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

February 3, 2016

Mr. Scott Batson
Site Vice President
Duke Energy Carolinas, LLC
Oconee Nuclear Station
7800 Rochester Highway
Seneca, SC 29672

SUBJECT: OCONEE NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT 05000269/2015004, 05000270/2015004, 05000287/2015004

Dear Mr. Batson:

On December 31, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Oconee Nuclear Station Units 1, 2, and 3. On January 21, 2016, the NRC inspectors discussed the results of this inspection with you and other members of your 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 NRC requirements. Further, the inspectors documented a licensee-identified violation which was determined to be of very low safety significance (Green). The NRC is treating these violations as non-cited violations (NCVs) 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, 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's Public Document Room or from the Publicly Available Records (PARS) component of NRC's Agencywide Documents 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/

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:
NRC Integrated Inspection Report 05000269/2015004,
05000270/2015004, 05000287/2015004
w/Attachment: Supplementary Information

cc: via Listserv

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's Public Document Room or from the Publicly Available Records (PARS) component of NRC's Agencywide Documents 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/

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:
NRC Integrated Inspection Report 05000269/2015004,
05000270/2015004, 05000287/2015004
w/Attachment: Supplementary Information

cc: via Listserv

☒ PUBLICLY AVAILABLE ☐ NON-PUBLICLY AVAILABLE ☐ SENSITIVE ☒ NON-SENSITIVE

ADAMS: ☒ Yes ACCESSION NUMBER: ML16035A028 ☒ SUNSI REVIEW COMPLETE ☒ FORM 665 ATTACHED

OFFICE	RII:DRP	RII:DRP	RII:DRP	RII:DRS	RII:DRS	RII:DRS
SIGNATURE	Via Email/RA/ELC1	Via Email/RA/NRS2	Via Email/RA/GSC1	Via Email/RA/SPS	Via Email/RA/CAF2	Via Email/RA/MKM3
NAME	E. Crowe	N. Childs	G. Croon	S. Sanchez	C. Fontana	M. Meeks
DATE	1/29/2016	2/1/2016	1/29/2016	1/29/2016	1/29/2016	1/29/2016
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
OFFICE	RII:DRS	RII:DRS	RII:DRS	RII:DRS	RII:DRP	RII:DRP
SIGNATURE	Via Email SAW4/RA/for	Via Email/RA/CMD4	Via Email/RA/ADN	Via Email/RA/JXR1	JGW1	FJE
NAME	M. Coursey	C. Dykes	A. Nielsen	J. Rivera	J. Worosilo	F. Ehrhardt
DATE	1/29/2016	1/29/2016	1/29/2016	2/3/2016	2/2/2016	2/3/2016
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPYDOCUMENT NAME: G:\DRPII\RPB1\OCONEE\REPORTS\2015\2015004\OCO DRAFT 2015004.DOCX

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos:	50-269, 50-270, 50-287
License Nos:	DPR-38, DPR-47, DPR-55
Report Nos:	05000269/2015004, 05000270/2015004, 05000287/2015004
Licensee:	Duke Energy Carolinas, LLC
Facility:	Oconee Nuclear Station, Units 1, 2 and 3
Location:	Seneca, SC 29672
Dates:	October 1, 2015, through December 31, 2015
Inspectors:	E. Crowe, Senior Resident Inspector N. Childs, Resident Inspector G. Croon, Resident Inspector S. Sanchez, Senior Emergency Preparedness Inspector (1EP2, 1EP3, 1EP4, 1EP5, 4OA1) C. Fontana, Emergency Preparedness Inspector (1EP2, 1EP3, 1EP4, 1EP5, 4OA1) M. Meeks, Senior Operations Engineer (1R11) M. Coursey, Reactor Inspector (1R08) C. Dykes, Health Physicist (2RS2, 2RS4, 4OA1) A. Nielsen, Senior Health Physicist (2RS5) J. Rivera, Health Physicist (2RS1, 2RS3, 4OA1)
Approved by:	Frank Ehrhardt, Chief Reactor Projects Branch 1 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000269/2015-004, 05000270/2015-004, 05000287/2015-004; October 1, 2015 through December 31, 2015; Oconee Nuclear Station Units 1, 2 and 3; Maintenance of Emergency Preparedness, Follow-up of Events and Notices of Enforcement Discretion

The report covered a three-month period of inspection by the resident inspectors and seven 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 February 4, 2015. The NRC's program for overseeing the safe operations of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

Cornerstone: Mitigating Systems

- Green. A Green self-revealing non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified for the failure to accomplish activities affecting quality in accordance with instructions and procedures established by the licensee. Specifically, the failure of station personnel to correctly close the Weidmuiller links on the feedwater control valves, in accordance with procedure PT/2/A/0152/020, "AFIS Circuitry Test," Enclosure 13.2, "AFIS Circuitry Verification and Valves Stroked on Refueling Frequency During FDW System Shutdown," Steps 1.22 and 1.23, caused feedwater flow oscillations. The feedwater flow oscillations resulted in a valid automatic feedwater isolation signal (AFIS) initialization. The licensee entered this issue into their corrective action program (CAP) as nuclear condition report (NCR) 01939072. The licensee verified all AFIS links on all units were closed and modified station procedures to include additional detail on ensuring that the links are fully closed.

  The licensee's failure to follow procedure PT/2/A/0152/020, "AFIS Circuitry Test," during the last AFIS circuitry testing on November 17, 2013 was a performance deficiency. The performance deficiency was more than minor because it was associated with the equipment performance and human performance attributes of the mitigating systems cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the failure of station personnel to correctly close the Weidmuiller links on the feedwater control valves caused feedwater flow oscillations resulting in a valid AFIS initialization. Using NRC IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2 "Mitigating System Screening Questions" Part B, dated July 1, 2012, the inspectors determined the finding to be of very low safety significance (Green) since the finding did not result in the loss of equipment specifically designed to mitigate a loss of feedwater flow. Specifically, the AFIS initiation was a valid actuation and as such, there was no loss of safety function. The finding had a cross-cutting aspect of procedure adherence in the area of human performance,

because the licensee did not adequately follow processes, procedures, and work instructions (H.8). (Section 4OA3)

Cornerstone: Emergency Preparedness

- Green. The inspectors identified a Green NCV of Title 10 of the Code of Federal Regulations (CFR), Part 50.47(b)(16), for the licensee's failure to maintain the effectiveness of its emergency plan by ensuring procedures for use by the emergency response organization are maintained and up-to-date. Specifically, responsibilities for emergency plan implementing procedure distribution were not adequately maintained in multiple emergency response facilities because the procedures were not of the correct revision and may have been used had an emergency been declared. After the NRC inspectors informed the licensee of the discrepancy, the licensee entered the issue into their CAP as action request (AR) 01959550. The licensee's immediate corrective actions were to perform an extent of condition review of all site EP procedures, including the corporate office and the other legacy Duke sites, and replace the procedures with the correct revision.

  The licensee's failure to adequately maintain controlled procedures in the emergency response facilities was a performance deficiency. The inspectors determined that the performance deficiency was more than minor because the performance deficiency was associated with the procedure quality attribute of the emergency preparedness (EP) cornerstone and adversely affected the associated cornerstone objective. The finding was evaluated using the EP significance determination process and was identified as having very low safety significance because it was a failure to comply with NRC requirements and was not a loss of the planning standard function. The finding was associated with a cross-cutting aspect in the documentation component of the human performance area because the licensee failed to maintain complete, accurate, and up-to-date documentation (H.7). (Section 1EP5)

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

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at approximately 100 percent rated thermal power (RTP). On November 18, 2015, reactor power was reduced to approximately 22 percent RTP in a planned attempt to stop then start the 1B2 reactor coolant pump to address higher than normal vibrations on the reactor coolant pump's spool piece. On November 19, 2015, the unit was returned to 100 percent RTP.

Unit 2 began the inspection period at approximately 100 percent RTP. On October 16, 2015, the unit shutdown for a planned refueling outage. The reactor achieved criticality on November 13, 2015 and returned to 100 percent RTP on November 14, 2015.

Unit 3 began the inspection period at approximately 100 percent RTP and remained at 100 percent RTP for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R04 Equipment Alignment

Partial Walkdown

a. Inspection Scope

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. The inspectors observed whether there was indication of degradation, and if so, verified the degradation was being appropriately managed in accordance with an aging management program and it had been entered into the licensee's corrective action program. Documents reviewed are listed in the attachment.

The inspectors selected the following two systems or trains to inspect:

- Unit 2, CT-5 while supplying U2 main feed buses with CT-2 removed
- Unit 3, turbine driven emergency feedwater system during monthly safe shutdown facility (SSF) preventive maintenance (PM)

b. Findings

No findings were identified.

1R05 Fire Protection

Quarterly Inspection

a. Inspection Scope

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 six fire areas to assess material condition and operational status of fire protection equipment. Documents reviewed are listed in the attachment.

- Unit 0, Keowee hydro station, fire zone KHS-001
- Unit 2, reactor building, fire zone 22
- Unit 3, low pressure injection (LPI) hatch area, fire zone 60
- Unit 3, west penetration room, fire zone 98
- Unit 3, east penetration room, fire zone 99
- Unit 3, control battery room, zone 100

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities

a. Inspection Scope

Non-Destructive Examination Activities and Welding Activities

From October 19–29, 2015, 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 2.

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.

- ultrasonic testing (UT), Weld 2HP-216-8, 2.5 in elbow-to-pipe, augmented (MRP-146) (observed)
- UT, Weld 2HP-218-18, 2.5 in. elbow-to-pipe, augmented (MRP-146) (observed)
- UT, liner plate at azimuth 24 degrees and 777 elevation (IWE) (reviewed)

The inspectors 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 2-HP-0524-35 pipe-to-elbow, 3 in., Class 2 (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 Vessel Upper Head Penetration Inspection Activities

The inspectors reviewed portions of the bare metal visual examination of the reactor vessel upper head penetrations and reviewed NDE reports for penetration numbers 5, 8, 24, and 60 to determine if the examinations were performed in accordance with the requirements of ASME Code Case N-729-1 and 10 CFR 50.55a(g)(6)(ii)(D). Additionally, the inspectors reviewed the visual examination for boric acid detection report for the Unit 2 reactor pressure vessel upper head to determine if the required examination coverage was achieved, and if limitations were recorded in accordance with the licensee procedures.

The inspectors reviewed the following examinations that identified relevant indications accepted for continued service. Specifically, the inspectors reviewed a sample of the examination records, and their associated evaluations (CR 1968714), to verify that licensee's acceptance for continued service was in accordance with the requirements of 10 CFR 50.55a(g)(6)(ii)(D) or an NRC-approved alternative.

- VT-1, white residue and minor rust near penetrations 5, 8, 24, and 60 ASME Code Class 1

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 containment 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 CAP.

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 for 2RC-61
- boric acid corrosion evaluation for 2HPI-PU-0005
- boric acid corrosion evaluation for 2SF-97
- boric acid corrosion evaluation for 2CF-61

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.

- NCR 01861432
- NCR 01836823
- NCR 01836822
- NCR 01908541

Steam Generator Tube Inspection Activities

The inspectors reviewed the eddy current (EC) examination activities performed in Unit 2 steam generators (SGs) 2A and 2B 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 EC 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 EC 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 EC data for SG tubes 2A-R89C5, 2A-R27C13, 2A-R141C57, 2A-R16C68, 2A-R142C55, 2A-R136C69, 2A-R134C71, 2B-R55C4, 2B-R100C8, 2B-R69C13, 2B-R8C42, 2B-R141C49, 2B-R139C59, 2B-R138C61, and 2B-R138C60 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 2 degradation assessment report (i.e., tube support plate wear and tube-to-tube wear), 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 EC indication reports to determine whether tubes with relevant indications were appropriately screened for in-situ pressure testing. The inspectors also compared the latest EC examination results with the last Condition Monitoring and Operational Assessment Report for Unit 2, 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 EC examination results to verify that new degradation mechanisms, if any, were identified and evaluated before plant startup. The review of EC examination results included the disposition of potential loose part indications on the SG 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 2, to confirm that operational leakage in each SG 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 a sample of tube plugging results for tubes 2A-R142C55, 2A-R136C69, 2A-R134C71, 2B-R55C4, 2B-R100C8, 2B-R69C13, and 2B-R138C60 to determine if the licensee installed the tube plugs in accordance with the applicable procedures.

The licensee did not perform secondary side inspections of the SGs during the outage; therefore, no NRC review was conducted of these activities.

Identification and Resolution of Problems

The inspectors reviewed a sample of ISI-related issues entered into the CAP 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 Requalification

.1 Resident Inspector Quarterly Review of Licensed Operator Requalification

a. Inspection Scope

On November 18, 2015, the inspectors observed an evaluated simulator scenario administered to an operating crew conducted in accordance with the licensee's accredited requalification training program. The scenario involved a borated water storage tank (BWST) level instrument failure, loss of main feedwater, a main steam line break, failure of AFIS automatic actuation, an engineered safeguards (ES) channel failure, and a reactor building cooling unit (RBCU) failure. Events progressed to a point where the crew entered an Unusual Event emergency 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.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors observed operator performance in the main control room on November 12, 2015 during synchronization of the Unit 2 main turbine to the electrical grid, and on November 18, 2015 during the 1B2 reactor coolant pump evolution to reduce observed vibrations.

The inspectors assessed the following:

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

- management and supervision

Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

.3 Annual Review of Licensee Requalification Examination Results

a. Inspection Scope

On April 20, 2015, the licensee completed the comprehensive biennial requalification written examinations and 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 14, 2015, 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

a. Inspection Scope

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

- Unit 0, control room ventilation system (VCR) placed into maintenance rule (a)(1)

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed the five 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 0, Orange risk condition due to CT-3 inoperable with Keowee overhead power path out of service
- Unit 0, Orange risk condition due to CT-1 inoperable with Keowee overhead power path out of service
- Unit 0, Yellow risk condition during CT-4 PM activities
- Unit 1, Orange risk condition during unwatering activities affecting SSF and protected service water (PSW)
- Unit 3, Yellow risk condition during PSW pump testing and alignment

b. Findings

No findings were identified.

1R15 Operability Evaluations and Functionality Assessments

Operability and Functionality Review

a. Inspection Scope

The inspectors selected the three 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 2, 2B main steam relief valve (MSRV) test, NCR 01970463
- Unit 2, 2HP-934 (letdown line relief valve) is leaking 1 drop per minute (DPM) from its relief port, NCR 01974447

- Unit 3, 3LPSW-5 actuator not operating manually, NCR 01961997

b. Findings

No findings were identified.

1R18 Plant Modifications

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) 000091880, Keowee Unit 1 Emergency Start Control Cable Replacement, Section 4.5, Unit 1 Keowee-Oconee Interposing Relays Electrical Isolation; Section 4.6, Unit 1 Keowee-Oconee Interposing Relay Cable Replacement; and Section 4.7, Unit 1 Keowee-Oconee Interposing Relay Testing
- EC 0000113524, Replacement For Keowee Excitation Transformer
- EC 0000400077, Replace Portion of CX Transformer Cable

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors either observed post-maintenance testing or reviewed the test results for the three 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.

- IP/3/A/0275/012A, U3 Feedwater Control Valve Demand and Interlock Calibration, performed on November 24, 2015 following repair of startup feedwater control valve 3FDW-35
- IP/3/A/0315/012, U3 Power Range/Wide Range NI Calibration
- PT/2/A/0600/012, U2 Turbine Driven Emergency Feedwater Pump Test

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
- 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

a. Inspection Scope

For the Unit 2 refueling outage from October 16, 2015 through November 13, 2015, 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

a. Inspection Scope

The inspectors reviewed the four 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 Surveillances

- PT/0/A/0600/021, Standby Shutdown Facility Diesel-Generator Operation
- PT/2/A/0150/003 A 013R, Reactor Building Integrated Leak Rate Test

Containment Isolation

- PT/2A/0151/012 B, Penetration 12B Leak Rate Test
- PT/2/A/0151/054, Penetration 54 Leak Rate Test

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP2 Alert and Notification System Evaluation

a. Inspection Scope

The inspectors evaluated the adequacy of the licensee's methods for testing and maintaining the alert and notification system in accordance with NRC Inspection Procedure 71114, Attachment 02, "Alert and Notification System Evaluation." The applicable planning standard, 10 CFR Part 50.47(b)(5) and its related 10 CFR Part 50, Appendix E, Section IV.D requirements were used as reference criteria. The criteria contained in NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, were also used as a reference.

The inspectors reviewed various documents which are listed in the attachment, interviewed personnel responsible for system performance, and observed aspects of periodic siren maintenance and testing. This inspection activity satisfied one inspection sample for the alert and notification system on a biennial basis.

b. Findings

No findings were identified.

1EP3 Emergency Response Organization Staffing and Augmentation System

a. Inspection Scope

The inspectors reviewed the licensee's emergency response organization (ERO) augmentation staffing requirements and process for notifying the ERO to ensure the readiness of key staff for responding to an event and timely facility activation. The qualification records of key position ERO personnel were reviewed to ensure all ERO qualifications were current. A sample of problems identified from augmentation drills or system tests performed since the last inspection was reviewed to assess the effectiveness of corrective actions.

The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 03, "Emergency Response Organization Staffing and Augmentation System." The applicable planning standard, 10 CFR 50.47(b)(2), and its related 10 CFR 50, Appendix E requirements were used as reference criteria.

The inspectors reviewed various documents which are listed in the attachment. This inspection activity satisfied one inspection sample for the ERO staffing and augmentation system on a biennial basis.

b. Findings

No findings were identified.

1EP4 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

Since the last NRC inspection of this program area, several changes were made to the radiological emergency plan, along with changes to several implementing procedures. The licensee determined that, in accordance with 10 CFR 50.54(q), the plan continued to meet the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50. The inspectors reviewed these changes to evaluate for potential reductions in the effectiveness of the plan. However, this review was not documented in a safety evaluation report and does not constitute formal NRC approval of the changes. Therefore, these changes remain subject to future NRC inspection in their entirety.

The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 04, "Emergency Action Level and Emergency Plan Changes." The applicable planning standards of 10 CFR 50.47(b), and its related requirements in 10 CFR 50, Appendix E, were used as reference criteria.

The inspectors reviewed various documents that are listed in the attachment to this report. This inspection activity satisfied one inspection sample for the emergency action

level and emergency plan changes on an annual basis.

b. Findings

No findings were identified.

1EP5 Maintenance of Emergency Preparedness

a. Inspection Scope

The inspectors reviewed the corrective actions identified through the emergency preparedness (EP) program to determine the significance of the issues, the completeness and effectiveness of corrective actions, and to determine if issues were recurring. The licensee's post-event after action reports, self-assessments, and audits were reviewed to assess the licensee's ability to be self-critical, thus avoiding complacency and degradation of their EP program. Inspectors reviewed the licensee's 10 CFR 50.54(q) change process, personnel training, and selected screenings and evaluations to assess adequacy. The inspectors toured facilities and reviewed equipment and facility maintenance records to assess the licensee's adequacy in maintaining them. The inspectors evaluated the capabilities of selected radiation monitoring instrumentation to adequately support emergency action level (EAL) declarations.

The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 05: "Maintenance of Emergency Preparedness." The applicable planning standards, related 10 CFR 50, Appendix E requirements, and 10 CFR 50.54(q) and (t) were used as reference criteria.

The inspectors reviewed various documents which are listed in the attachment. This inspection activity satisfied one inspection sample for the maintenance of emergency preparedness on a biennial basis.

b. Findings

Introduction. The inspectors identified a Green NCV of Title 10 of the Code of Federal Regulations (CFR), Part 50.47(b)(16), for the licensee's failure to maintain the effectiveness of its emergency plan by ensuring procedures for use by the emergency response organization are maintained and up-to-date. Specifically, responsibilities for emergency plan implementing procedure distribution were not adequately maintained in multiple emergency response facilities because the procedures were not of the correct revision and may have been used had an emergency been declared.

Description. During a tour of the emergency response facilities, the inspectors collected information on a sample of controlled procedures stored in the technical support center (TSC) and the operational support center (OSC). Following independent verification of procedure revision numbers, the inspectors identified at least one emergency plan implementing procedure that was out of date by two revisions. This procedure was available for use in both the TSC and the OSC. After informing the licensee of the discrepancy, the licensee entered the issue into their CAP as AR 01959550.

The licensee performed an extent of condition review and identified three other procedures that were not of the correct revision. All three of these procedures were available for use in both the TSC and OSC. The licensee also checked the other legacy Duke sites, as well as the corporate emergency facility, to ensure that these same procedures were current and up to date. No issues were identified at these locations.

The inspectors reviewed the changes that should have been reflected in the out of date procedures to determine the significance of those changes and the effect on licensee actions had an event occurred while these out of date procedures were in place. The most significant changes included: 1) a step to ensure communications (telephone number) with the control room and the incident command post operations liaison; 2) a corrected procedure number reference; 3) changing the primary communication method used by the licensee to communicate emergency information to offsite response organizations from the Selective Signaling System to the Duke Emergency Management Network (DEMNET); 4) providing enhanced calculations associated with the use of a non-digital air sampler; and 5) providing a different set of calculations when a digital air sampler may be used. There were several opportunities for the licensee to self-identify this discrepancy; during a self-assessment that was recently performed, during the annual quality assurance audit of the site EP program, and during the process of updating or revising controlled procedures.

Analysis. The licensee's failure to adequately maintain controlled procedures in the emergency response facilities was a performance deficiency. Specifically, the responsibilities for emergency plan implementing procedure distribution were not adequately maintained when NRC inspectors identified multiple controlled procedures in multiple emergency response facilities that were not of the correct revision and may have been used had an emergency been declared. The inspectors determined that the performance deficiency was more than minor because the performance deficiency was associated with the procedure quality attribute of the EP cornerstone and adversely affected the associated cornerstone objective. The finding was evaluated using the EP significance determination process and was identified as having very low safety significance (Green) because it was a failure to comply with NRC requirements and was not a loss of the planning standard function. The finding was associated with a cross-cutting aspect in the documentation component of the human performance area because the licensee failed to maintain complete, accurate, and up-to-date documentation. [H.7]

Enforcement. Title 10 CFR 50.54(q)(2) requires, in part, that a licensee authorized to possess and operate a nuclear power reactor shall follow and maintain the effectiveness of an emergency plan which meets the requirements in Appendix E to this part and the planning standards of 50.47(b). Title 10 CFR 50.47(b)(16) requires, in part, that responsibilities for plan development and review, and for distribution of emergency plans, which include emergency plan implementing procedures, are established. Contrary to the above, the licensee failed to maintain the effectiveness of its emergency plan. Specifically, responsibilities for emergency plan implementing procedure distribution were not adequately maintained when NRC inspectors identified multiple controlled procedures in multiple emergency response facilities that were not of the correct revision and may have been used had an emergency been declared. The

incorrect revision had been in place since April of 2015, with the latest revision becoming effective in July of 2015, resulting in approximately 3 months of non-compliance. The licensee's immediate corrective actions were to perform an extent of condition review of all site EP procedures, including the corporate office and the other legacy Duke sites, and replace the procedures with the correct revision. Because this failure is of very low safety significance (Green) and has been entered into the licensee's CAP as AR 01959550, this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000269, 05000270, 05000287/2015004-01, "Failure to adequately maintain controlled procedures in emergency response facilities."

2. RADIATION SAFETY (RS)

Cornerstones: Occupational Radiation Safety (OS) and Public Radiation Safety (PS)

2RS1 Radiological Hazard Assessment and Exposure Controls

a. Inspection Scope

Hazard Assessment and Instructions to workers

During facility tours of Units 1, 2, and 3 (U3), the inspectors directly observed labeling of radioactive material and postings for radiation areas (RAs), high RAs (HRAs), and very HRAs (VHRAs) in the radiologically controlled areas (RCAs), independent spent fuel storage installations (ISFSI), and selected radioactive waste (radwaste) processing and storage locations. Inspectors observed and evaluated labels on selected containers in those locations. The inspectors also reviewed survey records for several plant areas.

Inspectors independently surveyed areas in the plant and compared results to radiological conditions and postings in the plant. Inspectors also reviewed air sample records and observed work in potential airborne areas to assess the location of air monitors to include reactor head lift, letdown heat exchangers cutout, and removal of steam generator manway covers. The inspectors discussed changes to plant operations that could contribute to changing radiological conditions since the last inspection. For selected U2 end-of-cycle 27 (U2EOC27) outage jobs, the inspectors attended pre-job briefings and reviewed radiation work permit (RWP) details to assess communication of radiological control requirements and current radiological conditions to workers.

Hazard Control and Work Practices

The inspectors evaluated access barrier effectiveness for locked high radiation area and VHRA locations. Procedures for LHRA and VHRA access controls were discussed with cognizant health physics (HP) supervisors and staff, and operations personnel. Controls and their implementation for storage of irradiated material within the spent fuel pool were reviewed and discussed with cognizant RP personnel. Areas where dose rates could change significantly as a result of plant shutdown and refueling operations were also discussed. Radiological controls were evaluated for selected U2EOC27 tasks to include reactor head lift, letdown heat exchangers cutout, and removal of steam generator manway covers.

Occupational workers' adherence to selected RWPs and HP technician (HPT) proficiency in providing job coverage was evaluated through direct observations and

interviews with selected licensee staff of selected U2EOC27 activities. Electronic dosimeter alarm set points and worker stay times were evaluated against area radiation survey results for selected U2EOC27 work activities. Worker response to dose and dose rate alarms during work activities was also evaluated. HPT coverage and actions at the U2 containment access point, remote monitoring area, and RCA single point of access (SPA) were reviewed.

Control of Radioactive Material (RAM)
The inspectors observed the use of small article monitors, personnel contamination monitors, and portal monitors to survey material and personnel being released from the RCA and U2 containment. The inspectors also walked-down portions of the ISFSI, auxiliary building, turbine deck, and radwaste storage areas. The inspectors also reviewed source inventory and discussed leak tests for selected sealed sources, as well as discussed nationally tracked source transactions with cognizant RP staff. This included a walk down of storage locations for sealed sources in the auxiliary building.

Problem Identification and Resolution
Corrective Action Program documents associated with radiological hazard assessment and control were reviewed and assessed. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with licensee procedures.

Radiation Protection activities were evaluated against the requirements and guidance of Updated Final Safety Analysis Report (UFSAR) Section 12; 10 Code of Federal Regulations Parts 19 and 20; Regulatory Guide 8.38, "Control of Access to High and Very High Radiation Areas in Nuclear Power Plants," and approved licensee procedures. Documents reviewed during the inspection are listed in the report attachment.

b. Findings

No findings were identified.

2RS2 Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls

a. Inspection Scope

As Low As Reasonably Achievable (ALARA) Program Status
The inspectors reviewed the site's three-year rolling average (TYRA) collective exposure history for calendar year (CY) 2012 through CY 2014 and discussed with RP personnel plant exposure history, current trends and proposed activities to manage site collective exposure and source term reduction initiatives. Current ALARA program guidance and recent changes, as applicable, regarding estimating and tracking exposure were discussed and evaluated.

Radiological Work Planning and Exposure Tracking
The inspectors reviewed work activities and exposure estimates for U2EOC27 activities such as:

- low pressure service water (LPSW) piping replacement
- Alloy 600 Repairs

- eddy current testing
- nozzle dam installation and removal
- letdown cooler replacement

For the selected tasks, the inspectors reviewed dose mitigation actions and established dose goals. During the inspection, use of remote technologies including teledosimetry and remote visual monitoring as specified in RWP or procedural guidance were evaluated. Current collective dose data for selected tasks were compared with established estimates and, where applicable, changes to established estimates were discussed with responsible licensee ALARA planning representatives.

The inspectors reviewed ALARA work packages and evaluated the incorporation of operating experience and post-job reviews into RWP requirements. Day-to-day collective dose data for the selected tasks was monitored and compared with established dose estimates and evaluated against procedural criteria. Select work-in-progress reviews and adjustments to cumulative exposure estimate data were evaluated against work scope changes or unanticipated elevated dose rates. Inspectors reviewed selected post-job reviews conducted for previous refueling outage work. The licensee's on-line RWP cumulative dose databases used to track and trend current personal and cumulative exposure data and/or to trigger additional ALARA planning activities in accordance with current procedures were reviewed and discussed.

Source Term Reduction and Control

The inspectors reviewed historical dose rate trends for shutdown chemistry and cleanup and compared them to current U2EOC27 data. Source term reduction initiatives, including tri nuke filters were reviewed and discussed with pertinent personnel. The inspectors also reviewed temporary shielding packages for the outage.

Problem Identification and Resolution

The inspectors reviewed and discussed selected CAP documents associated with ALARA program implementation. The reviewed items included ARs, self-assessments, and quality assurance audit documents. The inspectors evaluated the licensee's ability to identify, and resolve the identified issues in accordance with licensee procedures.

The licensee's ALARA program activities and results were evaluated against the requirements of UFSAR Section 12; Technical Specifications (TS) Section 5.4; 10 CFR Parts 19 and 20; and approved licensee procedures. Documents reviewed during the inspection are listed in the report attachment.

b. Findings

No findings were identified.

2RS3 In-Plant Airborne Radioactivity Control and Mitigation

a. Inspection Scope

Engineering Controls
The inspectors reviewed the use of temporary and permanent engineering controls to mitigate airborne radioactivity during U2EOC27. In addition, during observations of jobs in-progress and containment walk-downs, inspectors observed the placement and use of high efficiency particulate air (HEPA) negative pressure units, and air sampling equipment. The inspectors evaluated the effectiveness of continuous air monitors and air samplers placed in work areas to provide indication of increasing airborne levels. The inspectors also reviewed procedural guidance for alpha emitter airborne monitoring.

Use of Respiratory Protection Devices
Inspectors reviewed the use of respiratory protection devices to limit the intake of radioactive material, including devices used for routine tasks and devices stored for use in emergency situations.

The inspectors evaluated self-contained breathing apparatus (SCBA) and negative pressure respirator (NPR) compliance with National Institute for Occupational Safety and Health certification requirements. The inspectors also reviewed records of Grade D (or better) air quality testing for supplied-air devices and SCBA bottles. In addition, the inspectors walked-down the compressor used for filling SCBA bottles. The inspectors discussed the process for issuing respirators, and evaluated whether selected individuals qualified for respirator and/or SCBA use had completed the required training, fit-test, and medical evaluation. Inspectors reviewed training material for personnel qualified for use of respiratory protection devices. Inspectors observed the physical condition of SCBA units, NPRs, air purifying respirators and device components staged for routine and emergency use throughout the plant. SCBA bottle air pressure, the number of units, and the number of spare masks and air bottles available were also evaluated by the inspectors.

Self-Contained Breathing Apparatus for Emergency Use
Control room operators were evaluated on the use of the devices, including SCBA bottle change-out and use of corrective lens inserts. Respirator qualification records and medical fitness records were reviewed and cross checked against selected main control room operators. In addition, qualifications for individuals responsible for testing and repairing SCBA vital components were evaluated through review of training records.

The inspectors walked-down the respirator issue and storage locations and evaluated whether the equipment was appropriately stored and maintained. Records of monthly and quarterly inventory and inspection of the equipment were also reviewed by the inspectors.

Problem Identification and Resolution
Licensee CAP documents associated with the control and mitigation of in-plant radioactivity and the use of respiratory protection devices were reviewed and assessed. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with licensee procedures. The inspectors also evaluated the scope of the licensee's internal audit program and reviewed recent assessment results.

Radiation protection activities were evaluated against the requirements UFSAR Section 12; 10 CFR Parts 19 and 20; and approved licensee procedures. Documents reviewed during the inspection are listed in the report attachment.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment

a. Inspection Scope

External Dosimetry
Inspectors reviewed and discussed the licensee's National Voluntary Accreditation Program (NVLAP) certification data for accreditation years April 2015 through March 2016 for ionizing radiation dosimetry. Inspectors reviewed program procedures for processing active personnel dosimeters and onsite storage of dosimeters were discussed and observed. Comparisons between electronic dosimeter (ED) and personnel dosimeters were discussed in detail. The inspectors also evaluated licensee procedures for unusual dosimetry occurrences and reviewed ED alarm investigation documents.

Internal Dosimetry
Inspectors reviewed and discussed the in vivo bioassay program with the licensee. Inspectors reviewed procedures that addressed methods for determining internal or external contamination, releasing contaminated individuals, and the assignment of dose and frequency of measurements depending on the nuclides. Inspectors reviewed and evaluated whole body count records selected from January 2013 to October 2015. The licensee's program for in vitro monitoring was reviewed and discussed in detail however, there were no dose assessments for internal exposure greater than 10 millirem committed effective dose equivalent.

Special Dosimetric Situations
Inspectors reviewed records of monitored declared pregnant women (DPWs) from January 2013 through October 2015 and discussed guidance for monitoring and informing DPWs. Inspectors reviewed the licensee's practice for monitoring external dose in areas if expected dose gradients. There were no available multibadging dose assessments to review for the inspection time period. In addition, the inspectors reviewed the licensee's program for evaluation of shallow dose equivalent (SDE), however there were no contamination events in the inspection period that required an SDE calculation. Inspectors reviewed the licensee's neutron dosimetry and survey program. Inspectors reviewed neutron surveys related with ISFSI loading and monitoring.

Problem Identification and Resolution
Inspectors reviewed and discussed licensee CAP documents associated with occupational dose assessment. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with licensee procedures. The inspectors also discussed the scope of the licensee's internal audit program and reviewed recent

assessment results.

The licensee's occupational dose assessment activities were evaluated against the requirements of UFSAR Section 12; TS Section 5.4; 10 CFR Parts 19 and 20; and approved licensee procedures. Documents reviewed during the inspection are listed in the report attachment.

b. Findings

No findings were identified.

2RS5 Radiation Monitoring Instrumentation

a. Inspection Scope

Radiation Monitoring Instrumentation
During tours of the auxiliary building, spent fuel pool areas, and radiation control area (RCA) exit point, the inspectors observed installed radiation detection equipment including the following instrument types: area radiation monitors (ARM)s, liquid and gaseous effluent monitors, personnel contamination monitors (PCM)s, small article monitors (SAM)s, and portal monitors. The inspectors observed the physical location of the components, noted the material condition, and compared sensitivity ranges with UFSAR requirements.

In addition to equipment walkdowns, the inspectors observed source checks and alarm setpoint testing of various portable and fixed detection instruments, including ion chambers, telepoles, neutron detectors, PCMs, SAMs, and portal monitors. For the portable instruments, the inspectors observed the use of a high range check source and reviewed records of periodic output value testing. The inspectors reviewed last recent records and evaluated alarm setpoint values for selected ARMs, PCMs, SAMs, effluent monitors, and a whole body count (WBC.) This included a sampling of instruments used for post-accident monitoring such as containment high range ARMs. Radioactive sources used to calibrate selected ARMs and effluent monitors were evaluated for traceability to national standards. Calibration stickers on portable survey instruments were noted during inspection of storage areas for ready to use equipment. The most recent 10 CFR Part 61 analysis for dry active waste (DAW) was reviewed to determine if calibration and check sources are representative of the plant source term. The inspectors also reviewed countroom quality assurance records for gamma ray spectrometry equipment and liquid scintillation detectors.

Problem Identification and Resolution
Selected licensee CAP documents associated with instrumentation were reviewed and assessed. The inspectors evaluated the licensee's ability to identify and resolve the identified issues in accordance with licensee procedures. The inspectors also reviewed recent self-assessment results.

Operability and reliability of selected radiation detection instruments were reviewed against details documented in the following: 10 CFR Part 20; NUREG-0737,

"Clarification of Three Mile Island Action Plan Requirements"; TS Section 3; UFSAR Chapters 11 and 12; and applicable licensee procedures. Documents reviewed during the inspection are listed in the report attachment.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

a. Inspection Scope

The inspectors reviewed a sample of the performance indicator (PI) data, submitted by the licensee, for the Unit 1, 2, and Unit 3 PIs listed below. The inspectors reviewed plant records compiled between December 30, 2014 and December 30, 2015 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

- emergency AC power system (3 units)
- residual heat removal (3 units)

For the review period of July 1, 2014 through June 30, 2015, the inspectors examined data reported to the NRC, procedural guidance for reporting PI information, and records used by the licensee to identify potential PI occurrences. The inspectors verified the accuracy of the PI for ERO drill and exercise performance through review of a sample of drill and event records. The inspectors reviewed selected training records to verify the accuracy of the PI for ERO drill participation for personnel assigned to key positions in the ERO. The inspectors verified the accuracy of the PI for alert and notification system reliability through review of a sample of the licensee's records of periodic system tests. The inspectors also interviewed the licensee personnel who were responsible for collecting and evaluating the PI data. Licensee procedures, records, and other documents reviewed within this inspection area are listed in the attachment. This inspection satisfied three inspection samples for PI verification on an annual basis.

Emergency Preparedness Cornerstone

- drill/exercise performance (DEP)
- emergency response organization drill participation (ERO)
- alert and notification system reliability (ANS)

Occupational Radiation Safety Cornerstone

The inspectors reviewed PI data collected from March 2014 through October 2015, for the occupational exposure control effectiveness PI. For the reviewed period, the inspectors assessed CAP records to determine whether HRA, VHRA or unplanned exposures, resulting in TS or 10 CFR 20 non-conformances, had occurred during the review period. In addition, the inspectors reviewed selected personnel contamination event data, internal dose assessment results, and electronic dosimeter alarms for cumulative doses and/or dose rates exceeding established set-points. Documents reviewed during the inspection are listed in the report attachment.

Public Radiation Safety Cornerstone

The inspectors reviewed the radiological control effluent release occurrences PI results for the public radiation safety cornerstone from March 2014 through October 2015. For the assessment period, the inspectors reviewed cumulative and projected doses to the public and PIP documents related to radiological effluent TS/ODCM issues. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data. Documents reviewed during the inspection are listed in the report attachment.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution

.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 timely completion of corrective actions, 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 July 2015 through December 2015 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 the following two NCRs:

- NCR 01800152, Inability of Keowee sprinkler system to provide adequate protection for Keowee main step-up transformer
- NCR 01959444, Vibrations on 1B2 RCP are higher than on other Unit 1 RCPs

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.

4OA3 Followup of Events and Notices of Enforcement Discretion (NOED)

.1 (Closed) LER 05000287/2015-01 Unit 3 Manual Reactor Trip Due to Unacceptable Main Feedwater Flow Control Valve Oscillations

a. Inspection Scope

On January 31, 2015, Oconee Unit 3 experienced oscillations of main feedwater outside normal parameters while operating at 100 percent RTP. Main control room operators made the decision to manually trip the reactor because of the feedwater oscillations and increasing reactor coolant system pressure. A subsequent investigation by licensee staff determined the feedwater flow oscillations were caused by a subcomponent failure of the electrical to pneumatic controller (E/P) which failed to properly control the position of main feedwater control valve 3FDW-32. The licensee affected repairs by replacing the E/P controller and removing all similar controllers of the same lot from their

warehouse stock. The failure was attributed to a manufacturing defect in the circuit board of the E/P controller.

The inspectors reviewed the licensee cause determination; information contained within corrective documents; and documentation of a previous Unit 3 reactor trip to evaluate the thoroughness of the licensee's process. The inspectors verified the accuracy of LER 05000287/2015001 which reported the January 31, 2015 event and also reviewed LER 05000287/2013001 which reported a similar event that occurred on October 24, 2013. The event in 2013 was attributed to a bent positioner shaft and o-ring leakage around the positioner's shaft. The licensee rebuilt the valve positioner and performed maintenance on other similar positioners in the other units in the plant. The inspectors determined the licensee's corrective actions for the event in 2013 were reasonable based upon available knowledge at that time. The inspectors were able to determine that the faulty E/P controller was installed in the control system of 3FDW-32 during the October 24, 2013 event. However, the inspectors determined that it was not within the licensee's ability to foresee the E/P controller as a likely cause during the October 24, 2013 event. LER 05000287/2015-01 is closed.

b. Findings

No findings were identified.

.2 (Closed) LER 05000269/270/287/2014-02 Deficiency in Loss of Coolant Accident Analysis Adversely Affected Predicted Peak Cladding Temperature

a. Inspection Scope

On November 25, 2014, the licensee received letters from their nuclear fuel supplier, AREVA, regarding a required notification under the provisions of 10 CFR 50.46, "Acceptance Criteria for ECCS for Light-Water Nuclear Power Reactors." These documents indicated that certain non-conservatisms were discovered in the methodology application and inputs used by AREVA for nuclear fuel core configurations with the Mark-B-HTP fuel supplied by AREVA and currently in use by the licensee. These non-conservatisms increased the fuel peak cladding temperature (PCT) to a value in excess of the value prescribed in 10 CFR 50.46(b)(1) under certain loss of coolant accident (LOCA) conditions. Duke Energy Carolinas, LLC formally reported this discovery to the NRC as an unanalyzed condition meeting the requirement for an eight-hour non-emergency report to the NRC under 10 CFR 50.72(b)(3)(ii)(B) on November 25, 2014.

Per the requirements of 10 CFR 50.46(a)(3)(II), the licensee submitted a written report within 30 days to the NRC regarding this issue (ADAMS Accession No. ML 14353A214). The licensee had entered this issue into their CAP as NCR 1909299. The inspectors reviewed this LER, the licensee's evaluation, and corrective action documents to verify the accuracy of the LER and that corrective actions were identified and/or implemented to address the issue. Further corrective actions planned by the licensee include, in part, submitting a LOCA evaluation model reanalysis to the NRC in accordance with the provisions of 10 CFR 50.46.
Documents reviewed are listed in the attachment. LER 05000269/270/287/2014-02 is

closed.

b. Findings

No findings were identified. Inspectors determined that it was not within the licensee's ability to foresee this condition and therefore no performance deficiency existed.

.3 (Closed) LER 05000269/270/287/2012-01, Unanalyzed Conditions Exist for Standby Shutdown Facility Mitigated Events

a. Inspection Scope

On January 26, 2012, the Oconee Site Vice President sent a letter to the NRC Region II Regional Administrator informing the NRC that Duke Energy Carolinas, LLC (Duke Energy) was performing a comprehensive design, licensing, and operational review of the Oconee Nuclear Station Standby Shutdown Facility (SSF). The goal of this review was to ensure that systems, structures, and components associated with the SSF functions are capable of performing their design functions. On March 6, 2012, the NRC issued Confirmatory Action Letter – Oconee Nuclear Station, Units 1, 2, and 3 Commitments to Perform a Comprehensive Standby Shutdown Facility Design Review and an Evaluation of Modifications/Procedure Changes to Reduce the Risk of Bus Duct Faults (CAL 2-12-001). On March 29, 2012, Duke Energy entered into their CAP that unanalyzed conditions exist for the SSF mitigated events since associated thermal and hydraulic analyses do not consider ONS operating conditions during shutdown and startup, especially those involving lower operating modes and lower decay heat. Subsequently, the licensee's evaluations and analyses efforts did not support SSF operability for all credited events. On April 6, 2012, the licensee reported that unanalyzed conditions exist for SSF mitigated events (Event Notification System Report No. 47810.) The event notification was reported under 10 CFR 50.72(b)(3)(ii)(B), nuclear plant being in an unanalyzed condition that significantly degrades plant safety. The event notification was subsequently followed up with an LER submittal identifying two reportable conditions; 10 CFR 50.73(a)(2)(ii)(B), a condition that resulted in the nuclear power plant being in an unanalyzed condition; and 10 CFR 50.73(a)(2)(i)(B) operation in a condition prohibited by technical specifications.

The licensee entered this condition into their CAP as NCR 1905088. The inspectors reviewed this LER, the licensee's evaluation, and corrective action documents to verify the accuracy of the LER and that corrective actions were identified and/or implemented to address the issue. Further corrective actions planned by the licensee include submitting a license amendment request encompassing the associated thermal/hydraulic analysis, plant modifications to letdown and makeup capability, and SSF operations. The inspectors determined that the submittal of the January 26, 2012 correspondence where the Oconee Site Vice President informed the NRC that Duke Energy Carolinas, LLC (Duke Energy) is performing a comprehensive design, licensing, and operational review of the Oconee Nuclear Station Standby Shutdown Facility (SSF) was the primary factor in the discovery of the regulatory issue. LER 05000269/270/287/2012-01 is closed.

b. Findings

The inspectors determined that a performance deficiency existed due to the licensee's failure to consider all required operating conditions during the design and implementation of the SSF. The enforcement aspects of this finding are discussed in Section 4OA7.

.4 (Closed) LER 05000270/2015-001, Valid Emergency Feedwater System Actuation Caused by a Main Feedwater System Block Valve Malfunction

a. Inspection Scope

On July 27, 2015, Unit 2 was returning to rated thermal power following a planned refueling outage. At approximately 16.6 percent power, an unexpected water level reduction occurred in the 2B once through steam generator (OTSG), due to a malfunction of the main feedwater block valve (2FWD-40), which failed to open on demand. Oconee control room staff immediately reduced power to a level that the startup main feedwater control valve could feed at the appropriate rate for the power level (<15 percent). During this transient, a valid emergency feedwater injection signal was received by the engineering safety (ES) system. The resident staff monitored the shutdown of Unit 2. The resident inspectors and a regional inspector monitored the licensee's troubleshooting activities. The NRC inspectors also evaluated the licensee's extent of condition review and activities. The licensee performed a root cause evaluation of the feedwater block valve and associated equipment and determined the cause to be a procedure use and adherence error by personnel performing the last AFIS circuitry test in the fall of 2013.

The inspectors verified the accuracy of the LER, the appropriateness of completed and planned corrective actions, and reviewed the licensee's root cause evaluation. The licensee entered this issue into their corrective action program as NCR 01939072. LER 05000270/287/2015-01 is closed.

b. Findings

Introduction. A Green self-revealing NCV of 10 CFR Part 50, Appendix B, Criterion V "Instructions, Procedures, and Drawings," was identified for the failure to accomplished activities affecting quality in accordance with instructions and procedures established by the licensee. Specifically, the licensee failed to accomplish PT/2/A/0152/020, "AFIS Circuitry Test," Enclosure 13.2, "AFIS Circuitry Verification and Valves Stroked on Refueling Frequency During FDW System Shutdown," Steps 1.22 and 1.23, while performing AFIS circuitry testing. The licensee did not properly snap closed the Weidmuiller links on the 2 FWD-40 circuitry. The failure to do so caused the 2FWD-40 to fail open upon demand resulting in a valid automatic actuation of the AFIS system.

Description. On July 27, 2015, Unit 2 was returning to RTP following a planned refueling outage. At approximately 16.6 percent RTP, an unexpected water level reduction in the OTSG 2B occurred due to the main feedwater block valve (2 FWD-40) failing to open upon demand. The licensee operators immediately recognized a loss of feedwater flow to the OTSG 2B and immediately reduced reactor power to a level that OTSG 2B startup feedwater control valve (2 FWD-44) could feed the appropriate rate for the current power level (<15 percent). This failure prevented the main feedwater

system from providing the flow necessary for RTP above 16.6 percent. The reduction in OSTG feedwater levels also resulted in an automatic feedwater isolation signal (AFIS) actuation and closure isolation of 2 FWD-40, 2 FWD-44, and OTSG 2B main feedwater control valve (2 FWD-41).

The main feedwater system is designed such that 2 FWD-44 controls feedwater flow to the 2B OTSG from 0 percent and approximately 15 percent and 2 FWD-41 controls feedwater flow between 15 percent - 100 percent RTP. Valves 2 FWD-41 and 2 FWD-44 are interlocked such that an electrical demand signal of 90 percent for 2 FWD-44 causes 2 FWD-41 to open and 2 FWD-44 to close. This action causes the transition from startup flow to main flow control and also sends an electronic signal to open 2 FWD-40.

The licensee troubleshot the issue of 2 FWD-40 failing to open upon demand and found that AFIS testing links were not fully engaged. These links are Weidmuiller links that must be snapped closed to be fully engaged. The licensee determined that the root cause of this event was the failure of station personnel performing the last AFIS circuitry test on November 17, 2013 to correctly close the Weidmuiller links. The licensee used procedure PT/2/A/0152/020, "AFIS Circuitry Test," to perform AFIS circuitry testing. PT/2/A/0152/020, "AFIS Circuitry Test," Enclosure 13.2, "AFIS Circuitry Verification and Valves Stroked on Refueling Frequency During FDW System Shutdown," Steps 1.22 and 1.23, provide instructions to close the Weidmuiller links. As corrective actions following this event, the licensee verified that all AFIS links on all units were closed and modified station procedures to include additional detail on ensuring that the links are fully closed.

Analysis. The inspectors determined that the licensee's failure to follow procedure PT/2/A/0152/020, "AFIS Circuitry Test," during the last AFIS circuitry testing was a performance deficiency. The finding is more than minor because it challenged the equipment performance and human performance attributes of the mitigating systems cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the failure of station personnel to correctly close the Weidmuiller links on the feedwater control valves caused feedwater flow oscillations resulting in a valid AFIS initialization. This challenged the reliability of safety related equipment. Using NRC IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2 "Mitigating System Screening Questions" Part B, dated July 1, 2012, the inspectors determined the finding to be of very low safety significance (Green) since the finding did not result in the loss of equipment specifically designed to mitigate a loss of feedwater flow. Specifically, the AFIS initiation was a valid actuation and as such, there was no loss of safety function. The finding had a cross-cutting aspect of procedure adherence in the area of human performance because the licensee did not adequately follow processes, procedures, and work instructions. (H.8).

Enforcement. 10 CFR Part 50 Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, or a type appropriate to the circumstances and shall be accomplished in accordance with these instructions,

procedures, or drawings. The licensee used procedure PT/2/A/0152/020, "AFIS Circuitry Test," to perform AFIS circuitry testing. PT/2/A/0152/020, AFIS Circuitry Test, Enclosure 13.2, "AFIS Circuitry Verification and Valves Stroked on Refueling Frequency During FDW System Shutdown," Steps 1.22 and 1.23 provide instructions to close the Weidmuiller links. Contrary to the above, on November 17, 2013, activities affecting quality were not accomplished in accordance with instructions and procedures. Specifically, the licensee personnel did not adhere to procedure PT/2/A/0152/020 while performing the last AFIS circuitry test by not properly snapping closed the Weidmuiller links on the 2 FWD-40 circuitry. The failure to do so caused 2FWD-40 to fail open upon demand resulting in a valid automatic actuation of the AFIS system. As corrective actions, the licensee verified all AFIS links on all units were closed and modified station procedures to include additional detail on ensuring that the links are fully closed. Because this violation was of very low safety significance and was entered into the licensee's corrective action program as NCR 01939072, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC's Enforcement Policy: NCV 05000270/2015004-02, "Failure to Accomplish Activities Affecting Quality in Accordance With Station Instructions and Procedures Which Resulted in a Valid AFIS Actuation."

4OA6 Management Meetings (Including Exit Meeting)

Exit Meeting Summary

On January 21, 2016, the resident inspectors presented the inspection results to Mr. Scott Batson and other members of licensee management. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) 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 Non-Cited Violation (NCV).

- 10 CFR 50, Appendix B, Criteria III, "Design Controls," requires in part, that "measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in 10 CFR 50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures and instructions." Contrary to the above, since May 11, 1992, the licensee failed to ensure that applicable regulatory requirements and design basis were correctly translated into specifications, drawings, procedures and instructions for the SSF. Specifically, the licensee's initial analytical assumptions were inadequate to demonstrate that the SSF could meet design requirements under all required operating conditions. Additionally, on multiple occasions the licensee failed to properly evaluate emergent issues and design changes to ensure the SSF continued to meet design requirements under all required operating conditions. The performance deficiency was more than minor because it was associated with the equipment performance and protection against external factors attributes of the mitigating systems cornerstone and adversely affected the cornerstone objective to

ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. An NRC Region II senior reactor analyst evaluated both internal events and external events (e.g. fire, turbine building flooding, tornado) and determined the risk significance was very low (Green). The dominant contributors to the low risk result were: 1) the limited exposure time per year that an individual Oconee unit would spend in the vulnerable time-window immediately following shutdown, and 2) the low frequency of the external events that would demand the SSF. The licensee entered this condition into their CAP as NCR 01905088 and NCR 01905183.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee
G. Armentrout, Programs Engineering
S. Batson, Site Vice President
S. Boggs, Emergency Services Coordinator
B. Bowers, Operations Instructor
E. Burchfield, Engineering Manager
T. Cheslak; Oconee Fire Protection Engineer
T. Doss, LOR Supervisor
C. Dunton, Site Support Director
P. Fisk; Superintendent of Operations
D. Harrleson, Balance of Plant Engineering
D. Lewis, Programs Engineering
A. Lotfi, Duke - Construction
T. Patterson, Safety Assurance Manager
J. Pottmeyer, Simulator Supervisor
J. Pounds, OMP Tornado/HELB QA Oversight
T. Ray, Station Manager
F. Rickenbaker, OMP Manager
D. Robinson, Radiation Protection Manager
C. Ropp, Operations Training Supervisor
M. Russo, Balance of Plant Engineering
C. Saville, Programs Engineering
J.R. Steely, Training Manager
J. Smith, Regulatory Compliance
P. Street, Emergency Planning Manager
C. Wasik, Regulatory Compliance Manager

NRC
R. Hall, Project Manager, NRR

Attachment

LIST OF ITEMS OPENED, CLOSED, DISCUSSED AND UPDATED

Discussed
None

Opened
None

Opened and Closed

05000269/270/287/2015004-01	NCV	Failure to Adequately Maintain Controlled Procedures in Emergency Response Facilities (Section 1EP5)
05000270/2015004-02	NCV	Failure to Accomplish Activities Affecting Quality in Accordance With Station Instructions and Procedures Which Resulted in a Valid AFIS Actuation (Section 4OA3.4)

Closed

05000287/2015-01	LER	Unit 3 Manual Reactor Trip Due to Unacceptable Main Feedwater Flow Control Valve Oscillations (Section 4OA3.1)
05000269/270/287/2014-02	LER	Deficiency in Loss of Coolant Accident Analysis Adversely Affected Predicted Peak Cladding Temperature (Section 4OA3.2)
05000269/270/287/2012-01	LER	Unanalyzed Conditions Exist for Standby Shutdown Facility Mitigated Events (Section 4OA3.3)
05000270/2015-01	LER	Valid Emergency Feedwater System Actuation Caused by a Main Feedwater System Block Valve Malfunction (Section 4OA3.4)

LIST OF DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

Other:

Oconee Nuclear Station Protected Equipment Log for October 20, 2015

Section 1R05: Fire Protection

Procedures:

O-FS-0-OC-9000-003, Pre Fire Plan – Keowee Hydro Station, Rev 00
O-FS-3-AB-9771-001, Pre Fire Plan – Auxiliary Bldg. Elev 771', Rev 00

Section 1R08: Inservice Inspection Activities

Condition Reports:

NCR 01836822, Items found during the Class A VT-2 exam on Unit 2, 12/4/2013
NCR 01836823, Items found during the Unit 2 EOC-26 hot Startup Tour, 12/3/2013
NCR 01861432, 2HPI-FT-007A Active Boric Acid Leak, 8/18/2014
NCR 01908541, U2 RCMUP Suction Pressure low, 4/12/2015
NCR 1969739, SF-97 had an active leak with no catchment, 10/28/2015
NCR 01968714, Documentation of RV Head Penetration ISI Visual examination, 10/27/2015

Drawings:

2-HP-0524, High Pressure Injection System from RC-P2B1 Suction piping Drain to 2B Letdown Cooler, Rev. 11
OFD-101A-2.1, Flow Diagram of High Pressure Injection System (Letdown Section), Rev. 45

Miscellaneous Documents:

Duke Energy UT Calibration/Examination for 2HP-216-8, Elbow to Pipe, 10/18/2015
Duke Energy UT Calibration/Examination for 2HP-218-18, Elbow to Pipe, 10/21/2015
Duke Energy Ultrasonic Instrument Linearity Check for USN 60 SW Serial No. 15A024PE, 9/29/2015
GTSM0808-04, Duke Energy ASME Section IX Welding Procedure Specification, Rev. 11
Krautkramer Transducer Certification for Serial No. 00DBVW
Oconee Unit 2EOC26 Steam Generator Condition Monitoring and Operational Assessment, 2/26/2014
Oconee Unit 2EOC27 Steam Generator Degradation Assessment, Rev. 1
S000030.08-WKP-000010, Oconee 2EOC27 – ROTSG ECT Inspection Plan, Rev. 0

Procedures:

AD-EG-PWR-1611, Boric Acid Corrosion Control Program - Implementation, Rev. 0
MP/0/A/1800/132, Inspection, Assessment, and Cleanup of Boric Acid on Plant Materials, Rev. 9
NDEMAN-NDE-995, NDE Procedures Manual – Volume 4 – NDE-995 Ultrasonic Examination of Small Diameter Piping Butt Welds and Base Material for Thermal Fatigue Damage, Rev. 7
ONS-SG-ANL-GL, Eddy Current Guidelines for Oconee Nuclear Station's Replacement Once-Through Steam Generators (ROTSG), Rev. 1
ONS-SG-APPENDIX H & I-QUAL, ROTSG Site Technique Validation for Oconee Nuclear Station, Rev. 1
PD-EG-PWR-1801, Steam Generator Management Program, Rev. 2
PD-EG-PWR-1611, Boric Acid Corrosion Control Program, Rev. 0

Self-Assessments:
G-ENG-SA-14-15, Boric Acid Corrosion Control Program – Effectiveness of Selected Program Elements, 7/31/2014
O-CHM-SA-14-06, 2EOC26 and 3EOC27 Feedwater Iron Management, 6/30/2014

Work Orders/Work Requests:
02151689 02, Unit 2, 2-HPI-HX-000B, Prefab Piping for Cooler Installation, 10/25/2015

Welder/NDE Examiner Quals:
GTSM-6-1, Record of Welder Performance Qualification Test: C. Irizarry, 9/1/2015
IHI Southwest Technologies Certificate of Qualification: D. Griebel and R. Jaschke
URS Quality Programs Visual Acuity Examination Record: D. Griebel and R. Jaschke

Section 1R11: Licensed Operator Requalification
Other
Active Simulator Exam OP-OC-ASE-15, Rev 00c
Licensee white paper – ODMI, 1B2 RCP Unwanted Vibrations

Section 1R12: Maintenance Effectiveness
Nuclear Condition Reports (NCR) and Problem Identification Program Reports (PIPs):
01908027; 01910141; 01947720;

Other:
Maintenance Rule (a)(1) Evaluation and Plan for Control Room Ventilation System (VCR), approved October 7, 2015

Procedures:
AD-EG-ALL-1210, Maintenance Rule Program, Rev 0

Section 1R13: Maintenance Risk Assessments and Emergent Work Control
Other:
ERAT Risk Profile – 15W41, updated October 6, 2015
Oconee Protected Equipment Log for October 6, 2015
Oconee Emergent Protected Equipment List, dated December 15, 2015
Oconee CT-1 Unit Threat Update, dated December 15, 2015

Procedures:
AD-WC-ALL-0410, Work Activity Integrated Risk Management, Rev 1

Section 1R15: Operability Evaluations
Drawings:
OFD-101A-1.1, Flow Diagram of High Pressure Injection System (Letdown Section), Rev 46

Nuclear Condition Reports (NCR) and Problem Identification Program Reports (PIPs):
01809364; 01942267; 01945119; 01945442; 01948302; 01906143; 01974447

Other:
OSS-0254.00-00-1001, High Pressure Injection and Purification & Deborating Demineralizer Systems, Rev 49

Procedures:
PT/2/A/0151/006, Penetration 6 Leak Rate Test, Rev 13

Work Orders and Work Requests:
20013057

Section 1R18: Plant Modifications
Documents:
EC0000113524, Suitable Replacement for Keowee Excitation Transformer, Rev 2
EC 000091880, Keowee Unit 1 Emergency Start Control Cable Replacement, Rev 0
EC 400077, Replace Portions of Single Conductor 1BA250G5 Cable for 1ETC4X,1ETC4Y, and 1ETC4Z With Three Conductor 3XJ250G8 Cable in Support of Keowee Underground URI Resolution Project, Rev 3

Drawings:
K-0720-C, Interconnection Diagram Misc. Terminal Cabinet No. 1MTC2, Rev 28
K-0720-D, Outline & Connection Diagram Terminal Cab. KHU-1, Rev 1
O-0799-C, Outline & Connection Diagram Terminal Cab. KHU-1A, Rev 1
O-0799-C-001, Outline & Connection Diagram Terminal Cab. KHU-1B, Rev 0

Nuclear Condition Reports (NCR) and Problem Identification Program Reports (PIPs):
01858280; 01859748; O-14-03190

Procedures:
TN/0/A/EC91880/003, EC91880 Keowee Unit 1 Emergency Start Control Cable Replacement, Rev 0

Work Orders and Work Request:
02163721; 2000869

Section 1R19: Post-Maintenance Testing
Other:
OSS-0254.00-00-1036, Design Basis Specification for Feedwater System, Rev 41

Procedures:
IP/0/A/0100/001, Controlling Procedure for Troubleshooting and Corrective Maintenance, Rev 38
PT/2/A/0600/012, Turbine Driven Feedwater Pump Test, Rev 94
IP/3/A/0315/012, TXS RPS Power Range Calibration at Power, Rev 01
IP/0/A/0301/003, Wide Range Neutron Flux Instrumentation Calibration at Power, Rev 0
IP/3/A/0275/012, Unit 3 Feedwater Control Valve Demand and Interlock Calibration, Rev 01

Work Orders and Work Requests:
20012735; 20028502; 20031859; 20035176; 20038138

Section 1R22: Surveillance Testing
Drawings:
OFD-101A-2.5, Flow Diagram of High Pressure Injection System (SSF Portion), Rev 21
OFD-104A-1.1, Flow Diagram of Spent Fuel Cooling System, Rev 59

OFD-144A-2.2, Flow Diagram of Component Cooling System (Reactor Building Heat Exchangers) Rev 18

Other:
OSS-0254.00-00-1022, Design Basis Specification for the Component Cooling System, Rev 19
UFSAR Section 3.8, Design of Structures
Selected Licensee Commitments 16.6.1, Containment Leakage Tests

Procedures
OP/0/A/1600/010, Operation of the SSF Diesel-Generator, Rev 88
PT/0/A/0600/021, Standby Shutdown Facility Diesel-Generator Operation, Rev 16
PT/2/A/0150/003 A 013R, Reactor Building Integrated Leak Rate Test, Rev 0
PT/2/A/0151/006, Penetration 6 Leak Rate Test, Rev 13
PT/2/A/0151/054, Penetration 54 Leak Rate Test, Rev 12

Section 1EP2: Alert and Notification System Evaluation

Corrective Action Documents
PIP 0-15-00627, Failed siren due to no rotation signal
PIP 0-15-01438, Siren #20 failed due to no rotation signal and silent test
PIP 0 -15-02831, Siren # 35 failed due to maintenance issues
PIP 0-15-02386, Siren failed Tuesday and weekly test, expected due to planned maintenance
PIP 0-13-07887, Sirens 4, 15, and 20 repaired
PIP 0-14-01687, Siren # 20 recommended for re-location to improve signal
PIP 0-14-05668, Repeat siren trend issues
PIP 0-15-00050, Perform evaluation of repeat failures of Siren # 57, DC power supply installation
PIP 0-15-00362, Siren # 57 failed first quarter test
PIP 0-15-00627, Siren #4 failed 1Q2015 silent test
PIP 0-15-01554, Sirens 5, 6, 7, 8, 53, 54, and 55 failed weekly test on 2/17/2015 due to power loss from freezing rain

Procedures and Reports
ANS white paper dated 11/12/2014
FAM 3.3, PIP M-14-5252, Annual Siren Preventative Maintenance Checklist, revision 13, 4/1/2015
Siren System FEMA Annual Siren Report for 2014

Records and Data
Equipment Repair Logs
Weekly Silent Tests, June 2014 – June 2015
Quarterly Growl Tests, June 2013 – June 2015
2014 Annual Siren Full Volume Test

Section 1EP3: Emergency Response Organization Staffing and Augmentation System

Corrective Action Documents
AR 01579059, Review new ERO expectations with TSC & OSC teams in ERO muster meetings
AR 01831005, Determine if process change is appropriate to ensure individuals are removed from ERO duty roster
AR 01852930, During the conduct of ERO quarterly drill 14-06 SAMG, the TSC unsatisfactorily

demonstrated the ability to classify the event
AR 01852995, A site assembly was required to be demonstrated
AR 01908582, Review the staffing issue identified in this PIP & generate additional actions as required

Procedures
ETQS 7111.0, Employee Training & Qualification System Standard, Rev. 9

Section 1EP4: Emergency Action Level and Emergency Plan Changes

Change Packages
50.54(q) Screening Evaluation Form, dated 4/17/15
50.54(q) Screening Evaluation Form, dated 9/15/14
50.54(q) Screening Evaluation Form dated 6/23/15
50.54(q) Screening Evaluation Form dated 5/29/15

Procedures
Oconee Nuclear Station (ONS) Emergency Plan (E-Plan), Rev. 2015-005, June 2015
E-Plan A – Appendix 5 Agreement Letters, EPA Appendix 05, Rev. 08, March 2015
E-Plan A – Section I, Accident Assessment, EPA Section I, Rev. 006, March 2015
E-Plan – Implementing Procedures, Volume 2, Rev. 2015-001, January 2015
E-Plan – Implementing Procedures, Volume 1, Rev. 2015-004, May 2015
E-Plan A – Section N, Exercise and Drills, EPA Section N, Rev. 005, May 2015
E-Plan, Section D, Emergency Classification System, Rev. 2015-004, May 2015
E-Plan, Section F, Emergency Communications, Rev. 2015-004, May 2015
E-Plan, Emergency Facilities and Equipment, Rev. 2015-004, May 2015

Section 1EP5: Maintenance of Emergency Preparedness

Corrective Action Documents
NCR 01835476, Evaluate EP feedback from the NSRB OE subcommittee
NCR 01907047, Determine actions to address the EAL issue
NCR 01907202, Create needed corrective actions to address issue identified in drill critique report
NCR 01908093, Ensure that the government agency request for enhancement is incorporated into the ENF form
NCR 01908988, Determine & create additional actions needed to address critique report issues
NCR 01909440, Determine & create corrective actions needed from critique report to address issues identified
NCR 01959550, EP procedure changes not current in TSC & OSC

Procedures
HP/0/B/1009/026, Environmental Monitoring for Emergency Conditions, Rev. 0 & 1
OP/0/A/1103/027, Radiation Monitoring Information, Rev. 18
OP/1/A/6101/008, Alarm Response Guide 1SA-08, Rev. 35
PT/0/A/0230/001, Radiation Monitoring Check, Rev.167
RP/0/A/1000/015A, Offsite Communications from the Control Room, Rev. 5
SR/0/A/2000/001, Standard Procedure for Corporate Communications Response to the EOF, Rev. 1

SR/0/A/2000/003, Activation of the Emergency Offsite Facility, Rev. 5, 6, & 7
SR/0/A/2000/004, Notification to States & Counties from the EOF for Catawba, McGuire, & Oconee, Rev.5

Records and Data
NOS Audit of Emergency Planning 2014-ONS-EP-01, dated 3/19/14
NOS Audit of Emergency Planning 2015-ONS-EP-PR-01, dated 3/11/15

Section 2RS1: Radiological Hazard Assessment and Exposure Controls
Corrective Action Program (CAP) Documents
Quick Hitter Self Assessment Report O-RPS-SA-15-03, 5/18/15
Radiation Protection Assessment O-RPS-SA-14-03, 1/14/15 (AR 01854539)
Radiation Protection Focused Self Assessment O-RPS-SA-15-06, 5/29/15 (AR 01929054)
NCR 01874208
NCR 01909245
NCR 01932267
NCR 01868983
NCR 01872399
NCR 01875508
NCR 01906186
NCR 01908351

Procedures and Guidance Documents
AD-PI-ALL-0100, Corrective Action Program, Rev. 3
AD-RP-ALL-2000, Sentinel Radiation Work Permit (RWP) Management, Rev. 0
AD-RP-ALL-2001, Taking, Counting, and Recording Surveys, Rev. 1
AD-RP-ALL-2005, Posting of Radiological Hazards, Rev. 1
AD-RP-ALL-2017, Access Controls for High, Locked High, and Very High Radiation Areas, Rev. 1
AD-RP-ALL-3001, Control of Radioactive Material and Use of Radioactive Material Labels, Rev. 1
HPS-0024, Alpha Monitoring Guidelines, Rev. 4
HP/0/B/1000/097, Radiological Protection Requirements For Independent Spent Fuel Storage Installation Phase V and VI, Rev. 17
HP/0/B/1000/099, Diving Operations, Rev. 8
RPSM 6.11, Maintenance of Radiation Control Zones, Rev. 3
TE-RP-ALL-2000, Preparation of Radiation Work Permit, Rev. 0

Records and Data
ALARA Plan No. 2015-ONS-3-I-004, DSC# 138 load, weld and transport cask to HSM, 7/15/15
Dose History for DSC# 132-138 (fuel casks loads), January 2014 - July 2015
Gamma Spectrum Analysis Sample IDs: ON15101900079, U2/RX U2 Letdown Cooler RWP 2030 (Lapel), 10/19/15; ON15101900083, U2/RX LDCR Cutout HP Pipe B/Z RWP 2030, 10/19/15; ON15101900123, U2 RX LDC B2 Cut Out RWP 2030, 10/19/15; ON15102000058, A S Gen MW UP RWP 2216, 10/20/15; ON15102000069, U2 Rx B SG UP MW BK UP, 10/20/15; ON15102100007, RWP 2158 U2 RX Cavity Work, 10/21/15; ON15102500092, U2 Rx SG B SG Lower Manway Removal RWP 2216, 10/25/15; ON15102500094, U2 Rx SG A Lower Manway Removal B/Z RWP 2216, 10/25/15

National Source Tracking System Annual Inventory Reconciliation Report, January 2015
PT/0/A/0750/003, Physical Inventory of Reportable Special Nuclear Materials, 2015 Annual Physical Inventory (includes non-fuel items), 2/18/15
RWP No. 2030, U2 Rx Bldg 2A and/or 2B Let Down Cooler Cut Out / Replace and Associated Activities, Rev. 01
RWP No. 2158, U2 Rx Bldg Remove / Replace RV Head, Rev. 15
RWP No. 2216, U2 Rx Bldg – A/B ROTSG – Set up / Remove / Replace Primary Manway / Handhole Covers, Rev. 27
VSDS Standard Map Survey Report, Oconee Nuclear Station, Survey Nos. ONS-M-20150910-5, ISFSI, 9/10/15; ONS-M-20151005-24, U1, 2, and 3 100 Corridor, 10/5/15; ONS-M-20151020-39, OTSG Channel Head Survey Form, 10/20/15; ONS-M-20151020-41, OTSG Manway Removal Survey Form, 10/20/15; ONS-M-20151020-48, OTSG Manway Removal Survey Form, 10/20/15; ONS-M-20151020-49, OTSG Channel Head Survey Form, 10/20/15; ONS-M-20151021-4, U2 Reactor Building 3rd Floor Rx Head on Head Stand, 10/21/15; ONS-M-20151025-30, Steam Generator Survey "B" Lower Channel Head, 10/25/15; ONS-M-20151025-31, Steam Generator Survey "A" Lower Channel Head, 10/25/15; ONS-M-20151026-1, Unit 2 "B" S/G Lower Playpen 2EOC27 U2 Lower Platform Survey, 10/25/15; ONS-M-20151102-41, Units 1, 2 and 3 100 Corridor, 11/2/15

Section 2RS2: Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls

Corrective Action Program Documents
NCR 01932363 Readiness Assessment- RP Occupational Baseline O-RPS-SA-15-03, 06/18/2015
NCR 01853673
NCR 01857844
NCR 01870540
NCR 01872447
NCR 01950780
NCR 01905840

Procedures and Guidance Documents
AD-PI-ALL-0100, Corrective Action Program, Rev. 3
AD-RP-ALL-9001, ALARA Planning, Revision 0
AD-RP-ALL-9000, ALARA Program, Revision 03

Records and Data
Daily Outage Reports, 0/17-11/4/2015
AD-RP-ALL-2019 TEDE-ALARA Evaluations and DAC Hour Tracking: TEDE ALARA Evaluation worksheets, 11/1/2015- 11/4/2015
RWP #5143, OMP- Protected Service Water (PSW) Installation and related work activities
RWP #2092, U2 RX BLDG Remove/Replace LPSW Piping
AD-RP-ALL-9001 ALARA Plan, Eddy Current Testing Unit 2
AD-RP-ALL-9001 ALARA Plan, 2A & 2B Letdown Cooler Replacement Unit 2
AD-RP-ALL-9001 ALARA Plan, Nozzle Dam Installation and Removal Unit 2
AD-RP-ALL-9001 ALARA Plan, LPSW Pipe Replacement Unit 2
AD-RP-ALL-9001 ALARA Planning In Progress Review (IPR):
2A & 2B Letdown Cooler Replacement RWP #2030 50% IPR & 25% IPR
RCP Nozzle UT Inspections RWP #2064, 25% IPR

Steam Generator Eddy Current Testing RWP #2219, 30% IPR
Install/Remove Temporary Shielding, 50% IPR
LPSW Pipe Replacement RWP #2092, 25% & 50% IPR
Alloy 600 repairs RWP #2022, 25%, 50%, & 75% IPR
ALARA Job Packages
Ultrasonic Exams on RCP Nozzles, 10/2014
Replace LPSW Piping to RCP, 11/2014
A & B SG Prep, 10/2014
A & B SG Plugging, 10/2014
Annulus Inspections, 10/2014
AD-RP-ALL-9000 Attachment 1, Special ALARA Meeting Agenda, 10/22/2015
Duke Carolinas Long Range ALARA Plan 2015-2020: Oconee Nuclear Station

Section 2RS3: In-Plant Airborne Radioactivity Control and Mitigation

Corrective Action Program Documents
Quick Hitter Self Assessment Report O-RPS-SA-15-03, 5/18/15
Radiation Protection Assessment O-RPS-SA-14-03, 1/14/15 (AR 01854539)
PIP O-13-09737
PIP O-14-03570
PIP O-14-04512
PIP O-14-11492
PIP O-15-01384

Procedures and Guidance Documents
AD-PI-ALL-0100, Corrective Action Program, Rev. 3
AD-RP-ALL-2019, TEDE ALARA Evaluations and DAC Hour Tracking, Rev. 0
AD-RP-ALL-6000, Respiratory Protective Equipment Approval and Issue, Rev. 1
AD-RP-ALL-6005, Powered Air-Purifying Respirators, Rev. 0
HP/0/B/1010/003, Respirator Maintenance and QA, Rev. 32
HP/0/B/1010/004. Selection of Proper Respiratory Protective Equipment and Respiratory Surveillance Requirements. Rev. 35
HP/0/B/1010/017, Breathing Air Quality Control Test Procedure, Rev. 11
HPS-0024, Alpha Monitoring Guidelines, Rev. 4

Records and Data
EnRad Laboratories Flow Test Certifications and Posi3 USB Test Results for SCBAs, EnRad IDs 04204, 5/7/14 and 5/13/15; 04215, 6/4/14 and 8/21/15; 04239, 5/7/14 and 6/9/15; 04455, 3/10/14 and 5/13/15
HP/0/B/1010/003, Respirator Maintenance and QA, Monthly Respiratory Inspections, 10/31/15
HP/0/B/1010/003, Respirator Maintenance and QA, SCBA Units, 10/20/15
PT/1-2/A/0110/005 A, Control Room Filter System Tests, 1/20/13 and 2/8/15
RESPP-N, Duke Energy Respiratory Practical (training for personnel required to wear respiratory protection), Rev. 5
RPSM 5.7, Enclosure 5.3, HEPA Filter System Integrity Test Data, HEPA Unit ID Number 250-4, 9/30/15
TRI Air Compressed Air/Gas Quality Testing for Mako, Comp Air 1, and Comp Air 2 Compressors, 1/30/15 and 6/12/15

Section 2RS4: Occupational Dose Assessment

Corrective Action Program Documents

NCR 01863221
NCR 01851859
NCR 01869152
NCR 01864406
NCR 01847494
NCR 01909245
NCR 01943721
NCR 01861688
NCR 01930837

Procedures and Guidance Documents

HP/0/B/1000/063, Body Burden Analysis- Evaluation of Results, Revision 023 & 024
SH/0/B/2001/001, Internal Dose Assessment, Revision 06
AD-RP-ALL-4010, Internal Dose Assessment, Revision 00
AD-PI-ALL-0100, Corrective Action Program, Revision 03
AD-RP-All-2009, Personnel Contamination Monitoring and Reporting, Revision 0
AD-RP-ALL-4004, Multiple Dosimetry, Revision 1

Records and Data

HP/0/B/1000/063 Enclosure 5.6 Respiratory Evaluation, Num xxxx91, 10/21/15-10/22/2015
HP/0/B/1000/063 Enclosure 5.6 Respiratory Evaluation, Num xxxx45, 10/21/15
HP/0/B/1000/063 Body Burden Analysis- Evaluation of Results3, Num xxxx99, 10/21/15-10/28/2015
HP/0/B/1000/063 Body Burden Analysis- Evaluation of Results, Num xxxx35, 10/21/15-10/28/2015
SH/0/B/2001/003 Investigation of Skin and Clothing Contaminations, PCE 14-006, 04/20/14-04/22/2014
HP/0/B/1000/063 Body Burden Analysis- Evaluation of Results, PCE 14-006, 04/20/14-04/22/2014
HP/0/B/1000/063 Body Burden Analysis- Evaluation of Results, Num xxxx26, 03/22/2014
HP/0/B/1000/063 Body Burden Analysis- Evaluation of Results, Num xxxx69, 03/22-24/2014
Summary of Internal Dose: Bioassay Results, 08/29/2014
HP/0/B/1000/063 Body Burden Analysis- Evaluation of Results, PCE 13-003, 10/18/13-10/22/201
AD-RP-ALL-2009, Personnel Contamination Monitoring and Reporting: PCE Record, PCE 15-004; PCE 15-005; PCE 15-006; PCE 15-007, 10/18/2015

Section 2RS5: Radiation Monitoring Instrumentation

Corrective Action Program Documents

O-RPS-SA-15-03, Quick Hitter Self-assessment Report, 7/27/15
NCR 01860990
NCR 01862673
NCR 01858969
NCR 01856675
NCR 01909350

Procedures and Guidance Documents
HP/0/B/1004/063, Inservice Radiation Protection Instrument Performance Check, Rev. 10
HP/0/A/1008/005, RIA Setpoints, Rev. 10
HP/0/B/1000/067 E, Quality Assurance for Automated Personnel Monitors, Rev. 32
AD-PI-ALL-0100, Corrective Action Program, Rev. 3
Surveillance Frequency Control Program, Rev. 2

Records and Data
Calculation OSC-4244, High Range Containment Monitor Correlation Factors for Digital Radiation Monitors RIA-57, 58, 2/25/91
Work Order 02013085 01, Auxiliary Building Gas Monitor Calibration, 3RIA-32, 9/12/12
Work Order 02117753 01, Auxiliary Building Gas Monitor Calibration, 3RIA-32, 6/10/14
Work Order 02099414 01, Sorrento On-line Dual Range Gas Monitor Calibration, 3RIA-37/38, 2/20/14
Work Order 02167439 01, Sorrento On-line Dual Range Gas Monitor Calibration, 3RIA-37/38, 3/25/15
Work Order 02013256 02, Sorrento Digital High Range Area Monitor, 1RIA-57&58, 9/11/12
Work Order 02141801 01, Sorrento Digital High Range Area Monitor, 1RIA-57&58, 2/6/15
Work Order 02100726 01, Plant Liquid Waste Discharge Radiation Monitor, RIA-33, 2/24/14
Work Order 02162257 01, Plant Liquid Waste Discharge Radiation Monitor, RIA-33, 12/29/14
People Mover Whole Body Counter Efficiency Confirmation, 10/8/14
AMS-4 Serial No. 1296, Calibration Records, 1/27/15 and 10/8/15
AMS-4 Serial No. 2626, Calibration Records, 1/27/15 and 10/7/15
ARGOS Serial No. 0307-35, Calibration Records, 1/13/14 and 1/5/15
SAM-11 Serial No. 253, Calibration Records, 12/18/13 and 11/24/14
SAM-11 Serial No. 251, Calibration Records, 12/18/13 and 11/24/14
Calibration/Verification of dose equivalent rates on PuBe Neutron Source No. 155 at Oconee Nuclear Station, 9/2/15
Barium-133 ONSI No. 238, Isotope Products Laboratory Data Sheet
Cesium-137 ONSI No. 307, Certificate of Radioactivity Calibration
Countroom QA/QC Daily Check Records, 1/1/15 – 11/3/15
High-purity Germanium Detector No. 1, Efficiency Calibration Checks, 2013 - 2015
10 CFR Part 61 Analysis, Dry Active Waste, 6/11/15

Section 4OA1: Performance Indicator Verification
Corrective Action Documents
NCR 01588132, Failed DEP opportunity during the 9/12/14 EOF tabletop exercise
NCR 01832633, Review & ensure implementation of revised NEI 99-02, Rev. 7 guidance for NRC PI reporting
NCR 01908316, This PIP is being written to document a DEP opportunity that did not meet performance criteria
NCR 01942872, Correct erroneous DEP KPI data reported to NRC
NCR 01942901, DEP data sheet enhancement
NCR 01942904, Correct ERO NRC KPI documentation

Procedures
AD-EP-ALL-001, Emergency Preparedness Key Performance Indicators, Rev. 1
AD-EP-ALL-002, NRC Regulatory Assessment Performance Indicator Guideline Emergency Preparedness Cornerstone, Rev. 1

AD-EP-ALL-0803, Evaluation & Critique of Drills & Exercises, Rev. 0
SRPMP 10-01, NRC Performance Indicator Data Collection, Validation, Review, and Approval, Rev. 006

Records and Data
NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Rev. 6
MSPI Basis Document for Oconee Nuclear Station Units 1, 2, 3, Rev. 14
MSPI Derivation Report, MSPI Emergency AC Power, December 2015
MSPI Derivation Report, MSPI Residual Heat Removal, December 2015
Unit 1, 2, and 3 Control Room Logs for emergency AC power
Unit 1, 2, and 3 Control Room Logs for residual heat removal
Documentation of Performance Indicator data from April 1, 2014 through June 30, 2015 for DEP, ANS, and ERO
OS-854.05, NRC Performance Indicator Reviews (including ED Alarm Logs), March 2014 - October 2015

Section 4OA2: Problem Identification and Resolution
Calculations:
OSC-KC-2135, Hydraulic Calculation for Keowee Hydro Station 250 KVA Transformer Suppression System, Rev 0

Drawings:
KFD-109A-1.1, Flow Diagram of Service Water System (Keowee Hydro Station), Rev 13
K-TC-0-124A-0001-001, Keowee Main Step-Up Transformer Mulsifyre System Design Criteria, Rev 0

Nuclear Condition Reports (NCRs):
01778236; 01906474; 01959444; 01973117

Other:
Oconee white paper - ODMI, 1B2 RCP Unwanted Vibrations
Fire Drill Report #04-10-02, Electrical Fire on Keowee Main Transformer, dated December 11, 2010
Oconee UFSAR Chapter 9, Section 9.5.1, Fire Protection System, dated December 31, 2012
Oconee Fire Impairment ON-2011-00055, Main Transformer Fire Suppression, initiated September 25, 2001

Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion (NOED)
Documents:
CAL 2-12-001, Confirmatory Action Letter – Oconee Nuclear Station, Units 1, 2, and 3 Commitments to Perform a Comprehensive Standby Shutdown Facility Design Review and an Evaluation Modifications/Procedure Changes to Reduce the Risk of Bus Duct Faults
Duke Energy Carolinas, LLC (Duke Entergy): 10 CFR 50.46 – 30-Day Report for Oconee Nuclear Station, Units 1, 2, and 3; Estimated Impacts to Peak Cladding Temperature due to Fuel Pellet Thermal Conductivity Degradation, Dated December 17, 2014
Duke Energy Carolinas, LLC: Oconee Nuclear Station (ONS), Units 1, 2, and 3, ONS Standby Shutdown Facility and Bus Duct Studies, Dated January 26, 2012
EA-11-226; Final Significance Determination of One Yellow Finding and One Green Finding and

Notice of Violation (NRC Inspection Report 05000269/2011019, 05000270/2011019, and 05000287/2011019 – Oconee Nuclear Station, Dated December 6, 2011
LER 05000269/270/287/2012-01, Unanalyzed Conditions Exist for Standby Shutdown Facility Mitigated Events, Rev 0
LER 05000269/270/287/201402, Deficiency in Loss of Coolant Accident Analysis Adversely Affected Predicted Peak Cladding Temperature, Rev 0
LER 05000287/201301, Unit 3 Manual Reactor Trip Due to Main Feedwater Oscillations, Rev 0
LER 05000287/201501, Unit 3 Manual Reactor Trip Due to Main Feedwater Flow Control Valve Oscillations, Rev. 0
Oconee Nuclear Station – NRC Special Inspection Report 05000269/201107, 05000270/2011017, and 05000287/2011017, Dated September 7, 2011
Oconee Nuclear Station, Units 1, 2, and 3, Request for Additional Information RE: 10 CFR 50.46 – 30-Day Report on Estimated Impacts to Peak Cladding Temperature due to Fuel Pellet Thermal Conductivity Degradation, Dated March 2, 2015
Prompt Determination of Operability to Evaluate SSF Operability Associated With the Restart of Unit 1 Following the Underspeed Issue on the 1A Main Feedwater Pump (Ref: PIP O-12-08649)
Response to Request for Additional Information Regarding the Duke Energy Carolinas, LLC (Duke Entergy) 10 CFR 50.46 – 30-Day Report of Oconee Nuclear Station, Units 1, 2, and 3; Estimated Impacts to Peak Cladding Temperature due to Fuel Pellet Thermal Conductivity Degradation, Dated March 31, 2015
SSF Thermal Margin – Status Report, Dated September 3, 2015

Nuclear Condition Reports (NCR) and Problem Identification Program Reports (PIPs):
13-11963; 15-00909; 01905088; 01909299