UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 8, 2019

MEMORANDUM TO: Michael T. Markley, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: Audrey L. Klett, Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

SUBJECT: OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3 – REGULATORY AUDIT IN SUPPORT OF REVIEW OF LICENSE AMENDMENT REQUEST NO. 2018-02 (EPID L-2018-LLA-0251)

By letter RA-18-0026 dated September 14, 2018, as supplemented by letter RA-19-0086 dated January 24, 2019, Duke Energy Carolinas, LLC submitted License Amendment Request No. 2018-02 for Oconee Nuclear Station, Units 1, 2, and 3 regarding revisions to the tornado licensing basis in the Updated Final Safety Analysis Report.

Staff from the U.S. Nuclear Regulatory Commission's (NRC's) Office of Nuclear Reactor Regulation will conduct an audit to support its review of this request. The audit will occur at NRC Headquarters in Rockville, Maryland from February 11, 2019, to March 29, 2019. The audit plan is enclosed.

Sincerely,

Audrey L. Klett, Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

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

Enclosure: As stated

cc: Listserv

REGULATORY AUDIT PLAN

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

DOCKET NOS. 50-269, 50-270, AND 50-287

1.0 BACKGROUND

By letter RA-18-0026 dated September 14, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18264A023), as supplemented by letter RA-19-0086 dated January 24, 2019 (ADAMS Accession No. ML19036A625), Duke Energy Carolinas, LLC submitted License Amendment Request No. 2018-02 for Oconee Nuclear Station, Units 1, 2, and 3 (ONS) regarding revisions to the tornado licensing basis in the Updated Final Safety Analysis Report (UFSAR). The licensee proposed to revise the UFSAR to: (1) credit the Standby Shutdown Facility (SSF) as the assured mitigation path following a tornado with the assumed initial conditions of loss of all alternating current power to all units with significant tornado damage to one unit; (2) incorporate the use of tornado missile probabilistic methodology (TORMIS) in the licensing basis and associated UFSAR changes; and (3) eliminate the spent fuel pool to high pressure injection flow path for reactor coolant makeup.

In its application, the licensee stated that thermal-hydraulic (T-H) analyses were performed to evaluate the condition of the primary system following a tornado relative to the operation of the SSF with a compromised main steam or compromised feedwater pressure boundary due to potential breaks in the respective systems. The licensee also referenced a finite element analysis (FEA) that was used to evaluate a set of assumed damage velocities for three missile types impacting surge lines. The licensee also stated that the assumed success criteria for the main steam relief valves (MSRVs) for tornado mitigation is that one of two lowest pressure relief valves opens and that one relief valve on the opposite header opens for overpressure protection. Staff from the U.S. Nuclear Regulatory Commission's (NRC's) Office of Nuclear Reactor Regulation (NRR) identified the need to better understand the licensee's supporting analyses by reviewing the T-H analyses and calculations that are not available in ADAMS.

The NRR Office Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195), states that a regulatory audit is a planned, licensed or regulation-related activity that includes the examination of primarily non-docketed information with the intent to gain understanding, to verify information, or to identify information that will require docketing to support the basis of the licensing or regulatory decision.

2.0 REGULATORY AUDIT BASIS

The NRC staff will perform the audit to support its evaluation of whether the licensee's request can be approved per Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.90.

3.0 REGULATORY AUDIT SCOPE AND METHODOLOGY

The NRC staff will review the licensee's T-H analyses, FEA, and calculations used to support the application, and other requested information to determine if any additional information will

require docketing to support or develop conclusions for the staff's safety evaluation of the requested amendments.

4.0 INFORMATION AND OTHER MATERIAL NECESSARY FOR THE AUDIT

The NRC staff requests the licensee to have the following information readily available and accessible for the staff's review via an internet-based portal:

a. All calculations associated with the T-H analyses related to the tornado mitigation scenarios in support of the licensee's application.

b. The FEA report associated with the following paragraph from the licensee's application:

> The surge piping targets are evaluated for crushing or crimping failure that would prevent adequate vent flow. An evaluation showed that only 44% of the flow area of only one of the 24 inch pipe (one of two for success) is required to provide an adequate vent path. A finite element analysis (FEA) was used to evaluate a set of conservatively assumed damage velocities for the three dominant missile types impacting the surge lines shown in Table 4 below. The FEA showed that greater than 44% of the normal flow area is available for the assumed velocities even at the worst case impact location and orientation.

c. The official calculation that provides the basis for the following statement in the licensee's application: "The assumed success criteria for the MSRVs for tornado mitigation is that one of two lowest pressure relief valves opens (either 1/2/3MS-8 on the 'A' Header or 1/2/3MS-16 on the 'B' Header), and that one relief valve (any one of eight) on the opposite header opens for overpressure protection."

d. The official calculation that provides the basis for the following statement in the licensee's application: "The surge piping targets are evaluated for crushing or crimping failure that would prevent adequate vent flow. *An evaluation showed that only 44% of the flow area of only one of the 24 inch pipe (one of two for success) is required to provide an adequate vent path [emphasis added].*"

e. A document that provides a crosswalk of the request for additional request for additional information (RAI) responses from the superseded tornado amendment request to the new application (i.e., a description of if or how the RAI responses were incorporated into or addressed in the new application).

f. The basis for values of tornado parameters and frequency to calculate wind speeds (in reference to the following statement from the application: "From the subregion data, tornado hazard inputs were developed for input to the TORMIS95 code including *frequency, intensity, width, length and direction characteristics [emphasis added].*"

g. A diagram of all exposed component locations and drawings of exposed piping (so that the staff can understand the system, structure, and component (SSC) interactions), and the basis for where the licensee credits separation for exposed SSCs and their interconnection. Refer to the following statement from the application: "The tornado current licensing basis (LB) is derived from information presently contained within several sections of the ONS UFSAR and generally relies on probabilistic insights,

separation [emphasis added], and defense-in-depth concepts to provide reasonable assurance that safe shutdown (SSD) can be achieved."

h. The basis for accounting for spalling in minimum damage velocity (VDAM) calculations and considerations to address tornado missile protection (e.g., UFSAR Section 3.5.1.3, SRP 3.5.3, and Bechtel report BC-TOP-9-A provide references and guidance on addressing exposed component locations).

i. A list of the studies and NRC approval correspondence supporting the following statement in the application: "Historically, a tornado that damages all three units has not been postulated in risk studies. *Studies previously submitted [emphasis added]* to the NRC assume a tornado damages one unit with an associated LOOP on the other two units."

The staff will then determine whether it needs to request any additional documents to be available on the portal after reviewing the above information.

5.0 TEAM ASSIGNMENTS AND LOGISTICS

The audit team will consist of the following NRC staff:

- Mr. Robert Beaton, Reactor Systems Branch (SRXB)
- Mr. Michael Breach, Mechanical Engineering and Inservice Testing Branch (EMIB)
- Mr. Gordon Curran, Containment and Plant Systems Branch (SCPB)
- Mr. Matthew Hamm, Technical Specifications Branch (STSB)
- Mr. John Hughey, PRA Oversight Branch (APOB)
- Ms. Audrey Klett, Plant Licensing Branch 2-1 (LPL2-1)
- Mr. Charles Moulton, PRA Licensing Branch B (APLB)
- Mr. Khoi Nguyen, Electrical Engineering Operating Reactor Branch (EEOB)

The NRC staff will conduct a teleconference with the licensee for the purposes of introductions and discussing the purpose of the audit and information needs. The staff will also confirm the sensitivity of any information discussed or presented on the online portal.

The audit will occur via an internet-based portal at NRC Headquarters Office in Rockville, Maryland, from February 11, 2019, through March 29, 2019. The NRC staff requests the licensee to have the information discussed in Section 4 readily available and accessible for the staff's review via an internet-based portal. The NRC staff requests the licensee to have its staff available at mutually agreeable business day times (e.g., Monday - Thursday, 9:00 a.m. to 4:00 p.m., Eastern Time) by telephone if the NRC staff has any questions during the audit related to any information on the portal. The NRC staff will not conduct an exit meeting; however, the NRC's licensing project manager will inform the licensee via routine communications when the staff no longer needs access to the portal.

6.0 DELIVERABLES

After the audit, the NRC staff will develop any additional requests for information, as needed, which it will provide the licensee via separate docketed correspondence. The staff intends to issue an audit summary within 30 days of completion of the audit.

SUBJECT: OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3 – REGULATORY AUDIT IN SUPPORT OF REVIEW OF LICENSE AMENDMENT REQUEST NO. 2018-02 (EPID L-2018-LLA-0251) DATED FEBRUARY 8, 2019

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ADAMS Accession No.: ML19037A005 ***by email**

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