



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

November 9, 2016

EA-16-151
EA-16-230

William R. Gideon
Site Vice President
Brunswick Steam Electric Plant
8470 River Rd. SE (M/C BNP001)
Southport, NC 28461

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT – NRC INTEGRATED INSPECTION
REPORT NOS.: 05000325/2016003 AND 05000324/2016003 AND EXERCISE OF
ENFORCEMENT DISCRETION

Dear Mr. Gideon:

On September 30, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Brunswick Steam Electric Plant, Units 1 and 2. On October 13, 2016, 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.

NRC inspectors documented three findings of very low safety significance (Green) in this report. These findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

On June 24, 2016, the NRC Office of Investigations completed an investigation regarding falsification of quality records by a contract employee at your facility. Based upon the evidence developed during the course of this investigation, the NRC concluded that a contract quality control inspector deliberately falsified a quality record dated March 23, 2015. Based on a review of the facts and circumstances in this case, the NRC has documented two licensee-identified violations in this report, one of which was determined to be of very low safety significance, the other which was determined to be a Severity Level IV. The NRC is treating these violations as NCVs consistent with Section 2.3.2.a of the Enforcement Policy.

In addition, a violation of the licensee's current site-specific licensing basis for tornado-generated missile protection was identified. Because this violation was identified during the discretion period covered by Enforcement Guidance Memorandum 15-002, "Enforcement Discretion for Tornado Missile Protection Noncompliance," and because the licensee has implemented compensatory measures, the NRC is exercising enforcement discretion by not issuing an enforcement action for the violation and allowing continued reactor operation.

Inspection Report 05000325/2016008, documented Finding (FIN) 2016008-01, Inadequate Procedures to Perform Maintenance on the Startup Auxiliary Transformer Non-segregated Bus and the 1B Reactor Recirculation Pump Variable Frequency Drive Cables, for which the NRC had not yet reached a preliminary significance determination (i.e., TBD). Section 1R12, Maintenance Effectiveness, of this report, discusses the final significance determination of very low safety significance (Green). FIN 2016008-01 is now closed.

If you contest the violations or the significance of these NCVs, 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 the Brunswick Steam Electric 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 the Brunswick Steam Electric 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 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Steven D. Rose, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Docket Nos.: 50-325, 50-324
License Nos.: DPR-71, DPR-62

Enclosure:
Inspection Report 05000325/2016003
and 05000324/2016003
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Letter to William R. Gideon from Steven D. Rose dated November 9, 2016

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT - NRC INTEGRATED INSPECTION
REPORT NUMBERS: 05000325/2016003 AND 05000324/2016003 AND
EXERCISE OF ENFORCEMENT DISCRETION

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-325, 50-324

License Nos.: DPR-71, DPR-62

Report No.: 05000325/2016003, 05000324/2016003

Licensee: Duke Energy Progress, Inc.

Facility: Brunswick Steam Electric Plant, Units 1 & 2

Location: Southport, NC

Dates: July 1, 2016 through September 30, 2016

Inspectors: M. Catts, Senior Resident Inspector
M. Schwieg, Resident Inspector
J. Dodson, Senior Project Engineer (Section 4OA7)

Approved by: Steven D. Rose, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Enclosure

SUMMARY

Integrated Inspection Report 05000325/2016003, 05000324/2016003; July 1, 2016, through September 30, 2016; Brunswick Steam Electric Plant, Units 1 and 2; Maintenance Risk Assessments and Emergent Work Control, Operability Determinations and Functionality Assessments, and Surveillance Testing.

This report covered a three-month period of inspection by resident inspectors and a regional inspector. One NRC-identified violation and two self-revealing violations are documented in this report. The significance of inspection findings are indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP) dated April 29, 2015. The cross-cutting aspects are determined using IMC 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated August 1, 2016. The NRC's program for overseeing the safe operations of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

Cornerstone: Mitigating Systems

- Green. An NRC-identified Green non-cited violation (NCV) of 10 CFR 50.65(a)(4) was identified for the failure of the licensee to implement all necessary prescribed risk management actions (RMAs) during a 2A residual heat removal (RHR) and residual heat removal service water (RHRSW) outage. Specifically, between August 31, 2016, and September 1, 2016, the licensee failed to post protective equipment signs on the 2B RHR/RHRSW motor control centers (MCCs) whose unavailability would have taken Unit 2 into a Yellow risk condition. The licensee took immediate corrective actions to protect the 2B RHR/RHRSW MCCs in the field. The licensee entered this issue into the corrective action program (CAP) as nuclear condition report (NCR) 2059064.

The inspectors determined the failure of the licensee to adequately post protected equipment signs for the 2B RHR/RHRSW system, whose unavailability would have taken the unit into a Yellow risk condition, was a performance deficiency. The finding was more than minor because if left uncorrected, the failure to perform RMAs could result in a loss of a safety-related mitigating function, specifically the RHR low pressure coolant injection (LPCI). Using IMC 0609, Appendix K, issued May 19, 2005, Maintenance Risk Assessment and Risk Management Significance Determination Process, Flowchart 2, Assessment of RMAs, the inspectors determined the finding screened as very low safety significance (Green) since the incremental core damage probability was less than $1E-6$. The finding has a crosscutting aspect in the area of human performance associated with the procedure adherence attribute because the licensee failed to follow plant procedures to fully protect the 2B RHR/RHRSW loop during the 2A RHR/RHRSW loop outage. [H.8] (Section 1R13)

- Green. A self-revealing Green NCV of Technical Specification (TS) 5.4.1a, Procedures, was identified for the failure of the licensee to have an adequate procedure for preventive maintenance (PM) on the Unit 2 high pressure coolant injection (HPCI) auxiliary oil pump motor overload relay 2-2XDA-B11-74. Specifically, from May 26, 2015, to July 6, 2016, the licensee failed to incorporate PM task 482688, a 12-year replacement task for the relays, into procedures, resulting in a shorted relay coil, the loss of control power, and the inoperability of the HPCI pump. The licensee replaced the relay and the HPCI pump was returned to operable. The licensee entered this issue into the CAP as NCR 2043067.

The inspectors determined that the failure of the licensee to have an adequate PM procedure to replace the Unit 2 HPCI auxiliary oil pump motor overload relay 2-2XDA-B11-74 was a performance deficiency. The finding was more than minor because it was associated with the procedural quality 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 failure to replace the HPCI auxiliary oil pump motor overload relay resulted in the inoperability of the Unit 2 HPCI pump, and the loss of safety function. Using IMC 0609, Appendix A, issued June 19, 2012, the SDP for Findings At-Power, Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined the finding screened to a more detailed risk evaluation, since the finding represented a loss of HPCI system and/or function. The inspectors used SAPHIRE to conduct a more detailed risk review of the finding. The inspectors determined that the finding was of very low safety significance (Green), because the core damage frequency (CDF) risk was less than $1.0E-6$ /year. This finding has a cross-cutting aspect in the area of human performance associated with the work management aspect, for failing to implement a process of planning, controlling, and executing work activities such that nuclear safety is an overriding priority. Specifically the licensee failed to effectively plan and coordinate PM strategies associated with operating experience to prevent the failure of the HPCI pump. [H.5] (Section 1R15)

- Green. A self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings, was identified for the failure of the licensee to have an adequate procedure for the 2B RHRSW pump operability test. Specifically, from July 12, 2001, to August 2, 2016, licensee procedure OPT-08.1.4A(B), RHR Service Water System Operability Test, did not contain sufficient information to maintain plant status control for the Unit 2 RHRSW subsystem "B" pressure switch instrument isolation valves, 2-SW-PS-1176B-3 and 2-SW-PS-1176D-3. This resulted in the valves being found mispositioned (closed) and the inoperability of the 2B RHRSW subsystem from June 4 - 15, 2016. This finding resulted in a violation of TS 3.7.1, RHRSW System, since the 2B RHRSW subsystem was inoperable for greater than the TS allowed outage time (AOT). As immediate corrective actions, the licensee opened the 2-SW-PS-1176B(D)-3 valves and ensured the subsystem "A" pressure switch instrument isolation valves were open. Additionally, the licensee revised procedure OPT-08.1.4A(B) to maintain plant status control by throttling the drain valves versus the pressure switch instrument isolation valves, and included an independent verification step to ensure the valves are returned to the correct position. The licensee entered this issue into the CAP as NCR 2037920.

The inspectors determined the licensee's failure to have an adequate procedure for the 2B RHRSW subsystem operability test to ensure configuration control was a performance deficiency. The finding was more than minor because it was associated with the procedural quality 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 inadequate procedure resulted in the inoperability of the 2B RHRSW subsystem. Using IMC 0609, Appendix A, issued June 19, 2012, the SDP for Findings At-Power, Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined the finding screened to a more detailed risk evaluation, since the finding represented an actual loss of safety function of a single train for greater than its TS AOT.

A regional Senior Risk Analyst (SRA) performed a detailed risk evaluation for the finding by setting the exposure period for 11 days, and assuming recovery actions that could be taken to mitigate the event. In addition, another later recovery was possible for the dominant sequences because service water, in sufficient quantity, could be pushed through the inoperable pumps to provide adequate cooling in non-loss-of-coolant accident (LOCA) sequences. The dominant contributor involved loss of the heat sink through common cause failure. The risk analysis resulted in a finding that is characterized as very low safety significance (Green). The finding had a cross-cutting aspect in the area of human performance associated with the challenge the unknown attribute because the licensee did not stop when faced with uncertain conditions, and risks were not evaluated and managed before proceeding. Specifically, the licensee continued through the April 2016 2B RHRSW system operability test, even when the procedure was not clear on which valve to manipulate to adjust for flow fluctuations. [H.11] (Section 1R22)

Violations of very low safety significance that were identified by the licensee have been reviewed by the NRC. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. These violations and corrective action tracking numbers are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at 100 percent rated thermal power (RTP). On August 26, 2016, the unit was reduced to 70 percent power for a control rod sequence exchange and turbine valve testing. The unit was returned to 100 percent RTP on August 28, 2016. On September 3, 2016, the unit was reduced to 70 percent power due to a loss of the Delco East line. The line was repaired and the unit was returned to 100 percent RTP on September 3, 2016. On September 22, 2016, the unit was reduced to 70 percent power, again due to a loss of the Delco East line. The line was repaired and the unit was returned to 100 percent RTP on September 22, 2016. The unit remained at or near 100 percent RTP for the remainder of the inspection period.

Unit 2 began the inspection period at or near 100 percent RTP. On July 7, 2016, the unit was reduced to 98 percent power due to loss of the Wilmington Corning line. The unit was returned to 100 percent RTP on July 7, 2016. On July 12, 2016, the unit was reduced to 70 percent power due to a fire in the 2C conventional service water (CSW) pump. The CSW header pressure was restored and the unit was returned to 100 percent RTP on July 13, 2106. On September 24, 2016, the unit was reduced to 70 percent power for a control rod sequence exchange and turbine valve testing. The unit was returned to 100 percent RTP on September 26, 2016. The unit remained at or near 100 percent RTP for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 2 samples)

a. Inspection Scope

.1 Readiness to Cope with External Flooding

The inspectors evaluated the licensee's implementation of flood protection procedures and compensatory measures during impending conditions of flooding or heavy rains. The inspectors reviewed the updated final safety analysis report (UFSAR) and related flood analysis documents to identify those areas containing safety related equipment that could be affected by external flooding and their design flood levels. The inspectors walked down flood protection barriers, reviewed procedures for coping with external flooding, and reviewed corrective actions for past flooding events. The inspectors verified that the procedures for coping with flooding could reasonably be used to achieve the desired results. For those areas where operator actions are credited, the inspectors assessed whether the flooding event could limit or preclude the required actions. Documents reviewed are listed in the attachment.

The inspectors conducted walkdowns of the following plant areas containing risk-significant structures, systems, and components that are below flood levels or otherwise susceptible to flooding:

- Service Water Building
- Emergency Diesel Generator (EDG) Building
- Storm Drain Collection Basin

.2 Impending Adverse Weather Conditions

The inspectors reviewed the licensee's preparations to protect risk-significant systems from Tropical Storm Hermine on September 2, 2016. The inspectors evaluated the licensee's implementation of adverse weather preparation procedures and compensatory measures, including operator staffing, before the onset of and during the adverse weather conditions. The inspectors reviewed the licensee's plans to address the ramifications of potentially lasting effects that may result from the adverse weather conditions. The inspectors verified that operator actions specified in the licensee's adverse weather procedure maintain readiness of essential systems. The inspectors verified that required surveillances were current, or were scheduled and completed, if practical, before the onset of anticipated adverse weather conditions. The inspectors also verified that the licensee implemented periodic equipment walkdowns or other measures to ensure that the condition of plant equipment met operability requirements. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04 – 5 samples)

a. Inspection Scope

.1 Partial Walkdown

The inspectors verified that critical portions of the selected systems were correctly aligned by performing partial walkdowns. The inspectors selected systems for assessment because they were a redundant or backup system or train, were important for mitigating risk for the current plant conditions, had been recently realigned, or were a single-train system. The inspectors determined the correct system lineup by reviewing plant procedures and drawings. Documents reviewed are listed in the Attachment.

The inspectors selected the following systems or trains to inspect:

- Unit 2, core spray (CS) loop A, July 27, 2016
- Unit 1, RHR loop A, August 13, 2016
- Unit 2, HPCI system, August 17, 2016
- Unit 2, RHR loop B, August 31, 2016

.2 Complete Walkdown

The inspectors verified the alignment of the Unit 2 CSW system on August 10, 2016. The inspectors selected this system for assessment because it is a risk-significant mitigating system. The inspectors determined the correct system lineup by reviewing plant procedures, drawings, the UFSAR, and other documents. The inspectors reviewed records related to the system outstanding design issues, maintenance work requests (WRs), and deficiencies. The inspectors verified that the selected system was correctly aligned by performing a complete walkdown of accessible components.

To verify the licensee was identifying and resolving equipment alignment discrepancies, the inspectors reviewed corrective action documents, including NCRs and outstanding work orders (WOs). The inspectors also reviewed periodic reports containing

information on the status of risk-significant systems, including maintenance rule reports and system health reports. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05Q – 6 samples)

a. Inspection Scope

Quarterly Inspection

The inspectors evaluated the adequacy of selected pre-fire plans by comparing the pre-fire plans to the defined hazards and defense-in-depth features specified in the fire protection program. In evaluating the pre-fire plans, the inspectors assessed the following items:

- control of transient combustibles and ignition sources
- fire detection systems
- water-based fire suppression systems
- gaseous fire suppression systems
- manual firefighting equipment and capability
- passive fire protection features
- compensatory measures and fire watches
- issues related to fire protection contained in the licensee's CAP

The inspectors toured the following fire areas to assess material condition and operational status of fire protection equipment. Documents reviewed are listed in the Attachment.

- 0PFP-SW-01A, Units 1 and 2, Service Water Building, 20-foot elevation
- 1PFP-RB1-01D, Unit 1, Reactor Building, South RHR Room, 17-foot elevation
- 2PFP-TB2-01k, Unit 2, Turbine Building, North 38-foot and 41-foot elevations
- 2PFP-RB2-01C, Unit 2, Reactor Building, North RHR Room, 17-foot elevation
- 2PFP-RB2-01D, Unit 2, Reactor Building, South RHR Room, 17-foot elevation
- 2PFP-RB2-01B, Unit 2, Reactor Building, North CS Room, 17-foot elevation

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program and Licensed Operator Performance (71111.11 – 2 samples)

a. Inspection Scope

.1 Resident Inspector Quarterly Review of Licensed Operator Regualification

On July 26, 2016, the inspectors observed an evaluated simulator scenario administered to an operating crew, including an air header rupture, an anticipated transient without SCRAM, failure of the standby liquid control pumps, an unisolable reactor core isolation

cooling (RCIC) steam line break, and fuel damage. The inspectors observed licensee activities in the simulator, technical support center, and the emergency operations facility to evaluate implementation of the emergency plan, including event classification, notification, and protective action recommendations. The inspectors evaluated the licensee's performance against criteria established in the licensee's procedures. Additionally, the inspectors attended the post-exercise critique to assess the licensee's effectiveness in identifying emergency preparedness weaknesses and verified the identified weaknesses were entered in the CAP. Documents reviewed are listed in the Attachment.

The inspectors assessed the following:

- licensed operator performance
- the ability of the licensee to administer the scenario and evaluate the operators
- the quality of the post-scenario critique
- simulator performance

.2 Resident Inspector Quarterly Review of Licensed Operator Performance in the Actual Plant/Main Control Room

The inspectors observed licensed operator performance in the main control room for the Unit 2 downpower due to the loss of the Wilmington Corning line on July 7, 2016; during an Alert declaration due to the fire at the 2C CSW pump on July 12, 2016; and the Unit 1 downpowers due to the loss of the Delco East line and the loss of the Southport feeder on September 3, and 22, 2016.

The inspectors assessed the following:

- use of plant procedures
- control board manipulations
- communications between crew members
- use and interpretation of instruments, indications, and alarms
- use of human error prevention techniques
- documentation of activities
- management and supervision

Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12 – 1 sample)

a. Inspection Scope

The inspectors assessed the licensee's treatment of the issue listed below to verify the licensee appropriately addressed equipment problems within the scope of the maintenance rule (10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants"). The inspectors reviewed procedures and records to evaluate the licensee's identification, assessment, and characterization of the problem as well as the corrective actions for returning the equipment to a satisfactory condition. Documents reviewed are listed in the Attachment.

- Unit 2, reactor protection system “B” train, controller failure and half scram, June 29, 2016

b. Findings

In Inspection Report 05000325/2016008, inspectors documented Finding (FIN) 2016008-01, Inadequate Procedures to Perform Maintenance on the Startup Auxiliary Transformer Non-segregated Bus and the 1B Reactor Recirculation Pump Variable Frequency Drive Cables, for which the NRC had not yet reached a preliminary significance determination (i.e., TBD).

Using IMC 0609, Appendix A, issued June 19, 2012, the SDP for Findings At-Power, the inspectors determined the finding screened to a more detailed risk evaluation because the finding caused a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. A detailed risk review was performed by the regional Senior Reactor Analyst. After additional review, it was determined that the two inadequate procedures did not share a direct common cause. Therefore, the risk associated with each condition was analyzed separately in accordance with the SDP. When separate, each finding, given the appropriate conditions, would result in a ground. The high resistance grounding design of the plant’s 4kV system limits the phase to ground fault current to a low enough value to limit plant equipment damage and allow time to search for the ground. The very low risk significance associated with these two separate grounds resulted in a Green (very low safety significance) finding. The risk significance of the event was mitigated because the licensee had earlier implemented modifications to the plant that would allow for early backfeed of alternating current power through the auxiliary unit transformer in the event of the failure of the path from the startup transformer. The licensee had also installed a supplemental EDG to provide a backup to the site EDGs that did not share the dependence on external sources of water for cooling. This finding is closed.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 5 samples)

a. Inspection Scope

The inspectors reviewed the maintenance activities listed below to verify that the licensee assessed and managed plant risk as required by 10 CFR 50.65(a)(4) and licensee procedures. The inspectors assessed the adequacy of the licensee’s risk assessments and implementation of RMAs. The inspectors also verified that the licensee was identifying and resolving problems with assessing and managing maintenance-related risk using the CAP. Additionally, for maintenance resulting from unforeseen situations, the inspectors assessed the effectiveness of the licensee’s planning and control of emergent work activities. Documents reviewed are listed in the Attachment.

- Unit 2, elevated risk due to the HPCI system unplanned inoperability, July 6, 2016
- Unit 2, elevated risk due to CS loop A maintenance outage, July 27, 2016
- Unit 1, elevated risk due to RHR loop B maintenance outage, August 3, 2016
- Unit 2, elevated risk due to the RCIC system maintenance outage, August 17, 2016
- Unit 2, elevated risk due to RHR and RHRSW loop A maintenance outage, August 31, 2016

b. Findings

Introduction: An NRC-identified Green NCV of 10 CFR 50.65(a)(4) was identified for the failure of the licensee to implement all necessary prescribed RMAs during a 2A RHR/RHRSW loop outage. Specifically, between August 31, 2016, and September 1, 2016, the licensee failed to post protective equipment signs on the 2B RHR/RHRSW MCCs whose unavailability would have taken Unit 2 into a Yellow risk condition.

Description: On August 31, 2016, the licensee placed the safety-related 2A RHR/RHRSW loop out-of-service to perform planned maintenance. The licensee evaluated the risk associated with this activity in accordance with 10 CFR 50.65(a)(4) and their Equipment Out of Service Software and determined the risk would be in an elevated Green risk condition. The RMAs were to protect equipment required for injection and decay heat removal during a design basis event. For Unit 2, the equipment required to be protected was the 2B RHR/RHRSW loop, the 2A and 2B CS systems, and the hardened wetwell vent. Procedures 0AP-025, [Brunswick Nuclear Plant] Integrated Scheduling, and AD-OP-ALL-0201, Protected Equipment, implement the requirements of 10 CFR 50.65(a)(4) at the site. Procedure 0AP-025, Attachment 6, states, in part, that primary components (e.g., motor operated valves) will be tagged at a minimum. 0AP-025, Section 11a, states equipment shall be posted when a component is out of service and is required for current plant operations, the redundant component as listed in the site-specific procedure shall be posted. In this case, the redundant loop was the 2B RHR/RHRSW.

On September 1, 2016, the inspectors reviewed the risk assessment and performed a walkdown of the posted equipment to ensure the RMAs were properly implemented. The inspectors identified that the 2B RHR/RHRSW 480V MCCs, which provide control and power to various motor operated valves, were not protected. The inspectors determined that the 2B RHR/RHRSW MCCs had not been protected since the start of the 2A RHR/RHRSW loop outage on August 31, 2016. Once the inspectors informed operations personnel that the equipment was not protected, operations personnel took immediate actions to protect the MCCs in the field. The licensee entered this issue into the CAP as NCR 2059064. Inspectors did verify the licensee had protected the 2B RHR/RHRSW pumps, 2A CS pump, the 2B CS pump, and the hardened wetwell vent.

Analysis: The inspectors determined the failure of the licensee to adequately post protected equipment signs for the 2B RHR/RHRSW system, whose unavailability would have taken the unit into a Yellow risk condition, was a performance deficiency. The finding was more than minor because if left uncorrected, the failure to perform RMAs could result in a loss of a safety-related mitigating function, specifically the RHR LPCI. Using IMC 0609, Appendix K, issued May 19, 2005, Maintenance Risk Assessment and Risk Management Significance Determination Process, Flowchart 2, Assessment of RMAs, the inspectors determined the finding screened as very low safety significance (Green) since the incremental core damage probability was less than $1\text{E-}6$. The finding has a crosscutting aspect in the area of human performance associated with the procedure adherence attribute because the licensee failed to follow plant procedures to fully protect the 2B RHR/RHRSW loop during the 2A RHR/RHRSW loop outage. (H.8)

Enforcement: 10 CFR 50.65(a)(4) states, in part, that before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. Contrary to

the above, between August 31, 2016, and September 1, 2016, the licensee failed to manage the increase in risk during the 2A RHR/RHRSW loop outage because all necessary prescribed RMAs were not implemented. As a result, the 2B RHR/RHRSW loop was not fully protected as required, during the elevated risk outage. The licensee took immediate corrective actions to protect the 2B RHR/RHRSW MCCs in the field. Because this finding is of very low safety significance (Green) and was entered into the licensee's CAP as NCR 2059064, consistent with Section 2.3.2.a of the NRC's Enforcement Policy, this violation is being treated as an NCV: NCV 05000324/2016003-01, Failure to Implement Risk Management Actions during Elevated Risk.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 6 samples)

a. Inspection Scope

Operability and Functionality Review

The inspectors selected the operability determinations or functionality evaluations listed below for review based on the risk-significance of the associated components and systems. The inspectors reviewed the technical adequacy of the determinations to ensure that TS operability was properly justified and the components or systems remained capable of performing their design functions. To verify whether components or systems were operable, the inspectors compared the operability and design criteria in the appropriate sections of the TS and UFSAR report to the licensee's evaluations. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. Additionally, the inspectors reviewed a sample of corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment.

- Unit 2, HPCI auxiliary oil pump motor overload relay failure, July 6, 2016
- Unit 1, Target Rock Part 21 notification, July 11, 2016
- Unit 2, drywell temperature drift, July 25, 2016
- Unit 1, HPCI oil bubbler knocked off, August 11, 2016
- Unit 2, 2A RHRSW pump cable degraded, September 1, 2016
- Unit 2, EDG 3 governor leak, September 13, 2016

b. Findings

Introduction: A self-revealing Green NCV of TS 5.4.1a, Procedures, was identified for the failure of the licensee to have an adequate procedure for PM on the Unit 2 HPCI auxiliary oil pump motor overload relay 2-2XDA-B11-74. Specifically, from May 26, 2015, to July 6, 2016, the licensee failed to incorporate PM task 482688, a 12-year replacement task for the relays into procedures, resulting in a shorted relay coil, the loss of control power, and the inoperability of the HPCI pump.

Description: On July 5, 2016, at 1614, the Unit 2 control room received the HPCI auxiliary oil pump motor overload alarm. The control room light indication for the auxiliary oil pump was extinguished, the associated field breaker had none of the required indications, and there was an acrid odor at the field breaker.

A loss of control power to the HPCI auxiliary oil pump occurred due to a shorted relay coil on the motor overload relay, 2-2XDA-B11-74, causing current flow in excess of the control power fuse. The licensee declared the HPCI pump inoperable. The licensee entered this issue into the CAP as NCR 2043067. On July 6, 2016, the licensee replaced the relay. The HPCI pump was restored to available at 0158 and declared operable at 1050. The purpose of the auxiliary oil pump is to provide hydraulic pressure to open the HPCI turbine stop and control valves during initial HPCI startup. With the loss of control power to the auxiliary oil pump, the HPCI pump was inoperable and could not have performed its safety function to provide high pressure emergency core cooling to the reactor pressure vessel.

The licensee performed a cause evaluation and determined the cause to be an age-related failure of the relay 2-2XDA-B11-74 coil, which led to the loss of control power for the HPCI auxiliary oil pump. The contributing cause was an incorrect classification of the relay as "important" and not the required "critical" classification. The licensee determined this relay had been installed for the life of the plant (approximately 40 years).

The inspectors reviewed operating experience (OE) 460540 from the Harris Nuclear Power Plant from 2011, when a safety-related system lost control power as a result of a shorted alarm relay coil. On August 16, 2011, based on the Harris OE, the licensee created PM task 482688, a 12-year replacement task, to replace the Unit 1 and 2 relays. However, the PM task identified these relays as "important" and not "critical." On May 26, 2015, PM task 751030 was initiated to remove the replacement PMs for the relays stating, "these are important, not critical, alarm relays and no PM is required per the Duke PM Template." The inspectors reviewed licensee procedure AD-EG-ALL-1202, Equipment Reliability Classification, Section 5.3, Criterion 5.3.2 1.e, which stated a functional failure that causes a Mitigating Systems Performance Index failure [HPCI] shall be scoped as Risk Category 1 (critical).

The licensee's corrective actions include creating a PM to replace the Unit 1 and 2 relays and to change the classification of the relays to critical. The Unit 1 HPCI auxiliary oil pump motor overload relay failed and was replaced in 1995. The licensee performed a visual inspection of the current Unit 1 relay and did not identify any degradation. Based on the current condition of the relay and the length of time it took for the Unit 2 relay to fail, the licensee plans to replace the Unit 1 relay during the 2017 HPCI online maintenance outage.

Analysis: The inspectors determined that the failure of the licensee to have an adequate PM procedure to replace the Unit 2 HPCI auxiliary oil pump motor overload relay 2-2XDA-B11-74 was a performance deficiency. The finding was more than minor because it was associated with the procedural quality 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 failure to replace the HPCI auxiliary oil pump motor overload relay resulted in the inoperability of the Unit 2 HPCI pump, and the loss of safety function. Using IMC 0609, Appendix A, issued June 19, 2012, the SDP for Findings At-Power, Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined the finding screened to a more detailed risk evaluation, since the finding represented a loss of HPCI system and/or function. The inspectors used SAPHIRE to conduct a more detailed risk review of the finding. The inspectors determined that the finding was of very low safety significance (Green), because the CDF risk was less than $1.0E-6$ /year. This finding has a cross-cutting aspect in the area of human performance associated with the work management aspect, for failure to implement a process of

planning, controlling, and executing work activities such that nuclear safety was an overriding priority. Specifically the licensee failed to effectively plan and control PM strategies associated with operating experience to prevent the failure of the HPCI pump. [H.5]

Enforcement. TS 5.4.1a, Procedures, states that written procedures shall be established, implemented, and maintained covering the following activities: a. The applicable procedures recommended in Regulatory Guide 1.33, Appendix A, November 1972 (Safety Guide 33). Safety Guide 33, Section I.2 states, that PM schedules should be developed to specify lubrication schedules, inspections of equipment, replacement of such items and filters and strainers, and inspection or replacement of parts that have a specific lifetime. Contrary to the above, from May 26, 2015, to July 6, 2016, the licensee failed to incorporate PM task 482688, a 12-year replacement task for the relays, into procedures. This resulted in a shorted relay coil, the loss of control power, and the inoperability of the HPCI pump. The licensee replaced the relay and the HPCI pump was returned to operable. Additionally, the licensee created a PM task to replace the relays and to change the classification of the relays to critical. Because this finding is of very low safety significance (Green) and was entered into the licensee's CAP as NCR 2043067, consistent with Section 2.3.2.a of the NRC's Enforcement Policy, this violation is being treated as an NCV: NCV 05000324/2016003-02, Inadequate Procedure to Perform Preventive Maintenance on the HPCI Auxiliary Oil Pump Motor Overload Relay.

1R18 Plant Modifications (71111.18 – 1 sample)

a. Inspection Scope

The inspectors verified that the plant modification listed below did not affect the safety functions of important safety systems. The inspectors confirmed the modification did not degrade the design bases, licensing bases, and performance capability of risk significant structures, systems and components. The inspectors also verified the modification performed during plant configurations involving increased risk did not place the plant in an unsafe condition. Additionally, the inspectors evaluated whether system operability and availability, configuration control, post-installation test activities, and changes to documents, such as drawings, procedures, and operator training materials, complied with licensee standards and NRC requirements. In addition, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with modifications. Documents reviewed are listed in the Attachment.

- Engineering Change 300449, add isolation valve to 1B standby liquid control (SLC) accumulator

b. Findings

No findings were identified.

1R19 Post Maintenance Testing (71111.19 – 6 samples)

a. Inspection Scope

The inspectors either observed post-maintenance testing or reviewed the test results for the maintenance activities listed below to verify the work performed was completed

correctly and the test activities were adequate to verify system operability and functional capability.

- Unit 1, WO 20053717, HPCI 1-E41-F008 investigation and repair, July 14, 2016
- Unit 2, WO 11970472, 2C CSW pump repair, July 15, 2016
- Unit 2, WO 13450200, RCIC 2-E51-F045 rebuild, August 18, 2016
- Unit 1, WO 20090150, SLC System Operability Test after SLC annual maintenance outage, September 8, 2016
- Unit 2, WO 13463214, EDG 3 pressure regulating valve replacement, September 13, 2016
- Unit 1, WOs 11409774 11409775, and 20036792, RCIC System Operability Test after RCIC annual maintenance outage, September 20, 2016

The inspectors evaluated these activities for the following:

- acceptance criteria were clear and demonstrated operational readiness
- effects of testing on the plant were adequately addressed
- test instrumentation was appropriate
- tests were performed in accordance with approved procedures
- equipment was returned to its operational status following testing
- test documentation was properly evaluated

Additionally, the inspectors reviewed a sample of corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with post-maintenance testing. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 5 samples)

a. Inspection Scope

The inspectors reviewed the surveillance tests listed below and either observed the test or reviewed test results to verify testing activities adequately demonstrated that the affected structures, systems, and components remained capable of performing the intended safety functions (under conditions as close as practical to design bases conditions or as required by TSs) and maintained their operational readiness.

The inspectors evaluated the test activities to assess for preconditioning of equipment, procedure adherence, and equipment alignment following completion of the surveillance. Additionally, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with surveillance testing. Documents reviewed are listed in the Attachment.

Routine Surveillance Tests

- OPT-08.1.4A, RHR Service Water System Operability Test – Loop A, June 3, 2016
- OPT-10.1.1, RCIC System Operability Test, August, 19, 2016
- OE&RC-1008, Operation of the Radwaste Building Sample Station, September 19, 2016

In-Service Tests (IST)

- OPT-08.2.2B, LPCI/RHR System Operability Test - Loop B, August 4, 2016

Reactor Coolant System Leak Detection

- Unit 2, OOI-02.3, Drywell Leakage Control, August 10, 2016

b. Findings

Introduction: A self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings, was identified for the failure of the licensee to have an adequate procedure for the 2B RHRSW pump operability test. Specifically, from July 12, 2001, to August 2, 2016, licensee procedure OPT-08.1.4A(B), RHR Service Water System Operability Test – Loop B, did not contain sufficient information to maintain plant status control for the 2B RHRSW subsystem pressure switch instrument isolation valves, 2-SW-PS-1176B-3 and 2-SW-PS-1176D-3. This resulted in the valves being found mispositioned (closed) and the inoperability of the 2B RHRSW subsystem from June 4 - 15, 2016. This finding resulted in a violation of TS 3.7.1, RHRSW System.

Description: On June 15, 2016, at 0515, the 2B RHRSW subsystem was placed in service in accordance with ZOP-43, Service Water Operating Procedure, for suppression pool cooling due to an upcoming HPCI pump run. The RHRSW Division II suction header pressure low alarm was received. The licensee investigated and found the 2B RHRSW pressure switch instrument isolation valves, 2-SW-PS-1176B-3 and 2-SW-PS-1176D-3, were closed when they should have been open. With these pressure switches isolated, the suction pressure of the nuclear service water (NSW) pumps could not be sensed, and the “B” and “D” RHRSW pumps could not start. The licensee immediately reopened the instrument isolation valves and returned the 2B RHRSW subsystem to operable at 0545.

The licensee performed an apparent cause evaluation and determined the most likely cause to be that procedure OPT-08.1.4B did not maintain plant status control for the 2-SW-PS-1176B(D)-3 isolation valves, resulting in the valves being mispositioned. The inspectors reviewed procedure OPT-08.1.4B, Section 3.0, Step 4.0, which states, in part, that when taking pressure readings...the indicator/pointer fluctuations are reduced to a minimum. A valve upstream of the gauge may be throttled to reduce fluctuation. The inspectors determined the procedure was not clear on which valve to throttle and did not require the valve be returned to the correct position at the end of the test.

The licensee determined the most likely time frame this event occurred was during the last performance of OPT-08.1.4B on April 6, 2016. The licensee's corrective actions included implementing procedure revision request 2044921 on August 2, 2016, to revise procedures OPT-08.1.4A(B) to include steps to specifically throttle the drain isolation valves 2-SW-PS-1176B(D)-6 as needed for suction pressure fluctuations instead of the 2-SW-PS-1176B(D)-3 valves, and included an independent verification step to ensure the valves are returned to the correct position.

On June 4, 2016, the licensee performed OPT-08.1.4A, RHR Service Water System Operability Test – Subsystem A, satisfactorily. During this test, the crosstie valve between the two RHRSW subsystems was opened, which provides the logic to start the 2B RHRSW pumps. Since the low header pressure alarm was not received, the licensee determined the header pressure was adequate to ensure the start of the 2B RHRSW pumps. The inspectors reviewed the evaluation and agreed with the conclusions.

Based on a review of past operability, the inspectors determined the licensee violated TS 3.7.1, RHRSW System, Conditions B and D, when the 2B RHRSW subsystem was inoperable for greater than the AOT of seven days, and the licensee did not perform the actions to be in Mode 3 in 12 hours and Mode 4 in 36 hours. On August 8, 2016, the licensee reported the TS violation as required by 10 CFR 50.73(a)(2)(i)(B), as discussed in Section 4OA3.2.

The inspectors determined the mission time for equipment in the reactor building assumes that plant personnel will not be able to access the areas for 30 days, based on expected high dose rates in excess of the NRC 5 REM limit, resulting in no operator credit for manual actions.

Analysis: The inspectors determined the licensee's failure to have an adequate procedure for the 2B RHRSW subsystem operability test to ensure configuration control was a performance deficiency. The finding was more than minor because it was associated with the procedural quality 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 inadequate procedure resulted in the inoperability of the 2B RHRSW subsystem. Using IMC 0609, Appendix A, issued June 19, 2012, the SDP for Findings At-Power, Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined the finding screened to a more detailed risk evaluation, since the finding represented an actual loss of function of a single train, for greater than its TS AOT. A regional SRA performed a detailed risk evaluation for the finding by setting the exposure period for 11 days, and assuming recovery actions that could be taken to mitigate the event. In addition, another later recovery was possible for the dominant sequences because service water, in sufficient quantity, could be pushed through the inoperable pumps to provide adequate cooling in non-LOCA sequences. The dominant contributor involved loss of the heat sink through common cause failure. The risk analysis resulted in a finding that is characterized as very low safety significance (Green). The finding had a cross-cutting aspect in the area of human performance associated with the challenge the unknown attribute because the licensee did not stop when faced with uncertain conditions, and risks were not evaluated and managed before proceeding. Specifically, the licensee continued through the April 2016 2B RHRSW system operability test, even when the procedure was not clear on which valve to manipulate to adjust for flow fluctuations. [H.11]

Enforcement: Appendix B of 10 CFR Part 50, Criterion V, Instructions, Procedures, and Drawings, requires, in part, that activities affecting quality shall be prescribed by documented procedures of a type appropriate to the circumstances and shall be accomplished in accordance with these procedures. TS 3.7.1, RHRSW System, requires two RHRSW subsystems to be operable. The required action for Condition B with one RHRSW subsystem inoperable, was to restore the subsystem to operable status within seven days. If the required actions and associated completion time for Condition B are not met, the required action for Condition D was to be in Mode 3 in 12 hours and Mode 4 in 36 hours. Contrary to the above, from July 12, 2001, to August 2, 2016, licensee procedure OPT-08.1.4B, RHR Service Water System Operability Test – Loop B, was not appropriate to the circumstances. Specifically, the procedure did not contain sufficient information to maintain plant status control for the 2B RHRSW subsystem pressure switch instrument isolation valves, 2-SW-PS-1176B-3 and 2-SW-PS-1176D-3. This resulted in the valves being found mispositioned (closed) and the inoperability of the 2B RHRSW subsystem from June 4 – 15, 2016. This finding resulted in a violation of TS 3.7.1, RHRSW System, since the 2B RHRSW subsystem

was inoperable for greater than the TS AOT. As immediate corrective actions, the licensee opened the 2-SW-PS-1176B(D)-3 valves and ensured the “A” subsystem pressure switch instrument isolation valves were open. Additionally, the licensee revised procedure OPT-08.1.4A(B) to maintain plant status control by throttling the drain valves versus the pressure switch instrument isolation valves, and included an independent verification step to ensure the valves are returned to the correct position. Because this finding is of very low safety significance (Green) and was entered into the licensee’s CAP as NCR 2037920, consistent with Section 2.3.2.a of the NRC’s Enforcement Policy, this violation is being treated as an NCV: NCV 05000324/2016003-03, Inadequate Procedure for the 2B RHRSW Subsystem Operability Test.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06 – 1 sample)

a. Inspection Scope

On July 26, 2016, the inspectors observed an evaluated simulator scenario administered to an operating crew, including an air header rupture, an anticipated transient without SCRAM, failure of the SLC pumps, an unisolable RCIC steam line break, and fuel damage. The inspectors observed licensee activities in the simulator to evaluate implementation of the emergency plan, including event classification, notification, and protective action recommendations. The inspectors evaluated the licensee’s performance against criteria established in the licensee’s procedures. Additionally, the inspectors attended the post-exercise critique to assess the licensee’s effectiveness in identifying emergency preparedness weaknesses and verified the identified weaknesses were entered in the CAP. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151 – 6 samples)

a. Inspection Scope

The inspectors reviewed a sample of the performance indicator (PI) data, submitted by the licensee, for the Unit 1 and Unit 2 PIs listed below. The inspectors reviewed plant records compiled between July 1, 2015, through June 30, 2016, to verify the accuracy and completeness of the data reported for the station. The inspectors verified that the PI data complied with guidance contained in Nuclear Energy Institute 99-02, “Regulatory Assessment Performance Indicator Guideline,” and licensee procedures. The inspectors verified the accuracy of reported data that were used to calculate the value of each PI. In addition, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with PI data. Documents reviewed are listed in the Attachment.

Cornerstone: Mitigating Systems

- Mitigating Systems Performance Index RHR system

Cornerstone: Barrier Integrity

- reactor coolant system leak rate
- reactor coolant system specific activity

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 2 samples)

.1 Routine Review

The inspectors screened items entered into the licensee's CAP to identify repetitive equipment failures or specific human performance issues for follow-up. The inspectors reviewed condition reports, attended screening meetings, or accessed the licensee's computerized corrective action database.

.2 Annual Follow-up of Selected Issues

a. Inspection Scope

The inspectors conducted a detailed review of the following two condition reports:

- NCR 1994959, Regulatory Issue Summary 2015-06 Tornado Missile Protection
- NCR 2042862, Part 21 Inadequate Swaging and Adherence of Silicone O-ring

The inspectors evaluated the following attributes of the licensee's actions:

- complete and accurate identification of the problem in a timely manner
- evaluation and disposition of operability and reportability issues
- consideration of extent of condition, generic implications, common cause, and previous occurrences
- classification and prioritization of the problem
- identification of root and contributing causes of the problem
- identification of any additional condition reports
- completion of corrective actions in a timely manner

Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

4OA3 Follow-up of Events (71153 – 4 samples)

.1 (Closed) Licensee Event Report (LER) 05000324/2016-002-00, High Pressure Coolant Injection System Inoperable due to Failed Relay Coil

a. Inspection Scope

On July 5, 2016, at 1614, the Unit 2 control room received the HPCI auxiliary oil pump motor overload alarm. The control room light indication for the auxiliary oil pump was

extinguished, the associated field breaker had none of the required indications, and there was an acrid odor at the field breaker. A loss of control power to the HPCI auxiliary oil pump occurred due to a shorted relay coil on the motor overload relay 2-2XDA-B11-74, causing current flow in excess of the control power fuse. The licensee declared the HPCI pump inoperable. On July 6, 2016, the licensee replaced the relay, and the HPCI pump was restored to operable. The licensee performed a cause evaluation and determined the cause to be an age-related failure of the relay 2-2XDA-B11-74 coil, which led to the loss of control power for the HPCI auxiliary oil pump. The licensee determined this relay had been installed for the life of the plant (approximately 40 years). The licensee entered this issue into the CAP as NCR 2043067. The inspectors reviewed the cause evaluation and the LER. Documents reviewed are listed in the Attachment.

b. Findings

A self-revealing NCV was documented in Section 1R15 of this report. No additional findings were identified during the review of this LER. This LER is closed.

.2 (Closed) LER 05000324/2016-001-00, Mispositioned Valves Result in Residual Heat Removal Service Water System Inoperability

a. Inspection Scope

On June 15, 2016, at 0515, the 2B RHRSW subsystem was placed in service in accordance with 2OP-43, Service Water Operating Procedure, for suppression pool cooling due to an upcoming HPCI pump run. The RHRSW Division II suction header pressure low alarm was received. The licensee investigated and found the 2B RHRSW pressure switch instrument isolation valves 2-SW-PS-1176B-3 and 2-SW-PS-1176D-3 closed when they should have been open. With these pressure switches isolated, the suction pressure of the NSW pumps could not be sensed, and the "B" and "D" RHRSW pumps could not start. The licensee immediately reopened the instrument isolation valves and returned the 2B RHRSW subsystem to operable. The licensee performed an apparent cause evaluation and determined the most likely cause to be that procedure OPT-08.1.4B did not maintain plant status control for the 2-SW-PS-1176B(D)-3 isolation valves resulting in the valves being mispositioned. The licensee entered this issue into the CAP as NCR 2037920. The inspectors reviewed the cause evaluation and the LER. Documents reviewed are listed in the Attachment.

b. Findings

A self-revealing NCV was documented in Section 1R22 of this report. No additional findings were identified during the review of this LER. This LER is closed.

.3 (Closed) LER 05000325/2016-004-00, Tornado Missile Vulnerability Results in Condition Prohibited by Technical Specifications

a. Inspection Scope

On July 21, 2016, Units 1 and 2 were in Mode 1 at 100 percent of RTP. At that time, the licensee determined that a conduit in the EDG building was vulnerable to a tornado missile. The tornado missile vulnerability has existed since original plant construction. The conduit contains cables associated with Unit 2 NSW pump "B". If the cables were disabled by a tornado missile, 2B NSW pump would be inoperable. TS 3.7.2, Service

Water System and Ultimate Heat Sink, requires three of the four NSW pumps to be operable. The licensee determined that during other NSW pump outages, TS 3.7.2 AOT was exceeded. Inspectors verified the immediate compensatory measures were taken and intermediate compensatory measures were taken including updating station abnormal procedures to start the NSW pumps via the alternate safe shutdown switches and providing training to address the vulnerability during tornadoes. Enforcement Guidance Memorandum 15-002, Enforcement Discretion for Tornado-Generated Missile Protection Noncompliance, was implemented, and the licensee declared the 2B NSW pump operable but nonconforming. The licensee entered this issue into the CAP as NCR 2028383. The inspectors reviewed the cause evaluation and the LER. Documents reviewed are listed in the Attachment.

b. Findings

Because the licensee implemented compensatory measures, the NRC is exercising enforcement discretion by not issuing an enforcement action for the violation and allowing continued reactor operation. This LER is closed.

.4 (Closed) LER 05000325/2016-002-01, Emergency Diesel Generator 3 Inoperable Due to Failure to Auto-Start

a. Inspection Scope

On March 4, 2016, at 1235, EDG 3 was declared inoperable. At the time, emergency bus E1, and balance of plant bus 1D were inoperable due to planned maintenance. Two inoperable EDGs represents a loss of safety function, for the onsite standby power source. Therefore, this condition was reported in accordance with 10 CFR 50.73(a)(2)(v)(D), as an event or condition that could have prevented the fulfillment of the safety function of a system that is needed to mitigate the consequences of an accident. In addition, it was determined that EDG 3 was inoperable for greater than the TS AOT and was reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as operation prohibited by the TSs. The LER was revised due to the root cause being changed to a design vulnerability associated with relaxation of the EDG 3 fuse holder fingers, which was not mitigated, resulting in a loss of electrical continuity, and the inoperability of EDG 3. The corrective action to prevent recurrence will be to implement a design change to address the vulnerability. The licensee entered this issue into the CAP as NCR 2007449. The inspectors reviewed the revised cause evaluation and LER. Documents reviewed are listed in the Attachment.

b. Findings

A self-revealing NCV was documented in the previous inspection report (2016002) in Section 1R19. No additional findings were identified during the review of this LER. This LER is closed.

4OA6 Meetings, Including Exit

On October 13, 2016, the resident inspectors presented the inspection results to Mr. Gideon and other members of the licensee's staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

4OA7 Licensee-Identified Violations

The following violations of very low safety significance (Green) and Severity Level (SL) IV were identified by the licensee and are violations of NRC requirements which meet the criteria of the NRC Enforcement Policy, for being dispositioned as a NCV.

- .1 10 CFR Part 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings, requires in part that, activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. WO 2281641-05 instructions required in part that, the craft and quality control (QC) hold points, verify the unistrut bolts were torqued to a minimum torque of 72 in/lbs., verify tagging and marking, verify clearances and tolerances, and verify configuration (including dimensions).

Contrary to the above, on March 23, 2015, a contract QC inspector deliberately failed to accomplish an activity affecting quality in accordance with a prescribed, documented instruction. Specifically, the QC inspector signed the QC hold points on WO 2281641-05 associated with the removal/installation of a safety-related pipe support for backup nitrogen in the drywell, without verifying and confirming the work had been satisfactorily accomplished according to the WO. Using IMC 0609, Appendix G, Shutdown Operations Significance Determination Process, inspectors determined this finding to be of very low safety significance (Green) since the finding did not involve the total loss of any safety function. This issue was documented in the licensee's CAP as NCR 739864.

- .2 10 CFR 50.9, Completeness and Accuracy of Information, requires, in part, that information required by statute or by the Commission's regulations, orders, or license conditions to be maintained by the licensee shall be complete and accurate in all material respects. WOs associated with safety-related activities are designated as quality-related records that are required to be maintained by the licensee's Quality Assurance Program.

Contrary to the above, on March 23, 2015, a contract QC inspector deliberately falsified the quality record for WO 2281641-05, resulting in the licensee's maintaining of information that was incomplete and inaccurate. The WO is material to the NRC, as it provides documented evidence of compliance with QC inspection requirements. Using traditional enforcement, the SL assigned to this violation was SL IV, because there was a deliberate violation of regulatory requirements, and resulted in no or relatively inappreciable potential safety consequences. This violation also meets the criteria for a NCV because the licensee identified the violation and promptly provided the information concerning the violation, to the NRC. This issue was documented in the licensee's CAP as NCR 739864.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

K. Allen	Director, Design Engineering
B. Bagwell	Environmental & Chemistry
A. Baker	Supervisor, Environmental & Chemistry
A. Brittain	Director, Nuclear Plant Security
P. Brown	Manager, Nuclear Performance Improvement
J. Bryant	Regulatory Affairs
R. Carpenter	Radiation Monitor Engineer
C. Dunsmore	Manager, Nuclear Work Management
J. Ferguson	Manager, Nuclear Oversight
W. Gideon	Vice President
L. Grzeck	Manager, Nuclear Regulatory Affairs
J. Hicks	Manager, Nuclear Training
B. Houston	Manager, Maintenance
F. Jefferson	Director, Nuclear Engineering
J. Johnson	Manager, Nuclear Chemistry
K. Moser	Plant Manager
E. Neil	Manager, Nuclear Rad Protection
J. Nolin	General Manager, Nuclear Engineering
W. Orlando	Superintendent, E/I&C
A. Padleckas	Assistant Ops Manager, Training
D. Petrusic	Superintendent, Environmental & Chemistry
J. Pierce	Manager, Nuclear Operations
A. Pope	Director, Nuclear Organization Effectiveness
M. Regan	Project Manager, Major Projects
M. Smiley	Manager, Nuclear Ops Training
R. Wiemann	Director, Electrical/Rx Systems
E. Williams	Superintendent, Nuclear Maintenance

State of North Carolina

P. Cox	Department of Health and Human Services
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NRC Personnel

S. Rose	Chief, Reactor Projects Branch 4
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LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000324/2016003-01	NCV	Failure to Implement Risk Management Actions during Elevated Risk (Section 1R13)
05000324/2016003-02	NCV	Inadequate Procedure to Perform Preventive Maintenance on the HPCI Auxiliary Oil Pump Motor Overload Relay (Section 1R15)
05000324/2016003-03	NCV	Inadequate Procedure for the 2B RHRSW Subsystem Operability Test (Section 1R22)

Closed

05000325/2016008-01	FIN	Inadequate Procedures to Perform Maintenance on the SAT Non-Segregated Bus and the 1B Reactor Recirculation Pump Variable Frequency Drive Cables (Section 1R12)
05000324/2016-002-00	LER	High Pressure Coolant Injection System Inoperable due to Failed Relay Coil (Section 4OA3.1)
05000324/2016-001-00	LER	Mispositioned Valves Result in Residual Heat Removal Service Water System Inoperability (Section 4OA3.2)
05000325/2016-004-00	LER	Tornado Missile Vulnerability Results in Condition Prohibited by Technical Specifications (Section 4OA3.3)
05000325/2016-002-01	LER	Emergency Diesel Generator 3 Inoperable Due to Failure to Auto-Start (Section 4OA3.4)

LIST OF DOCUMENTS REVIEWED

Common Documents Reviewed

Updated Final Safety Analysis Report
Individual Plant Examination
Individual Plant Examination of External Events
Technical Specifications and Bases
Technical Requirements Manual
Control Room Narrative Logs
Plan of the Day

Section 1R01: Adverse Weather Protection

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D-25025, Reactor Building Residual; Heat Removal System Piping Diagram Sht 1B, Rev. 73
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1PFP-RB, Reactor Building PreFire Plans, Rev. 18

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0AOP-02, Control Rod Malfunction Misposition, Rev. 28

0AOP-05, Radiological Spills, High Radiation, Airborne Activity, Rev. 32

0AOP-05.4, Radiological Release, Rev. 001

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0EOP-01-LEP-03, Alternate Boron Injection, Rev. 30

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2EOP-01-ATWS, ATWS Procedure, Rev. 001

0EOP-01-LEP-02, Alternate Control Rod Insertion, Rev. 029

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2048995 2048985 2048965 2048868 2048827 2048776

2045123 2045179

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2041518

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2050688

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2042862	2048171	2053366	2058227	2053746	1941638
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Work Orders

20040225	20107656	20042294
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D-25047, Reactor Building Standby Liquid Control System Piping Diagram, Rev. 31
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11970472 13450200 13463214 20090150

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2044383	2063939	2045179	2045123	2045187	2045958
2050694	2050709	2050693	2050688	2051577	2051407
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2045123	2045179	63617	700024
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Condition Reports

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Work Orders

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