



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

February 3, 2017

Mr. Tom Ray  
Site Vice President  
Duke Energy Corporation  
Oconee Nuclear Station  
7800 Rochester Highway  
Seneca, SC 29672

**SUBJECT: OCONEE NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT  
05000269/2016004, 0500270/2016004, AND 05000287/2016004**

Dear Mr. Ray:

On December 31, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Oconee Nuclear Station Units 1, 2, and 3. On January 12, 2017, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of the inspection are documented 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. The NRC is treating these violations as non-cited violations (NCV) consistent with Section 2.3.2.a 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; and the NRC resident inspectors at the Oconee Nuclear Station.

T. Ray

2

This letter, its enclosure, and your response (if any) will be available electronically 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/*

Frank Ehrhardt, Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

Docket Nos.: 50-269, 50-270, 50-287  
License Nos.: DPR-38, DPR-47, DPR-55

Enclosure:  
IR 05000269/2016004, 0500270/2016004,  
and 05000287/2016004 w/Attachment:  
Supplemental Information

cc: Distribution via ListServ

DISTRIBUTION:  
See next page

T. Ray

2

This letter, its enclosure, and your response (if any) will be available electronically 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/*

Frank Ehrhardt, Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

Docket Nos.: 50-269, 50-270, 50-287  
License Nos.: DPR-38, DPR-47, DPR-55

Enclosure:  
IR 05000269/2016004, 0500270/2016004  
and 05000287/2016004 w/Attachment:  
Supplemental Information

cc: Distribution via ListServ

DISTRIBUTION:  
See next page

PUBLICLY AVAILABLE     NON-PUBLICLY AVAILABLE     SENSITIVE     NON-SENSITIVE  
ADAMS:  Yes    ACCESSION NUMBER: ML17034A161     SUNSI REVIEW COMPLETE     FORM 665 ATTACHED

OFFICE	RII:DRS	RII:DRS	RII:DRS	RII:DRS	RII:DRS	RII:DRP
SIGNATURE	RPC1 via email	BCC2 via email	MKM3	GKO via email	MAR1 via email	ELC1 via email
NAME	RCarrion	BCollins	MMeeks	GOTTenberg	MRiley	ECrowe
DATE	1/24/2017	1/24/2017	1/25/2017	1/24/2017	1/30/2017	1/24/2017
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
OFFICE	RII:DRP	RII:DRP	RII:DRP	RII:DRP	RII:DRP	
SIGNATURE	NRS2 via email	JXP1 via email	MMT2 via email	JGW1	FJE	
NAME	NChilds	JParent	MToth	JWorosilo	FEhrhardt	
DATE	2/1/2017	1/30/2017	1/30/2017	1/31/2017	2/3/2017	
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	

OFFICIAL RECORD COPY

T. Ray

3

Letter to Tom Ray from Frank Ehrhardt dated February 3, 2017

SUBJECT: OCONEE NUCLEAR STATION – NRC INTEGRATED INSPECTION REPORT  
05000269/2016004, 0500270/2016004, AND 05000287/2016004

**DISTRIBUTION:**

M. Kowal, RII

K. Sloan, RII

OE Mail

RIDSNRRDIRS

PUBLIC

RidsNRRPMOconee Resource

**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket Nos.: 50-269, 50-270, 50-287

License Nos.: DPR-38, DPR-47, DPR-55

Report No.: 05000269/2016004, 0500270/2016004, and  
05000287/2016004

Licensee: Duke Energy Carolinas, LLC

Facility: Oconee Nuclear Station, Units 1, 2, and 3

Location: Seneca, SC 29672

Dates: October 1, 2016 through December 31, 2016

Inspectors: E. Crowe, Senior Resident Inspector  
N. Childs, Resident Inspector  
J. Parent, Resident Inspector  
M. Toth, Project Engineer  
R. Carrion, Senior Reactor Inspector (Section 1R08)  
B. Collins, Reactor Inspector (Section 1R08)  
M. Meeks, Senior Operations Engineer (Section 1R11)  
G. Ottenberg, Senior Reactor Inspector (Section 1R15)  
M. Riley, Reactor Inspector (Section 1R15, 1R18)

Approved by: Frank Ehrhardt, Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

Enclosure

## SUMMARY

IR 05000269/2016004, 0500270/2016004, and 05000287/2016004, October 1, 2016 through December 31, 2016; Oconee Nuclear Station, Units 1, 2, and 3; Operability Determinations and Functionality Assessments

The report covered a three-month period of inspection by the resident inspectors and regional inspectors. There were two NRC-identified violations 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 November 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. The NRC identified a non-cited violation (NCV) of Title 10 *Code of Federal Regulations* (10 CFR) 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to correctly determine the bounding degraded voltage to be assumed in the determination of motor operated valve (MOV) actuator output capability. Specifically, the licensee did not use appropriate transient voltages as input into the evaluation of the capability of the MOVs that are required to reposition in response to an accident signal. In response, the licensee entered the issue into their corrective action program as nuclear condition report (NCR) 2056895 and planned to formally revise their calculations to reflect the current plant configuration.

This performance deficiency was more than minor because it was associated with the design control attribute of the mitigating systems cornerstone, and adversely impacted the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Oconee's programmatic failure to use bounding terminal voltage values in the evaluation of their automatically actuated, safety-related MOVs did not ensure they would be capable of mitigating accidents when powered from sources other than the 230kV switchyard, thus resulting in doubt on their capability to perform their intended safety function. The finding was determined to be of very low safety significance (Green) because the finding was a deficiency affecting the design or qualification of a mitigating structure, system, or component (SSC), and the SSC maintained its operability or functionality. No cross-cutting aspect was assigned because the inspectors determined that the finding was not indicative of current licensee performance, because the most recent transient analysis that was performed for the sources other than the 230kV switchyard was performed in 2012. (Section 1R15)

- Green. The NRC identified a NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure to identify appropriate procedural updates that were needed to ensure the Lee combustion turbine (LCT) procedures were appropriate for the circumstances and maintained current. Specifically, the licensee did not include appropriate operational limitations in procedures associated with the LCTs. In

response, the licensee generated NCR 2058763, verified the LCT automatic voltage regulator setpoint was, and had been, 13.8kV, and generated a corrective action to revise the affected procedures' limits to 13.78kV, a value bounded by station analyses.

This performance deficiency was more than minor because it was associated with the procedure quality attribute of the mitigating systems cornerstone, and adversely impacted the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Oconee's failure to limit the operating voltage band of the LCTs to an amount that was demonstrated as acceptable by analysis resulted in doubt on their capability to provide power to safety-related equipment during an accident. The finding was determined to be of very low safety significance (Green) because the finding was a deficiency affecting the design or qualification of a mitigating SSC, and the SSC maintained its operability or functionality. No cross-cutting aspect was assigned because the inspectors determined that the finding was not indicative of current licensee performance, because the update to the procedures occurred in January and October 2007, after replacement of the LCTs. (Section 1R15)

## REPORT DETAILS

### Summary of Plant Status

Unit 1: Operated at or near 100 percent rated thermal power (RTP) until November 5, 2016, when the unit was shut down for a scheduled refueling outage. The unit was returned to 100 percent RTP on November 27, 2016, and remained so for the duration of the inspection period.

Unit 2: Operated at or near 100 percent RTP for the entire inspection period.

Unit 3: Operated at or near 100 percent RTP for the entire inspection period.

### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 1R01 Adverse Weather Protection (71111.01)

##### a. Inspection Scope

##### .1 Seasonal Extreme Weather Conditions

The inspectors conducted a detailed review of the station's adverse weather procedures written for extreme low temperatures. The inspectors verified that weather-related equipment deficiencies identified during the previous year had been placed into the work control process and/or corrected before the onset of seasonal extremes. The inspectors evaluated the licensee's implementation of adverse weather preparation procedures and compensatory measures before the onset of and during seasonal extreme weather conditions. Documents reviewed are listed in the Attachment.

The inspectors evaluated the following risk-significant systems:

- standby shutdown facility (SSF)
- essential siphon vacuum (ESV)

##### .2 Impending Adverse Weather Conditions

The inspectors reviewed the licensee's preparations to protect risk-significant systems from adverse weather conditions expected during December 1, 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 consequences 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)

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 two systems or trains to inspect:

- Unit 1, low pressure injection (LPI), safety related electrical distribution, and low pressure service water during reactor coolant system level lowered below the reactor vessel flange
- Unit 1, LPI and safety related electrical distribution during reduced reactor coolant system inventory for reactor vessel head installation

.2 Complete Walkdown

The inspectors verified the alignment of the Unit 1 high pressure injection (HPI) system. 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 updated final safety analysis report, and other documents. The inspectors reviewed records related to the system design, maintenance work requests, 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 condition reports and outstanding work orders. 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 (71111.05AQ)a. Inspection Scope.1 Quarterly Inspection

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

- control of transient combustibles and ignition sources
- fire detection systems
- 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 corrective action program

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

- Unit 1, reactor building, fire zone 122
- Unit 2, LPI hatch area & hot machine shop tunnel, fire zone 67
- Unit 3, motor driven emergency feedwater pump area, fire zone 7
- Unit 3, purge inlet room, fire zone 114

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (71111.08)a. Inspection ScopeNon-Destructive Examination Activities and Welding Activities

From November 14 through 18, 2016, the inspectors conducted an onsite review of the implementation of the licensee's inservice inspection (ISI) program for monitoring degradation of the reactor coolant system boundary, risk-significant piping and component boundaries, and containment boundaries in Unit 1.

The inspectors either directly observed or reviewed the following non-destructive examinations (NDEs) mandated by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code of Record: 2007 Edition with 2008 Addenda) to evaluate compliance with the ASME Code, Section XI and Section V requirements and, if any indications or defects were detected, to evaluate if they were dispositioned in accordance with the ASME Code or an NRC-approved alternative

requirement. The inspectors also reviewed the qualifications of the NDE technicians performing the examinations to determine whether they were current and in compliance with the ASME Code requirements.

- liquid penetrant test (PT), Weld #1-14C-0222-26, SSF-auxiliary service water (ASW) 6" pipe, ASME Class 3 (reviewed)
- PT, Weld #1-14C-0222-27, SSF-ASW 6" pipe, ASME Class 3 (reviewed)
- ultrasonic testing, Weld # 1-20B-21-16-7, pipe to valve 1PRV-6, ASME Code Class 2 (observed/reviewed)
- magnetic testing, Component # 1FDW-249-43B, elbow to pipe, ASME Code Class 2 (observed/reviewed)
- visual testing (VT-2), outer surface of reactor vessel head, ASME Code Class 1 (reviewed)

The inspectors either directly observed or reviewed the following welding activities, qualification records, and associated documents in order to evaluate compliance with procedures and the ASME Code, Section XI and Section IX requirements. Specifically, the inspectors reviewed the work order, repair and replacement plan, weld data sheets, welding procedures, procedure qualification records, welder performance qualification records, and NDE reports.

- Weld #1-14C-0222-26, SSF-ASW 6" pipe, ASME Class 3 (reviewed)
- Weld #1-14C-0222-27, SSF-ASW 6" pipe, ASME Class 3 (observed/reviewed)
- Unit 1 flex alternate reactor coolant system (RCS) makeup connection points, Welds #1-LP-0253-1, -2, -3, -4Z, -5Z, -6Z, -7Z, and -8Z, ASME Class 2 (reviewed)
- Unit 1 1 HP-VA-0137 replacement, Weld #1-HP-0519-222, ASME Class 3 (reviewed)

During non-destructive surface and volumetric examinations performed since the previous refueling outage, the licensee did not identify any relevant indications that were analytically evaluated and accepted for continued service; therefore, no NRC review was completed for this inspection procedure attribute.

#### Pressurized Water Reactor (PWR) Vessel Upper Head Penetration Inspection Activities

The inspectors verified that for the Unit 1 vessel head, a bare metal visual examination and a volumetric examination were not required during this outage (end of core (EOC) 29), in accordance with the requirements of ASME Code Case N-729-1 and 10CFR50.55a(g)(6)(ii)(D), as it had been performed during refueling outage EOC 27. The next scheduled examination will be performed during EOC 32. Therefore, no NRC review was done for this inspection procedure attribute.

#### Boric Acid Corrosion Control Inspection Activities

The inspectors reviewed the licensee's boric acid corrosion control (BACC) program activities to determine if the activities were implemented in accordance with the commitments made in response to NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," and applicable industry guidance documents. Specifically, the inspectors performed an onsite records

review of procedures and the results of the licensee's containment walkdown inspections performed during the current refueling outage. The inspectors also interviewed the BACC program owner; conducted an independent walkdown of the containment building to evaluate compliance with licensee's BACC program requirements; and verified that degraded or non-conforming conditions, such as boric acid leaks, were properly identified and corrected in accordance with the licensee's BACC and corrective action programs.

The inspectors reviewed the following engineering evaluations, completed for evidence of boric acid leakage, to determine if the licensee properly applied applicable corrosion rates to the affected components; and properly assessed the effects of corrosion induced wastage on structural or pressure boundary integrity in accordance with the licensee procedures.

- Boric Acid Corrosion Evaluation – 1CA-PT157 (as part of action request (AR) 02059041, below)
- Boric Acid Corrosion Evaluation – 1RC-206 (as part of AR 02008337, below)
- Boric Acid Corrosion Evaluation – 1LP-199 (as part of AR 01854240, below)
- Boric Acid Corrosion Evaluation – 1LP-32 (as part of AR 01854217, below)
- Boric Acid Corrosion Evaluation – 1LWD-349 (as part of AR 01854070, below)

The inspectors reviewed the following condition reports and associated corrective actions related to evidence of boric acid leakage to evaluate if the corrective actions completed were consistent with the requirements of the ASME Code and 10 CFR Part 50, Appendix B, Criterion XVI.

- AR 01852785, "Boron Deposits on 1B LPI Cooler"
- AR 01853110, "1HP-243 Is Leaking"
- AR 01854070, "15-DPM Leak from 1LWD-349 (LPI switchover mode cooler inlet)"
- AR 01854138, "1HP-935 Seal Return Pen #7 Relief Inside Has Dried and Wet Boron on It"
- AR 01854217, "1LP-32 Non-Active Inaccessible Boric Acid Leak"
- AR 01854240, "Several Boric Acid Leaks on Unit 1 High Point Vents"
- AR 01854601, "Active Leak on 1HP-236"
- AR 01909822, "1GWD-VA-0153 Is Leaking Past Its Seat"
- AR 01909897, "Excessive Boric Acid Leak 1LWD-VA-0346"
- AR 01934699, "BACCP Evaluation 1HP-106 Excessive/Active Boric Acid Leak"
- AR 01939215, "FLM Request for BACC Engineering Evaluation"
- AR 02008337, "Unit 1 RB Tour Results (Mode 3) U1EOC28B Forced Outage"
- AR 02014669, "1B LPI Cooler Has Boron Leak at Flange"
- AR 02015007, "Repair 1HP-137 (A1 Seal Return Vent) Seat Leak"
- AR 02022150, "Boric Acid Leak on 1LP-199 Vent"
- AR 02059041, "Active Boron Leak on Piping Flange Going to 1CAPT157"
- AR 02075866, "1EOC29 Containment Discovery During Shutdown"

### Steam Generator Tube Inspection Activities

The inspectors reviewed the eddy current examination activities performed in Unit 1 steam generators “A” and “B” during this current refueling outage to verify compliance with the licensee’s technical specifications, ASME BPVC Section XI, and Nuclear Energy Institute 97-06, “Steam Generator Program Guidelines.”

The inspectors reviewed the scope of the eddy current examinations, and the implementation of scope expansion criteria, to verify these were consistent with the Electric Power Research Institute (EPRI) Pressurized Water Reactor Steam Generator Examination Guidelines, Revision 7. The inspectors reviewed documentation for a sample of eddy current data analysts, probes, and testers to verify that personnel and equipment were qualified to detect the applicable degradation mechanisms in accordance with the EPRI Examination Guidelines. This review included a sample of site-specific Examination Technique Specification Sheets (ETSSs) to verify that their qualification and site-specific implementation were consistent with Appendix H or I of the EPRI Examination Guidelines. The inspectors also reviewed a sample of eddy current data for steam generator tubes A-R137C65, A-R17C68, B-R11C22, B-R76C14 and B-R138C50, with a qualified data analyst, to confirm that data analysis and equipment configuration were performed in accordance with the applicable ETSSs and site-specific analysis guidelines. The inspectors verified that recordable indications were detected and sized in accordance with vendor procedures.

The inspectors selected a sample of degradation mechanisms from the Unit 1 Degradation Assessment report and verified that their respective in-situ pressure testing criteria were determined in accordance with the EPRI Steam Generator Integrity Assessment Guidelines, Revision 3. Additionally, the inspectors reviewed eddy current indication reports to determine whether tubes with relevant indications were appropriately screened for in-situ pressure testing. The inspectors also compared the latest eddy current examination results with the last Condition Monitoring and Operational Assessment report for Unit 1 to assess the licensee’s prediction capability for maximum tube degradation and number of tubes with indications. The inspectors verified that the licensee’s evaluation was conservative and that current examination results were bound by the Operational Assessment projections.

The inspectors assessed the latest eddy current examination results to verify that new degradation mechanisms, if any, were identified and evaluated before plant startup. The review of eddy current examination results included the disposition of potential loose part indications on the steam generator secondary side to verify that corrective actions for evaluating and retrieving loose parts were consistent with the EPRI Guidelines. The inspectors also reviewed a sample of primary-to-secondary leakage data for Unit 1 to confirm that operational leakage in each steam generator remained below the detection or action level threshold during the previous operating cycle.

The inspectors’ review included the implementation of tube repair criteria and repair methods to verify they were consistent with plant technical specifications and industry guidelines. The inspectors verified that the licensee had selected the appropriate tubes for plugging based on the required plugging criteria. The inspectors reviewed the tube

plugging procedure and directly observed tube plugging activities for tubes A-R62C3, A-R90C5 and A-R146C19, to determine if the licensee installed the tube plugs in accordance with the applicable procedures.

Furthermore, the inspectors interviewed licensee staff and reviewed a sample of inspection results for the inspection conducted in the secondary side internals of steam generators "A" and "B," to verify that potential areas of degradation based on site-specific operating experience were inspected, and appropriate corrective actions were taken to address degradation indications. This review included the results of Foreign Object Search and Retrieval (FOSAR) activities and evaluations for potential loose parts in the secondary side of the "A" steam generator.

#### Identification and Resolution of Problems

The inspectors reviewed a sample of ISI-related issues entered into the corrective action program to determine if the licensee had appropriately described the scope of the problem and had initiated corrective actions. The review also included the licensee's consideration and assessment of operating experience events applicable to the plant. The inspectors performed this review to ensure compliance with 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requirements.

#### b. Findings

No findings were identified.

### 1R11 Licensed Operator Regualification Program and Licensed Operator Performance (71111.11)

#### a. Inspection Scope

#### .1 Resident Inspector Quarterly Review of Licensed Operator Regualification

On October 19, 2016, the inspectors observed an evaluated simulator scenario administered to an operating crew which was conducted in accordance with the licensee's accredited regualification training program.

The scenario involved securing 1B main feedwater pump due to a steam leak, 1HP-120 failure, a small break loss of coolant accident with multiple failures; engineered safeguard (ES) channels 1 & 2 (& diverse HPI actuation system) failure to auto-actuate, 1 HP-24 fails closed, 1C HPI pump fails to start, 1FDW-315 fails to closed, and 1B reactor building cooling unit failed to respond to ES low speed signal. Events progressed to a point where the crew entered an Alert declaration.

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

Documents reviewed are listed in the Attachment.

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

The inspectors observed licensed operator performance in the Unit 1 main control room on November 4, 2016 during reactor shutdown for the refueling outage.

The inspectors observed licensed operator performance in the main control room during the performance of the emergency power switching logic functional test on November 19, 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.

.3 Annual Review of Licensee Requalification Examination Results

a. Inspection Scope

On May 13, 2016, the licensee completed the annual requalification operating examinations required to be administered to all licensed operators in accordance with Title 10 of the Code of Federal Regulations 55.59(a)(2), "Requalification Requirements," of the NRC's "Operator's Licenses." During the week of December 5, 2016, the inspectors performed an in-office review of the overall pass/fail results of the individual operating examinations and the crew simulator operating examinations in accordance with Inspection Procedure (IP) 71111.11, "Licensed Operator Requalification Program." These results were compared to the thresholds established in Section 3.02, "Requalification Examination Results," of IP 71111.11.

b. Findings

No findings were identified.

### 1R12 Maintenance Effectiveness (71111.12)

#### a. Inspection Scope

The inspectors assessed the licensee's treatment of the three issues 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 problems as well as their corrective actions for returning the equipment to a satisfactory condition. The inspectors also interviewed plant personnel to assess the licensee's treatment of performance deficiencies and extent of condition. Documents reviewed are listed in the Attachment.

- Unit 0, Keowee hydro Unit 1, 230KV synchronizing switch failed to transfer from manual to automatic
- Unit 1, Tave setpoint lowered without operator input
- 10 CFR 50.65(a)(3) Periodic Evaluation

#### b. Findings

No findings were identified.

### 1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

#### a. Inspection Scope

The inspectors reviewed the three 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 risk management actions. The inspectors also verified that the licensee was identifying and resolving problems with assessing and managing maintenance-related risk using the corrective action program. 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 1, November 7, 2016, yellow risk activities during reactor coolant system level lowered below the reactor vessel flange
- Unit 1, November 21, 2016, yellow risk activities during reactor coolant system level lowered below the reactor vessel flange
- Unit 1 and Unit 2, December 12, 2016, green risk activities with 1PSW-22; 1PSW-24; and 2PSW-24 inoperable but available

#### b. Findings

No findings were identified.



1R15 Operability Determinations and Functionality Assessments (71111.15)

a. Inspection Scope

Operability and Functionality Review

The inspectors selected the seven 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 technical specification 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 technical specification and updated final safety analysis 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 1, Unit 2, and Unit 3, "89-10 MOV Operation During Transient Steady State Voltages," NCR 02041498
- Unit 1, Unit 2, and Unit 3, "230 KV Switchyard at Degraded Grid is not an Overall Bounding Scenario of the Electrical Power System," NCR 02056895
- Unit 1, Unit 2, and Unit 3, "Keowee Hydro Unit 1 230KV Synchronizing Switch not Transferring from Manual to Automatic Operation," NCR 02064523
- Unit 1, Unit 2, and Unit 3, "Reevaluate Oconee's Review of NRC Information Notice (IN) 97-45," NCR 02069527
- Unit 2, "Reactor Coolant System Pressure Fluctuations Potential Issue with Pressurizer Heaters," NCR 02065480
- Keowee Unit 1 and Unit 2, "125 vDC Battery Cells Discovered with Cracks in the Plate Straps," NCR 02078977
- LCT Functionality, NCRs 2028376, 2041498, and 2058763

b. Findings

.1 Failure to Perform Appropriate Evaluation of Motor Operated Valve Actuator Output Capability

Introduction: The NRC identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to correctly determine the bounding degraded voltage to be assumed in the determination of MOV actuator output capability. Specifically, the licensee did not use appropriate transient voltages as input into the evaluation of the capability of the MOVs that are required to reposition in response to an accident signal.

Description: The safety-related MOVs at Oconee can receive their electrical motive power from one of several sources, depending on the electrical system alignment, and as allowed by Oconee's technical specifications. These sources include offsite power from the station 230 kilovolt (kV) switchyard, the onsite Keowee hydro-electric units (KHUs), the offsite LCT units, or from the offsite 100kV central switchyard. In typical power system alignments, either the 230kV switchyard (offsite power) or the KHUs (onsite emergency AC source) would be used to mitigate accidents. However, because of the allowable alignments per technical specifications, and the design of the emergency power switching logic at Oconee, if an accident signal is received while the emergency standby buses are aligned to either the LCTs or the central switchyard, these sources could be relied upon to provide adequate electrical power to mitigate the accident. An accident condition would generate a signal for certain MOVs to reposition immediately to mitigate the accident, and they would be required to stroke within a required stroke time to meet the assumptions of the station's accident analyses.

Oconee MOV Calculations OSC-5599, "Generic Letter 89-10 Calculation for Unit 2 Gate and Globe Valves," Revision 31; OSC-5674, "Generic Letter 89-10 Calculation for Unit 1 Gate and Globe Valves at Oconee," Revision 34; and OSC-5760, "Generic Letter 89-10 MOV Calculation for Unit 1 Butterfly Valves at Oconee," Revision 13; stated, in part, that "To assure operability, actuator capability at degraded voltage conditions is shown to exceed valve thrust/torque requirements. Degraded voltage is determined by modeling electrical loads that affect available motor voltage at the time of valve actuation." Additionally, Calculation OSC-5675, "Generic Letter 89-10 Calculation for Unit 2 Gate and Globe Valves," Revision 33; stated, in part, that "The latest revision of Calculation OSC-2060 will always be used to determine the minimum voltage available to each MOV during a design basis event. This is determined by the use of the ETAP program." Oconee's Calculation OSC-2060 was the voltage adequacy study for Unit 2, and did not include evaluations of the KHU or LCT sources. For all three units, the licensee assumed that the 230kV switchyard would provide the limiting terminal voltage at the automatically actuated MOV actuator motors during both transient and steady state conditions following the initiation of an accident. However, it was determined that while the 230kV switchyard remained the limiting voltage source under steady state conditions, it was not the most limiting voltage source during transient conditions since the KHUs or the LCTs would present a greater challenge to MOV capability during transient conditions, a period during which the automatically actuated valves would have to operate.

On approximately September 19, 2016, the NRC became aware that the licensee did not have adequate electrical transient analyses for all of the potential electrical power sources to allow for the correct determination of the adequacy of the KHU or the LCT sources to provide motive power to the MOV actuators. The licensee had not properly accounted for frequency variation effects on the MOV capability. The licensee re-performed the transient analyses for the KHUs and the LCTs using the ETAP computer program and determined that several of the MOVs had negative margins (available thrust/torque less than required thrust/torque) during short periods of time during the voltage transient which could lengthen their stroke times. The licensee compared these predicted stall times to allowable stroke times from Oconee's accident analyses, and determined the MOVs remained capable of performing their intended functions. The inspectors reviewed the licensee's approach and the results of the analyses, and

determined they were adequate. The licensee placed this issue into their corrective action as NCR 2056895 to revise the calculations to reflect the current plant configuration.

Analysis: The licensee's failure to correctly determine the bounding degraded voltage to be assumed in the determination of MOV actuator output capability, was a performance deficiency and a failure to meet 10 CFR 50, Appendix B, Criterion III, "Design Control." This performance deficiency was more than minor because it was associated with the design control attribute of the mitigating systems cornerstone, and adversely impacted the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Oconee's programmatic failure to use bounding terminal voltage values in the evaluation of their automatically actuated, safety-related MOVs did not ensure they would be capable of mitigating accidents when powered from sources other than the 230kV switchyard, thus resulting in doubt on their capability to perform their intended safety function.

The team used IMC 0609, Att. 4, "Initial Characterization of Findings," issued October 7, 2016, for Mitigating Systems, and IMC 0609, 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 deficiency affecting the design or qualification of a mitigating SSC, and the SSC maintained its operability or functionality. No cross-cutting aspect was assigned because the inspectors determined that the finding was not indicative of current licensee performance, because the most recent transient analysis that was performed for the sources other than the 230kV switchyard was performed in 2012.

Enforcement: Title 10 CFR 50, Appendix B, Criterion III, "Design Control," required, in part, that, "design control measures shall provide for verifying or checking the adequacy of design, such as by the use of alternate or simplified calculation methods or by the performance of a suitable testing program." Contrary to the above, from original licensing until September 2016, the licensee did not verify or check the adequacy of the MOV design. Specifically, the licensee did not adequately verify that correct voltage inputs were used in the determination of the MOV actuator capability. Oconee's programmatic failure to use bounding terminal voltage values in the evaluation of their automatically actuated, safety-related MOVs could have affected their capability to perform their intended safety function. In response to this issue, the licensee performed preliminary electrical system transient analyses, compared these results to MOV requirements to confirm their acceptability, and initiated actions to formally update their calculations. This violation is being treated as an NCV consistent with Section 2.3.2.a. of the Enforcement Policy. The violation was entered into the licensee's corrective action program as NCR 2056895. (NCV 05000269, 270, 287/2016004-01, "Failure to Perform Appropriate Evaluation of Motor Operated Valve Actuator Output Capability.")

## .2 Inappropriate Voltage Band in Lee Combustion Turbine Unit Operating and Surveillance Procedures

Introduction: The NRC identified a Green NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure to identify appropriate

procedural updates that were needed to ensure the LCT procedures were appropriate for the circumstance and maintained current. Specifically, the licensee did not include appropriate operational limitations in procedures associated with the LCTs.

Description: The emergency electrical power system at Oconee can receive its electrical power input from one of several sources, depending on the electrical system alignment, and as allowed by Oconee's technical specifications. These sources include offsite power from the station 230 kV switchyard, the KHUs, the offsite LCT units, or from the offsite central switchyard. In typical power system alignments, either the 230kV switchyard (offsite power) or the KHUs (onsite emergency AC source) would be used to mitigate accidents. However, because of the allowable alignments per technical specifications, and the design of the emergency power switching logic at Oconee, if an accident signal is received while the emergency electrical buses are aligned to either the LCTs or the 100kV central switchyard, these sources would be relied upon to provide adequate electrical power to mitigate the accident. Oconee Technical Specifications 3.8.1 and 3.8.2 allow the LCTs to be aligned to the Oconee standby buses.

To demonstrate appropriate Oconee emergency electrical system response to analyzed events while being powered from the LCTs, the licensee created Calculation OSC-3290, "Voltage Study for Oconee Auxiliary Power Systems When Fed from Lee Combustion Turbine via CT5 XMR," Revision 10. Minor modification (OD) 500910 revised the Oconee design and licensing documentation as a result of replacement of the LCTs and changes to their step up transformer tap setting. The OD recognized that the new LCTs' step up transformer high side tap setting was 105 kV instead of the previous 102.5 kV, and concluded that this change would allow the voltage setting for the LCT generators to be 13.8 kV instead of the old setting of 14.1 kV, and would keep the associated voltage at Oconee within the requirements of calculation OSC-3290. However, following implementation of the changes to the LCTs and their transformer, Procedures OP/0/A/1107/003, "100KV Power Supply," OP/0/A/1107/003B, "Procedure for Furnishing Power to Oconee," and PT/3/A/0610/006, "100KV Power Supply from Lee Steam Station," were updated to reflect the physical changes to the equipment, and included an allowable voltage band of 13.7 to 13.8kV at the output of the LCT generators. These procedures were considered QA-1 in Oconee's quality group classification. The OD did not consider the effect of the voltages allowed by the procedures and their impact on the Oconee safety-related equipment.

The Duke Energy topical report, DUKE-QAPD-001, "Quality Assurance Program Description Operating Fleet," Section D.17.3.2.14, "Document Control," stated "Duke Energy Corporation has programmatic controls in place to continually identify procedure revisions to routine procedures which may be needed to ensure that procedures are appropriate for the circumstance and are maintained current." On approximately September 19, 2016, the NRC became aware that the procedure updates following modifications to the LCTs and their transformer were not appropriate to the circumstance. Specifically, the procedures allowed a lower voltage (13.7kV) at the output of the LCT generators, however calculation OSC-3290 had not demonstrated this operating voltage as being acceptable for safety related equipment performance at Oconee. Upon recognition that the procedure allowed a non-conservative voltage operating limit, the licensee generated NCR 2058763, verified the LCT automatic voltage

regulator setpoint was, and had been, 13.8kV, and generated a corrective action to revise the affected procedures' limits to 13.78kV, a value bounded by station analyses.

Analysis: The licensee's failure to identify appropriate procedural updates that were needed to ensure the procedures were appropriate for the circumstance and maintained current was a performance deficiency and a failure to meet 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings." This performance deficiency was more than minor because it was associated with the procedure quality attribute of the mitigating systems cornerstone, and adversely impacted the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, Oconee's failure to limit the operating voltage band of the LCTs to an amount that was demonstrated as acceptable by analysis resulted in doubt on their capability to provide power to safety-related equipment during an accident.

The team used IMC 0609, Att. 4, "Initial Characterization of Findings," issued October 7, 2016, for Mitigating Systems, and IMC 0609, 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 deficiency affecting the design or qualification of a mitigating, and the SSC maintained its operability or functionality. No cross-cutting aspect was assigned because the inspectors determined that the finding was not indicative of current licensee performance, because the update to the procedures occurred in January and October 2007, after replacement of the LCTs.

Enforcement: Title 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," required, 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" Contrary to the above, since January 2007, the licensee did not prescribe documented procedures appropriate to the circumstances, nor include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Specifically, following revisions to OP/0/A/1107/003 and OP/0/A/1107/003B and PT/3/A/0610/006, which included an allowable LCT operating band of 13.7-13.8kV, Oconee did not include appropriate quantitative acceptance criteria for determining that the alignment of the LCTs for Oconee operation had been satisfactorily accomplished. Oconee's failure to limit the operating voltage band of the LCTs to an amount that was demonstrated as acceptable by analysis could have affected their capability to provide power to safety-related equipment during an accident. In response to this issue, the licensee verified the LCT automatic voltage regulator setpoint was, and had been, 13.8kV, and generated a corrective action to revise the affected procedures' limits to 13.78kV, a value bounded by station analyses. This violation is being treated as an NCV consistent with Section 2.3.2.a. of the Enforcement Policy. The violation was entered into the licensee's corrective action program as NCR 2058763. (NCV 05000269, 270, 287/2016004-02, "Inappropriate Voltage Band in Lee Combustion Turbine Unit Operating Procedure.")

1R18 Plant Modifications (71111.18)a. Inspection Scope

The inspectors verified that the three plant modifications listed below did not affect the safety functions of important safety systems. The inspectors confirmed the modifications did not degrade the design bases, licensing bases, and performance capability of risk significant structures, systems and components. The inspectors also verified modifications 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 (EC) 114936, "2CA and 2CB 125VDC Class 1E Vital Instrumentation and Control Battery Replacement"
- EC 112284, "230kV Yellow Bus Differential Upgrade"
- EC ONS-2006-014, "NSM-ON-13090 Voltage Adequacy Changes"

The inspectors reviewed EC ONS-2006-014, Revision (Rev.) 1, to determine if the supporting design and licensing basis documentation was updated and that the changes were in accordance with the specified design requirements. The inspectors also reviewed the modification package to determine if the modification met the requirements of Title 10 CFR 50.59. The inspectors used, in part, Nuclear Energy Institute (NEI) 96-07, "Guidelines for 10 CFR 50.59 Implementation," Rev. 1, to determine acceptability of the completed evaluation. The NEI document was endorsed by the NRC in Regulatory Guide 1.187, "Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments," dated November 2000. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)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.

- work order (WO) 20080429, instrument and control battery 2CA service test conducted between September 16 and 21, 2016

- WO 20063275, instrument and control battery 2CB service test conducted between October 6 and 12, 2016
- WO 20112831, Keowee hydro Unit 1 operation following replacement of the unit's 230kV synchronizing switch performed on October 10, 2016
- WO 20084054, PT/1/A/0230/015, "HPI Motor Cooler Flow Test," conducted on October 10, 2016
- WO 20048287, OP/0/A/1106/029, "Control Room, Equipment Room, and Cable Room Chillers," October 11, 2016
- WO 20051434, PT/1/A/0251/024, "HPI Full Flow Test," November 20-22, 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.

1R20 Refueling and Other Outage Activities (71111.20)

a. Inspection Scope

For the Unit 1 refueling outage from November 5, 2016 through November 27, 2016, the inspectors evaluated the following outage activities:

- outage planning
- shutdown, cooldown, refueling, heatup, and startup
- reactor coolant system instrumentation and electrical power configuration
- reactivity and inventory control
- decay heat removal and spent fuel pool cooling system operation
- containment closure

The inspectors verified that the licensee:

- considered risk in developing the outage schedule
- controlled plant configuration per administrative risk reduction methodologies
- developed work schedules to manage fatigue
- developed mitigation strategies for loss of key safety functions

- adhered to operating license and technical specification requirements

The inspectors verified that safety-related and risk-significant structures, systems, and components not accessible during power operations were maintained in an operable condition. The inspectors also reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with outage activities. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors reviewed the six surveillance tests listed below and either observed the test or reviewed test results to verify testing adequately demonstrated equipment operability and met technical specification and current licensing basis. 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

- PT/1/A/0610/001 J, "Emergency Power Switching Logic Functional Test"

Containment Isolation Valve

- PT/1/A/0151/011C, "Penetration 11C Leak Rate Test"
- PT/1/A/0151/024, "Penetration 24 Leak Rate Test"
- PT/1/A/0151/042, "Penetration 42 Leak Rate Test"
- PT/1/A/0151/044, "Penetration 44 Leak Rate Test"

In-Service Tests (IST)

- PT/2/A/0600/013, "Motor Driven Emergency Feedwater Pump Test"

b. Findings

No findings were identified.



Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

The inspectors observed the emergency preparedness drill conducted on December 13, 2016. The inspectors observed licensee activities in the simulator and the technical support center 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 corrective action program. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope

The inspectors reviewed a sample of the performance indicator (PI) data, submitted by the licensee, for the Unit 1, Unit 2, and Unit 3 PIs listed below. The inspectors reviewed plant records compiled between November 2015 and November 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

- residual heat removal system
- emergency AC power system

b. Findings

No findings were identified.

## 4OA2 Problem Identification and Resolution (71152)

### .1 Routine Review

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

### .2 Semi-Annual Trend Review

#### a. Inspection Scope

The inspectors reviewed issues entered in the licensee's corrective action program and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors focused their review on repetitive equipment issues, human performance trends, and plant programs, but also considered the results of inspector daily problem identification program report screenings, licensee trending efforts, and licensee human performance results. The review nominally considered the 6-month period of July 2016 through December 2016 although some examples extended beyond those dates when the scope of the trend warranted. The inspectors compared their results with the licensee's analysis of trends. Additionally, the inspectors reviewed the adequacy of corrective actions associated with a sample of the issues identified in the licensee's trend reports. The inspectors also reviewed corrective action documents that were processed by the licensee to identify potential adverse trends in the condition of structures, systems, and/or components as evidenced by acceptance of long-standing non-conforming or degraded conditions. Documents reviewed are listed in the Attachment.

#### b. Findings and Observations

No findings were identified.

### .3 Annual Followup of Selected Issues

#### a. Inspection Scope

The inspectors conducted a detailed review of problem identification program report NCR 1776556, "Openings in High Energy Line Break (HELB) Barriers not on Drawings."

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 and Observations

No findings were identified.

4OA5 Other Activities

.1 Verification of Completion of Milestone 5 of Protected Service Water (PSW)

The inspectors reviewed licensee procedures and training activities related to installation and testing of permanent equipment associated with the completion of the PSW system. These procedures and training included the necessary activities (guidance) to provide alternate power to equipment in each of the three Oconee units such as HPI pumps; pressurizer heaters; vital equipment inverters, battery chargers, and load centers. The procedures and training also included the operation of PSW related pumps and valves and the operation of the auxiliary chilled water support system. The inspectors verified that station procedures were adequate for station operators to accomplish the aforementioned tasks. Additionally, the inspectors verified that adequate training was provided to personnel to accomplish the aforementioned tasks. With the completion of the activities listed above and documented in inspection report 05000269/2016003, 0500270/2016003, and 05000287/2016003, Section 4OA5 (ML16315A104), the inspectors determined that the licensee's modification met the intent of Milestone 5.

4OA6 Meetings, Including Exit

On January 12, 2017, the resident inspectors presented the inspection results to Mr. Tom Ray 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.

ATTACHMENT: SUPPLEMENTAL INFORMATION

**SUPPLEMENTAL INFORMATION**

**KEY POINTS OF CONTACT**

Licensee Personnel

- A. Best, Boric Acid Corrosion Control Program Manager
- E. Burchfield, Plant Manager
- J. Day, ISI Coordinator
- C. Dunton, Nuclear Site Support Director
- M. Dunton, Operations Manager
- T. Grant, Nuclear Engineering General Manager
- M. Hatley, Site Steam Generator Management Engineer
- D. Mayes, Duke Corporate Steam Generator Management
- R. Meixell, Regulatory Compliance
- P. Mettler, Site Licensing
- A. Norwood, Lead Nuclear Engineer- Design Engineering
- T. Ray, Site Vice-President
- C. Smith, Fleet MOV Program Engineer
- T. Thulien, Duke Corporate Level III
- C. Wasik, Regulatory Affairs Manager

NRC Personnel

- N. Childs, Resident Inspector
- E. Crowe, Senior Resident Inspector
- F. Ehrhardt, Chief, Projects Branch 1, Division of Reactor Projects
- J. Parent, Resident Inspector

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

Opened and Closed

- |                               |     |   |
|-------------------------------|-----|---|
| 05000269, 270, 287/2016004-01 | NCV | Failure to Perform Appropriate Evaluation of Motor Operated Valve Actuator Output Capability [Section 1R15] |
| 05000269, 270, 287/2016004-02 | NCV | Inappropriate Voltage Band in Lee Combustion Turbine Unit Operating Procedure [Section 1R15]                |

## LIST OF DOCUMENTS REVIEWED

### **Section 1R01: Adverse Weather Protection**

#### Nuclear Condition Report

01930298

#### Procedures

IP/0/B/1601/003, Meteorological Equipment Checks, Rev. 042

OP/0/B/1104/050, Weather Related Activities, Rev. 005

OP/2/A/1102/020 D, SSF and Outside Rounds, Rev. 082

PT/0/A/0110/017, Cold Weather Protection, Rev. 011

#### Work Orders/Requests

20054316

### **Section 1R04: Equipment Alignment**

#### Drawings

O-702, Rev. 36

O-702-A, Rev. 35

OFD-100A-1.1, Rev. 40

OFD-100A-1.2, Rev. 28

OFD-100A-1.3, Rev. 18

OFD-101A-1.1, Rev. 46

OFD-101A-1.2, Rev. 43

OFD-101A-1.3, Rev. 32

OFD-101A-1.4, Rev. 46

OFD-101A-1.5, Rev. 26

OFD-102A-1.1, Rev. 68

OFD-102A-1.2, Rev. 59

OFD-102A-1.3, Rev. 29

OFD-124A-1.1, Rev. 51

OFD-124B-1.1, Rev 65

#### Procedures

PT/1/A/0251/024, HPI Full Flow Test, Rev. 047

#### Work Orders/Requests

WO 20051434, 1A HPI Motor: Remove/Replace for Off-Site Refurb

### **Section 1R05: Fire Protection**

#### Procedures

NSD: 403, Shutdown Risk Management (Modes 4, 5, 6, and No-Mode) per 10 CFR 50.65(a)(4), Rev. 36

O-FS-1-RB-9000-001, Pre-Fire Plan for Unit 1 Reactor Bldg., Elevation(s) 777'-861', Rev. 001

O-FS-2-AB-9771-001, Pre-Fire Plan for Unit 2 Auxiliary Bldg., Elev. 771', Rev. 002

O-FS-2-AB-9783-001, Pre-Fire Plan for Unit 2 Auxiliary Bldg., Elev. 783', Rev. 002

O-FS-3-AB-9838-001, Pre-Fire Plan for Unit 3 Auxiliary Bldg., Elev. 838', Rev. 003  
 O-FS-3-TB-9775-001, Pre-Fire Plan for Unit 3 Turbine Bldg., Elev. 775', Rev. 001

### **Section 1R08: Inservice Inspection Activities**

#### Corrective Action Documents

AR 01852785, Boron Deposits on 1B LPI Cooler  
 AR 01853110, 1HP-243 Is Leaking  
 AR 01854070, 15-DPM Leak from 1LWD-349 (LPI Switchover Mode Cooler Inlet)  
 AR 01854138, 1HP-935 Seal Return Pen #7 Relief Inside Has Dried and Wet Boron on It  
 AR 01854217, 1LP-32 Non-Active Inaccessible Boric Acid Leak  
 AR 01854240, Several Boric Acid Leaks on Unit 1 High Point Vents  
 AR 01854601, Active Leak on 1HP-236  
 AR 01909822, 1GWD-VA-0153 Is Leaking Past Its Seat  
 AR 01909897, Excessive Boric Acid Leak 1LWD-VA-0346  
 AR 01934699, BACCP Evaluation 1HP-106 Excessive/Active Boric Acid Leak  
 AR 01939215, FLM Request for BACC Engineering Evaluation  
 AR 02008337, Unit 1 RB Tour Results (Mode 3) U1EOC28B Forced Outage  
 AR 02014669, 1B LPI Cooler Has Boron Leak at Flange  
 AR 02015007, Repair IHP-137 (A1 Seal Return Vent) Seat Leak  
 AR 02022150, Boric Acid Leak on 1LP-199 Vent  
 AR 02059041, Active Boron Leak on Piping Flange Going to 1CAPT157  
 AR 02075866, 1EOC29 Containment Discovery during Shutdown

#### NDE Reports

MT-16-184, Magnetic Particle Examination of Component # 1FDW-249-43B, Elbow to Pipe  
 UT-16-1758, Ultrasonic Examination of Weld # 1-20B-21-16-7, Pipe to Valve 1PRV-6  
 VT-2, Visual Examination for Boric Acid Detection, Report Number O1-29, Component ID:  
 1-RPV-Head-PEN, Outer Surface of RV Head

#### Procedures

MP/0/A/1800/132, Inspection, Assessment, and Cleanup of Boric Acid on Plant Materials, Rev. 9

NDE-NE-ALL-7202, Visual Examination of PWR Reactor Pressure Vessel Upper Head Penetrations, Rev. 0

NDE Procedures Manual - Volume 3 – NDE-25, Magnetic Particle Examination, Rev. 28

NDE Procedures Manual - Volume 3 – NDE-35, Liquid Penetrant Examination, Rev. 26

NDE Procedures Manual - Volume 4 - PDI-Generic Procedure for The Ultrasonic Examination of Ferritic Pipe Welds PDI-UT-I, Rev. E

S000001-07-000015, Mechanical Rolled Tube Plug & Stabilizer Installation Field Procedure for Replacement Once-Through Steam Generators, Rev. 10

#### Work Orders/Requests

WO 01982532 11, U1, SSF-ASW Pipe: Install SSF-ASW 6" Pipe (Removed for Insp) (ASME Class 3)

Weld Record 161515 for Welds #1-14C-0222-26 and 1-14C-0222-27

Welding Procedure Specification (WPS) Technical Sheet for WPS GTSM0101-01, Rev. 8

WPS GTSM0101-01, Revision 8, for GTAW, SMAW, or Combination

Material Issue Record (MIR) #161515-001, dated 11/15/2016

MIR #161515-002, dated 11/15/2016

MIR #161515-003, dated 11/15/2016

Procedure Qualification Record L-102E, Rev. 0

Procedure Qualification Record L-104, Rev. 3

Procedure Qualification Record L-133, Rev. 1

Procedure Qualification Record L-146D, Rev. 0

Procedure Qualification Record L-193A, Rev.2

Records of Welder Performance Qualification Tests for welding personnel

Liquid Penetrant Examination Report of Weld #1-14C-0222-26

Liquid Penetrant Examination Report of Weld #1-14C-0222-27

Certification Records of NDE personnel: K. Cole and B. Kendrick

Drawings:

1-14C-0222, From CCW Line to Steam Gen. "1B" Emerg. Feed Heater, Revision 12

O-0447C, Piping Layout Standby Shutdown Facility Auxiliary Service Water Piping Plan and Sections, Rev. 8

OFD-133A-2.5, Flow Diagram of Condenser Circulating Water System (SSF AUX. SERVICE), Rev. 55

WO 20007109 18, EC-114930, U1, Prefab Piping and Components (Shop) (ASME Class 2)

Engineering Change 0000114930, U1 Flex Alternate RCS Makeup Connection Points, Rev. 005

Weld Record 160827 for Welds #1-LP-0253-1, -2, -3, -4Z, -5Z, -6Z, -7Z, and -8Z

Welding Procedure Specification (WPS) Technical Sheet for WPS GTOO0808-04, Rev. 0

Procedure Qualification Record (PQR) L-110D, dated 2/11/91

PQR L-138A, Rev. 0

PQR L-148C, dated 4-18-88

Records of Welder Performance Qualification Tests for welding personnel

MIR #160827-001, dated 8/31/2016

MIR #160827-002, dated 9/6/2016

MIR #160827-003, dated 9/6/2016

MIR #160827-004, dated 9/19/2016

MIR #160827-005, dated 9/20/2016

MIR #160827-006, dated 9/21/2016

MIR #160827-007, dated 9/22/2016

MIR #160827-008, dated 9/26/2016

MIR #160827-009, dated 9/27/2016

Liquid Penetrant Examination Reports for Welds #1-LP-0253-1, -2, -4Z, and -5Z

Certification Records of NDE personnel: K. Cole, K. Evatt, and H. Grant

Drawings:

1-LP-0253, Low Pressure Injection System from BWST to Drain, Revision 0

HBV-B2-30-0074, 3" Fullport Ball Valve, Sch 40, Buttweld Endcaps, SS Construction, Level Operated, ANSI Class 150, Sheet 1 of 2, Rev. A

O-0438-114930-01, Isometric Piping Layout RC Makeup Connection, Elevation 796'-6", Rev. B

OFD-102A-1.1, Flow Diagram of Low Pressure Injection System (Borated Water Supply & LPI Injection), Rev. 69

OFD-102A-1.2, Flow Diagram of Low Pressure Injection System (LPI Pump Discharge), Rev. 60

OFD-104A-01-02, Flow Diagram of Spent Fuel Cooling System (Purification Loop), Rev. 22  
 WO 20069519 02, EC-404197, Unit-1, HP-VA-0137: Prefab Valve and Piping) (ASME Class 3) Engineering Change 0000404197, Evaluate Replacement Valve for 1HP-137, Revision 000 Engineering Change – Field Package 0000404197, Evaluate Replacement Valve for 1HP-137, Rev. 000  
 Weld Record 160928 for Weld #1-HP-0519-222  
 Welding Procedure Specification (WPS) Technical Sheet for WPS GTOO0808-04, Rev. 0  
 WPS #GTOO0808-04, Revision 0, for Gas Tungsten Arc Welding (GTAW)  
 Procedure Qualification Record (PQR) L-110D, dated 2/11/91  
 PQR L-138A, Rev. 0  
 PQR L-148C, dated 4-18-88  
 MIR #160928-001, dated 10/14/2016  
 MIR #160928-002, dated 10/18/2016  
 MIR #160928-003, dated 10/19/2016  
 MIR #160928-004, dated 11/13/2016  
 MIR #160928-005, dated 11/13/2016  
 MIR #160928-006, dated 11/14/2016  
 MIR #160928-007, dated 11/14/2016  
 MIR #160928-008, dated 11/14/2016  
 Records of Welder Performance Qualification Tests for welding personnel  
 Liquid Penetrant Examination Report #4415 of Weld #1-HP-0519-222  
 Certification Records of NDE personnel: K. Cole, A. Holden, R. Massey, W. McNeal, and K. Nance  
 Drawings:  
 1-HP-0519, High Pressure Injection System from Conn 'A' off Reactor Coolant Pump 1A1 to Reactor Coolant Seal Return Coolers, Rev. 3  
 101634-0, V02B-SW-ST-W010-001N2-001, ANSI 2500# with Oval Handwheel, Sheet 1 of 1, Rev. 2  
 OFD-101A-1.1, Flow Diagram of High Pressure Injection System (Letdown Section), Rev.46

#### Other Documents

06-00000406-000, B&W 5/8" Mechanical Roll Plug Qualification Report for Oconee 1, 2, 3 and Crystal River ROTSG's, Rev. 000  
 3010-PLAN-100673, BWXT Oconee 1EOC29 – ROTSG ECT Inspection Plan, Rev. 000  
 Applied Test Systems, Inc. Certificate of Compliance for Ultrasonic Test Block, dated 1 Oct 1991  
 Certification Records of NDE personnel: A. Hutton, K. Regan, M. Schmalz, T. Walkowiak, and B. Zollner  
 Focused Self-Assessment Report, Self-Assessment Number: AR #01985576, Type SAST, Assignment 03  
 Instrument Certification, Certificate # 554749, Instrument ID# MCNDE40196, Infrared Thermometer, Serial Number: 24621020, Calibration Date: 6/28/2016  
 Krautkramer Transducer Certificate of Conformity, Serial Number 01F6BL, dated 5/2/2006  
 Magnetic Particle Examination, Report Number MT-16-184, Component ID: 1FDW-249-43B; Elbow to Pipe  
 Magnetic Particle System – Calibration/Performance/Sensitivity Report, dated 7/11/16  
 Magnetic Particle System – Calibration/Performance/Sensitivity Report, dated 11/6/16



PH Tool Reference Standards Dimensional Inspection Report for Recertification of Type MAB  
 Miniature Angle-Beam Calibration Block, block serial number A04396, dated 04/08/15  
 Program Description (PD)-EG-PWR-1611, Boric Acid Corrosion Control Program, Rev. 1  
 Self-Assessment CRP-LIA-02-003, Operating Experience, 4/26/2012  
 Ultrasonic Calibration/Examination, Report Number UT-16-1758, Component ID:  
 1-20B-21-16-7; Pipe to Valve 1PRV-6  
 Ultrasonic Instrument Linearity Report Number L-16-411 for GE USN 60 SW, serial number  
 023K3B, dated 11/12/16  
 Visual Examination for Boric Acid Detection, Report Number O1-29, Component ID:  
 1-RPV-Head-PEN, Outer Surface of RV Head

#### Steam Generator (SG) NDE Examiner Qualifications

BWXT Certificate of NDE Personnel Qualification: LIII-QDA (Davis), dated 7/15/2015  
 BWXT Certificate of NDE Qualification: LIII-QDA (Baumann), dated 9-Jul-2015  
 BWXT Certificate of Vision Examination (Baumann), dated 12/15/2015  
 BWXT Certificate of Vision Examination (Davis), dated 9/6/2016  
 MoreTech Certificate of Personnel Qualification (Chambers), dated 07/01/13  
 MoreTech Certificate of Personnel Qualification: LIII-QDA (Merriman), dated 06/13/12  
 MoreTech Certificate of Vision Examination (Chambers), dated 12/09/2015  
 MoreTech Certificate of Vision Examination (Merriman), dated 09/25/16  
 Zetec Certificate of Qualification: LIIIA-QDA (Bipes), dated 25 September 2015  
 Zetec Eye Examination Certification (Bipes), dated 8/8/16

#### **Section 1R11: Licensed Operator Requalification**

##### Other

ASE-22, Active Simulator Exam, Rev. 00c

##### Procedures

AP/1-2/A/1700/035, Loss of SFP Cooling and/or Level, Rev. 19  
 OP/1/A/1102/010, Controlling Procedure for Unit Shutdown, Rev. 223  
 OP/0/A/1108/001, Enclosure 4.31, Unit 1 RCS Heatup/Cooldown Curves, Rev. 111  
 PT/1/A/0610/001 J, Emergency Power Switching Logic Functional Test, Rev. 50  
 RP/0/A/1000/001, Emergency Classification, Rev. 005  
 RP/0/A/1000/002, Control Room Emergency Coordinator Procedure, Rev. 011

#### **Section 1R12: Maintenance Effectiveness**

##### Documents

EVAL-2015-ON-KU+-00000959 – Keowee Generator Super System (a)(1) evaluation, August 4,  
 2015  
 EVAL-2015-ON-KU+-00000960 – Keowee Generator Super System (a)(1) evaluation, August 4,  
 2015  
 EVT-HPO-2013-00038397  
 EVT-GCS-2015-00060116  
 EVT-GCS-2015-00060315  
 Maintenance Rule Periodic Assessment – Oconee Nuclear Station, July 1, 2013 – December  
 31, 2015

Nuclear Condition Report

01736591; 01832657; 01839899; 01867477; 01909956; 01932636; 02009949; 02064523;  
02074758;

Other

EC 113574, Revise Tave Setpoint Range, Rev. 001

Procedures

PT/0/A/0620/009, Keowee Hydro Operation, Rev. 51

Work Orders/Requests

20112830

**Section 1R15: Operability Evaluations**Calculations

OSC-2059, U1, AC Power System Voltage and Fault Duty Analyses, Rev. 25  
 OSC-2060, U2, AC Power System Voltage and Fault Duty Analyses, Rev. 26  
 OSC-2061, U3, AC Power System Voltage and Fault Duty Analyses, Rev. 21  
 OSC-3290, Voltage Study for the Oconee Auxiliary Power Systems When Fed from Lee  
 Combustion Turbine via CT5 XMR, Rev. 10  
 OSC-3585, U1/2/3, AC Power System Analysis for Oconee when Fed from Central Tie 100kV  
 System, Rev. 3  
 OSC-5599, Generic Letter 89-10 Calculation for Unit 2 Gate and Globe Valves, Rev. 31  
 OSC-5674, Generic Letter 89-10 Calculation for Unit 1 Gate and Globe Valves at Oconee, Rev.  
 34  
 OSC-5675, Generic Letter 89-10 Calculation for Unit 2 Gate and Globe Valves, Rev. 33  
 OSC-5760, Generic Letter 89-10 MOV Calculation for Unit 1 Butterfly Valves at Oconee, Rev.  
 13  
 OSC-5952, U1/2/3, AC Power System Analysis for Oconee when Supplied by the Keowee  
 Underground Path, Rev. 6  
 OSC-7028, CYME Modeling of the January 1997 ESF Tests 2, 5, 6 and 3, Rev. 1

Miscellaneous

DPC-1205.19-00-0008, Investigation of Limitorque Undervoltage Capability, Rev. 0  
 DPS-1205.19-00-0002, Guideline for Performing Motor Operated Valve Reviews and  
 Calculations, Rev. 7  
 Lee Combustion Turbines' (GE LM6000) Voltage Adequacy Justification, dated 12/19/06  
 Lee Digital Exc/AVR Checklist  
 NCR 02028376 IDF- ETAP Support, dated 9/18/16  
 OD500910, Install 2 new LM-6000-PC gas turbines at Lee, dated 6/2/08

Nuclear Condition Report

01574708; 02028376; 02034217; 02041498; 02056895; 02058763; 02064523; 02065480;  
02065656; 02073450; 02073587; 02078977

Other

Ops Guide 16-17, 1,2,3RIA-57 and 1,2,3RIA-58 indications during HELB event affecting the Pen  
 Rooms, Rev 1

ONS-2016-098, Special Report per Technical Specification 5.6.6, Inoperability of Unit 1, 2, and 3 Post Accident Monitoring Containment High Range Radiation Monitors, dated November 14, 2016

Procedures

OP/0/A/1107/003, 100KV Power Supply, Rev. 89  
 OP/0/A/1107/003B, Procedure for Furnishing Power to Oconee, Rev. 10  
 PT/0/A/0620/009, Keowee Hydro Operation, Rev 51  
 PT/2/A/0610/006, 100KV Power Supply from Lee Steam Station, Rev. 4  
 PT/3/A/0610/006, 100KV Power Supply from Lee Steam Station, Revs. 3 and 4  
 03OP/0/2499/02, Operation for Oconee, Rev. 19

Work Orders/Requests

20112830

**Section 1R18: Plant Modifications**

Documents

Critical Activity Plan, 230KV Yellow Bus Outage  
 EC 112284, 230KV Yellow Bus Differential Upgrade, Rev. 6  
 EC 114936, 2CA and 2CB 125VDC Class 1E Vital Instrumentation and Control Battery Replacement, Revs. 0 – 4  
 EC ONS-2006-014, NSM-ON-13090 Voltage Adequacy Changes, Rev.1, dated 2/8/10  
 OSC-0208, Seismic Anchorage of Miscellaneous Electrical Equipment in the Auxiliary Building, Rev. 124  
 OSC-4300, protective relay settings, Rev. 26  
 OSC-7435, operability evaluation for PIP 99-2499: hydrogen gas generation in the station's battery room, Rev. 1

Nuclear Condition Report

02072057

Procedures

TN/0/A/112284/E1, 230KV Yellow Bus Differential Relay Upgrade, Rev. 0  
 TN/0/A/112284/E2, Engineering Change 112284 230KV Switchyard Yellow Bus Differential Relay Upgrade Modification – Post Modification Testing, Rev. 0

**Section 1R19: Post-Maintenance Testing**

Documents

2CB Control Battery BCT-2000 Battery Load Test Report, dated 10/17/2016  
 EC 114936, 2CA and 2CB 125 VDC Class 1E Vital Instrumentation and Control Battery Replacement, Revs. 0 – 4  
 OSC-0208, Seismic anchorage of miscellaneous electrical equipment in the Auxiliary Bldg, Rev. 124  
 OSC-7435, operability evaluation for PIP 99-2499: hydrogen gas generation in the station's battery room, Rev. 1

Nuclear Condition Report

02054523; 02055274; 02057579; 02057606; 02064523; 02068711; 02080657

Procedures

IP/0/A/3000/001 C, Removal, Installation, and Jumpering of Battery Cells, Rev. 41

IP/0/A/3000/026, Battery Cell Connection Resistance Test, Rev. 41

IP/2/A/3000/003 CA, Instrument and Control Battery 2CA Service Test and Annual Surveillance, Rev. 3

IP/2/A/3000/003 CB, Instrument and Control Battery 2CB Service Test and Annual Surveillance, Rev. 3

OP/0/A/1106/029, Control Room, Equipment Room, and Cable Room Chillers, Rev. 053

PT/0/A/0620/009, Keowee Hydro Operation, Rev. 51

PT/1/A/0230/015, High Pressure Injection Motor Cooler Performance Test, Rev. 042

PT/1/A/0251/024, HPI Full Flow Test, Rev. 047

Work Orders/Requests

20048287; 20051434; 20063275; 20080429; 20084054; 20112830; 20125649

**Section 1R20: Refueling and Other Outage Activities**Procedures

MP/0/A/1800/132, Inspection, Assessment, and Cleanup of Boric Acid on Plant Materials, Rev. 009

**Section 1R22: Surveillance Testing**Drawings

OFD-121D-2.1, Rev. 39

Procedures

AP/1-2/A/1700/035, Loss of SFP Cooling and/or Level, Rev. 19

PT/1/A/0151/011C, Penetration 11C Leak Rate Test, Rev. 9

PT/1/A/0151/024, Penetration 24 Leak Rate Test, Rev. 8

PT/1/A/0151/042, Penetration 42 Leak Rate Test, Rev. 8

PT/1/A/0151/044, Penetration 44 Leak Rate Test, Rev. 9

PT/1/A/0610/001 J, Emergency Power Switching Logic Functional Test, Rev. 50

PT/2/A/0600/013, Motor Driven Emergency Feedwater Pump Test, Rev. 69

**Section 1EP6: Drill Evaluation**Documents

EM-78, Nuclear Power Facility Emergency Notification Form, March 2016 Rev.

ERO Drill 2016-06

Procedures

AD-LS-ALL-0006, Notification/Reportability Evaluation, Rev. 1

RP/0/A/1000/001, Emergency Classification, Rev. 5

RP/0/A/1000/027, Re-Entry Recovery Procedure, Rev. 1

**Section 40A1: Performance Identification Verification**Documents

Duke Energy Oconee Nuclear Station Units 1, 2, and 3 Mitigating Systems Performance Index (MSPI) Basis Document, Rev. 16

EVT-EL-2014-00038463

EVT-ELK-2013-00038386  
 EVT-ELK-2013-00038389  
 EVT-GCS-2015-00060116  
 EVT-GCS-2015-00060315  
 EVT-HPO-2013-00038397  
 EVT-HPO-2015-00038471  
 EVT-LP-2013-00038379  
 EVT-LPI-2013-00019474  
 EVT-LPI-2015-00038468  
 EVT-TS-2016-00062502  
 EVT-TS-2016-00062503  
 EVT-TS-2016-00062610

MSPI Derivation Reports – MSPI System Emergency AC Power System – Unavailability Index,  
 Dated September, 2016 for Units 1, 2, and 3

MSPI Derivation Reports – MSPI System Emergency AC Power System – Unreliability Index,  
 Dated September, 2016 for Units 1, 2, and 3

MSPI Derivation Reports – MSPI System Residual Heat Removal System – Unavailability Index,  
 Dated September, 2016 for Units 1, 2, and 3

MSPI Derivation Reports – MSPI System Residual Heat Removal System – Unreliability Index,  
 Dated September, 2016 for Units 1, 2, and 3

OSC-8901, Oconee PRA Input for MSPI Basis Document, Rev 6

#### Nuclear Condition Report

01830903; 01839899; 01844024; 01852239; 01905659; 01907660; 01908143; 01909956;  
 01932636; 02017282; 02023473

#### Procedures

AD-EG-ALL-1217, Mitigating System Performance Index (MSPI), Rev. 0

### **Section 40A2: Problem Identification and Resolution**

#### Documents

ONDS-351, Rev. 0, Oconee Nuclear Station Units 1, 2, & 3 Analysis of HELBs Outside of  
 Containment

DBD No. OSS.0254.00-00-2006, Rev. 12, 125V DC Vital I&C

#### Drawings

O-1025-01, Auxiliary Building – Unit 1 Architectural Plan at El. 809+3 East Penetration Room,  
 Rev. 10

O-1025-06, Auxiliary Building – Unit 2 Architectural Plan at El. 809+3 East Penetration Room,  
 Rev. 4

O-1025-09, Auxiliary Building – Unit 3 Architectural Plan at El. 809+3 East Penetration Room,  
 Rev. 7

#### Nuclear Condition Report

NCR 01905440, Questions raised about licensing basis of HELB walls in Auxiliary Building

NCR 01713200, Reportability Evaluation

NCR 01839743, OBDN identified in O-12-2311 also applies to ventilation penetration

NCR 02065653, Unsealed penetrations in vital battery room HELB walls

**Section 4OA5: Other Activities****Procedures**

AP/0/A/1700/025, Safe Shutdown Facility Emergency Operating Procedure, Rev. 63  
AP/1-2/A/1700/036, Degraded Control Room Area Cooling, Rev. 16  
AP/3/A/1700/036, Degraded Control Room Area Cooling, Rev. 8  
AP/1/A/1700/050, Plant Fire, Rev. 3  
AP/2/A/1700/050, Plant Fire, Rev. 3  
AP/3/A/1700/050, Plant Fire, Rev. 3  
AP/0/A/1700/051, Alternate Reactor Building Cooling, Rev. 3  
EP/1/A/1800/001 0B, Blackout, Rev. 3  
EP/2/A/1800/001 0B, Blackout, Rev. 4  
EP/3/A/1800/001 0B, Blackout, Rev. 4  
EP/1/A/1800/001 0Q, Unit 1 EOP Enclosures 5.41-5.46, Rev. 4  
EP/2/A/1800/001 0Q, Unit 2 EOP Enclosures 5.41-5.46, Rev. 4  
EP/3/A/1800/001 0Q, Unit 3 EOP Enclosures 5.41-5.46, Rev. 4  
OP/0/A/1650/001, PSW System, Rev. 4  
OP/0/A/1650/002, PSW Ventilation, Rev. 2  
OP/0/A/1650/005, PSW AC Power, Rev. 16  
OP/0/A/1650/006, PSW DC Power, Rev. 8  
OP/1/A/1170/010, Operation of Batteries and Battery Chargers, Rev. 60  
OP/1/A/1107/018, Removal and Restoration Motor Control Centers, Rev. 16  
OP/1/A/6101/005, Alarm Response Guide 1SA-05, Rev. 19  
OP/1/A/6101/006, Alarm Response Guide 1SA-06, Rev. 42  
OP/2/A/1107/010, Operation of Batteries and Battery Chargers, Rev. 48  
OP/2/A/1107/013, Removal and Restoration Motor Control Centers, Rev. 13  
OP/2/A/6101/005, Alarm Response Guide 2SA-05, Rev. 20  
OP/2/A/6101/006, Alarm Response Guide 2SA-06, Rev. 29  
OP/3/A/1107/010, Operation of Batteries and Battery Chargers, Rev. 47  
OP/3/A/1107/013, Removal and Restoration Motor Control Centers, Rev. 13  
OP/3/A/6101/005, Alarm Response Guide 3SA-05, Rev. 22  
OP/3/A/6101/006, Alarm Response Guide 3SA-06, Rev. 27