



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

November 10, 2022

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

**SUBJECT: SHEARON HARRIS NUCLEAR PLANT – INTEGRATED INSPECTION REPORT
05000400/2022003**

Dear Thomas Haaf:

On September 30, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Shearon Harris Nuclear Plant. On November 1, 2022, the NRC inspectors discussed the results of this inspection with you 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. Two of these findings involved violations of NRC requirements. One Severity Level IV violation without an associated finding is documented in this report. We are treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

A licensee-identified violation which was determined to be of very low safety significance is documented in this report. 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 violations or the significance or severity of the violations 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.

T. Haaf

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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 11/10/22

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

Docket No. 05000400
License No. NPF-63

Enclosure:
As stated

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SUBJECT: SHEARON HARRIS NUCLEAR PLANT – INTEGRATED INSPECTION REPORT
05000400/2022003 dated November 10, 2022

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

Docket Number: 05000400

License Number: NPF-63

Report Number: 05000400/2022003

Enterprise Identifier: I-2022-003-0019

Licensee: Duke Energy Progress, LLC

Facility: Shearon Harris Nuclear Plant

Location: New Hill, NC 27562

Inspection Dates: July 01, 2022 to September 30, 2022

Inspectors: B. Bishop, Senior Project Engineer
P. Boguszewski, Senior Resident Inspector
S. Downey, Senior Reactor Inspector
M. Endress, Senior Resident Inspector
T. Fanelli, Senior Reactor Inspector
P. Gresh, Emergency Preparedness Inspector
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C. Smith, Resident Inspector
J. Walker, Emergency Response Inspector
A. Wilson, Senior Project Engineer

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. A licensee-identified non-cited violation is documented in report section: 71114.04.

List of Findings and Violations

Treatment of Class 1E Interfaces and Interlocks with the Turbine Trip System Design			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000400/2022003-01 Open/Closed	None (NPP)	71111.17T
The NRC identified a Green finding and associated NCV of 10 CFR 50 Appendix B, Criterion III, "Design Control," for the licensee's failure to ensure independence between turbine control system circuits and the trains of reactor protection system (RPS) circuits.			

Failure to Properly Implement Procedure when Restoring 'B' High Head Injection Pump			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000400/2022003-02 Open/Closed	[H.12] - Avoid Complacency	71153
A self-revealed Green finding and associated NCV of Technical Specification 6.8.1 "Procedures and Programs," was identified when the licensee failed to follow station procedures resulting in a momentary loss of seal injection and inoperability of both trains of high head safety injection. Specifically, the licensee failed to properly align the 'B' charging/safety injection pump (CSIP) prior to performing the operability surveillance.			

Failure to Report a Loss of Safety Function associated with High Head Safety Injection			
Cornerstone	Severity	Cross-Cutting Aspect	Report Section
Not Applicable	Severity Level IV NCV 05000400/2022003-03 Open/Closed	Not Applicable	71153
The inspectors identified a Severity Level IV NCV of 10 CFR 50.72, "Immediate Notification Requirements for Operating Nuclear Power Reactors," for the licensee's failure to make a required non-emergency eight-hour notification for a loss of safety function association with the high head safety injection system.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
URI	05000400/2021010-01	Treatment of Class 1E Interfaces and Interlocks	71111.17T	Closed

		with the Turbine Trip System Design		
LER	05000400/2021-005-00	LER 2021-005-00 for Shearon Harris Nuclear Power Plant, Unit 1, Past Inoperability of Effluent Accident Monitor Exceeded Time Allowed by Technical Specifications	71114.05	Closed
LER	05000400/2022-004-00	LER 2022-004-00 for Shearon Harris Nuclear Power Plant, Unit 1, Both Trains of High Head Safety Injection Inoperable	71153	Closed

PLANT STATUS

Unit 1 began the inspection period at rated thermal power. On August 28, 2022, a manual reactor trip occurred due to loss of the 'B' main feedwater pump. The unit was restarted on August 29, 2022, and returned to rated thermal power on September 3, 2022. The unit remained at or near rated thermal power for the remainder of the 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) 'A' residual heat removal (RHR) pump while 'B' RHR pump was out of service for planned maintenance on July 12, 2022
- (2) 'B' emergency service water (ESW) pump while 'A' ESW was out of service for planned maintenance on July 19, 2022
- (3) 'A' emergency diesel generator (EDG) while 'B' EDG was out of service for planned maintenance on July 19, 2022
- (4) Auxiliary feedwater (AFW) system following the loss of 'B' main feedwater pump and subsequent manual reactor trip on August 28, 2022.

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) 'A' EDG room and support equipment areas (fire zones 1-D-1-DGA-RM, 1-D-3-DGA-ES, 1-D-DTA, 1-D-1-DGA-ASU, 1-D-1-DGA-ER, 1-D-2-DGA-HVD) on August 5, 2022
- (2) Reactor auxiliary building (RAB) 286' elevation 'A' switchgear room and 'A' battery room (fire zones 1-A-SWGRA and 1-A-BATA) on August 10, 2022

- (3) RAB 216' elevation mechanical penetration area, corridor, and service pipe tunnel (fire zones 1-A-2-MP, 1-A-2-COR, 1-A-2-PT) on August 24, 2022
- (4) RAB 305' elevation operations offices, termination cabinet room, rod control cabinet room, and main control room (fire zones 1-A-6-COMA, 12-A-6-RT1, 12-A-6-RCC1, and 12-A-6-CR1) on September 13, 2022
- (5) RAB 236' elevation 'A' and 'B' RHR heat exchanger rooms (fire zone 1-A-34-RHXA AND 1-A-34-RHXB) on September 13, 2022
- (6) RAB 261' elevation alternate seal injection and filter room (fire zone 1-A-4-COMC) on September 14, 2022.

71111.07T - Heat Exchanger/Sink Performance

Heat Exchanger (Service Water Cooled) (IP Section 03.02) (1 Sample)

The inspectors evaluated heat exchanger performance on the following:

- (1) 'A' component cooling heat exchanger (1CC-CCWHXA).

Heat Exchanger (Closed Loop) (IP Section 03.03) (2 Samples)

The inspectors evaluated heat exchanger performance on the following:

- (1) RHR heat exchangers (1RH-HXA, 1RH-HXB)
- (2) EDG lube oil coolers (1DLO-E007, 1DLO-E008).

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 main control room during Mode 1 power ascension and turbine generator synchronization to the grid on August 29, 2022.

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

- (1) The inspectors observed and evaluated a simulator scenario for operator training involving a feedwater break followed by small break loss of coolant accident on August 24, 2022.

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) External piping leaks on fire protection supply piping (nuclear condition report (NCR) 02437198) on August 11, 2022

- (2) Vacuum pump suction isolation valve failed to shut (NCR 02425550) on September 15, 2022.

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 (Green) risk during planned unavailability of 'B' RHR pump for breaker maintenance on July 12, 2022
- (2) Elevated (Yellow) risk during planned unavailability of 'B' ESW and 'B' EDG for preventative maintenance on July 19, 2022 - July 22, 2022
- (3) Elevated (Green) risk during emergent motor replacement of 'B' condensate pump post trip on August 29, 2022 - September 1, 2022
- (4) Elevated (Green) risk during planned operational testing of low temperature over pressure protection on September 15, 2022.

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (4 Samples)

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

- (1) Damage to rubber seal on ESW suction valve 1SW-3, (NCR 02434802) on August 4, 2022
- (2) 'A' chiller sump oil temperature high out of specification (NCR 02437015) on August 9, 2022
- (3) Outboard seal oil leak on 'B' high head safety injection pump (NCR 02435293) on August 17, 2022
- (4) 'A' ESW pump packing seal flow indication issues on August 24, 2022.

71111.17T - Evaluations of Changes, Tests, and Experiments

Sample Selection (IP Section 02.01)

The inspectors reviewed the following evaluations, screenings, and/or applicability determinations for 10 CFR 50.59 from September 19, 2022 - September 30, 2022.

- (1) URI 05000400/2021010-01, "Treatment of Class 1E Interfaces and Interlocks with the Turbine Trip System Design."

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) Engineering change (EC) 416914, temporary OST-1010 limit changes in August 2022.

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (6 Samples)

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

- (1) OP-139, "Service Water System," on 'A' ESW following planned maintenance outage on July 20, 2022
- (2) OST-1013, "1A-SA Emergency Diesel Generator Operability Test Monthly Interval Modes 1-6," on the 'A' EDG following maintenance outage on July 22, 2022
- (3) Work associated with logic and input card replacement to resolve "INTERMEDIATE RANGE HIGH FLUX LVL ROD STOP" annunciator on August 23, 2022
- (4) Diagnostic testing on 'C' charging safety injection pump recirculation isolation valve following lubrication and torque adjustments on August 25, 2022
- (5) OP-148, "Essential Services Chilled System," on essential chilled services water 'A' chiller following planned maintenance on September 13, 2022
- (6) OP-157, "Condensate System," following 'B' condensate pump motor replacement on September 2, 2022.

71111.22 - Surveillance Testing

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

Surveillance Tests (other) (IP Section 03.01) (3 Samples)

- (1) OST-1823, "1A-SA Emergency Diesel Generator Operability Test Modes 1 Through 6 and Defueled" on August 17, 2022
- (2) OST-1122, "Train A Under voltage trip actuating device operational test and contact check, Modes 1-6" on September 15, 2022
- (3) OST-1044, "ESFAS Train A Slave Relay Test 18 month interval, Modes 1-4" on September 23, 2022.

FLEX Testing (IP Section 03.02) (1 Sample)

- (1) Quarterly functional test of FLEX diesel generator #1 and #2, on September 1, 2022.

71114.02 - Alert and Notification System Testing

Inspection Review (IP Section 02.01-02.04) (1 Sample)

- (1) The inspectors evaluated the maintenance and testing of the alert and notification system during the week of August 29, 2022.

71114.03 - Emergency Response Organization Staffing and Augmentation System

Inspection Review (IP Section 02.01-02.02) (1 Sample)

- (1) The inspectors evaluated the readiness of the Emergency Response Organization (ERO) during the week of August 29, 2022.

71114.04 - Emergency Action Level and Emergency Plan Changes

Inspection Review (IP Section 02.01-02.03) (1 Sample)

- (1) The inspectors evaluated submitted Emergency Action Level (EAL), Emergency Plan, and Emergency Plan Implementing Procedure changes during the week of August 29, 2022. This evaluation does not constitute NRC approval.

71114.05 - Maintenance of Emergency Preparedness

Inspection Review (IP Section 02.01 - 02.11) (1 Sample)

- (1) The inspectors evaluated the maintenance of the emergency preparedness program during the week of August 29, 2022.

71114.06 - Drill Evaluation

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

The inspectors evaluated:

- (1) An emergency preparedness drill involving the failure of all three fission product barriers on August 4, 2022.

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, 2021 - June 30, 2022)

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

- (1) Unit 1 (July 1, 2021 - June 30, 2022)

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

- (1) Unit 1 (July 1, 2021 - June 30, 2022)

EP01: Drill/Exercise Performance (DEP) Sample (IP Section 02.12) (1 Sample)

- (1) July 1, 2021, through June 30, 2022

EP02: Emergency Response Organization (ERO) Drill Participation (IP Section 02.13) (1 Sample)

- (1) July 1, 2021, through June 30, 2022

EP03: Alert And Notification System (ANS) Reliability Sample (IP Section 02.14) (1 Sample)

- (1) July 1, 2021, through June 30, 2022

71152A - Annual Follow-up Problem Identification and Resolution

Annual Follow-up of Selected Issues (Section 03.03) (1 Sample)

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

- (1) Seal injection flow change during testing on May 9, 2022 (NCR 02426708).

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 05000400/2021-005-00, "Past Inoperability of Effluent Accident Monitor Exceeded Time Allowed by Technical Specifications" (ADAMS Accession No. ML21235A012). The inspection conclusions associated with this LER are documented under the "Inspection Results" section.
- (2) LER 05000400/2022-004-00, "Both Trains of High Head Safety Injection Inoperable" (ADAMS Accession No. ML22181A122). The inspection conclusions associated with this LER are documented under the "Inspection Results" section.

INSPECTION RESULTS

Treatment of Class 1E Interfaces and Interlocks with the Turbine Trip System Design			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000400/2022003-01 Open/Closed	None (NPP)	71111.17T
The NRC identified a Green finding and associated NCV of 10 CFR 50 Appendix B, Criterion III, "Design Control," for the licensee's failure to ensure independence between turbine control system circuits and the trains of reactor protection system (RPS) circuits.			
<u>Description:</u> On December 28, 2021, the NRC identified an Unresolved Item (URI), 05000400/2021010-01, while examining modifications to the main turbine trip system (TTS), with two URI concerns. To close the URI concerns, the NRC reviewed information from the licensee's, WCAP-8892-A (with Safety Evaluation Report) "Westinghouse 7300 Series Process Control System Noise Tests," dated 1977; performed walkdowns of the TTS and RPS circuits; evaluated the plant licensing basis and WCAP; and conferred with NRC staff about the independence requirements between the RPS and TTS circuits. For URI concern 1,			

the following violation was identified. Concern 2 resulted in no findings.

Harris Updated Final Safety Analysis Report (UFSAR) Section 7.1, "Introduction," specified that the RPS circuits met the requirements in "IEEE Std. 279-1971 'IEEE Standard: Criteria for Protection Systems for Nuclear Power Generating Stations.'" The inspectors noted that IEEE 279-1971, Section 4.6, "Channel Independence," stated, that "channels that provide signals for the same protective function shall be independent and physically separated to accomplish decoupling of the effects of unsafe environmental factors, electric transients, and physical accident consequences documented in the design basis, and to reduce the likelihood of interactions between channels during maintenance operations or in the event of channel malfunction." To meet channel independence, in the UFSAR Section 7.1.2.1.6, "Equipment protection," the licensee committed to use IEEE 384-1974, "IEEE Trial-Use Standard Criteria for Separation of Class 1E Equipment and Circuits."

The inspectors noted that the Harris TTS had interlocks and circuits used by the redundant RPS circuits to control certain turbine trips. Using non-safety related EC packages, Harris modified the TTS to use digital controls. The inspectors noted that the EC treated the TTS functions and redundant circuits as non-Class 1E (non-safety related electrical devices). The modified redundant TTS circuits were powered by a 75KVA transformer and a 15-ampere circuit breaker, thus exceeding the one ampere maximum short circuit current allowed by WCAP-8892-A to meet independence requirements in the RPS cabinets. The TTS trains were electrically connected to each other without isolation devices and trained with both trains of redundant Class 1E RPS circuits in cable trays and RPS cabinets. Notes on the Class 1E wiring drawings for the RPS cabinets specified that the TTS circuits were part of each Class 1E train. There was no indication on the wiring drawings that the TTS circuits were non-Class 1E or associated circuits and that they must be kept separate from other Class 1E circuits beyond any credited isolation devices. The inspectors performed walkdowns of the RPS and TTS circuits and identified that the TTS circuits were bundled and bound together with various redundant RPS circuits in cable trays and RPS cabinets beyond any credited isolation devices. The condition of the installed circuits demonstrated that the licensee did not maintain RPS independence from the TTS as specified by IEEE 384-1974. Standard IEEE 384-1974 Section 4.5, "Associated Circuits," specified, in part, that "they shall be uniquely identified as such and shall remain with, or be separated the same as, those Class 1E circuits with which they are associated including an isolation device." "Beyond the isolation device a circuit is not subject to the requirements of this document provided it does not again become associated with a Class 1E system."

The licensee expressed their belief that independence did not exist prior to the 2017 modification in question. The inspectors conveyed to the licensee that the circuits in question were modified, in part, to physically connect the A & B trains together on the same terminals. Prior to this, normally open relay contacts would have separated the A & B trains when the relays were not energized. It is noted that both configurations may not have had the required independence, however, the 2017 modification presented an opportunity for the licensee to recognize and analyze the lack of Class 1E, non-Class 1E, and train independence.

By not meeting RPS independence, the licensee compromised the requirements for single failure and interactions between control and protection systems affecting the reliability of the RPS. As communicated by Atomic Energy Commission, where cables carrying electrically isolated control (non-protection) signals from redundant protection cabinets come together, electrically, and physically, at common points in the plant, an abnormal occurrence at a common point could produce adverse fault potentials or electrical interference on electrical

cables. Thus, electromagnetic interference (high voltage or noise) could be transmitted back to the originating circuits in all redundant protection cabinets. In this event, despite electrical barriers, faults might bypass the barriers and be coupled into protection circuits because of their proximity to the fault-carrying non-protection (control) wiring.

Corrective Actions: The licensee entered this into their corrective action program as CR02443358 to implement a modification or a license amendment.

Performance Assessment:

Performance Deficiency: The failure to ensure independence between turbine control system circuits and the trains of reactor protection system circuits in accordance with IEEE 279-1971, Section 4.6 "Independence" and the UFSAR Section 7.0, "Instrumentation and Controls," was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Design Control attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The failure to ensure the independence of the RPS increases the likelihood that common mode failures could interfere with safety functions.

Significance: A regional senior reactor analyst (SRA) conducted a detailed risk assessment using the guidance in IMC 609, Appendix A and using SAPHIRE 8, version 8.2.6, and the Shearon Harris SPAR model, Revision 8.55, dated February 28, 2017, to model the condition. The SRA assumed an exposure time of 1-year (max allowed by the Significance Determination Process (SDP)) and modeled the condition by adjusting the common cause failure (CCF) terms for reactor protection system analog process logic modules in 2 of 3 channels and 3 of 4 channels (RPS-CCX-CF-4OF6 and RPS-CCX-CF-6OF8). A failure of the reactor protection system occurs when a valid plant trip input is present, and a plant trip is not produced. The RPS is normally energized and a loss of power will cause the system to fail safe and trip the plant. Thus, for a RPS failure to occur, a hot short condition is required. Based upon this fact and considering operational experience data collected on hot shorts, the SRA conservatively chose a one order of magnitude adjustment to the nominal CCF terms in order to bound the condition. The dominant accident sequence was a plant transient, anticipated transient without scram, failure of main feedwater system, and failure of operators to emergency borate. The increase in core damage probability was less the 1E-7. Therefore, the finding is characterized as very low safety significance (Green).

Cross-Cutting Aspect: Not Present Performance. No cross-cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance.

Enforcement:

Violation: 10 CFR 50, Appendix B, Criterion III, "Design Control," states, in part, measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in § 50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions.

Contrary to the above, since April 19, 2017, the licensee failed to assure that applicable design basis, as defined in § 50.2 for those structures, systems, and components to which

this appendix applies are correctly translated into specifications, drawings, procedures, and instructions. Specifically, the licensee failed to translate safety-related independence requirements into the specifications for the RPS turbine trip modifications.

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

The disposition of this finding and associated violation closes URI: 05000400/2021010-01.

Licensee-Identified Non-Cited Violation	71114.04
This violation of very low safety significance was identified by the licensee and has been entered into the licensee corrective action program and is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.	
Violation: Title 10 CFR Part 50.54(q)(2) requires, in part, that a holder of a nuclear power reactor operating license under this part, shall follow and maintain the effectiveness of an emergency plan that meets the requirements in Appendix E to this part and the planning standards of 10 CFR 50.47(b). Title 10 CFR Part 50.47(b)(4) requires a standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee, and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures.	
<p>Contrary to the above, from July 3, 2018, until July 7, 2022, the licensee failed to maintain the effectiveness of its emergency plan and standard emergency classification scheme for hazards during hot and cold initiating conditions, RA3.2 and HA5.1. Specifically, in July 2018 the licensee implemented NRC-approved NEI 99-01, Revision 6, emergency action levels (EALs), which states that an Alert should be declared in cases where abnormal radiation levels or toxic gases impede access to equipment necessary for normal plant operations, cooldown, or shutdown. The licensee included plant areas RAB 190 RHR Pumps room in Mode 4, and RAB 216 (boron injection tank) in Modes 4 or 5, in the table of areas which are identified as requiring access and subject to EAL classifications under RA3.2 and HA5.1. In June 2021, the licensee determined that access to these areas was not procedurally required and thus abnormal radiation levels or toxic gasses that impede access would not need to meet established EAL thresholds as defined by NEI 99-01 Revision 6. However, the potential to over-classify an event did exist.</p> <p>Significance/Severity: Green. Using IMC 0609, Appendix B, Table 5.4-1, for an EAL over-classification, the inspectors determined that the inclusion of the above-mentioned areas in Table R-3/H-2 on the EAL Wallboards would result in an unnecessary classification and therefore can be considered very low safety significance (Green).</p> <p>Corrective Action References: The condition was corrected in July 2022 with implementation of revision 3 of CSD-EP-HNP-0101-01, EAL Technical Bases Document, and revision 2 of CSD-EP-HNP-0101-02, EAL WALLCHART (BOTH HOT AND COLD).</p>	

Minor Violation	71114.05
Minor Violation: During review of LER 50-400/2021-005-00, the inspectors identified a violation of 10 CFR 50.47(b)(4), which requires, in part, that a standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the licensee.	

Contrary to the above, from October 6, 2020, to June 22, 2021, the licensee’s waste processing building (WPB) vent stack 5A high range noble gas radiation monitor used incorrect flow rate measurement values. These values were not actual calculated values, but the maximum flow rate values (assumed) for that vent stack due to the radiation monitor being inoperable. Using maximum flow rate values would indicate a higher level of effluent discharge. EAL threshold values for this monitor are used as an input to the classification matrix for initiating conditions RU1.1, RA1.1, RS1.1, and RG1.1. The inspectors determined that with a higher level of indicated discharge, the potential existed for an EAL over classification.

Screening: The inspectors determined the performance deficiency was minor. IMC 0612 Appendix B, “Additional Issue Screening Guidance,” the inspectors determined the violation to be minor because with a very large reactor coolant system (RCS) volume release, other EAL classification thresholds would be met sooner and at a lower classification level, such as the unusual event threshold. This would result in a much lower likelihood of an over classification. The entire RCS volume would need to discharge into the WPB lab to achieve this EAL threshold.

Enforcement: The licensee entered the issue into the corrective action program as CR2424355. The correct flow rate values were used in the vent stack 5A high range noble gas radiation monitor, and operability of the radiation monitor was restored. This failure to comply with 10 CFR 50.47(b)(4) constitutes a minor violation that is not subject to enforcement action in accordance with the NRC’s Enforcement Policy.

Failure to Properly Implement Procedure when Restoring 'B' High Head Injection Pump			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000400/2022003-02 Open/Closed	[H.12] - Avoid Complacency	71153
A self-revealed Green finding and associated NCV of Technical Specification 6.8.1 “Procedures and Programs,” was identified when the licensee failed to follow station procedures resulting in a momentary loss of seal injection and inoperability of both trains of high head safety injection. Specifically, the licensee failed to properly align the 'B' charging/safety injection pump (CSIP) prior to performing the operability surveillance.			
<u>Description:</u> On May 2, 2022, the licensee was performing an operability surveillance on 'B' CSIP in accordance with OST-1093, "Chemical Volume Control System/Safety Injection System Operability Train B." The CSIP system is relied on during accidents that affect water inventory in the RCS to inject borated water directly into the RCS. Per the procedure, the licensee stroked closed 1CS-220, discharge cross-connect valve, and subsequently received an alarm for low seal injection flow and corresponding indications of lowering seal injection flow. The licensee’s immediate actions were to reopen 1CS-220 and send operators into the field to investigate.			
Upon investigation, it was discovered that valve, 1CS-197, 'B' CSIP manual discharge isolation valve, was incorrectly left in the locked closed position from previous post-maintenance testing. Prior to this evolution, OP-107.03, "CVCS Fill, Vent, and Maintenance Activities" was implemented to restore 'B' CSIP alignment. OP-107.03 Section 8.10.2, Step 40, directs the licensee to complete a configuration control closeout where 1CS-197 is			

required, per procedure, to be locked open. However, this step, which was required to ensure proper system alignment, was not completed prior to initiation of OST-1093. With both 1CS-197 and 1CS-220 closed, this configuration resulted in both trains of high head safety injection pumps being inoperable. This resulted in an entry into Technical Specification Limiting Condition of Operation (LCO) 3.0.3. Once identified, operators immediately opened 1CS-220, restoring 'A' high head safety injection and exited Technical Specification LCO 3.0.3.

Corrective Actions: Upon receiving indications of lowering seal injection flow, the operators immediately reopened 1CS-220 to restore seal injection flow and 'A' CSIP. Additionally, the operators opened 1CS-197 and were able to complete OST-1093 to restore the 'B' CSIP to operable. The licensee entered this occurrence into their corrective action program and implemented additional corrective actions that included updating the procedure to enhance procedural continuity.

Corrective Action References: NCR 02426708

Performance Assessment:

Performance Deficiency: The inspectors determined that the licensee's failure to adequately perform procedure OP-107.03 steps to properly restore the 'B' CSIP system alignment was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Configuration Control attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee failed to properly perform procedure steps to restore 'B' CSIP alignment after maintenance. During the performance of the 'B' CSIP operability surveillance, both high head safety injection pumps became inoperable due to failing to maintain system configuration which directly impacted the mitigating system cornerstone.

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 determined that the finding had very low safety significance (Green) because it: (1) was not a design deficiency; (2) did not represent a loss of function of at least a single train for longer than its technical specification allowed outage time; (3) did not result in the loss of PRA function for greater than 24 hours, and (4) did not result in the loss of a high safety-significant, non-technical specification train.

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 failed to validate their assumptions when implementing OP-107.03. Additionally, the licensee failed to verify system flow path prior to performing the operability surveillance.

Enforcement:

Violation: Shearon Harris Technical Specification 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 emergency core cooling system as applicable procedures. The licensee established OP-107.03 for chemical volume control system filling, venting, and maintenance activities and includes restoration instructions post maintenance. Specifically, OP-107.03 Step 8.10.3. directs the licensee to lock open 1CS-197.

Contrary to the above, on May 2, 2022, the licensee failed to properly implement OP-107.03, Step 8.10.3. This action directly resulted in the momentary loss of seal injection flow and inoperability of both high head safety injection pumps.

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

Failure to Report a Loss of Safety Function associated with High Head Safety Injection

Cornerstone	Severity	Cross-Cutting Aspect	Report Section
Not Applicable	Severity Level IV NCV 05000400/2022003-03 Open/Closed	Not Applicable	71153

The inspectors identified a Severity Level IV NCV of 10 CFR 50.72, "Immediate Notification Requirements for Operating Nuclear Power Reactors," for the licensee's failure to make a required non-emergency eight-hour notification for a loss of safety function association with the high head safety injection system.

Description: On May 2, 2022, the licensee was performing an operability surveillance on train 'B' charging/safety injection pump (CSIP) in accordance with OST-1093, "Chemical Volume Control System/Safety Injection System Operability Train B." Per the procedure, the licensee stroked closed 1CS-220, discharge cross-connect valve, and subsequently received an alarm for low seal injection flow and corresponding indications of lowering seal injection flow. The licensee's immediate actions were to reopen 1CS-220 and send operators in the field to investigate. Upon investigation, it was discovered that valve, 1CS-197, 'B' CSIP manual discharge isolation valve, was incorrectly left in the locked closed position from previous post-maintenance testing. Prior to this evolution, OP-107.03 was used to restore 'B' CSIP alignment post maintenance. OP-107.03 Section 8.10.2, Step 40, directs the licensee to complete a configuration control closeout, contained in Step 8.10.3, where 1CS-197 is required, per procedure, to be locked open. However, this step was not completed prior to initiation of OST-1093. With both 1CS-197 and 1CS-220 closed, this configuration resulted in a loss of safety function condition for both high head safety injection pumps, which occurred for approximately 23 seconds.

10CFR50.72(b)(3)(v), states, in part, any event or condition that at the time of discovery could have prevented the fulfillment of the safety function of systems needed to shutdown the reactor and maintain a safe shutdown condition and systems needed to mitigate the consequences of an accident is reportable. Because the loss of safety function condition was present when the control room received initial indications and alarms due to the system misalignment; this event is considered reportable. NUREG-1022 further clarifies that reportability should not take precedent over safe operation.

Corrective Actions: The licensee reported the loss of safety function of the high head safety injection pumps (LER 05000400/2022-004-00), under 10 CFR 50.73(a)(2)(v)(A) and 10 CFR 50.73(a)(2)(v)(D) within the required 60 days. Additionally, the licensee entered the issue into the corrective action program to document the missed notification.

Corrective Action References: NCR 2443443

Performance Assessment: The inspectors determined this violation was associated with a minor performance deficiency.

Enforcement: The ROP's significance determination process does not specifically consider the regulatory process impact in its assessment of licensee performance. Therefore, it is necessary to address this violation which impedes the NRC's ability to regulate using traditional enforcement to adequately deter non-compliance.

Severity: NRC Enforcement Policy dated January 15, 2020, Section 6.9, categorizes the failure to make a required report per 10 CFR 50.72, as an example of a Severity Level IV violation.

Violation: 10 CFR 50.72(b)(3)(v) states, in part, that the licensee shall notify the NRC Operations Center via the Emergency Notification System within eight hours of the occurrence of any event or condition that at the time of discovery could have prevented the fulfillment of the safety function of structures or systems that are needed to: (A) shut down the reactor and maintain it in a safe shutdown condition and (D) mitigate the consequences of an accident.

Contrary to the above, on May 2, 2022, the licensee failed to notify the NRC Operations Center of a condition that at the time of discovery, could have prevented the fulfillment of the safety function of a system relied on to shutdown the reactor and maintain it in a safe shutdown condition as well as mitigate the consequences of an accident within the allotted eight hours. Specifically, the licensee did not notify the NRC Operations Center within eight hours of discovering the loss of safety function associated with high head safety injection.

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 November 1, 2022, the inspectors presented the Integrated Inspection results to Thomas Haaf and other members of the licensee staff.
- On September 2, 2022, the inspectors presented the Emergency Preparedness Program Inspection results to Thomas Haaf and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.04	Drawings	CPL-2165-S-0544	Simplified Flow Diagram - Feedwater System Unit 1	46
71111.05	Fire Plans	A34-6-286-0639	RAB Elev. 286', Fire Area 1-A-SWGRA, Fire Zone: 1-A-SWGRA, Switchgear Room A	Rev. 1
		A36-6-286-0643	RAB Elev. 286', Fire Area 1-A-BATA, Fire Zone: 1-A-BATA, Battery Room A-SA	Rev. 1
		CSD-HNP-PFP-190-216	RAB Elevation 190 and 216 Pre-Fire Plan	Rev. 001
		CSD-HNP-PFP-DGB	Diesel Generator Building Pre-fire Plan	Rev. 001
		CSD-HNP-PFP-RAB-236	RAB Elevation 236 Pre-Fire Plan	Rev. 002
		CSD-HNP-PFP-RAB-261	RAB Elevation 261 Pre-Fire Plan	Rev. 001
		CSD-HNP-PFP-RAB-305-324	RAB Elevation 305 Pre-Fire Plan	Rev. 004
71111.07T	Calculations	SW-0048	CCW Heat Exchanger Performance with Reduced Service Water Flow	Revision 5
		SW-0049	EDG Jacket Water Cooler Performance with Reduced Service Water Flow	Revision 4
		SW-0080	ESW Flow Requirements Based on Reservoir Level	Revision 15
		SW-0083	CCW and RHR Heat Exchanger Overall Heat Transfer Coefficients	Revision 2
	Procedures	AD-EG-ALL-1312	Raw Water Program Implementation	Revision 0
		MPT-M0038	Emergency Diesel Generator Lube Oil Heat Exchanger Inspection and Cleaning	Revision 16
		PLP-620	Service Water Program (Generic Letter 89-13)	Revision 21
71111.11Q	Procedures	GP-005	Power Operation (Mode 2 to Mode 1)	115
71111.12	Corrective Action Documents	NCR 02425550	1AE-16 failed to shut	04/29/2022
		NCR 02437198	Fire Piping Leaks	
	Miscellaneous Work Orders		Fire Protection Program Health Report	Q2-2022
		20535102		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		20547112		
		20551701		
71111.13	Procedures	AD-OP_ALL-0212	Risk Informed Completion Time Program Calculations	Rev. 0
		AD-WC-ALL-0240	On-line Risk Management Process	Rev. 3
		MST-I0250	Reactor Coolant System Cold Overpressure Protection Loops Operational Test	Rev. 20
71111.15	Calculations	HNP-CALC-SW-0085	Ultimate Heat Sink Analysis	Rev. 4
	Corrective Action Documents	AR 02434802	1SW-3 seal torn	7/19/2022
		Condition Report(s)	02439182	
		NCR 02403733	WC-2B SB Tripped On Low Oil Pressure	
		NCR 02437015	OPT-1512 A chiller sump temperature high OOS	
	Engineering Changes	EC 410258	Modify Chiller Thermostat Lube Oil Set Point	Rev. 0
	Procedures	APP-ALB-002	Main Control Board	54
OPT-1512		Essential Chilled Water Turbopak Units Quarterly Inspection/Checks Modes 1-6	Rev. 50	
71111.19	Corrective Action Documents	Condition Report(s)	02438994	
	Miscellaneous	20317596-01	Duke Nuclear MOV Program - MOV Diagnostic Test Instructions / Criteria, 1CS-210	08/03/2022
	Procedures	OP-148	Essential Services Chilled Water System	Rev. 84
	Work Orders		20555513	
		20555904		
71111.22	Procedures	OST-1013	1A-SA Emergency Diesel Generator Operability Test Monthly Interval Modes 1-2-3-4-5-6	44
		OST-1122	Train A 6.9kV Emergency Bus Undervoltage Trip Actuating Device Operational Test and Contact Check, Modes 1-6	Rev. 24
		OST-1823	1A-SA Emergency Diesel Generator Operability Test Modes 1 through Mode 6 and Defueled	67
		OST-1830	Turbine Driven Auxiliary Feedwater pump auto start: ESF	Rev. 016

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Work Orders		Response Time Train A 18 month interval, Modes 1-4 20537709	