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

June 27, 2014

Mr. Scott L. Batson
Site Vice President
Duke Energy Corporation
Oconee Nuclear Station
7800 Rochester Highway
Seneca, SC 29672-0752

SUBJECT: OCONEE NUCLEAR STATION – NRC COMPONENT DESIGN BASES INSPECTION REPORT 05000269/2014007, 05000270/20140007, AND 05000287/2014007

Dear Mr. Batson:

On May 9, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Oconee Nuclear Station Units 1, 2 and 3. On June 18, 2014, the NRC team leader discussed the results of this inspection with Oconee management and staff. Inspectors documented the results of this inspection in the enclosed inspection report.

NRC inspectors documented two findings of very low safety significance (Green) in this report. These findings involved violations of NRC requirements. Additionally, in this report, NRC inspectors documented one Severity Level IV violation with no associated finding and a licensee-identified violation, which was determined to be Severity Level IV. The NRC is treating these violations as non-cited violations (NCV) consistent with Section 2.3.2.1 of the Enforcement Policy.

If you contest the violations or 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, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC resident inspector at the Oconee Nuclear Station.

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 Regional Administrator, Region II; and the NRC resident inspector at the Oconee Nuclear Station.

In accordance with Title 10 of the *Code of Federal Regulations* 2.390, “Public Inspections, Exemptions, Requests for Withholding,” of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's Agencywide Document Access and Management System (ADAMS). ADAMS is

accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Rebecca L. Nease, Branch Chief
Engineering Branch 1
Division of Reactor Safety

Docket Nos.: 05000269, 05000270, 05000287
License Nos.: DPR-38, DPR-47, DPR-55

Enclosure:
Inspection Report 05000269/2014007, 05000270/2014007, 05000287/2014007
w/Attachment: Supplementary Information

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accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

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Letter to Scott Batson from Rebecca L. Nease dated June 27, 2014

SUBJECT: OCONEE NUCLEAR STATION – NRC COMPONENT DESIGN BASES INSPECTION REPORT 05000269/2014007, 05000270/20140007, AND 05000287/2014007

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	50-269, 50-270, and 50-287
License Nos.:	DPR-38, DPR-47, and DPR-55
Report Nos.:	05000269/2014007, 05000270/2014007, and 05000287/2014007
Licensee:	Duke Energy Carolinas, LLC
Facility:	Oconee Nuclear Station, Units 1, 2, and 3
Location:	7800 Rochester Highway Seneca, SC 29672
Dates:	February 10, 2014 - March 28, 2014 April 28, 2014 – May 2, 2014 May 5, 2014 – May 9, 2014
Inspectors:	J. Eargle, Senior Reactor Inspector (Lead) R. Williams, Senior Reactor Inspector S. Pindale, Senior Reactor Inspector S. Sanchez, Senior Emergency Preparedness Inspector T. Fanelli, Reactor Inspector W. Monk, Reactor Inspector G. Nicely, Contractor (Electrical) T. Tinkel, Contractor (Mechanical)
Approved by:	Rebecca L. Nease, Chief Engineering Branch 1 Division of Reactor Safety

Enclosure

SUMMARY

IRs 05000269/2014-007, 05000270/2014-007 and 05000287/2014-007; 2/10/2014 – 5/9/2014; Oconee Nuclear Station, Units 1, 2, and 3; Component Design Bases Inspection.

This inspection was conducted by a team of six Nuclear Regulatory Commission (NRC) inspectors from Regions I and II, and two NRC contract personnel. Two Green non-cited violations and one Severity Level (SL)-IV violation were identified. The significance of inspection findings is indicated by their color (Green, White, Yellow, Red) using the NRC Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Aspects Within Cross Cutting Areas," dated December 19, 2013. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated July 9, 2013. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

NRC identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green: The team identified a Green non-cited violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to ensure that at the worst-case voltage, protective devices and thermal overload relays for safety-related loads would not trip prior to and after the transfer to the emergency power source. This transfer occurs for a sustained degraded voltage below the under voltage relay voltage settings for the duration of the time delay setting or the manual actions credited. The licensee revised their voltage calculations to account for previously unanalyzed loads. The licensee entered this issue into its corrective action program as problem identification program (PIP) O-14-2280.

  The team determined that the performance deficiency was more than minor because it was associated with the Design Control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the team identified that the voltages evaluated in the licensee's analysis were non-conservative and could result in lower unanalyzed voltages that could result in connected safety-related loads stalling, becoming damaged, their protective devices tripping, or loads such as battery chargers being below their minimum operating voltages. The team determined that the finding was of very low safety significance (Green) because it was a design deficiency that did not result in a loss of off-site power operability. The team determined that no cross cutting aspect was applicable because this finding was not indicative of current licensee performance. (Section 1R21.2.b.i)

- Green: The team identified a Green non-cited violation (NCV), with two examples, of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to correct conditions adverse to quality. Specifically, the licensee (1) failed to correct voltage calculations for safety-related 4160 volt circuit breaker 125 volt-direct current control circuits and (2) failed to correct voltage calculations for safety-related 120 volt alternating current motor control center control circuits. The above issues were previously identified as NCV 05000269,270,287/2011010-04 and NCV 05000269,270,287/2011010-03, respectively.

The incomplete corrective actions were newly entered in the licensee's corrective action program as problem identification program (PIP) reports O-14-2781 and O-14-2811 to track their completion.

The team determined that the performance deficiency was more than minor because it affected the Equipment Performance attribute of the Mitigating Systems Cornerstone, and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The team determined the finding was of very low safety significance (Green) because the inadequate corrective actions did not result in losses of operability or function for either example. The violation was assigned the cross-cutting aspect of Resolution in the area of Problem Identification and Resolution because the licensee did not take effective corrective actions to address issues in a timely manner. [P.3] (Section 1R21.2.b.ii)

- SL-IV: The team identified a Severity Level IV non-cited violation of 10 CFR 50.71(e) for the licensee's failure to include in the latest Updated Final Safety Analysis Report (UFSAR) changes made to the site's licensing bases with respect to station battery testing made during the Technical Specification conversion to Integrated Technical Specifications. Specifically, the UFSAR did not identify the standards by which the testing was conducted. The licensee entered this issue into its corrective action program as problem identification program report O-14-2338 and planned to include the omitted battery testing standards to the UFSAR during an upcoming update cycle.

  The team dispositioned the performance deficiency using the traditional enforcement process because failing to update the UFSAR had the potential to adversely impact the NRC's ability to perform its regulatory function. The performance deficiency was characterized as a Severity Level IV violation in accordance with the NRC Enforcement Policy, Section 6.1.d.3 as the lack of up-to-date information did not result in any unacceptable change to the facility or procedures. In accordance with IMC 0612, "Power Reactor Inspection Reports," no cross-cutting aspects are assigned to traditional enforcement violations. (Section 1R21.2.b.iii)

Licensee-Identified Violations

A violation of very low safety significance was identified by the licensee and has been reviewed by the team. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and corrective action tracking numbers are listed in Section 4OA7 of this report.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R21 Component Design Bases Inspection (71111.21)

.1 Inspection Sample Selection Process

The team selected risk-significant components for review using information contained in the licensee's probabilistic risk assessment. In general, this included components that had a risk achievement worth factor greater than 1.3 or Birnbaum value greater than 1E-6. The sample included 18 components, two of which were associated with containment large early release frequency (LERF), and five operating experience (OE) items.

The team performed a margin assessment and a detailed review of the selected risk-significant components to verify that the design bases had been correctly implemented and maintained. Where possible, this margin was determined by the review of the design basis and the Updated Final Safety Analysis Report (UFSAR). This margin assessment also considered original design issues, margin reductions due to modifications, or margin reductions identified as a result of material condition issues. Equipment reliability issues were also considered in the selection of components for a detailed review. These reliability issues included items related to failed performance test results, significant corrective action, repeated maintenance, maintenance rule status, Regulatory Issue Summary 05-020 (formerly Generic Letter 91-18) conditions, NRC resident inspector input regarding problem equipment, system health reports, industry OE, and licensee problem equipment lists. Consideration was also given to the uniqueness and complexity of the design, OE, and the available defense-in-depth margins. An overall summary of the reviews performed and the specific inspection findings identified is included in the following sections of the report.

.2 Component Reviews

a. Inspection Scope

Components

- Low Pressure (LP) Injection Motor-Operated Valves (MOV) LP-15 and LP-16 (Units 1, 2, and 3)
- Condenser Circulating Water (CCW) MOVs -10, 11, 12, & 13 (Units 1, 2, and 3)
- Turbine Driven Emergency Feedwater (TDEFW) Pumps (Units 1, 2, and 3)
- TDEFW Steam Isolation Valves MS-93 (Units 1, 2, and 3)
- TDEFW Steam Control Valves MS-87 (Units 1, 2, and 3)
- Motor Driven Emergency Feedwater (MDEFW) Pumps (Units 1, 2, and 3)
- Station Auxiliary Service Water (ASW) Pump
- Keowee Governor Oil Pumps
- Keowee Emergency Start Logic
- Standby Shutdown Facility (SSF) Feed from Protected Service Water (PSW) Switchgear
- 125 volt direct current (Vdc) Vital I&C Batteries (Units 1, 2, and 3)
- CT6 and CT7 Transformer

- SSF 600 volt alternating current (Vac) Motor Control Center 3XSF Breaker 3A
- 4160 Vac Breakers N1 and N2 (Unit 3)
- SSF ASW Pump Motor
- Diverse Scram System Channel 1 & 2 Pressure Transmitters 3RCPT0244 and 3RCPT0245

Components with LERF Implications

- Turbine Bypass MOVs MS-19, 22, 28, & 31 (Units 1, 2, and 3)
- Atmospheric Dump Valves MS-162, & 164 (Units 1, 2, and 3)

For the 18 components listed above, the team reviewed the plant technical specifications (TS), UFSAR, design bases documents (DBDs), and drawings to establish an overall understanding of the design bases of the components. Design calculations and procedures were reviewed to verify that the design and licensing bases had been appropriately translated into these documents. Test procedures and recent test results were reviewed against DBDs to verify that acceptance criteria for tested parameters were supported by calculations or other engineering documents, and that individual tests and analyses served to validate component operation under accident conditions. System modifications, vendor documentation, system health reports, preventive and corrective maintenance history, and corrective action program documents were reviewed (as applicable) in order to verify that the performance capability of the component was not negatively impacted, and that potential degradation was monitored or prevented. Maintenance Rule information was reviewed to verify that the component was properly scoped, and that appropriate preventive maintenance was being performed to justify current Maintenance Rule status. Component walkdowns and interviews were conducted to verify that the installed configurations would support their design and licensing bases functions under accident conditions and had been maintained to be consistent with design assumptions. Documents reviewed are listed in the attachment to this report.

Additionally, the team performed the following component-specific reviews:

- The team observed a simulator scenario involving time critical actions for aligning emergency core cooling system suction from the borated water storage tank to the reactor building emergency sump (high pressure recirculation) to verify the required operator actions could be accomplished within the required times and as relied upon in design assumptions, and that the actions could be accomplished in accordance with approved licensee procedures.
- The team observed a simulator scenario involving operator actions to identify and isolate a main steam line rupture following a reactor/turbine trip, and after emergency operating procedure immediate actions had been performed, to verify the actions could be accomplished as relied upon in design assumptions and in accordance with approved licensee procedures.
- The team performed table-top reviews, with a licensed operator, of several abnormal and emergency procedures to better understand actions to be taken during a turbine building flood and isolation of a faulted steam generator; then the team conducted in-field walkdowns of these procedures to verify the actions could be accomplished within the assumed timeframe, that there was sufficient guidance in the procedures to properly complete the tasks, that equipment or tools necessary to assist in accomplishing these tasks were available in the designated locations, and that the

areas requiring accessibility were indeed accessible; in addition, the team interviewed operators qualified to these tasks to ensure their knowledge and training was sufficient to successfully accomplish the tasks.

- The team assessed the adequacy of the emergency power and DC control cabling systems located in the concrete underground raceway to determine if any single failure vulnerabilities existed.

b. Findings

i Failure to Evaluate the Under Voltage Relays at the Worst Case Minimum Drop Out Bus Voltage

Introduction: The team identified a Green non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to ensure that at the worst-case voltage, protective devices and thermal overload relays for safety-related loads would not trip prior to and after the transfer to the emergency power source. This transfer occurs for a sustained degraded voltage below the under voltage relay voltage settings for the duration of the time delay setting or the manual actions credited.

Description: Licensee calculations OSC-2059, OSC-2060 and OSC-2061, documented the bounding operating voltage requirements for Units 1, 2, and 3, respectively. Appendix A to these calculations identified the minimum bus voltage levels to be 87.5%, 87.5% and 87.3% of the base 4160Vac bus voltage for Units 1, 2 and 3, respectively. Each of these calculations analyzed the effect of operating safety-related loads below the minimum acceptable voltages identified. The lowest voltage evaluated was at 84.7% of the 4160Vac bus, which corresponded to 97% of the tap setting for the under voltage relays. The licensee identified this as the "must drop out" point.

The team noted that the under voltage relays in use at Oconee were CV-7 inverse time induction disk relays. The relay manufacturer's documentation guaranteed that this type of relay, on a decreasing voltage, would drop out at 97% of tap, but had no guaranteed time for the drop out to complete. For decreasing voltages, it was not until the 90% of tap setting (78.6% of bus voltage) or lower that the manufacturer's documentation guaranteed a specific time for the drop out to complete. Additionally, the team noted that the calculations only evaluated operating equipment and did not account for system transients or the effect of starting safety-related equipment when voltage was at the "must drop out" point. Evaluation at the lower voltage could result in connected safety-related loads stalling, becoming damaged, their protective devices tripping, or loads such as battery chargers being below their minimum operating voltages for (1) the degraded voltage time delay of 9±1 seconds for a degraded voltage and ES actuation and (2) during manual actions for up to 12 minutes for a degraded voltage with no ES actuation. In response, the licensee stated that although the manufacturer did not provide a guaranteed drop out time at 97% of tap, specific testing would be performed that verified that the under voltage relays would fully actuate within 16 seconds. The licensee also performed an operability determination and determined that all energized equipment could survive a system transient at the "must drop out" point and considered the effects of starting safety-related equipment at the "must drop out" point.

Analysis: The licensee's failure to ensure that at the worst-case voltage, protective devices and thermal overload relays for safety-related loads would not trip prior to and after the transfer to the emergency power for a sustained degraded voltage below the under voltage relay voltage settings for the duration of the time delay setting or manual actions credited was a performance deficiency and a violation of 10 CFR Part 50, Appendix B, Criterion III. The team determined that the finding was more than minor because it was associated with the Design Control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the team identified that the voltages evaluated in the licensee's analysis were non-conservative and could result in lower unanalyzed voltages that could result in connected safety-related loads stalling, becoming damaged, their protective devices tripping, or loads such as battery chargers being below their minimum operating voltages. The team used IMC 0609, Att. 4, "Initial Characterization of Findings," issued June 19, 2012, for Mitigating Systems, and IMC 0612, App. A, "The Significance Determination Process (SDP) for Findings At-Power," issued June 19, 2012, and determined the finding to be of very low safety significance (Green) because the finding was a design deficiency that did not result in a loss of off-site power operability. The team determined that no cross-cutting aspect was applicable because this finding was not indicative of current licensee performance.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control", requires, in part, that design control measures provide for verifying or checking the adequacy of design and that design changes shall be subjected to design control measures commensurate with those applied to the original design. Contrary to this, since November 30, 2005, the licensee did not verify the adequacy of their design for safety-related loads. Specifically, the licensee failed to verify that the connected safety-related loads would not would not trip prior to and after the transfer to the emergency power source for a sustained degraded voltage below the under voltage relay voltage settings for the duration of the time delay setting or manual actions credited. This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy. The violation was entered into the licensee's corrective action program as PIP O-14-2280. (NCV 05000269/2014007-01; 05000270/2014007-01; 05000287/2014007-01; Failure to Evaluate the Under Voltage Relays at the Worst Case Minimum Drop Out Bus Voltage)

ii Failure to Correct Issues with DC System Voltage Calculations and 120Vac Motor Control Center (MCC) Control Circuit Calculations

Introduction: The team identified a Green NCV, with two examples, of 10 CFR 50, Appendix B, Criterion XVI, for the licensee's failure to correct a condition adverse to quality. Specifically, the licensee (1) failed to perform all corrective actions identified to correct voltage calculations for safety-related 4160V circuit breaker 125Vdc control circuits and (2) failed to perform all corrective actions to correct voltage calculations for safety-related 120Vac MCC control circuits. The above issues were previously identified in NCV-05000269,270,287/2011010-04 and NCV-05000269,270,287/2011010-03, respectively.

Description: The team identified the following deficiencies with the licensee's corrective actions:

- Example 1 – Failure to Perform Corrective Actions to Correct Voltage Calculations for Safety-Related 4160V Circuit Breaker 125Vdc Control Circuits

  Licensee calculation OSC-4701, "Operability Evaluation for PIR 0-092-0057," determined the adequacy of 125Vdc control voltage to the ITE Type 5HK 4160V breakers in the safety-related Keowee standby S and SK breaker switchgears (B1T and B2T). Section 8 of this calculation determined that the required voltage to the U1, U2 and U3 SK breakers was limited to between 58.8Vdc and 68.2Vdc, which was inadequate to meet the 90Vdc minimum voltage rating for the close coils, as specified by the breaker vendor. Section 10.14.6 of calculation OSC-4276, "Oconee 125Vdc Vital Instrumentation and Control Voltage Adequacy," applied an alternate acceptance criterion of 70Vdc for the close coils, based on testing documented in Test Report (TR)-144, "Oconee Emergency Power 5HK Switchgear Test." The calculation determined that the lowest calculated required voltage at the close coils of the S and SK circuit breakers was approximately 58.8Vdc, and concluded that the breakers were capable of operation. The team noted that the testing documented in OSC-4701 was a one-time field test of the actual breakers, and TR-144, performed later, consisted of tests on only three specimens with the same nominal test conditions and acceptance criteria specified in OSC-4701. The team also noted that neither test controlled the environmental conditions such as aging or coil temperature to determine whether the components would remain operable during design basis conditions. Additionally, the team noted that the testing, performed under mild conditions, indicated that some close coils failed from 45Vdc to 65Vdc. The team determined that this variance in the predictability of operation under mild test environments did not provide reasonable assurance of operation at voltages below the 90Vdc minimum operating voltage and the more limiting design basis environmental conditions.

  The team noted that during the 2011 CDBI, a similar issue of concern was identified for the SSF ITE 5HK 4160 breakers and was documented in PIP O-11-11438 and dispositioned as NCV 05000269,270,287/2011010-04 "Inadequate Control Circuit Voltage Calculations." During that inspection the CDBI team identified other licensee calculations that were susceptible to this issue including calculations OSC-4276 and OSC-8113. OSC-4701 is used as an input to OSC-8113. In response to this concern during the 2011 CDBI, the licensee initiated PIP O-11-11438 to update design basis documentation to include testing criteria, to provide justification for using the alternate acceptance criteria, and to update applicable procedures. During the current inspection, the team noted that PIP O-11-11438 was closed and that while it addressed concerns with testing the SSF breakers at lower voltages, it did not address calculations OSC-4276 and OSC-8113, as identified in the associated NCV, nor did it address the limiting design basis environmental conditions, such as aging and coil temperature.

- Example 2 – Failure to Perform Corrective Actions to Correct Voltage Calculations for Safety-Related 120Vac Motor Control Center Control Circuits

  Attachment 1 to licensee calculation OSC-5930, "Unit 1 Motor Starter Circuit Voltage and Fuse Adequacy Calculation," listed acceptance criteria for various types of

120Vac contactor coils used in 600V and 208V MCCs, ranging from 65% to 78.4% of 120V rated voltage. The criteria for contactor pickup voltage was based on various tests and was lower than the criteria specified in applicable National Electrical Manufacturing Association (NEMA) standards (NEMA ICS-2) of 85%. During the 2011 CDBI, in NCV 05000269,270,287/2011010-03, "Failure to Perform Adequate Calculations to Support Keowee Voltage Trip Setpoints," the team identified the following concerns:

- For Sylvania TM starters only two specimens each of size 1 and 2 were tested, providing an inadequate basis for the rating.
- For Joslyn Clark and Cutler Hammer contactors the calculation took credit for Control Power Transformer boost (approximately 2-4%) that had already been credited in tests.
- Tests were conducted on contactors at shop ambient temperature (cold coil). Contactors may have been required to operate in service with hot coils. This could have raised the pickup voltage by approximately 4%.
- The acceptance criteria in the calculation did not provide margin over test criteria to account for degradation over the service life of the contactors. Contactors were not periodically tested to confirm low pickup voltage capability.
- The calculation contained incomplete or obsolete information (e.g. contactors that have been replaced and test reports missing).

In response, the licensee initiated PIP O-11-11440 to revise the instrument procedures and validate the previous test values. Additionally, the PIP contained actions to develop a periodic testing plan that would validate the minimum pickup voltages being used for each type of starter/contactor and ensure they have not degraded, and to generate action requests to perform the new periodic testing on the starters/contactors. During the current inspection, it was identified that PIP O-11-11440 was closed on 10/9/2013 with some of the identified corrective actions not implemented and some that did not fully address each issue identified above. Specifically, the scope of the periodic testing was identified to be random and not comprehensive, the testing did not account for design basis environmental conditions (e.g. testing the contactors with hot coils), and the testing values specified in the implementing procedures had not been verified to correspond to those used by the latest calculations or documented in a design deliverable document.

Analysis: The licensee's failure to perform corrective actions to correct voltage calculations for safety-related 4160V circuit breaker 125Vdc control circuits and to correct voltage calculations for safety-related 120Vac MCC control circuits as required by 10 CFR Part 50, Appendix B, Criterion XVI, was a performance deficiency. The team determined that the performance deficiency was more than minor because it affected the Equipment Performance attribute of the Mitigating Systems Cornerstone, and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, failing to account for aging and environmental effects could negatively impact the reliability of the affected safety-related electrical components. The team used IMC 0609, Att. 4, "Initial Characterization of Findings," issued June 19, 2012, for Mitigating Systems, and IMC 0612, App. A, "The Significance Determination Process (SDP) for Findings At-Power," issued June 19, 2012, and determined the finding to be of very low safety significance (Green) because the incomplete corrective actions did not result in

losses of operability or function for any of the examples. The violation was assigned the cross-cutting aspect of Resolution, in the area of Problem Identification and Resolution, because the licensee did not take effective corrective actions to address the issues in a timely manner. [P.3]

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions," requires, in part, that, "measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment and non-conformances are promptly identified and corrected." Contrary to the above, since October 9, 2013, the licensee failed to correct conditions adverse to quality. Specifically, the licensee (1) failed to correct voltage calculations for safety-related 4160V circuit breaker 125Vdc control circuits and (2) failed to correct voltage calculations for safety-related 120VAC MCC control circuits. This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy. The violation was entered into the licensee's corrective action program as PIPs O-14-2781 and O-14-2811. (NCV 05000269/2014007-02; 05000270/2014007-02; 05000287/2014007-02; Failure to Correct Issues with the DC System Testing and 120Vac Motor Control Center Control Circuits)

iii Failure to Update the UFSAR with Current Battery Testing Standards

Introduction: The team identified a Severity Level IV NCV of 10 CFR 50.71(e) for the licensee's failure to include in the latest Updated Final Safety Analysis Report (UFSAR) changes made to the site's licensing basis with respect to station battery testing made during the Technical Specification conversion to Integrated Technical Specifications. Specifically, the UFSAR did not identify the standards by which the testing is conducted.

Description: During a review of battery test procedures the team determined that Oconee had not established design basis requirements in the UFSAR to support the licensing basis requirements in Technical Specification 5.5.20, "Battery Discharge Testing Program." The licensee documented this issue in their corrective action program with PIP O-14-02338, which stated that during the TS conversion to Integrated Technical Specifications, an apparent change was made to the plant's licensing basis with respect to station battery testing. This licensing basis change was not subsequently reflected in the UFSAR as required by 10 CFR 50.71(e). Specifically, the UFSAR did not identify the standard(s) by which testing is conducted.

Analysis: The licensee's failure to update the UFSAR with current battery testing standards, as required by 10 CFR 50.71(e), was a performance deficiency. The team dispositioned the performance deficiency using the traditional enforcement process because failing to update the UFSAR had the potential to adversely impact the NRC's ability to perform its regulatory process. The performance deficiency was more than minor because the failure to provide complete licensing and design basis information in the UFSAR could result in either the licensee making an inappropriate licensing interpretation or the NRC making an inappropriate regulatory decision based on incomplete information in the UFSAR. The performance deficiency was characterized as a Severity Level IV violation in accordance with the NRC Enforcement Policy, Section 6.1.d.3 as the lack of up-to-date information did not result in any unacceptable change to the facility or procedures. In accordance with IMC 0612, "Power Reactor Inspection Reports," issued January 24, 2013, there are no cross-cutting aspects assigned to traditional enforcement violations.

Enforcement: Title 10 CFR 50.71(e) requires in part, that "licensees shall periodically update the Final Safety Analysis Report (FSAR), originally submitted as part of the application for the operating license, to assure that the information included in the report contains the latest information developed. The submittal shall include the effects of all changes made in the facility or procedures as described in the FSAR." Contrary to the above, since December 16, 1998, the licensee failed to update the UFSAR to assure that the information included in the report contained the latest information developed. Specifically, the licensee failed to identify the current standards by which the station battery testing was conducted. The failure to update the UFSAR as required by 10 CFR 50.71(e) was characterized as a Severity Level IV violation. This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy. The violation was entered into the licensee's corrective action program as PIP O-14-2338. (NCV 05000269/2014007-03; 05000270/2014007-03; 05000287/2014007-03; Failure to Update the UFSAR with Current Battery Testing Standards)

iv (Opened) Degraded Voltage Relay Scheme

Introduction: The team identified an unresolved item (URI) to determine whether a performance deficiency exists with respect to the licensee's degraded voltage relay scheme.

Description: The team identified that the licensee's degraded voltage relays did not monitor the safety-related 4.16kV buses, but rather they monitored the switchyard 230kV Yellow bus. This resulted in a lack of degraded voltage protection whenever the 4.16kV safety-related buses were not being fed through the start-up transformers. During normal power operation, the 4.16kV safety-related buses were supplied from the unit auxiliary transformers. Additionally, for degraded voltage detected on the 230kV switchyard Yellow bus with no accident signal present, the degraded voltage relay alarm in the main control room would have only resulted in manual actions to resolve the degraded voltage condition or to disconnect from the degraded source. It was estimated that the manual actions could take as long as 12 minutes to resolve the degraded voltage condition. The use of degraded voltage relays only on the 230kV switchyard Yellow bus and the use of manual actions for a degraded voltage condition appeared to be contrary to the design criteria for degraded voltage protection stated in an NRC letter to the licensee dated June 3, 1977 and NRC Regulatory Issue Summary 2011-12. Lastly, the team identified that Oconee currently credits operation of the loss-of-voltage relays monitoring the 4.16kV main feeder buses to disconnect from offsite power on a loss of voltage condition and subsequent re-connection to Keowee Hydro to meet the UFSAR Chapter 15 plant accident analyses. However, the loss of voltage relay setpoints and associated time delays were not included in the plant TS. This appeared to be contrary to 10 CFR 50.36(c)(2)(ii)(C) Criterion 3.

The team determined that consultation with the Office of Nuclear Reactor Regulation was warranted for the NRC to determine: (1) whether Oconee's existing licensing and design bases are adequate and meet all NRC regulations and requirements with their current degraded voltage relays design and off-site/station electric power system design, (2) whether the automatic actions for the loss-of-voltage relays meet the intent of the degraded voltage relays, and (3) whether the current plant TS meet the requirements of 10 CFR 50.36(c)(2)(ii)(C) which state, in part, that a TS limiting condition for operation of a nuclear reactor must be established for a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the

integrity of a fission product barrier. The licensee entered this issue into their corrective action program as PIP O-14-2034. This issue is being tracked as URI 05000269/2014007-04, 05000270/2014007-04, 05000287/2014007-04, Degraded Voltage Relay Scheme.

v. (Opened) Potential Unanalyzed Condition Associated with Emergency Power System

Introduction: The team identified a URI to determine whether a performance deficiency exists related to the configuration of electrical cabling in the underground concrete raceway. Specifically, the team was concerned that short circuits and/or ground faults in the cabling could potentially impact the functionality of the emergency power system which is required to mitigate certain design basis events.

Description: During a review of Oconee's engineered safeguards protection system (ESPS) emergency power start control for the KHUs, the team noted that the 125Vdc control cables for train A of the ESPS and cables for supervisory control of both KHUs were recently modified. The team also noted that these 125Vdc control cables were installed in the same underground concrete raceway systems as the 4160Vac auxiliary power cables, 13.8kVac power cables for both emergency power and protected service water (PSW), and were in close proximity to these power cables. The team was concerned that a short circuit (which the licensee considered outside their design basis) in the 13.8kVac cables could induce voltage and currents in the dc control system which could potentially impact the functionality of the emergency power system which is required to mitigate certain design basis events. A similar issue exists in Manhole 6 of the PSW underground raceway where the new power supply to the PSW (adjacent to the 125Vdc control emergency power system) could short circuit or fault to ground. The licensee had not performed an analysis to determine the effects of such failures on the ability of the emergency power system to perform its safety function, thus the team questioned whether the plant was in an unanalyzed condition. Although the licensee did not agree that these failures were part of their licensing basis, they reported this as an unanalyzed condition to the NRC in accordance with 10 CFR 50.73(a)(2)(ii)(B) in Licensee Event Report 269/2014-01. In response to the team's concerns, the licensee entered this issue into their corrective action program, and performed immediate and prompt determinations of operability in which they concluded a reasonable expectation of operability exists.

The team has requested assistance from subject matter experts in the Office of Nuclear Reactor Regulation via a Task Interface Agreement[1] to review the emergency power system licensing basis to determine the acceptability of the licensee's design. If the design is found to be noncompliant with the licensing basis, the licensee will be required to implement corrective actions to restore compliance.

This issue is being tracked as URI 05000269/2014007-05, 05000270/2014007-05, 05000287/2014007-05, Potential Unanalyzed Condition Associated with Emergency Power System.

[1] A Task Interface Agreement is a request for technical assistance to the Office of Nuclear Reactor Regulation (NRR) on subjects within the scope of NRR's mission. In this case, there is a lack of clarity on whether the licensee's current design complies with the licensee's licensing basis and NRR is being asked to establish the agency position.

.3 Operating Experience

a. Inspection Scope

The team reviewed five operating experience issues for applicability at Oconee Nuclear Station, Units 1, 2, and 3. The team performed an independent review of these issues and, where applicable, assessed the licensee's evaluation and dispositioning of each item. The issues that received a detailed review by the team included:

- NRC Information Notice (IN) 2013-14, "Potential Design Deficiency in Motor-Operated Valve Control Circuitry," dated August 23, 2013
- NRC IN 2013-05, "Battery Expected Life and Its Potential Impact on Surveillance Requirements," dated March 19, 2013
- NRC IN 2012-16, "Preconditioning of Pressure Switches Before Surveillance Testing," dated August 29, 2012
- NRC IN 2012-14, "Motor-Operated Valve Inoperable Due To Stem-Disc Separation," dated July 24, 2012
- NRC IN 2012- 06, "Ineffective Use of Vendor Technical Recommendations," dated April 24, 2012

b. Findings

No findings were identified.

4OA7 Licensee-Identified Violations

The following Severity Level IV violation was identified by the licensee and is a violation of NRC requirements which met the criteria of the NRC Enforcement Policy for being dispositioned as a NCV.

- 10 CFR 50.71(e) requires, in part, that "each person licensed to operate a nuclear power reactor, shall update periodically, the FSAR originally submitted as part of the application for the license, to assure that the information included in the report contains the latest information developed. This submittal shall include the effects of all changes made in the facility or procedures as described in the FSAR." Contrary to the above, since December 6, 2012, after updating the UFSAR to reflect the new licensing basis under NFPA-805, several items applicable to the Fire Protection System were incorrectly removed. Traditional enforcement was applicable because the violation could impact the regulatory process, and was evaluated using the NRC's Enforcement Policy. This violation was determined to be a Severity Level IV violation because the lack of up-to-date information did not result in an unacceptable change to the facility or procedures. This violation was documented in the licensee's corrective action program as PIP O-13-09302.

4OA6 Meetings, Including Exit

On March 20, 2014, the team leader presented the inspection results to Mr. Scott Batson and other members of the licensee's staff. On March 28, 2014, May 9, 2014, and June 18, 2014, the team leader discussed the results of the inspection with Oconee management and other members of the licensee's staff. The team verified that no proprietary information was documented in this report.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee personnel
K. Alter, Regulatory Affairs Manager
K. Anderson, BOP Supervisor
S. Batson, Site Vice President
V. Bowman, Design Engineering Manager
J. Brady, Regulatory Affairs
E. Burchfield, Engineering Manager
T. Patterson, Safety Assurance Manager
R. Price, Design Engineering Manager
J. Smith, Regulatory Affairs
C. Wasik, Regulatory Compliance Manager
N. Watson, IST Program Coordinator

NRC personnel
E. Crowe, Oconee Senior Resident Inspector
G. Matharu, Sr. Electrical Engineer, Office of Nuclear Reactor Regulation (NRR)
R. Mathew, Team Leader, NRR
J. Zimmerman, Branch Chief, NRR

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Opened and Closed

05000269, 270, 287/2014007-01	NCV	Failure to Evaluate the Under Voltage Relays at the Worst Case Minimum Drop Out Bus Voltage [Section 1R21.2.b.i]
05000269, 270, 287/2014007-02	NCV	Failure to Correct Issues with DC System Voltage Calculations and 120Vac Motor Control Center (MCC) Control Circuit Calculations [Section 1R21.2.b.ii]
05000269, 270, 287/2014007-03	SL-IV	Failure to Update the UFSAR with Current Battery Testing Standards [Section 1R21.2.b.iii]

Opened

05000269, 270, 287/2014007-04	URI	Degraded Voltage Relay Scheme [Section 1R21.2.b.iv]
05000269, 270, 287/2014007-05	URI	Potential Unanalyzed Condition Associated with Emergency Power System [Section 1R21.2.b.v]

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AD-EG-ALL-1105, Critical Spare Program, Rev. 0
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EP/1/A/1800/001, Enclosure 5.34, Aligning SSF-ASW for Steam Generator Feed, Rev. 39
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EP/1/A/1800/001, Enclosure 5.5, Pressurizer and Letdown Storage Tank Level Control, Rev. 39
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EP/1/A/1800/001, Enclosure 5.9, Extended Emergency Feedwater Operation, Rev. 39
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