



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

February 12, 2020

Mr. J. Ed Burchfield  
Site Vice President  
Duke Energy Carolinas, LLC  
7800 Rochester Highway  
Seneca, SC 29672-0752

SUBJECT: OCONEE NUCLEAR STATION – INTEGRATED INSPECTION REPORT  
05000269/2019004 AND 05000270/2019004 AND 05000287/2019004

Dear Mr. Burchfield:

On December 31, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Oconee Nuclear Station. On January 27, 2020, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. We are treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or the significance or severity of the violation documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement; and the NRC Resident Inspector at 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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; and the NRC Resident Inspector at Oconee Nuclear Station.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

**/RA/**

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

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

Enclosure:  
As stated

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SUBJECT: OCONEE NUCLEAR STATION – INTEGRATED INSPECTION REPORT  
05000269/2019004 AND 05000270/2019004 AND 05000287/2019004  
Dated February 12, 2020

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

Docket Numbers: 05000269, 05000270 and 05000287

License Numbers: DPR-38, DPR-47 and DPR-55

Report Numbers: 05000269/2019004, 05000270/2019004 and 05000287/2019004

Enterprise Identifier: I-2019-004-0022

Licensee: Duke Energy Carolinas, LLC

Facility: Oconee Nuclear Station

Location: Seneca, SC

Inspection Dates: October 01, 2019 to December 31, 2019

Inspectors: J. Nadel, Senior Resident Inspector  
J. Parent, Resident Inspector  
A. Ruh, Resident Inspector  
A. Butcavage, Reactor Inspector  
P. Cooper, Reactor Inspector  
C. Dykes, Health Physicist  
M. Meeks, Senior Operations Engineer  
A. Nielsen, Senior Health Physicist  
M. Riley, Reactor Inspector  
J. Rivera, Health Physicist

Approved By: Frank J. Ehrhardt, Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

Enclosure

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection at Oconee Nuclear Station, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

### List of Findings and Violations

Failure to Verify Adequacy of Reactor Building Cooling Units			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000269,05000270,05000287/2019004-01 Open/Closed	[H.6] - Design Margins	71111.18
Inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," when the licensee failed to verify the adequacy of design of the reactor building cooling units (RBCUs). Specifically, safety analysis engineers failed to verify the minimum test acceptance criteria for RBCU capacity remained adequate after modifying the safety analysis.			

### Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
LER	05000269/2019-002-00	LER 2019-002-00 for Oconee Nuclear Station, Unit 1, Core Flooding System Loss of Safety Function	71153	Closed

## **PLANT STATUS**

Unit 1 operated at or near 100 percent rated thermal power (RTP) for the entire inspection period.

Unit 2 began the inspection period at 100 percent RTP. On November 9, 2019 the unit was shut down for a planned refueling outage. The unit was returned to 100 percent RTP on December 11, 2019 and remained at this power level for the remainder of the inspection period.

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

## **INSPECTION SCOPES**

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in IMC 2515, Appendix D, "Plant Status," and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

## **REACTOR SAFETY**

### 71111.04Q - Equipment Alignment

#### Partial Walkdown Sample (IP Section 03.01) (1 Sample)

The inspectors evaluated system configurations during partial walkdowns of the following system:

- (1) Alternate chilled water system during turbine building heavy lifts over main feeder buses on November 5-7, 2019

### 71111.05Q - Fire Protection

#### Quarterly Inspection (IP Section 03.01) (4 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

- (1) Unit 1 Turbine Building Elevation 796', Fire Zones 34, 34A, 35, 36, and 44 on October 21, 2019
- (2) Unit 2 Turbine Building Elevation 822', Fire Zones 40 and 41 on October 24, 2019
- (3) Unit 3 Turbine Building Elevation 822', Fire Zones 38, 39, and 39A on October 24, 2019
- (4) U2 Reactor Building All Elevations, Fire Zone 123 on December 8, 2019

#### 71111.08P - Inservice Inspection Activities (PWR)

##### PWR Inservice Inspection Activities Sample (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated pressurized water reactor non-destructive testing by reviewing the following examinations from October 7 - 11, 2019:
  1. Ultrasonic Examination (UT)
    - a. UT Examination of Component ID: 2-GRID-001, Containment Liner Plate, (Observed)
  2. Penetrant Testing (PT)
    - a. Review of Pre-Fab Final PT, Weld ID 171162, Engineering Change No. 402444, Unit-2 Alloy 600 Phase III RCS Hot Leg Pressure Tap Safe End, Final PT Documentation, ASME Class 1, Fillet Weld, Work Order 20083860-03
  3. Visual Examination (VT-2)
    - a. VT-2 Leakage Examination, 2-RPV-HEAD-PEN, Reactor Vessel Closure Head, Outer Surface , ASME Class 1 (Reviewed)
  4. Eddy Current Testing (ET)
    - a. SG 2A- ET for tubes R12C23, R26C3, ASME Class 1 (Observed)
    - b. SG 2B- ET for tubes R131C53, R138C33 & R151C1, ASME Class 1 (Observed)

The inspectors evaluated the licensee's boric acid corrosion control program performance, through field walk-down inside containment and review of the boric acid program corrective actions and evaluations of reported leakage.

#### 71111.11A - Licensed Operator Regualification Program and Licensed Operator Performance

##### Regualification Examination Results (IP Section 03.03) (1 Sample)

- (1) Annual Review of Licensee Regualification Examination Results: On July 1, 2019, the licensee completed the comprehensive biennial regualification written examinations and the annual regualification 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), "Regualification Requirements," of the NRC's "Operator's Licenses." During the week of December 16, 2019, 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 Regualification Program." These results were compared to the thresholds established in Section 3.02, "Regualification Examination Results," of IP 71111.11.

#### 71111.11Q - Licensed Operator Regualification Program and Licensed Operator Performance

##### Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

- (1) The inspectors observed and evaluated licensed operator performance in the Unit 2 Control Room during reactor coolant system draining to 145" on November 10, 2019.

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

- (1) The inspectors observed and evaluated licensed operators perform table top training on new emergency preparedness procedure AD-EP-ALL-0111, "Control Room Activation of the ERO," Revision 0, on November 20, 2019.

#### 71111.12 - Maintenance Effectiveness

##### Routine Maintenance Effectiveness Inspection (IP Section 02.01) (4 Samples)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

- (1) Nuclear Condition Report (NCR) 2249515, Standby shutdown facility (SSF) diesel generator (DG) tripped on overcurrent
- (2) NCR 2294220, Repetitive processor failures in Unit 3 automatic feedwater isolation system digital channel 1B trip confirm module
- (3) NCR 02303769, Blown fuse caused a partial loss of control power to ACB-6, which provides normal auxiliary power to the 2X switchgear for KHU-2
- (4) NCR 02295613, B main control room chiller compressor tripped after seizing

#### 71111.13 - Maintenance Risk Assessments and Emergent Work Control

##### Risk Assessment and Management Sample (IP Section 03.01) (3 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

- (1) Risk assessment and work controls for SSF auxiliary service water (ASW) pump oil drain/sample and analysis on October 24, 2019
- (2) Risk assessment and work controls for the Unit 2 reactor coolant system (RCS) drain down to 145 inches on November 10, 2019
- (3) Risk assessment and work controls for low pressure service water (LPSW) system breach during 2LPSW-1116 replacement on November 16, 2019

#### 71111.15 - Operability Determinations and Functionality Assessments

##### Operability Determination or Functionality Assessment (IP Section 02.02) (6 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) Immediate determination of operability (IDO) for NCR 2294192, acceptance criteria for reactor building cooling unit capacities may be non-conservative
- (2) IDO for NCR 2286307, discovery of metal chunk foreign material in 3B LPSW min-flow line
- (3) IDO for NCR 2300141, main control room envelope door found blocked open
- (4) IDO for NCR 02301011, evaluation of a Part 21 for Rotork Valves - failure of the beryllium copper clutch ring in their NA1 actuators manufactured between January 1, 1979 and December 31, 1982



- (5) Wall thickness acceptance evaluation for NCR 2302194, ultrasonic readings below recommended minimum thickness on Unit 2 main feed piping in east penetration room
- (6) NRC operability review of NCR 02304315, U1/U2 LPSW A & B pumps auto start due to low U1/U2 LPSW header pressure during Unit 2 engineered safeguards (ES) Ch 3 testing

#### 71111.18 - Plant Modifications

##### Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (1 Sample)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Change to calculation OSC-8064, Appendix K to credit increased reactor building cooling unit capacities in accident containment analyses for 24 month operating cycles

#### 71111.19 - Post-Maintenance Testing

##### Post-Maintenance Test Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated the following post maintenance tests:

- (1) Post-modification test of motor operated valve 2RC-219 per PT/2/A/0152/017, "Reactor Coolant System Valve Stroke Test," following implementation of engineering change (EC) 403752 to replace the SSF letdown line on December 2, 2019
- (2) Post-modification test of solenoid valve 2RC-223 per PT/2/A/0152/017, "Reactor Coolant System Valve Stroke Test," following implementation of EC 403752 to replace the SSF letdown line on December 2, 2019
- (3) Post-modification test of motor operated valve 2RC-218 per PT/2/A/0152/017, "Reactor Coolant System Valve Stroke Test," following implementation of EC 403752 to replace the SSF letdown line on December 6, 2019
- (4) Post-modification test PT/2/A/0400/020, "SSF RC Letdown Line Discharge Test," following implementation of EC 403752 to replace the SSF letdown line on December 6, 2019
- (5) PT/3/A/0203/006 A, "Low Pressure Injection Pump Test - Recirculation," following the removal and reinstallation of the 3A Low Pressure Injection Pump Motor on December 12, 2019

#### 71111.20 - Refueling and Other Outage Activities

##### Refueling/Other Outage Sample (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated U2R29 activities from November 9, 2019 to December 12, 2019.

#### 71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

#### Surveillance Tests (other) (IP Section 03.01) (2 Samples)

- (1) PT/2/A/0203/008, "Component Test of ES Channels 3 & 4," on November 23, 2019
- (2) PT/2/A/0610/001 J, "Emergency Power Switching Logic Functional Test," on November 25, 2019

#### Inservice Testing (IP Section 03.01) (1 Sample)

- (1) PT/1/A/0152/013, "Low Pressure Service Water System Valve Stroke Test," on October 23, 2019

#### Containment Isolation Valve Testing (IP Section 03.01) (1 Sample)

- (1) PT/2/A/0151/019, "Penetration 19 Leak Rate Test," on December 1, 2019

### **RADIATION SAFETY**

#### 71124.01 - Radiological Hazard Assessment and Exposure Controls

#### Radiological Hazard Assessment (IP Section 02.01) (1 Sample)

The inspectors evaluated radiological hazards assessments and controls.

- (1) The inspectors reviewed the following:

##### Radiological Surveys

- ONS-M-20190808-8, Independent Spent Fuel Storage Installation, August 8, 2019
- ONS-M-20190913-12, Independent Spent Fuel Storage Installation, September 13, 2019
- ONS-M-20191112-63, Unit 2 Reactor Building 3rd floor, November 12, 2019
- ONS-M-20191116-14, Unit 2 Reactor Building Basement, November 16, 2019
- ONS-M-20191118-4, Unit 2 1st Floor Containment, November 18, 2019
- ONS-M-20191118-3, Unit 2 2nd Floor Containment, November 18, 2019
- ONS-M-20191119-44, Unit 2 Reactor Building Basement, November 19, 2019
- ONS-M-20191119-11, Unit 2 Reactor Building 3rd floor, November 19, 2019

##### Air Sample Survey Records

- ON19111200063 U2RX HDMOVE #7393...RWP 2158, November 12, 2019
- ON19111900048 U2RB Valve breach 2LP-177 #01201 RWP 2100, November 19, 2019
- ON19111900038 U2RB 2LP-176 Valve Inspection RWP 2100, November 19, 2019
- ON19111900003 U2RX Reactor Head "O" Ring Cut and Removal, November 19, 2019

#### Instructions to Workers (IP Section 02.02) (1 Sample)

The inspectors evaluated instructions to workers including, labels, radiation work permits and electronic dosimeter alarm setpoints used to access high radiation areas.

(1) The inspectors reviewed the following:

##### Radiation Work Permits, including RWP's for airborne areas if available

- # 2216, U2 RXB A/B ROTSG- Set up/Remove/Replace Primary Manway/Handhole Covers, Revision 29
- # 2221, U2 RXB- A/B ROTSG Tube Plugging/ Stabilization/ Plug Removal, Revision 24
- # 2069, SSF Let Down Line Replacement, Revision 0

##### Electronic Alarming Dosimeter Alarms

- RWP #3999, Dose rate setpoint/Dose rate alarm: 25 mrem/hr/57 mrem/hr, April 23, 2018
- RWP #1270, 50 mrem/hr /51 mrem/hr, November 2, 2018

##### Labeling of Containers

- Auxiliary Building 304
- Refueling Floor by equipment hatch

#### Contamination and Radioactive Material Control (IP Section 02.03) (1 Sample)

The inspectors evaluated licensee processes for monitoring and controlling contamination and radioactive material. The inspectors verified transactions of nationally tracked sources had been reported.

(1) The inspectors verified the following sealed sources are accounted for and are intact:

- ONS 732, March 1988, 4.0 E+5
- ONS 733, March 1988, 1.3 E+2
- ONS 65, February 1971, 5.00 E+5
- ONS 534, October 1985, 1.00 e+3

#### Radiological Hazards Control and Work Coverage (IP Section 02.04) (1 Sample)

The inspectors evaluated in-plant radiological conditions during facility walkdowns and observation of radiological work activities.

(1) The inspectors also reviewed and observed the following risk significant radiological work activities:

- Steam Generator A & B tube plugging/manway removal
- SSF let down line replacement activities
- U2RB 2LP-176 & 177 valve inspection work
- U2 2B1 "J" leg decontamination

#### High Radiation Area and Very High Radiation Area Controls (IP Section 02.05) (1 Sample)

- (1) The inspectors evaluated risk-significant high radiation area and very high radiation area controls, including postings and physical controls.

#### Radiation Worker Performance and Radiation Protection Technician Proficiency (IP Section 02.06) (1 Sample)

- (1) The inspectors evaluated radiation worker awareness and performance and radiation protection technician proficiency.

#### 71124.02 - Occupational ALARA Planning and Controls

#### Radiological Work Planning (IP Section 02.01) (1 Sample)

The inspectors evaluated the licensee's radiological work planning.

- (1) The inspectors reviewed the following activities:
  - ALARA Plan 2019-ONS-2-O-006, Safe Shutdown Facility Letdown Line Replacement, Revision 0, Revision 1, Revision 2
  - ALARA Plan 2018-ONS-1-O-017, Incore Instrumentation, Revision 0
  - ALARA Plan 2019-ONS-2-O-001, Incore Instrumentation, Revision 0

#### Verification of Dose Estimates and Exposure Tracking Systems (IP Section 02.02) (1 Sample)

The inspectors evaluated dose estimates, exposure tracking and source term reduction effectiveness

- (1) The inspectors reviewed the following as low as reasonably achievable planning documents:
  - ALARA Critique (Equivalent), 2018-ONS-1-O-017, November 13, 2018
  - In-Progress Review (Equivalent), 2019-ONS-2-O-006, 50%, November 15, 2019
  - RWP 2069 Special ALARA Committee Meeting Agenda, November 20, 2019
  - In-Progress Review (Equivalent), 2019-ONS-2-O-006, 75%, November 24, 2019
  - ALARA Critique RWP 2069, December 8, 2019

#### Implementation of ALARA and Radiological Work Controls (IP Section 02.03) (1 Sample)

The inspectors reviewed as low as reasonably achievable practices and radiological work controls.

- (1) The inspectors reviewed the following activities:
  - RWP 2069, SSF Letdown Line Replacement Unit 2
  - RWP 2221, Steam Generator Tube Plugging

#### Radiation Worker Performance (IP Section 02.04) (1 Sample)

The inspectors evaluated radiation worker and radiation protection technician performance and implementation of ALARA techniques and controls for work activities during job tasks associated with Unit 2 Refueling Outage 29.

- (1) The inspectors reviewed the following:
- Steam generator manway removal/ replacement & tube plugging
  - U2RB 2LP-176 & 177 valve work
  - SSF letdown line replacement
  - 2B "J" leg decontamination

#### 71124.03 - In-Plant Airborne Radioactivity Control and Mitigation

##### Engineering Controls (IP Section 02.01) (1 Sample)

The inspectors evaluated equipment used to mitigate and monitor airborne radioactivity and verified licensee has established trigger points for evaluating airborne alpha and beta emitting radionuclides.

- (1) The inspectors reviewed the following:

##### Installed Ventilation Systems

- Unit 1 and Unit 2 Main Control Room Emergency Filtration System

##### Temporary Ventilation System Setups

- Unit 2 Refueling Outage 29 S/G A HEPA Vacuum

##### Portable or Installed Monitoring Systems

- AMS-4 Continuous Air Monitor, Unit 1 and Unit 2 Spent Fuel Pool

#### Use of Respiratory Protection Devices (IP Section 02.02) (1 Sample)

The inspectors evaluated the licensee's use and maintenance of respiratory protection equipment. This included review of respirator qualification records and grade D quality supplied air.

- (1) The inspectors reviewed the following:

##### TEDE-ALARA evaluations for the use of respiratory protection equipment

- Unit 2, B Cavity, "J" leg decontamination
- Reactor vessel O-ring cut and removal

##### Respiratory protection used during work activities

- Unit 2, B Cavity, "J" leg decontamination

##### Periodic Inspection records for staged respirators (ready-for-use)

- October 2019
- November 2019

#### Self-Contained Breathing Apparatus for Emergency Use (IP Section 02.03) (1 Sample)

The inspectors evaluated the licensee's storage and maintenance of SCBA for emergency use. This included a review of SCBA qualification records.

- (1) The inspectors reviewed the following:

##### Periodic Inspection records for staged SCBAs (ready-for-use)

- August 2019
- September 2019

##### SCBA maintenance records (past 2 years)

- SCBA Enrad # 4214
- SCBA Enrad # 4145

#### 71124.04 - Occupational Dose Assessment

Inspectors evaluated licensee performance with respect to the methods for instrumentation use, monitoring, assessment and assignment for occupational dose.

#### Source Term Categorization (IP Section 02.01) (1 Sample)

- (1) The inspectors evaluated the licensee's characterization of the source term and use of scaling factors for the use of hard-to-detect radionuclide activity.

#### External Dosimetry (IP Section 02.02) (1 Sample)

- (1) The inspectors evaluated the external dosimetry program implementation.

#### Internal Dosimetry (IP Section 02.03) (1 Sample)

The inspectors evaluated the internal dosimetry program implementation.

- (1) The inspectors reviewed the following:

##### Whole Body Counts

- Internally Deposited Beta/Gamma, 1B2 RCP Machining of Flange (Individual 1), October 29, 2018
- Internally Deposited Beta/Gamma, 1B2 RCP Machining of Flange (Individual 2), October 29, 2018
- Facial Particle, U2 Reactor Building Deep End Canal Work, November 27, 2019

##### In-vitro internal monitoring

- Sample No. 4, Diving Activities, April 30, 2019

##### Dose assessments performed using air sampling and DAC-hr monitoring

- Sample ON1911900004, U2 Reactor Building Cutting of O-Ring, November 18, 2019

#### Special Dosimetric Situations (IP Section 02.04) (1 Sample)

The inspectors evaluated licensee methods for assessment of special dosimetric situations such as declared pregnant worker, exposure in nonuniform fields, shallow dose equivalent and neutron exposure.

- (1) In addition to DPW records inspectors also reviewed the following:

##### EDEX exposures

- None were available during this inspection period.

##### Shallow Dose Equivalent

- None were available during this inspection period.

##### Neutron Dose Assessment

- Temporary Neutron Exposure Log, DSC159 ISFSI Campaign, July 7, 2019

#### 71124.05 - Radiation Monitoring Instrumentation

##### Walk Downs and Observations (IP Section 02.01) (1 Sample)

During plant walkdowns the inspectors evaluated and observed material condition, calibration stickers, and source check status of many portable survey instruments and personnel contamination monitors. Inspectors also observed source check demonstrations on portable instrumentation. Inspectors also evaluated the use of area radiation monitors and continuous air monitors.

- (1) Some instruments and records inspectors reviewed included but were not limited to the following:

##### Personnel contamination monitors, portal monitors and small article monitors

- ARGOS personnel contamination monitors at Turbine Building satellite RCA exit point
- CHRONOS small article monitors at Turbine Building satellite RCA exit point
- GEM-5 portal monitors at Protected Area exit

##### Portable Survey Instruments, ARMS, and Air Samplers/CAMS

- Portable ion chambers
- Portable telescoping GM detectors
- Area Radiation Monitors in Auxiliary Building
- AMS-4 continuous air monitor in U1/U2 spent fuel pool

#### Calibration and Testing Program (IP Section 02.02) (1 Sample)

The inspectors reviewed the calibration/testing frequency, methods and records for various types of monitoring, survey and analysis instrumentation. Inspectors reviewed results of the Inter-laboratory comparison program.

- (1) The inspectors reviewed the following calibration records:

Laboratory Instruments

- Liquid Scintillation Detector # 106756 TR-4, July 1, 2019
- High Purity Germanium Detector # 5, August 26, 2019

Whole Body Counter

- Whole Body Counter # ONSFS1, October 18, 2019

Post-Accident Monitoring Instrumentation

- 1-RIA 57, Containment High Range Radiation Monitor, March 26, 2019
- 1-RIA 58, Containment High Range Radiation Monitor, March 26, 2019

Portal Monitors, Personnel contamination Monitors, and Small Article Monitors

- ARGOS-5ABZ, Enrad ID # 07808, September 16, 2019
- GEM-5, Enrad ID # 03351, September 26, 2019
- Chronos-4, Enrad ID # 12395, September 17, 2019

Portable Survey Instruments, Area Radiation Monitors, and Continuous Airborne Monitors

- Ludlum Model 12-4 (remball), Enrad ID # 02844, January 15, 2019
- Telepole Enrad ID # 02707, March 21, 2019
- 1-RIA 1, Unit 1 and Unit 2 Main Control Room Area Radiation Monitor, September 1, 2019
- Ion chamber, Enrad ID # 11433, September 6, 2019
- AMS-4 Continuous Airborne Monitor Enrad # 10728, October 15, 2019

Electronic Dosimeters

- Dosimeter # A11CAA, August 21, 2019

**OTHER ACTIVITIES – BASELINE**

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

MS06: Emergency AC Power Systems (IP Section 02.05) (3 Samples)

- (1) Unit 1 (October 1, 2018 - September 30, 2019)
- (2) Unit 2 (October 1, 2018 - September 30, 2019)
- (3) Unit 3 (October 1, 2018 - September 30, 2019)

MS09: Residual Heat Removal Systems (IP Section 02.08) (3 Samples)

- (1) Unit 1 (October 1, 2018 - September 30, 2019)
- (2) Unit 2 (October 1, 2018 - September 30, 2019)
- (3) Unit 3 (October 1, 2018 - September 30, 2019)



OR01: Occupational Exposure Control Effectiveness Sample (IP Section 02.15) (1 Sample)

- (1) November 2018 - October 2019

PR01: Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual  
Radiological Effluent Occurrences (RETS/ODCM) Radiological Effluent Occurrences Sample  
(IP Section 02.16) (1 Sample)

- (1) April 2018 - October 2019

71152 - Problem Identification and Resolution

Semiannual Trend Review (IP Section 02.02) (1 Sample)

- (1) The inspectors reviewed the licensee's corrective action program for potential adverse trends that might be indicative of a more significant safety issue from July 1, 2019 through December 31, 2019.

Annual Follow-up of Selected Issues (IP Section 02.03) (3 Samples)

The inspectors reviewed the licensee's implementation of its corrective action program related to the plant modifications in Trench 3 and the protected service water ductbank, the rotork motor operated valve actuators, and the Keowee CX transformer:

- (1) NCRs 2203327 and 2282671, corrective actions for NRC violations from report 2018-013 associated with separation of buried cables
- (2) NCR 2235278, resolution of NRC identified violation regarding incorrect use of combined qualification for Rotork motor operated valve actuators
- (3) NCR 2257729, deferral of planned CX PM and Doble Test following 2018 deferral of CX Doble test. Resulted in a corrective action to replace the CX Transformer ahead of the 2024 planned replacement schedule.

71153 - Followup of Events and Notices of Enforcement Discretion

Event Report (IP Section 03.02) (1 Sample)

The inspectors evaluated the following licensee event reports (LERs):

- (1) LER 05000269/2019-002-00, Unit 1 Core Flooding System Loss of Safety Function (ML19262H511). The circumstances surrounding this LER are documented in Inspection Report 05000269/2019003 Section 71111.15.

**INSPECTION RESULTS**

Failure to Verify Adequacy of Reactor Building Cooling Units			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000269,05000270,05000287/2019004-01 Open/Closed	[H.6] - Design Margins	71111.18

Inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," when the licensee failed to verify the adequacy of design of the reactor building cooling units (RBCUs). Specifically, safety analysis engineers failed to verify the minimum test acceptance criteria for RBCU capacity remained adequate after modifying the safety analysis.

Description: On December 15, 2015, safety analysis engineers revised the large break loss of coolant accident long-term containment response calculation, OSC-8064. The purpose of the revision was to show with new, improved reactor building cooling unit (RBCU) performance data, that the existing post-LOCA containment temperature and pressure profiles would remain bounding even after considering the increased decay heat produced by operating the reactor on a 24-month vs. an 18-month cycle. Maintaining the existing profiles was important because the acceptable environmental qualification of post-accident monitoring instrumentation and other electrical components in the reactor building were based on those profiles. In Appendix K of the calculation, safety analysis engineers began using a new, vendor-supplied, performance capability curve for modeling the cooling capacity of the RBCUs.

Although the improved capacity was being used in the safety analysis, the acceptance criteria for routine RBCU performance tests continued to be based on the old curve. Monitoring performance against the old curve was considered appropriate because engineers assumed that a cooling unit performing at the old curve would, under the new external conditions, also perform at the new, improved curve. Engineers made this assumption because they considered the two curves to be representative of the capacity of the same physical cooling unit with just the external conditions being changed. Inspectors identified that this assumption was incorrect because the two curves made different assumptions about the cooling unit's internal fouling.

On September 26, 2019, inspectors identified that when engineers began using the new, improved capacity curve, they failed to recognize that most of the improvement was due to a difference in the assumed fouling factor between the new and old curves. The old curve was based on a 0.0005 (hr-ft<sup>2</sup>-°F/BTU) fouling factor, but the new curve was based on zero fouling. Removing the fouling factor accounted for approximately 75 percent of the improvement gain in the new capacity curve. The remaining 25 percent improvement was due to the curve being generated from reactor building environmental conditions that more closely resembled the safety analysis initial conditions. As a result, a cooling unit operating at the old curve would only be operating at approximately 83 percent of what was assumed in the safety analysis.

Once the performance test acceptance criteria were recognized to be non-conservative, operators reviewed the most recent actual performance data for the three RBCUs on each unit to verify that the safety analysis could still be satisfied. For Unit 1 the available operating margin was reduced from 77 percent to 47 percent. For Unit 2 the available operating margin was reduced from 19 percent to -0.8 percent. For Unit 3 the available operating margin was reduced from 39 percent to 16 percent. The available margin is routinely monitored during plant operation because it declines over time due to tube-side fouling from the low pressure service water system. To support continued operability on Unit 2 until the planned refueling outage in November 2019, engineers demonstrated in an immediate determination of operability that the existing post-loss-of-coolant accident (LOCA) containment temperature and pressure profiles would be maintained if the assumed low pressure service water temperature was reduced from 90 degrees Fahrenheit to 85 degrees. This was reasonable because the lake temperature had already peaked for the season at 83 degrees. About two

weeks later, a prompt determination of operability demonstrated an alternate approach by re-performing the safety analyses with a 20 percent reduction in assumed RBCU capacity, and showing that the post-LOCA containment temperature profile would generally be elevated by 10°F, but the limiting reactor building electrical equipment would remain environmentally qualified and operable.

Corrective Actions: The licensee revised the safety analysis to reflect the expected minimum RBCU capacity, issued a human performance crew learning communication to the safety analysis group, and initiated action to procure additional RBCU data from the vendor to validate assumptions.

Corrective Action References: NCR 2294192

Performance Assessment:

Performance Deficiency: The failure to verify the adequacy of design of the RBCUs per 10 CFR Part 50, Appendix B, Criterion III, was a performance deficiency. Specifically, safety analysis engineers failed to verify the minimum test acceptance criteria for RBCU capacity remained adequate after modifying the safety analysis.

Screening: The inspectors determined the performance deficiency was more than minor because if left uncorrected, it would have the potential to lead to a more significant safety concern. Specifically, the non-conservative acceptance criteria could have reasonably resulted in unintended operation outside of the safety analyses because expected higher fouling over time could have reduced margin to the point where the safety analyses were no longer bounding.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Using Exhibit 2, "Mitigating Systems Screening Questions," inspectors determined the finding was of very low safety significance (Green) because it was a deficiency affecting the design of the RBCUs, and qualification of reactor building electrical equipment, but they maintained their operability.

Cross-Cutting Aspect: H.6 - Design Margins: The organization operates and maintains equipment within design margins. Margins are carefully guarded and changed only through a systematic and rigorous process. Special attention is placed on maintaining fission product barriers, defense-in-depth, and safety related equipment. In this case, a change was made to a design calculation that involved items outside the expertise of the originator (i.e. fouling). Applying special attention and rigor such as obtaining additional reviews from subject matter experts or the vendor may have prevented the error. Although the original deficiency was introduced more than the nominal three-year period typically associated with "present performance," the cross-cutting aspect was assigned because, in April 2019, safety analysis engineers re-validated the existing methodology after it was questioned by site engineering.

Enforcement:

Violation: 10 CFR Part 50, Appendix B, Criterion III required, in part, that design control measures shall provide for checking the adequacy of design, such as by the performance of design reviews. Contrary to the above, since December 15, 2015, the design review performed for large break loss of coolant accident long-term containment response did not verify the adequacy of design of the RBCUs. Specifically, safety analysis engineers failed to

verify the minimum test acceptance criteria for RBCU capacity remained adequate after modifying the safety analysis.

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

## **EXIT MEETINGS AND DEBRIEFS**

The inspectors verified no proprietary information was retained or documented in this report.

- On December 12, 2019, the inspectors presented the Radiation Protection Baseline Inspection inspection results to Ed Burchfield, Site Vice President and other members of the licensee staff.
- On January 27, 2020, the inspectors presented the integrated inspection results to J. Ed Burchfield and other members of the licensee staff.

## DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.04Q	Calculations	OSC-10963	Electrical Design Input Calculation for Engineering Change 110408	0
		OSC-10969	Mechanical Design input Calculation for the Alternate Chilled Water (AWC) System	4
		OSC-7934	Auxiliary Building GOTHIC Heat Up Analysis – PSW Event Cases	11
		OSC-9659-ICC-0004	NFPA 805 Impacts due to AWC Manual Valve Position Changes	0
	Corrective Action Documents		2286301, 20153797, 2276864, 1854557, 1857675, 2277519, 2278566, 2296376, 2298512, 2167815	
	Drawings	O-6708	One Line Diagram Alternate Chill Water (AWC) 4160/600V System	3
		O-6708-A	One Line Diagram Alternate Chill Water (AWC) 600/208V System	5
		O-6708-B	One Line Diagram Alternate Chill Water (AWC) 600/208V System	1
		OFD-116Q-1.1	Flow Diagram of AWC System Yard Chillers and Auxiliary Skids	7
		OFD-116Q-1.2	Flow Diagram of AWC System Auxiliary Building Chiller No.1 Main Headers	14
		OFD-116Q-1.3	Flow Diagram of AWC System Auxiliary Building Chiller No.2 Main Headers	6
		OFD-116Q-1.4	Flow Diagram of AWC System Auxiliary Building Cable Rooms	2
		OFD-126C-1.1	Flow Diagram of Drinking Water System (Drinking Wtr. Make-up Service Building)	20
		OFD-126C-1.2	Flow Diagram of Plant Drinking Water System (Turbine Bldg., Admin. Bldg., IRW Facility, & QA Radiographic Facility Supply)	25
	Procedures	AM/0/A/3007/066	Abnormal Procedure for Installation and Removal of RBCU	4

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Hale Pumps and Hoses	
		AM/0/A/3007/085	Abnormal Procedure for Installation and Removal of Unit 1 and 2 Cable Room AWC Coolers	1
		AM/0/A/3007/086	Abnormal Procedure for Installation and Removal of Nitrogen System for Auxiliary Building Air Handling Units and Exhaust Fan Damper Control During AWC Operation	2
		AM/0/A/3007/087	Abnormal Procedure for Installation and Removal of AWC – Trane 500-Ton Model RTAC Chiller Make-up Water	1
		AP/1-2/A/1700/036	Degraded Control Room Area Cooling	20
		OP/0/A/1106/029 C	Alternate Chilled Water System	18
71111.05Q	Calculations	OSC-10731	Fire PRA Input to the ONS NRPA 805 Monitoring Program	003
		OSC-9314	NFPA 805 Transition Risk-Informed, Performance-Based Fire Risk Evaluation	006
		OSC-9378	ONS Fire PRA (FPRA) Summary Report	004
		OSC-9659	Oconee Nuclear Safety Capability Assessment for Units 1, 2, and 3	011
	Drawings	O-0756-M	Fire Detection System Detector Tabulation	021
	Fire Plans	CSD-ONS-FS-020	Standard Operating Guide Key Equipment List by Fire Zone	0
		CSD-ONS-PFP-1TB-0796	Pre-Fire Plan for U1 Turbine Building Elevation 796	0
		CSD-ONS-PFP-2RB	Pre-Fire Plan for U2 Reactor Building All Elevations	0
		CSD-ONS-PFP-2TB-0822	Pre-Fire Plan for U2 Turbine Building Elevation 822	0
		CSD-ONS-PFP-3TB-0822	Pre-Fire Plan for U3 Turbine Building Elevation 822	0
71111.08P	Calculations	NS-TECR-102658	Oconee Mathematically Calculated Calibration Curve	Rev. 001
	Calibration Records	MIZ-80	166, 526480, 540464, 542183, 542555, 544984, 648200, 648202, 649080, 649081, 654402, 654403, 654404	
		Probes	11342, 12024, 14379, 23627, 24010, 24058, 24654, 25921	
		S000001-07-	Mechanical Rolled Tube Plug & Stabilizer Installation Field	Rev. 13

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		000015	Procedure for Replacement Once Through Steam Generators	
	Corrective Action Documents	A/R # 02294252	2HP-123 Boron Leak Containment Isolation Valve	9/27/19
		ACTION REQUEST - 02302962	NCR - ISI Visual Examination of 2-RPV-HEAD-PEN	11/17/19
		AR-02171026	Active Boric Acid Leak from Valve 2HP-110	12/10/17
		AR-02173332	2C-HPI Pump Shaft has Active Boron Leak	12/20/17
		AR-02302078	ISI Visual Examination of Component 2-SCV-011, Containment Liner	11/16/19
		NCR 02294245	Boric Acid Corrosion Evaluation	10/24/19
	Corrective Action Documents Resulting from Inspection	NCR-02302449	BORON OBSERVED IN PRESSURIZER HEATER PLUGS	11/14/19
		NCR-02302598	Safety Concern - Fall Protection	11/14/19
		WO 20158328	Clean (Boric Acid ) Stains on Underside of Grating Below 2B Hot Leg Elbow, Considerable deposits on the underside of grating, below the pressurizer surge line where the hot leg comes out.	11/9/19
		WO 20158790	Boron Observed on Pressurizer Heater Sleeves	11/13/19
	Drawings	0-ISIC2-1062-0010	Oconee Unit-2, Containment Liner Plate, In-service Inspection Areas, Developed Elevation, Sht. 2	Rev. 2
		0-ISIC2-1962-009	Oconee Unit-2, Containment line Plate, In-service Inspection Areas, Developed Elevation, Sht. 1	Rev. 2
		128719E	B&W Reactor Vessel Radio-graphic Outline and Weld Identifiers	Rev. 3
		149766E	Pressurizer Heater Bundle Assembly and Details	Rev. 8
		151991 E	Arrangement Reactor Vessel Longitudinal Section	Rev. 14
		5059428B	BWI Replacement OTSG EDM/ASME/WEAR Array Calibration Standard	Rev. 0
		O-1479 A	Oconee U-2, Piping Layout, Ground Floor Plan, Reactor Building	Rev. 55
		OM 1201.-1538.001 (151991-E)	Arrangement Reactor Vessel Long Section	Rev.14
	Engineering	0300-TECR-	Condition Monitoring and Preliminary Operational	Rev. 0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Evaluations	104094	Assessment for Oconee-2 O2R29 Outage	
		3011-AST-101520	Steam Generator Condition Monitoring and Final Operational Assessment for Oconee-2 O2R28 Outage	Rev. 0
		AD-EG-PWR-1813	Steam Generator Degradation Assessment	Rev. 0
		AR-02294252 Boric Acid Evaluation	Valve 2HP-123	9/27/19
		NCR-02171026, Boric Acid Corrosion Evaluation	Evaluation of Active Boric Acid Leak at Valve 2HP-VA-110	1/10/18
		Oconee Unit-2, Cycle 29	Collective Significance Review for Leakage	2/27/19
	Miscellaneous	Badge # 285307	Duke Energy, NDE Examiner Certification Review	9/5/19
		Badge # 463070	Duke Energy, NDE Examiner Certification Review	9/10/19
		Badge #224415	Duke Energy, NDE Examiner Certification Review	9/9/19
		Badge #472208	Duke Energy, NDE Examiner Certification Review	9/5/19
		C-Q-02.04-F02	Training Attendance Roster	O2R29
		GTOO0808-04	ASME Section XI, Welding Procedure Specification Technical Sheet	Rev. 4
		NIS 2-A (Work Order 20083860	Owners Certificate of Conformance for Repair Replacement Plan 20083860-03	1/17/18
		Oconee UFSAR Section 3.8	Design of Structures	12/31/17
		Oconee Unit-2 Doc. ID 2015-85	Integrated Leakage Rate Test Report	12/7/2015
		Personnel Qualifications	J. Baumann, S. Merriam, T. Thulien,	
		ST3118 Completion Information	Oconee WO 20218685 Completion Information	11/19/19
		Visual Acuity	S. Merriam, T. Thulien,	
	NDE Reports	UT-19-010	System ID: CONT (Containment Liner Plate), Component	11/16/19



Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			ID: 2-GRID-001, Ultrasonic Examination Report IAW, Procedure NDE-NE-ALL-6401  gRID-001	
		VT-17-107	Visual Examination for Boric Acid Detection, RPV Bottom Head BMI Nozzles	1/25/18
		VT-19-076	System ID: CONT (Containment), Component ID: 2-SCV-011, Report of Visual Examination of IWE Surfaces (VT-1)	11/14/19
		VT-19-110	Component ID, 2-RPV-HEAD-PEN, Reactor Pressure Vessel Outer Head Surface -Visual Examination	11/22/19
	Procedures	0300-PLAN-103523	ROTSG ECT Inspection Plan	Rev. 1
		8-QPP-761	Multifrequency Eddy Current Examination of Steam Generator Tubing	Rev. 8
		ETSS	13091.2, 27091.2, 96042.1, 96043.4	
		NDE-NE-ALL-6102	Utilization of PDI-UT-2 Generic Procedure for the Ultrasonic, Examination of Austenitic Pipe Welds	Rev. 002
		NDE-NE-ALL-6403	Straight Beam Ultrasonic Examination	Rev. 000
		NDE-NE-ALL-7402	Visual Examination of IWE Components	Rev. 1
		NDE-NE-ONS-0131	Eddy Current Guidelines for Oconee Nuclear Station's Replacement Once-Through Steam Generators	Rev. 2
		NDE-NE-ONS-0132	ROTSG Site Technique Validation for Oconee Nuclear Station	Rev. 2
		O-ISISG-0169.030.0050	Fifth Interval Steam Generator Inservice Inspection Plan	Rev. 1
		S000001-07-000015	Mechanical Rolled Tube Plug & Stabilizer Installation Field Procedure for Replacement Once Through Steam Generators	Rev. 13
	Work Orders	20154083	2HP-123 Boron Leak- Containment Isolation	9/27/19
		WO 20083860	Oconee Unit-2 Alloy 600 Phase III, RCS Hot Leg Pressure	1/17/18

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Tap Safe End, Weld Pre-Fab of Instrument Valves, for Outage 02R28	
		WO 20158781	2HP-348 has 1/4 TSP. DRY BORON on PIPE CAP	11/13/19
		WO 20303980	Oconee Unit-2, Engineer (Mode 3) Reactor Bldg. Boric Acid Leak Inspection	11/9/19
		WO-20218685	Active Boron Leak From Valve 2HP-110	11/26/19
		WR 20092675	Active Boron Leak from Valve 2HP-110	12/10/17
		WR-20158781	2HP-348 Has 1/4 TSP Dry Boron on Cap	11/13/19
71111.11Q	Procedures	OP/0/A/1102/026	Operations IPTE Pre-Job Briefings	031
		OP/2/A/1103/011	Draining and Nitrogen Purging RCS	101
71111.12	Corrective Action Documents		2200104, 2249753, 1845371, 1773940, 1761628, 2290674, 2291819, 2294220, 2291906, 2292616, 2298746, 2298508, 02295613, 02296687, 02303769, 02299588	
	Drawings	K-0700	One Line Diagram Relays & Meters 13.8-230kV	44
		OEE-345-105	Elementary Diagram AFIS Analog Inputs to Digital Channel 1 Trip Confirm (Blue)	1
		OM 2311.D-0021.001	Oconee Unit 3 AFIS – STAR Trip Confirm Dig. CH 1 & 2 15V DC Distribution	D1
		OM 351-0272.001	Circuit Board Assembly	A
		OM 351-0274.001	Final Assembly - Regulator	A
		OM 351-0275.001	Schematic – Remote S.V.S Regulator 3-phase with Paralleling	A
	Miscellaneous		Maintenance Rule (a)(1) evaluation for NCR 2292616	
			Maintenance Rule Expert Panel Meeting Minutes dated November 7, 2019	
			Equipment Reliability Suite, MRule – Function Scoping software	
			Oconee OAC	
			eSOMS – Operator Logs	
			Regulatory Guide 1.160 – Monitoring the Effectiveness of Maintenance at Nuclear Power Plants	4

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		8003189-AFIR-1	As-Found Inspection Report for Automatic Voltage Regulator, Repair and Return	0
		OM 2201.C-0928.001	STAR System Instruction Manual	D07
		OM 351-0164.002	SSF Diesel Generator Instructions and Parts Manual	31
		OSS-0254.00-00-2026	(ELEC) Automatic Feedwater Isolation System	7
		AD-EG-ALL-1210	Maintenance Rule Program	1
	Procedures	AD-EG-ALL-1311	Failure Investigation Process (FIP)	1
		IP/0/A/2005/004	NEI, PP-EP SVS Static Voltage Regulator Exciter System	16
		IP/0/A/2005/004 A	SSF Diesel Generator Automatic Voltage Regulator Bench Test	0
	Work Orders		20208499, 2083722, 20201615, 20208939, 20357208, 20154895, 20157106	
71111.13	Drawings	OFD-124B-2.1	Flow Diagram of Low Pressure Service Water System (Auxiliary Building Services)	77
		OFD-133A-2.5	Flow Diagram of Condenser Circulating Water System (SSF AUX. Service)	61
		OM 245.-2628.001	Velan Bolted Cover Swing Check Valve (Cast)	1
	Miscellaneous		Complex Activity Plan for 2LPSW-1116 during O2R29	0 and 1
			O2R29 Shutdown Safety Overview – Outage Defense in Effect	
			Oconee U2, O2R29 Summary Schedule, IRT	September 9, 2019
	Procedures	MP/0/A/1200/108	Valve-Removal and Installation of Flanged Valves or Wafer Valves to Piping	66
		MP/0/A/1840/040	Pumps – Motors – Miscellaneous Components – Lubrication – Oil Sampling – Oil Change	039
		OP/0/A/1102/026	Operations IPTE Pre-Job Briefings	031

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		OP/2/A/1103/011	Draining and Nitrogen Purging RCS	101
		Site Directive 1.3.5	Shutdown Protection Plan	39
	Work Orders		20137409, 20352487	
71111.15	Calculations	OSC-5649	LPSW Test Acceptance Criteria (TAC)	19
	Corrective Action Documents		2292821, 2286307, 02304315, 02293695, 02301011	
	Drawings	18ALV500X11	ALV Pump	B
		OFD-124A-3.1	Flow Diagram of Low Pressure Service Water System Turbine Building	39
		OM 1240-002	Instruction Manual Operation-Maintenance Instructions and Parts Catalog for Automatic Pipeline Strainer Model No. 590 & 592	1
		OM 208-0064.001	Service Water Pump Installation Manual	0
		OM 240-002	Zurn Strain-O-Matic Model '67' Automatic Self-Cleaning Strainer with Exclusive "Lin-A-Flo" Design	0
		OM 245-617	Chart of List 1233 F.E. Tilting Disc Check Valves with Flexitallic Gasket	0
		ONTC-3-124A-0006-001	Unit 3 LPSW Pump Discharge Check Valve Leakage Test Acceptance Criteria	0
		OSC-10448	Environmental Qualification Evaluation for Oconee Reactor Building Water Level Transmitters and Supporting Equipment	1
		OSC-2784	Oconee Fouled Coolers / High Lake Temperature Equipment Qualification Evaluation	6
	Miscellaneous		Results / Erosion / Corrosion Wall Thickness Acceptance Evaluation for locations 2-FDW60-A & 2-03-18-25	
			UT Erosion/Corrosion Examination Summary No. O2-05927, O2-05930	
			Licensee's Logs via eSOMS	
			Oconee OAC SDS	
		ASME OM Code-	Code for Operation and Maintenance of Nuclear Power	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		2004	Plants	
		OSS-0254.00-00-1004	(Mech) Design Basis Specification for Standby Shutdown Facility Reactor Coolant Makeup System	056
		OSS-0254.00-00-1028	(Mech) Design Basis Spec for the Low Pressure Injection and Core Flood System (LPI)	059
	Procedures	AP/1/A/1700/024	Loss of LPSW	028
		MP/0/A/1600/031	Strainer – Zurn – LPSW Pump Maintenance	5
		PT/0/0160/006	Reactor Building Cooling Units Performance Test performed March 11, 2019	42
		PT/2/A/0160/002	Reactor Building Cooling Unit Air Flow Test performed November 16, 2017	12
		PT/2/A/0203/008	Component Test of ES Channels 3 & 4	025
	Work Orders		20346861, 2142983, 20304470	
71111.18	Calculations	OSC-10511	LPSW Flow to RBCUs for Environmental Qualification Purposes	0
		OSC-5666	Reactor Building Cooling Unit Performance Test – Unit 2	67, 68
		OSC-5667	Reactor Building Cooling Unit Performance Test – Unit 3	72
		OSC-6146	Post-LOCA Reactor Bldg Cooling Unit Capacity	2
		OSC-8064	ROTSG Long-Term Containment Response Following a Large Break LOCA	16
	Corrective Action Documents		2294192, 1905036	
	Engineering Changes	110165	Revise TAC Sheets for setpoints of LPSW pressure switches and LPSW pump TAC sheets ONTC-1-12	0
	Miscellaneous	ONEI-0400-400	Oconee Nuclear Station Revised RBCU Requirements in Support of 1-Year Mission Times	0
71111.19	Calculations	OSC-10826	SSF Letdown Flow Instrumentation Loop Uncertainty, 1/2/3 RC FE0016	
		OSC-11212	SSF RC Letdown Line Valve Data Sheet Calculation (RC-218, RC-219, RC-223)	3
		OSC-5675	Generic Letter 89-10 Calculation for Unit 2 Gate and Globe	39

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Valves	
		OSC-7184	Generic Letter 89-10 MOV Calculation for Units 1,2, 3 Gate and Globe Valves at Oconee	5
	Corrective Action Documents		2304894	
	Drawings	O-1721-C	RC Makeup & Letdown and High Pressure Injection & Purification System	12D
		OFD-101A-2.5	Flow Diagram of High Pressure Injection System (SSF Portion)	23
		OFD-102A-2.1	Flow Diagram of Low Pressure Injection System (Borated Water Supply And LPI Pump Suction)	60
		OFD-104A-1.1	Flow Diagram of Spent Fuel Cooling System	64
		OFD-107A-2.1	Flow Diagram of Coolant Storage System Quench Tank Portion	15
		OM 245.-2830.001	DMV-2184, 2.5" Class 2500 SD Valve, BW Ends, with Rotork 25NET1 Electric Actuator	2
		OM 253.-0123.001	Solenoid Operated Valve Energize to Open (FC) On/Off 2.5-inch BW	2
		ONTC-2-101A-0025	Unit 2 SSF RC Letdown Line Performance Test	2
	Engineering Changes	EC403752	Modify U2 SSF RCS Letdown Line to Support SSF Operability in All Modes of Operation	15
	Miscellaneous		EC403752 Post-Modification Test Exceptions Management Review	November 14, 2018
		OM 245.-2830.003	NIB – Flow Test Two SPX Flow Copes-Vulcan 2.5-inch Class 2500# Severe Duty Control Valves (DMV-2184 & DMV-2198)	0
		OM 245.-2830.005	NIIB – (DMV-2184 & DMV-2198) Weak Link Report with Seismic Acceleration & Fatigue Life 2.5" Class 2500	0
		OM 245.-2830.020	I/B – DMV-2184 & DMV-2198 25NET Hand/Auto Lever Upgrade Instructions	1
	Procedures	IP/0/A/3001/011 L	Diagnostic Testing Motor Operated Valves Using Teledyne/Quicklook System	5

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		OP/2/A/1600/008	SSF RC Makeup and Letdown Systems	035
		PT/2/A/0152/017	Reactor Coolant System Valve Stroke Test	032
		PT/2/A/0400/020	SSF RC Letdown Line Discharge Test	011
		PT/3/A/0203/006 A	Low Pressure Injection Pump Test – Recirculation	094
		TN/2/A/403752/E1	Procedure for Implementation of EC403752 – Unit 2 SSF RC Letdown Line Control Circuit Replacement Installation	001
	Work Orders		20307071-99, 20307071-42, 20307071-43, 20367709-11, 20307071-66, 20307071-50	
71111.20	Corrective Action Documents		2307084, 2167511, 2306246, 2306288, 2307084, 2934250	
	Drawings	OFD-124B-2.1	Flow Diagram of Low Pressure Service Water System (Auxiliary Building Services)	77
		OM 245.-2628.001	Bolted Cover Swing Check Valve (Cast)	1
	Miscellaneous		Complex Activity Plan for 2LPSW-1116 during O2R29	0, 1
			Oconee Nuclear Station Technical Specifications, Revised August 8, 2019	
			Oconee Nuclear Station Selected Licensee Commitments	November 7, 2019
			Oconee U2, O2R29 Summary Schedule, IRT	September 9, 2019
			Generic Letter No. 88-17, Loss of Decay Heat Removal	October 17, 1988
			Unit Shutdown/Cooldown & Depressurization JITT NIGHT Shift	5m
			Clearance OPS-2 -19-LPS-2LPSW-1116 -0455	
		O2R29	Shutdown Safety Overview – Outage Defense in Effect	
	Procedures	AD-MN-ALL-0002	Foreign Material Exclusion	10
		AD-OP-ALL-0203	Reactivity Management	12
		AP/1-2/A/1700/035	Loss of SFP Cooling and/or Level	024
		EP/2/A/1800/001	Restoration of Power	001

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		0P – Enclosure 5.38		
		FG/0/A/1900/005	Initial Assessment and FLEX Equipment Staging	005
		MP/0/A/1150/002	Reactor Vessel – Closure Head – Removal	63
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		OP/1-2/A/1104/006	SF Cooling System	109
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	Work Orders		20304120, 20137409	
71111.22	Calculations	OSC-4672	Unit 1 & 2 LPSW System LOCA/LOOP Response	11
	Corrective Action Documents		2298193, 02304315	
	Drawings	O-422H-22-02	Instrument Detail LPSW Flow Control to Decay Heat Cooler 1B	8
		OFD-116A-2.1	Flow Diagram of Reactor Building Purge System	12
		OFD-124B-1.1	Flow Diagram of Low Pressure Service Water System	68
	Engineering Changes	412012	Equivalent Change, Use of VALCOR V70900-65-24	0
	Miscellaneous		Licensee's Logs via eSOMS	
			Oconee OAC SDS	
	Procedures	AP/1/A/1700/024	Loss of LPSW	028
		PT/2/A/0150/006	Mechanical Penetration Leak Rate Data	067
		PT/2/A/0150/034	Leak Rate History Record and Reactor Building Leak Rate Verification	012
		PT/2/A/0151/019	Penetration 19 Leak Rate Test	016
		PT/2/A/0203/008	Component Test of ES Channels 3 & 4	025
	Work Orders		20304541, 20304470	
71124.01	Corrective Action Documents	02222444; 02200884; 02207944; 0211886		
	Miscellaneous	AD-RP-ALL-2017	Access Controls to Very High Radiation Areas and Supplemental Access Controls for HRA and LHRA: Unit 2 RB Annulus	December 11, 2019
71124.02	Corrective Action Documents	02203837; 02296924; 02166562; 02241719		
	Miscellaneous	HP/0/B/1000/016	OTSG Platform Worker Dose Tracking; Steam Generator Tube Plugging RWP 2221/ Task 11	November 19, 2019, 08:18

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	Self-Assessments	AD-PI-ALL-0300	Self Assessment and Benchmark Programs: Quick Hitter Self-Assessment Report 02114260-05	May 05, 2017
71124.03	Miscellaneous		SCBA Qualification List for the RP Group	October 31, 2019
71124.04	Corrective Action Documents	NCRs 02163071, 02201294, and 02221063		
	Procedures	AD-RP-ALL-4015	Dosimetry in Gradient Radiation Fields	Rev. 0
71124.05	Corrective Action Documents	AR 02242797		
	Procedures	AD-EG-ALL-1202	Preventive Maintenance and Surveillance Testing Administration	Rev. 8
	Radiation Surveys	ONS-M-20181109-13	Rad Waste Room 123 Resin Batch Tk. Transfer Pump	November 9, 2018
71151	Corrective Action Documents	02200447; 02241002		
	Miscellaneous		Unit 1, 2, and 3 MSPI Derivation Report for period ending September 2019	
			MSPI Basis Document	26
			Unit 1, 2, and 3 MSPI Margin Report for period ending September 2019	
		NEI 99-02	Regulatory Assessment Performance Indicator Guideline	7
71152	Calculations	OSC-11832	Evaluation of Switchyard Trenches S105 and S117	1
	Corrective Action Documents		1702592, 01907384, 02257729	
		AR 02295447, 02282671, 02203327, 02293642		
	Drawings	K-0700	One Line Diagram Relays & Meters 13.8-230kV	44
		K-0702	One Line Diagram 600 Volt Station Auxiliary Circuits	62
		K-0708	Three Line Diagram Generator No. 1	12
		K-0709	Three Line Diagram Transformers No. 1, 1X, 2X, CX, 1E &	21

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			2E	
	Engineering Changes	415620	Update OM-245-1931.001 vendor manual based on vendor supplied information	0
		415794	Keowee CX Transformer Replacement	003
	Miscellaneous	CNM 1392.00-0013.001	Doble Evaluation Criteria	0
		DPM-1393.01-0038.001	Rotork NQR Series Reports	2
		EQMM-1393-01-A01-00	Environmental Qualification Maintenance Manual – Equipment Type: Electric Motor Actuator Manufacturer: Rotork Model/Series: NA1	17
		MCM 1354.00-0029.001	Overload and Short Circuit Tests of Cables	9/29/14
		OM 245-0980.001	Rotork Valve Operator Nuclear Qualification (Post 1978)	4
		OM 245-1931.001	Technical Repair Guide for Rotork Valve Actuators “NA” Range Models	6
	Procedures	AD-HS-ALL-0110	Electrical Safety	14
		AD-MN-ALL-0002	Foreign Material Exclusion	10
		AD-OP-ALL-0200	Clearance and Tagging	20
		AD-PI-ALL-0100	Corrective Action Program	21
		IP/O/A/2000/004	Doble Testing	023
		OSS-0218.00-00-0019	(ELECT) Installation Spec Cable and Wiring Separation Criteria	18
		OSS-0254.00-00-4013	(MECH) Design Basis Specification for the Oconee Single Failure	8
		TE-MN-ALL-0202	Transformer and Apparatus Testing	000
	Work Orders		20147967, 02208634, 20086331, 02164537, 02208634, 20179664, 20245600, 20008002, 20008003, 20023531	