-1000, "Conduct of Maintenance," requires, in part, the use of unique labeling during the lifting/landing process to ensure restoration to the as-found configuration.

Corrective Actions: The licensee responded to the reactor trip and stabilized the unit. The wiring error was identified, and the CTs were rewired. The licensee entered the issue into the corrective action program and performed a causal evaluation.

Corrective Action References: NCR 02447620

Performance Assessment:

Performance Deficiency: The inspectors determined that the licensee's failure to follow the established maintenance procedure, AD-MN-ALL-1000, by not using unique labeling to ensure proper restoration of as-found condition was a performance deficiency, which 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 Initiating Events cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, a lack of unique identification on the lifting/landing documentation caused the wiring error on the CTs. The wiring error caused the lockout of the 'A' UAT and the subsequent reactor trip. Additionally, this is aligned with a similar scenario detailed in Example 4.b from IMC 0612, Appendix E, "Examples of Minor Issues."

Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Per IMC 0609 Appendix A Exhibit 1, the inspectors determined the significant screened to very low safety significant (Green) since the performance deficiency caused solely a reactor trip and was not coincident with a loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition.

Cross-Cutting Aspect: H.7 - Documentation: The organization creates and maintains complete, accurate and up-to-date documentation. Specifically, the licensee failed to maintain lifting/landing sheets used to track and communicate the appropriate configuration for the CT wiring. The lack of unique identification resulted in a wiring error that directly resulted in a reactor trip.

Enforcement: Inspectors did not identify a violation of regulatory requirements associated with this finding.

Minor Violation	71153

Inadequate Procedure Results in Auxiliary Feedwater Actuation

Minor Violation: A self-revealed minor violation of Technical Specification 6.8.1, "Procedures," was identified when the licensee failed to maintain written procedures covering activities recommended in Regulatory Guide 1.33, Revision, 2, Appendix A. Specifically, the licensee failed to maintain the procedure, OP-134.01, "Feedwater System," for starting the

main feedwater system, as required by Regulatory Guide 1.33, Revision, 2, Appendix A Section 3.k, resulting in an automatic motor driven auxiliary feedwater actuation.

On October 30, 2022, with the plant at 0 percent reactor power, the control room operators attempted to start the ‘B’ main feedwater pump. When the pump controller was taken to "START," the ‘B’ main feedwater pump did not start due to a position limit switch on a main feedwater pump to condenser recirculation valve not being made up. This 'B' main feedwater pump failure to start resulted in a sensed loss of the last running main feedwater pump, and therefore, an automatic motor driven auxiliary feedwater actuation occurred.

Duke's investigation revealed procedure OP-134.01, Section 5.1, did not contain an initial condition to perform GP-002, "Normal Plant Heatup From Cold Solid to Hot Subcritical," Attachment 10, "Condensate/Feedwater Pumps Start Permissive Verification," to ensure the conditions for starting the main feedwater pump were met prior to attempting to start the pump.

The NRC inspectors determined that this violation was within Duke's ability to foresee and correct, in part, because at the time this violation occurred, Duke's procedures directed operators to perform the pre-start permissive verifications in Attachment 10 of GP-002 when starting the first main feed pump during plant startup, however, if later all main feedwater pumps were secured, then OP-134.01 did not direct operators to perform pre-start permissive verifications prior to restarting the main feedwater pumps.

Screening: The inspectors determined the performance deficiency was minor. The performance deficiency was screened in accordance with IMC 0612 Appendix B, “Additional Screening Guidance,” dated August 9, 2023, and was determined to be of minor significance because the performance deficiency did not meet any of the more than minor screening questions. More specifically, at the time of the event, motor driven auxiliary feedwater pumps were already in service and feeding all three steam generators. Although the motor driven auxiliary feedwater flow control valves fully opened, increasing flow to the steam generators, the increase in flow had minimal impact on overall steam generator levels, and did not challenge any critical safety functions.

Enforcement: The licensee has taken corrective actions, including procedure revisions, to restore compliance. This failure to comply with Technical Specification 6.8.1a. constitutes a minor violation that is not subject to enforcement action in accordance with the NRC’s Enforcement Policy.

EXIT MEETINGS AND DEBRIEFS

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

- On October 25, 2023, the inspectors presented the integrated inspection results to Thomas Haaf, Site Vice President, and other members of the licensee staff.
- On July 27, 2023, the inspectors presented the radiation safety baseline inspection results to David Hoffman, Plant General Manager, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.13	Corrective Action Documents	NCR 2476806		
71111.13	Engineering Changes	422923	HNP PHOENIX: RE-EVALUATING EQUIPMENT ALIGNMENT USER INPUTS FOR OPTIONSNEEDING IMPROVED SPECIFICITY	07/17/2023
71111.15	Drawings	5-I-1319	Simplified Flow Diagram Component Cooling Water System Sheet 1 Unit 1	Revision 1
71111.15	Drawings	CPL-2165 S-0799	Simplified Flow Diagram Primary and Demineralized Water Systems Reactor Auxiliary Building Unit 1	
71111.15	Miscellaneous	Adverse Condition Monitoring Plan	CCW System Leakage	Revision 3
71111.15	Miscellaneous	VM-BKE	Valves	Revision 39
71111.15	Procedures	AOP-14	Loss of Component Cooling Water	Revision 40
71111.15	Procedures	OP-145	Component Cooling Water	Revision 83
71124.06	Corrective Action Documents	NCRs 02368078, 02427236, 02429091, 02435877, 02437865, 02442716, 02444838, 02449978, 02454224.	Various	
71124.07	Corrective Action Documents	NCRs 02427763, 02460334, 02463898	Various	
71124.07	Procedures	MPT-I0129	Maintenance Periodic Test, Meteorology Tower Equipment Calibration	
71124.07	Work Orders	20550145 01	PERFORM GENERAL INSPECTION OF MET TOWER EQUIPMENT	08/24/2022
71152A	Corrective Action	NCR 02447620		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Documents			
71152A	Corrective Action Documents	NCR 02447663		
71152A	Corrective Action Documents	NCR 02475271		
71152A	Procedures	AD-EG-ALL-1311	Failure Investigation Process	Revision 3