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

November 27, 2018

Mr. Ed Burchfield, Jr.
SVP Nuclear Operations
Oconee Nuclear Station
Duke Energy Carolinas, LLC
7800 Rochester Hwy
Seneca, SC 29672

SUBJECT: REISSUE – OCONEE NUCLEAR STATION, UNITS 1, 2 & 3 - NRC DESIGN BASES ASSURANCE INSPECTION (PROGRAMS) REPORT NUMBER 05000269/2018010, 05000270/2018010 AND 05000287/2018010

Dear Mr. Burchfield:

On November 16, 2018, the U.S. Nuclear Regulatory Commission (NRC) issued the Design Bases Assurance Inspection Report for Oconee Nuclear Station Units 1, 2 and 3, Adams Accession Number **ML 18320A213**. In reviewing this report, we identified an administrative error regarding the point of contact for whom the inspection results were presented to during the Exit meeting conducted on October 5, 2018. Specifically, that the results of the inspection were discussed with Mr. Paul Fisk and other members of your staff. When on October 5, 2018 the inspection results were discussed with you and other members of your staff and that on November 15, 2018 additional inspection results were discussed with Mr. Paul Fisk and other members of your staff. We request that the previous cover letter and report be replaced with the enclosures to this letter.

In accordance with Title 10 of the Code of Federal Regulations (10 CFR) 2.390 “Public inspections, exemptions, requests for withholding” of the NRC’s “Agency Rules of Practice and Procedure,” a copy of this letter will be available electronically for public inspection in the NRC Public Document Room, of the Public Available Records (PARS) component of NRC’s ADAMS; accessible form the NRC website at https://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Please contact me at 404-997-4703 with any questions you may have regarding this letter.

Sincerely,

/RA/

Omar López-Santiago, Chief
Engineering Branch 1
Division of Reactor Safety

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

Enclosure:
1. Reissued Oconee Cover Letter
2. NRC DBAI (PROGRAMS) IR
05000269/2018010, 05000270/2018010
AND 05000287/2018010 w/Attachment:

cc: Distribution via ListServ

SUBJECT: REISSUE – OCONEE NUCLEAR STATION, UNITS 1, 2 & 3 - NRC DESIGN BASES ASSURANCE INSPECTION (PROGRAMS) REPORT NUMBER 05000269/2018010, 05000270/2018010 AND 05000287/2018010 dated November 27, 2018

DISTRIBUTION:
M. Greenleaf, RII, DRS
M. Riley, RII, DRS
G. Ottenberg, RII, DRS
O. Lôpez-Santiago, RII, DRS

* See previous page for concurrence

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

ADAMS: ☐ Yes ACCESSION NUMBER: **ML 18331A376** ☐ SUNSI REVIEW COMPLETE ☐ FORM 665 ATTACHED

OFFICE	RII:DRS/EB1	RIII:DRS/EB1	RII:DRS/EB1	RII:DRS/EB1	
SIGNATURE	MCG9	MAR1	GKO	ORL	
NAME	M. GREENLEAF	M. RILEY	G. OTTENBERG	O. LOPEZ-SANTIAGO	
DATE	11/ 27 /2018	11/ 27 /2018	11/ 27 /2018	11/ /2018	
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	

OFFICIAL RECORD COPY DOCUMENT NAME: S:\DRS NEW\ENG BRANCH 1\BRANCH INSPECTION FILES\2017-2018-2019 CYCLE INSPECTION FOLDER FOR ALL SITES\ENG PROGRAMS\OCONEE EQ 2018\REISSUE - OCO 2018 EQ INSPECTION REPORT REV 6.DOCX

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

November 16, 2018

Mr. Ed Burchfield, Jr.
SVP Nuclear Operations
Oconee Nuclear Station
Duke Energy Carolinas, LLC
7800 Rochester Hwy
Seneca, SC 29672

SUBJECT: OCONEE NUCLEAR STATION, UNITS 1, 2 & 3 - NRC DESIGN BASES ASSURANCE INSPECTION (PROGRAMS) REPORT NUMBER 05000269/2018010, 05000270/2018010 AND 05000287/2018010

Dear Mr. Burchfield:

On October 5, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Oconee Nuclear Station Units 1, 2 and 3 and discussed the results of this inspection with you and other members of your staff. On November 15, 2018 additional inspection results were discussed with Mr. Paul Fisk and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented 2 findings of very low safety significance (Green) in this report. These findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

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

Enclosure

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

Sincerely,

/RA/

Omar López-Santiago, Chief
Engineering Branch 1
Division of Reactor Safety

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

Enclosure:
Inspection Report 05000269/2018010,
05000270/2018010 and 05000287/2018010

cc: Distribution via ListServ

SUBJECT: OCONEE NUCLEAR STATION, UNITS 1, 2 & 3 - NRC DESIGN BASES ASSURANCE INSPECTION (PROGRAMS) REPORT NUMBER 05000269/2018010, 05000270/2018010 AND 05000287/2018010 dated November 16, 2018

DISTRIBUTION:
M. Greenleaf, RII, DRS
M. Riley, RII, DRS
G. Ottenberg, RII, DRS
O. Lôpez-Santiago, RII, DRS

* See previous page for concurrence

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

ADAMS: ☐ Yes ACCESSION NUMBER:__**ML 18320A213** _☐ SUNSI REVIEW COMPLETE ☐ FORM 665 ATTACHED

OFFICE	RII:DRS/EB1	RIII:DRS/EB1	RII:DRS/EB1	RII:DRS/EB1	
SIGNATURE	MCG9	MAR1	GKO	ORL	
NAME	M. GREENLEAF	M. RILEY	G. OTTENBERG	O. LOPEZ-SANTIAGO	
DATE	11/ 15/2018	11/ 2 /2018	11/ 6 /2018	11/ /2018	
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	

OFFICIAL RECORD COPY DOCUMENT NAME: S:\DRS NEW\ENG BRANCH 1\BRANCH INSPECTION FILES\2017-2018-2019 CYCLE INSPECTION FOLDER FOR ALL SITES\ENG PROGRAMS\OCONEE EQ 2018\OCO 2018 EQ INSPECTION REPORT REV 6.DOCX

U.S. NUCLEAR REGULATORY COMMISSION

Inspection Report

Docket Number(s):	05000269, 05000270, 05000287
License Number(s):	DPR-38, DPR-47, DPR-55
Report Number(s):	05000269/2018010, 05000270/2018010, 05000287/2018010
Enterprise Identifier:	I-2018-010-0050
Licensee:	Duke Energy Carolinas, LLC
Facility:	Oconee Nuclear Station Units 1, 2 & 3
Location:	Seneca, South Carolina
Inspection Dates:	September 18, 2018, to October 5, 2018
Inspectors:	M. Greenleaf, Reactor Inspector G. Ottenberg, Senior Reactor Inspector M. Riley, Reactor Inspector
Approved By:	Omar López-Santiago, Chief Engineering Branch 1 Division of Reactor Safety

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring Duke Energy Carolinas LLC's performance at Oconee Nuclear Station Units 1, 2 and 3 by conducting a design bases assurance inspection (programs) 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. NRC violations are summarized in the table below.

List of Findings and Violations

Incorrect Use of Combined Qualification for Rotork Motor Operated Valve Actuator			
Cornerstone	Significance/Severity	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000269/2018010-01 Closed	None	71111.21N – Design Bases Assurance Inspection (Programs)
The inspectors identified a Green finding and associated Non-cited Violation (NCV) of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.49(e)(5), for the licensee's failure to appropriately include the effects of thermal aging in the qualification of the Rotork valve motor operator. Consequently, the 1LP-104 valve motor operator was installed in the plant for longer than the qualification had been demonstrated.			

Failure to Evaluate Impact to Required Design Functions for Viking Penetrations Following Changes to East Penetration Room Environmental Parameters			
Cornerstone	Significance/Severity	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000269/2018010-02 Closed	None	71111.21N – Design Bases Assurance Inspection (Programs)
The inspectors identified a Green finding and associated Non-cited Violation (NCV) of Criterion III of Appendix B of Title 10 of the *Code of Federal Regulations, Part 50,* for the licensee's failure to establish measures for the selection and review for suitability of application of Viking penetrations that is essential to the safety related functions of the penetrations.			

INSPECTION SCOPE

Inspections were conducted using the appropriate portions of the inspection procedure (IP) 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 reviewed selected procedures and records, observed activities, performed walk downs, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.21N - Design Bases Assurance Inspection (Programs)

The inspectors evaluated environmental qualification program implementation by reviewing the following components from September 18, 2018, to September 21, 2018, and October 1, 2018, to October 5, 2018:

Environmental Qualification (EQ) Program Components (4 Samples)

(1) 1RX-PNEA13, Containment Penetration (*Viking Type J – feedthrough assemblies and cable assemblies*)
(2) 3A High Pressure Injection Pump Motor Bushing and Connector, (*Elastimold Bushing and Connector*)
(3) 2HPI-SX-TRN002, 2B Protected Service Water to High Pressure Injection Motor Operated Transfer Switch (*Nutherm International Inc. – Selector Switches and Motor Operating Device*)
(4) 2RBC-MR-0020BAHU, 2B Reactor Building Cooling Unit Fan Motor (*Howden Buffalo – Motor assembly*)

EQ Program Components Inside Primary Containment (3 Samples)

(5) Instrumentation Cable in Containment (*Boston Insulated Wire – various cable types containing Bostrad 7 insulation*)
(6) 1LP-104, Low Pressure Injection Loss of Coolant Accident Boron Dilution Valve (*Rotork Valve Operator (post 1978) Model NA1 Actuator*)
(7) 1-RIA-58, 1A Containment High Radiation Monitor (*Sorrento Electronics – Connectors*)

INSPECTION RESULTS

Incorrect Use of Combined Qualification for Rotork Motor Operated Valve Actuator			
Cornerstone	Significance/Severity	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000269/2018010-01 Closed	None	71111.21N – Design Bases Assurance Inspection (Programs)

The inspectors identified a Green finding and associated Non-cited Violation (NCV) of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.49(e)(5), for the licensee's failure to appropriately include the effects of thermal aging in the qualification of the Rotork valve motor operator. Consequently, the 1LP-104 valve motor operator was installed in the plant for longer than the qualification had been demonstrated.

Description:

The inspectors reviewed OM 245. --0980.001, NIB-Rotork Valve Operator Nuclear Qualification (Post 1978), which documented the qualification testing that was performed for the post-1978 Rotork NA1 valve motor operators. The 1LP-104 valve operator, chosen for review by the inspection team, was installed inside containment in 2005, and was considered a replacement component which was to be qualified in accordance with 10 CFR 50.49 requirements. While reviewing the qualification file, the inspectors identified that the qualified life for the component was not appropriately demonstrated.

The Environmental Qualification Test Report / Analysis Summary included in OM 245. --0980.001 indicated that the "Qualified Life/ Replacement Interval," of 40 years was demonstrated by Wyle Laboratories Test Report 43979-1, "Qualification Test Report for Two Valve Operators (11NAZT1 and 90NAZT1) for Rotork Controls, Inc. Rochester, New York," Section II, and it further directed the reader to "See Remarks Section Paragraph 1."

Test report 43979-1, Section II, "Environmental and Mechanical Wear Aging Test," indicated that each of the two test specimens were thermally aged at approximately 200 degrees Fahrenheit (°F) for 400 hours and were further subjected to a total of 2000 mechanical cycles.

The Remarks Section Paragraph 1 stated the following:

"Aging/Qualified Life
Section II, of Report 43979-1, "Environmental and Mechanical Wear Aging Test" shows the actuator being aged for 400 hours at 200°F. This is not equivalent to 40 years at 120°F (120°F being Duke's ambient temperature) per the Arrhenius Equation. Additional testing by Test Report TR-3030 shows justification of the 40 year qualified life of the operator. Reference Rotork letter dated December 27, 1985 paragraph 1C.

An added justification of the 40 year life is to have one actuator pulled from containment, tested and inspected for functionability and the characteristics of the sealing material every five years. Reference OM-245-0980, Section NA1 Nuclear Qualification, Paragraph 2."

The Rotork letter dated December 27, 1985, paragraph 1C, stated the following:
"As you have determined, Test Report No. 43979-1 does not specifically address the life of the actuator relative to thermal aging testing. Initially, let me point out that we did age the actuators for 400 hours at 200°F (Reference Section 2, Page 1, Para. 1.0). Also, note that the motor was preaged as an individual component for 200 hours at 338°F. For your information, the basis of the aging program was an early draft of IEEE-382. The motor preaging was based on the l0°C rule. Since the time of Rotork's testing, the arrhenius equation has become accepted as the proper method of determining the life of non-metallic components. The attached Test Report No. TR3030 provides component life information based on the arrhenius equation. Included in TR3030 is a bill of material for non-metallic components, activation energies for non-metallic components, and reference to the documents used to determine the activation energies. The lowest activation energy level found is .89ev.

Using .89ev and an ambient of 120°F (provided by Duke), a calculated qualified life equivalent to 400 hours of aging at 200°F is 2.2 years. The motor preaging of 200 hours at 338°F is equivalent to a qualified life of approximately 145 years. The thermal aging conducted in TR3030 is equivalent to 221 years at 120°F (see the attached modified version of Table 1 in TR3030).

Since the thermal aging program conducted in TR3030 was very severe (equivalent to 221 years of normal plant life) and since the actuator continued to function within acceptable parameters, results can be applied to obtain a qualification package which shows that the actuator will continue to function throughout its forty year life. Since the various non-metallic materials were not significantly degraded, the operation of the actuator under accident conditions as conducted in Test Report No's 43979-1, 43979-3 and 58364 can be assumed."

Although the Remarks section stated that Rotork Test Report TR-3030 [16NAT1 Thermal Aging Type Test Report] showed justification for a 40 year qualified life, the testing described in that test report did not conform to the qualification testing methods in IEEE 323-1974, "IEEE Standard for Qualifying Class IE Equipment for Nuclear Power Generating Stations," or the requirements of 10 CFR 50.49. The TR-3030 testing did not perform any design basis accident testing at elevated temperatures or pressures, did not include a chemical spray environment, and did not include humidity or radiation environment considerations. Therefore, absent any additional ongoing qualification activity as described in Remarks Section Paragraph 1, or further analysis, the 40 year qualified life was inappropriately based on separate effects testing, as test report TR-3030 only included thermal and mechanical aging effects on the degradation of the component followed by functional testing. The qualified life was therefore based only on a demonstration that the component would function under a non-accident, non-irradiated condition following a period of thermal and mechanical aging.

Inspectors discovered that the licensee had been performing functional testing and visual inspection of the sealing material on a five year frequency in an effort to extend the qualified life in accordance with 10 CFR 50.49(e)(5). Specifically, OM-245-0980, Section NA1 Nuclear Qualification, Paragraph 2, described the ongoing testing as follows:

> *"Every year after start-up of each nuclear power plant, at least one Rotork actuator is removed from a valve, tested on a Rotork test rig, disassembled, inspected, reassembled and tested. We will make a Rotork engineer available to examine the unit and document a statement on its functionability and the characteristics of the sealing material. Although it is at the power plant's-discretion, I would suggest the selection of one actuator each year in one of the most severe ambients would be sufficient."*

Further, it was discovered that the every five year removal/test/inspect activity had been canceled by Duke in 1997, as documented in their corrective action program in NCR 01702592 (former PIP M-97-3898).

The inspectors determined that the licensee's failure to appropriately demonstrate the qualification of the Rotork Actuator, resulted in the 1LP-104 actuator being installed in the plant for longer than the qualification had been demonstrated.

Corrective Actions: The licensee determined the extent of condition and evaluated the affected actuators for operability, and determined them to be operable but non-conforming. The licensee plans to include further testing or analysis to ensure the affected components conform to their EQ program requirements.

Corrective Action Reference: NCR 02235278

Performance Assessment:

Performance Deficiency: The inspectors determined that the licensee's failure to appropriately include the effects of thermal aging in the qualification of the Rotork valve motor operator was a performance deficiency.

Screening: The performance deficiency was determined to be more than minor because it adversely impacted the equipment performance attribute of the mitigating systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to demonstrate qualification calls into question the reliability, capability, and availability of the valve to perform its safety function of post-boron dilution following a LOCA when the valve has been subjected to the harsh environmental stressors at the end of its installed life.

Significance: The team evaluated the finding in accordance with NRC Inspection Manual Chapter (IMC) 0609, Attachment 4, "Initial Characterization of Findings," issued October 7, 2016, for Mitigating Systems, and IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," issued June 19, 2012, and determined the finding to be of very low safety significance (Green) because the finding was a deficiency affecting the qualification of a mitigating SSC, and the SSC had maintained its operability. Specifically, the licensee evaluated the ability to operate the affected valve operators during accident conditions, and determined the valves remained capable of performing their safety functions.

Cross Cutting Aspect: No cross cutting aspect was assigned because the team determined the finding did not reflect present licensee performance.

Enforcement:

Violation: Title 10 CFR 50.49(e)(5) required, in part, "Equipment qualified by test must be preconditioned by natural or artificial (accelerated) aging to its end-of-installed life condition. Consideration must be given to all significant types of degradation which can have an effect on the functional capability of the equipment. If preconditioning to an end-of-installed life condition is not practicable, the equipment may be preconditioned to a shorter designated life. The equipment must be replaced or refurbished at the end of this designated life unless ongoing qualification demonstrates that the item has additional life."

Contrary to the above, since 1997, the specimens used in the type-test qualifying the 1LP-104 valve were not preconditioned to its end-of-installed life condition, the installed item was not replaced or refurbished at the end of a shorter designated life, and the item was not demonstrated to have additional life by ongoing qualification. Specifically, the licensee had not performed ongoing qualification as originally planned to demonstrate that the item had additional life.

Enforcement Actions: This violation is being treated as a Non-Cited Violation, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Evaluate Impact to Required Design Functions for Viking Penetrations Following Changes to East Penetration Room Environmental Parameters			
Cornerstone	Significance/Severity	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000269/2018010-02 Closed	None	71111.21N – Design Bases Assurance Inspection (Programs)
The inspectors identified a Green finding and associated Non-cited Violation (NCV) of Criterion III of Appendix B of Title 10 of the *Code of Federal Regulations, Part 50,* for the licensee's failure to establish measures for the selection and review for suitability of application of Viking penetrations that is essential to the safety related functions of the penetrations.			
Description: The east penetration rooms of Oconee Nuclear Station were originally classified as mild environments during the origination of the station's EQ Program. Following the issuance of OSC-8104 "High Energy Line Breaks in the Penetration Room," Rev. 0, the Viking penetration 1-EA-13 was required to mitigate the consequences of a Main Steam Line Break in the east penetration room (EPR) at Oconee Nuclear Station, including temperature, pressure, and steam conditions at the end of its installed life. The design basis environmental parameters for the effects of the considered high energy line breaks (HELBs) in the EPR were changed following the issuance of the calculation results, and the new results were not appropriately considered for their impact to the design requirements of the equipment in the EPR (including penetration 1-EA-13).			

Qualification documentation reviewed by NRC inspectors only demonstrated qualification of the penetration for LOCA conditions inside containment. No documentation supporting qualification of the penetration following the harsh environment stemming from a HELB in the EPR has been provided for the penetration in question.

Corrective Actions: The licensee determined the equipment to be operable but non-conforming. The licensee plans restore qualification to the Viking penetrations to ensure that they meet their qualification and design requirements.

Corrective Action Reference: NCR 02235293

Performance Assessment:

Performance Deficiency: The inspectors determined that the failure to verify the adequacy of the design of the Viking penetrations for HELB conditions in the east penetration room was a performance deficiency.

Screening: The performance deficiency was determined to be more than minor because it adversely impacted the equipment performance attribute of the mitigating systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to demonstrate that the penetration will be capable of performing its safety function of passing safety related signals to and from the Reactor Protection System, Automatic Feed-water Isolation System and Engineering Safeguards system adversely affects the ability of those systems to reliably perform their safety functions.

Significance: The team evaluated the finding in accordance with NRC Inspection Manual Chapter (IMC) 0609, Attachment 4, “Initial Characterization of Findings,” issued October 7, 2016, for Mitigating Systems, and IMC 0609, Appendix A, “The Significance Determination Process (SDP) for Findings At-Power,” issued June 19, 2012, and determined the finding to be of very low safety significance (Green) because the finding was a deficiency affecting the qualification of a mitigating SSC, and the SSC had maintained its operability. Specifically, the licensee inspected spare cable assemblies located in the warehouse and determined that the cable assemblies installed were composed of shielded cables insulated with silicone. The station determined that the silicone insulation and the spare cable assembly – as built – is likely to survive the deleterious effects of the short-duration HELB postulated to occur in the EPR. This determination was based on the performance of similar silicone insulated cables to perform their function in high temperature environments coupled with the relatively short duration of the HELB event.

Cross Cutting Aspect: No cross cutting aspect was assigned because the team determined the finding did not reflect present licensee performance.

Enforcement:

Violation: Criterion III of Appendix B of 10 CFR Part 50 requires in part that, “Measures shall also be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components. Design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.”

Contrary to the above, since issuance of Rev. 0 of OSC-8104 (dated August 21, 2002), the station did not establish measures for the selection and review for suitability of application of equipment that is essential to the safety related functions of the SSCs. The station also did not provide for verifying or checking the adequacy of the design of the Viking penetrations, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program to ensure that the penetrations are suitable for their application in HELB environments in the east penetration room. Specifically, the station did not ensure that the Viking penetrations would be qualified for HELB environments in the east penetration room.

Enforcement Actions: 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 October 5, 2018 the inspector presented the inspection results to Mr. Ed Burchfield, and other members of the licensee staff.
- On November 15, 2018, the inspector re-characterized the inspection results in a re-exit meeting with Mr. Paul Fisk and other members of the licensee staff.

LIST OF DOCUMENTS REVIEWED

CORRECTIVE ACTION DOCUMENTS WRITTEN AS A RESULT OF THE INSPECTION

NCR 02231581, Oconee 2018 DBAI EQ Inspection
NCR 02231604, ONS Penetration Room FWLB Flood Level Not Listed in EQCM
NCR 02231623, Editorial Error in Design Basis Document for LPI
NCR 02231720, EQMM not updated as required per EC 110132
NCR 02231942, 2018 DBAI EQ – 1RXPNEA13 Outside Terminal Box Mounting
NCR 02232199, 2018 DBAI EQ – Pages Missing in OM-314-317.002
NCR 02232204, 2018 EQ EQCM Documentation Errors
NCR 02232258, 2018 DBAI EQ EC110961 No EQ Impact Review
NCR 02232300, 2018 DBAI EQ: OSC-6998 Did Not Address All BIW Cable Types
NCR 02232815, (ONS DBAI) Rad analysis incomplete in OSC-1521 for HPI room
NCR 02233042, 2018 DBAI EQ Document Discrepancy
NCR 02233101, 2018 EQ NRC DBAI Superseded EQ Qualification Reference
NCR 02233202, 2018 EQ DBAI Electrical Penetration Fault Calculation Review
NCR 02233324, 2018 EQ Document Discrepancy
NCR 02233739, 2018 EQ DBAI Viking EPA MSLB Temperature Qualification
NCR 02233749, 2018 DBAI EQ: RBCU Motor Documentation Requires Revision
NCR 02233927, EQ Program Documentation Inefficiencies
NCR 02234698, (2018 DBAI EQ) Evaluate 1993 Part 21 Notice 93-333 on BIW Ca
NCR 02234738, 2018 NRC EQ DBAI Elastimold Connectors on HPI MTRs Issues
NCR 02235002, 2018 DBAI EQ EQCM Document Deficiency
NCR 02235012, 2018 DBAI EQ Document Deficiency
NCR 02235141, 2018 DBAI EQ Document Discrepancy
NCR 02235165, ONS 2018 DBAI EQ – Original Plant Equipment with Unknown Pos
NCR 02235213, (2018 DBAI EQ) WO2022952 Completed Procedure Not Retrievable
NCR 02235253, 2018 DBAI EQ – EQML / EQDB list incorrect model for pent 3EE3
NCR 02235278, 2018 DBAI EQ Rotork NA1 actuator EQ testing gaps
NCR 02235293, 2018 EQ DBAI East Penetration Room MSLB Qualification
NCR 02235349, 2018 DBAI EQ Motor pH Qualification

PROCEDURES

AD-EG-ALL-1000, Conduct of Engineering, Rev. 1
AD-EG-ALL-1612, Environmental Qualification (EQ) Program, Rev. 2
AD-PI-ALL- 0400, Operating Experience Program, Rev. 7
IP/0/A/3009/017, Wire Terminal Installation, Labeling, and Termination (600V or Less), Rev. 39
MP/0/A/1840/040, PUMPS - MOTORS – MISCELLANEOUS COMPONENTS - LUBRICATION - OIL SAMPLING – OIL CHANGE, Rev. 38
MP/0/A/3009/020 B, Motor – QA - Electric - Removal, Replacement, And Post Maintenance Testing, Rev. 41
NSD-303, Environmental Qualification Program, Rev. 5

DRAWINGS

500722-53, Axivane Fan Model 66-30-11701585 Series 2000 Special, Rev. 7
72088, PSW System 5kV Motor Operated Transfer Switch Schematic Diagram, Rev. 1
O EE-264-10, Elementary Diagram, 600V Load Center PSWLXPX13 (2C) Feed to Manual Transfer Switch for MCC 2XJ, Rev. 1
O-1157-W-005, Auxiliary Building Unit 2 Miscellaneous Electrical Equipment Mounting Details, Rev. 0

O-1703-C, One Line Diagram – Stat. Auxiliary Circuits 600V/208V L/C 2X4 & MCC 2XH, 2XK & 2XR, Rev. 38
O-1875-A, Reactor Building Electrical Penetrations Schedule East – EA7 thru ED3
O-6719-B, Connection Diagram HPI Pumps 2A and 2B Transfer Switches 2HPISXTRN001 & 2HPISXTRN002, Rev. 0
OEE-152-24, Elementary Diagram LP LOCA Boron Dilution System Motor Operated Valve 1LP104, Rev. 6
OM 314. --0063.001, HIGH PRESSURE INJECTION PUMP MOTOR, Rev. 14
OM 314. --0098.001, Rev. D1
OM 337.—0015.001, Viking Penetration Master Types E Thru J, Rev. A

CALCULATIONS

DPC 1381.05-00-0006, Duke Power Company - Shelf Life and Storage, Rev. 2
DPC 1381.05-00-0022, Rotork MOV Shelf Life Calculation, Rev. 0
DPC 1381.05-00-0041, EQ Analysis For Annealing ROTORK MOV Switch Mechanism And Add-On-Pak Components, Rev. 1
ONDS-351, ANALYSIS OF POSTULATED HIGH ENERGY LINE BREAKS (HELBs) OUTSIDE OF CONTAINMENT, Rev. 2
OSC-10714, Environmental Qualification (EQ) Qualified Life Evaluation For Elastimold Electrical Connectors, Rev. 0
OSC-10790, Oconee Nuclear Station Internal Flooding Analysis, Rev. 3
OSC-2059, U1, AC Power System Voltage and Fault Duty Analysis, Rev. 25
OSC-2107, Penetration Room Main Steam Line Break Analysis, Rev. 2
OSC-2784, Oconee Fouled Coolers/High Lake Temperature Equipment Qualification Evaluation, Rev. 6
OSC-4151, Penetration Overcurrent Protection, Rev. 15
OSC-5373, FSAR Section6.2.1.4 – Steam Line Break: Reactor Building, Rev. 4
OSC-5460, Oconee MSLB/EQ Analysis, Rev. 3
OSC-6182, Main Steam Line Break {MSLB} - Event Mitigation Requirements Type III, Rev. 19
OSC-6998, Qualified Life Analysis for BIW Chlorosulfonated Polyethylene (CSPE) Cable, Rev. 1
OSC-7068, Qualified Life Analysis for the Westinghouse Pump Motors, Rev. 0
OSC-7168, Temperature Monitoring Verification for Time Limiting Aging Analysis (TLAA), Rev. 1
OSC-7962, Design Input Calculation for Reactor Building Cooling Unit Fan Replacement NSM ON-X3095, Rev. 3
OSC-8064, ROTSG Long-Term Containment Response Following a Large Break LOCA, Rev. 16
OSC-8104, High Energy Line Breaks in the Penetration Room, Rev. 3
OSC-8265, East Penetration Room Flooding from Feedwater Line Breaks, Rev. 3
OSC-8410, Impact of TSP-C Modification on Environmental Qualifications at ONS, Rev. 1
OSC-8505, Oconee HELB EQ Analysis for Penetration Rooms, Rev. 2
OSC-8671, Auxiliary Building Flood Design Values, Rev. 6
OSC-9225, Environmental Qualification (EQ) Evaluation for Revised Oconee Electrical Penetration Configurations, Rev. 1
OSS-0274.00-00-0008, TIME-LIMITED AGING ANALYSES OF ELECTRICAL COMPONENTS FOR LICENSE RENEWAL, Rev. 1

CORRECTIVE ACTION DOCUMENTS

NCR 01702592	NCR 01743706	NCR 1169650	NCR 1779144
NCR 1803167	NCR 1850579	NCR 1904817	NCR 1910477
NCR 1982249	NCR 2191146	NCR 2229479	

WORK ORDERS

1635989	1636315	1867257	01905493
2039536	02078637	02185871	02186232
20007103	20027984	20049949	20137036
20137520	20163412	98668452	2022952
2105522			

SELF-ASSESSMENTS REPORTS

01985578, Environmental Qualification (EQ) Program Focused Self-Assessment (DEC Program), dated 8/26/2016
022110548, Environmental Qualification (EQ) Program Readiness Self-Assessment (ONS), dated 7/11/2018

MISCELLANEOUS DOCUMENTS

DPS1318.00-00-0001, Motor Repair Specification, Rev. 2
EC 107282, Remove U1 Hybrid Penetrations from the EQ Program, Rev. 0
EC 110132, HPI & LPI MOTOR LUBRICANT CHANGE EQUIVALENCY AND EQMM UPDATE, Rev. 1
EC 110961, LPI, HPI & LPSW PUMP MOTOR SPACE HEATER MODIFICATION, Rev. 0
EC 112496, HPI, LPI & LPSW PUMP MOTOR, MOTOR LEAD CABLE/STATOR – QUALIFICATION, Rev. 0
EC 404894, CN/M/O, CGI, PQL2, VARIOUS, CONNECTOR, ELASTIMOLD, ACP/DLT/WOB, Rev. 0
EC 405560, O, CGI, PQL2, 491933, BUSHING, ELASTIMOLD, ACP/DLT, Rev. 0
EC 94212, OE101638 - REPLACE ROTORK OPER.WITH LIMITORQUE 1LP-EV-104, Rev. 0
EQMM-1393.01-A01-00, ENVIRONMENTAL QUALIFICATION MAINTENANCE MANUAL, EQUIPMENT TYPE: Electric Motor Actuator, Rev. 12
EQMM-1393.01-F02-00, Radiation Monitor, Rev. 3
EQMM-1393.01-F02-00, RD-23A General Atomic Radiation Monitor, Rev. 3
EQMM-1393.01-G01-00, Reliance Fan Motors, Rev. 8
EQMM-1393.01-G04-00, Motors, Rev. 16
EQMM-1393.01-N10-01, PSW System 5kV Motor Operated Transfer Switch, Rev. 1
EQMM-EQML.ONS-A00-00, ENVIRONMENTAL QUALIFICATION MAINTENANCE MANUAL EQ MASTER LIST {EQML), EQUIPMENT TYPE: ACTUATORS, Rev. 7
EQMM-EQML.ONS-A00-00, Environmental Qualification Maintenance Manual EQ Master List (EQML) Equipment Type: Actuators, Rev. 7
EQMM-EQML.ONS-F00-00, Environmental Qualification Maintenance Manual EQ Master List (EQML) Equipment Type: Monitors, Rev. 1
EQMM-EQML.ONS-G00-00, ENVIRONMENTAL QUALIFICATION MAINTENANCE MANUAL EQ MASTER LIST (EQML), EQUIPMENT TYPE: Motors, Rev. 1
EQMM-EQML.ONS-G00-00, Environmental Qualification Maintenance Manual EQ Master List (EQML) Equipment Type: Motors, Rev. 1
EQMM-EQML.ONS-J00-00, Environmental Qualification Maintenance Manual EQ Master List (EQML) Equipment Type: Penetration Assemblies, Rev. 1
EQMM-EQML.ONS-N00-00, Environmental Qualification Maintenance Manual EQ Master List

(EQML) Equipment Type: Switches, Rev. 2
EQMM-EQML.ONS-P00-00, Environmental Qualification Maintenance Manual EQ Master List (EQML) Equipment Type: Transmitters, Rev. 5
IN 93-33 Response, Potential Deficiency of Certain Class 1E Instrumentation and Control Cables, May 12, 1993
K-011368-ANAL-0001-R00, Kinetrics, Inc., QUALIFICATION ANALYSIS FOR GENERIC QUALIFICATION OF ROTORK NA1E SERIES ELECTRIC ACTUATORS AND IWN, IBN, AND ISN SERIES GEARBOXES TO IEEE STD 382-1996 CASE IV QUALIFICATION LEVEL, dated 6/10/05
Letter from Duke Power Company to NRC, Oconee Nuclear Station Docket Nos. 50-269, -270, -287, May 19, 1983
Letter from Duke Power Company to NRC, Oconee Nuclear Station Docket Nos. 50-269, -270, -287, May 20, 1983
Letter from Duke Power Company to NRC, Oconee Nuclear Station Docket Nos. 50-269, -270, -287, October 26, 1984
Letter from Duke Power Company to NRC, Oconee Nuclear Station Docket Nos. 50-269, -270, -287, IE Bulletin 79-01B, January 30, 1981
Letter from Duke Power Company to NRC, Oconee Nuclear Station, McGuire Nuclear Station, Catawba Nuclear Station, Docket Nos. 50-269, -270, -287, 50-369, -370, 50-413, -414, Response to Generic Letter 84-24, January 28, 1985
Letter from NRC to Duke Power Company, Environmental Qualification of Safety-related Electrical Equipment, May 22, 1981
Letter from NRC to Duke Power Company, Environmental Qualification of Electrical Equipment Important to Safety, March 20, 1985
Letter from NRC to Duke Power Company, Safety Evaluation for Environmental Qualification of Safety-Related Electrical Equipment, April 11, 1983
MDS-OS-73.2, ANALYSIS OF EFFECTS RESULTING FROM POSTULATED PIPING BREAKS OUTSIDE CONTAINMENT FOR OCONEE NUCLEAR STATION, UNITS 1, 2 & 3, dated 4/25/73
MDS-OS-73.2, Supplement 1, ANALYSIS OF EFFECTS RESULTING FROM POSTULATED PIPING BREAKS OUTSIDE CONTAINMENT FOR OCONEE NUCLEAR STATION, UNITS 1, 2 & 3, dated 6/22/73
MDS-OS-73.2, Supplement 2, ANALYSIS OF EFFECTS RESULTING FROM POSTULATED PIPING BREAKS OUTSIDE CONTAINMENT FOR OCONEE NUCLEAR STATION, UNITS 1, 2 & 3, dated 2/12/74
NRC Inspection Report Nos. 50-269/88-03, 50-270/88-03, and 50-287/88-03, May 12, 1988
NUC-9, Baldor Electric Company Summary Report, Rev. 9
O-EQCM, Environmental Qualification Criteria Manual (EQCM), Rev. 0
OM 245. --0980.001, NIB-ROTORK VALVE OPERATOR NUCLEAR QUALIFICATION (POST 1978), Rev. 4
OM 245. --1931.001, I/B -TECHNICAL REPAIR GUIDE FOR ROTORK VALVE ACTUATORS "NA" RANGE MODELS, Rev. 5
OM 274.0010.00A, I/B-Reactor Building Cooling Fan Motors Inst Book, Rev. 9
OM 314. --0099.001, I/B (VIEWABLE) HPI PUMP MOTOR T &B ELASTIMOLD CONNECTORS, Rev. D06
OM 314. --0120.001, I/B -(VIEWABLE) LARGE AC BUFFALO MOTORS, Rev. 18
OM 314. --0317.001, NIB -(VIEWABLE) LARGE IE MOTORS ENVIR QUALI REPORT, Rev. 4
OM 314. --0317.002, WCAP 7829 FAN COOLER MOTOR UNIT TEST, dated 1/2/86
OM 314. --0317.003, I/B-MOTOR LUBRICANT QUALIFICATION INFORMATION, Rev. 2
OM 314. --0317.004, NIB - SUPPLEMENTAL QUALIFICATION INFORMATION FOR THE NSR MOTORS, Rev. 2

OM 314. --0317.005, NIB· QUALIFICATION OF ROCKBESTOS RADIATION RESISTANT SR CABLE, Rev. 1
OM 314. --0399.001, I/B -HIGH PRESSURE INJECTION PUMP MOTOR INSTRUCTION MANUAL, Rev. 4
OM 314. --0421.004, QUALIFICATION OF WESTINGHOUSE CLASS IE PUMP MOTORS, Rev. D4
OM 316.—0050.001, Environmental Qualification Package for BIW Cable Systems Inc. Chlorosulfonated Polyethylene (CSPE) Insulated Instrumentation Cable, Rev. 3
OM 322-0106.007, Nutherm Qualification Report for 5kV Motor Operated Manual Transfer Switch for PSW System, dated 4/18/16
OM 322-0106.009, Nutherm Qualification Report for PSW System 5kV Motor Operated Manual Transfer Switches P/N 72086, dated 5/27/14
OM 337.—0037.001, I/B – Electrical Penetrations, Rev. 7
OM 337.—0080.001, NIB – Viking Electrical Penetrations Qualification Testing Summary, Rev. 5
OM 360.0009.001, NIB-Reactor Bldg Cooling Unit Fans Environmental Qual Report, Rev. 4
OM 395.0042.001, NIB – RIA57&58 HRCM Qualification Report, dated 11/30/17
OS-0314.00-00-0066, SPARE HIGH PRESSURE INJECTION PUMP MOTOR, dated 4/27/82
OSS-0254.00-00-1001, (MECH) HIGH PRESSURE INJECTION AND PURIFICATION & DEBORATING DEMINERALIZER SYSTEMS, Rev. 56
OSS-0254.00-00-1026, (Mech) Reactor Building Cooling System Design Basis Document, Rev. 42
OSS-0254.00-00-1028, (MECH) DESIGN BASIS SPEC FOR THE LOW PRESSURE INJECTION AND CORE FLOOD SYSTEM (LPI), Rev. 55
OSS-0254.00-00-1053, Protected Service Water System, dated 12/5/16
OSS-0254.00-00-2023, Area Radiation Monitoring DBD, Rev. 11
OSS-0274-00-00-0008, Time-Limited Aging Analysis of Electrical Components for License Renewal, Rev. 1
OSS-0314.00-00-0007, HIGH PRESSURE INJECTION PUMP MOTOR, Rev. 3
OSS-0314.00-00-0011, (Elect) Purchase Spec Reactor Building Cooling Unit Fan Motor Replacement, dated 10/18/17
OSS-0314.00-00-0011, (Elect) Purchase Spec Reactor Building Cooling Unit Fan Motor Replacement, Rev. 5
OSS-0328.00-00-003, Procurement Specification for the Design, Fabrication and Testing of the AQ-1, PSW 5kV Motor Operated Manual Transfer Switches for the HPI System Upgrade, Rev. 4
OSS-0395.00-00-0001, High Range Radiation Monitor, dated 10/19/17
QR-8802, Report on Qualification Tests for ·Rockbestos Radiation Resistant SR Generic Nuclear Incident for Class 1E Service in Nuclear Generating Stations, Rev. 1
Summary of Meeting between Duke Power Company and NRC, Summary of Meeting on January 31, 1984 with DPC to Review Equipment Qualification Program, February 8, 1984
Westinghouse MOTOR INCOMING REPORT # 2015-0032 Final Report, Duke Energy / Oconee, dated 6/22/15