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ONS-2017-087

December 4, 2017

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

10 CFR 50.54(f)

Duke Energy Carolina, LLC (Duke Energy)
Oconee Nuclear Station, Units 1, 2 and 3
Docket Numbers 50-269, 50-270, 50-287
Renewed License Numbers DPR-38, DPR-47, and DPR-55

Subject: Spent Fuel Pool Evaluation Supplemental Report, Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident

References:

1. NRC Letter, *Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident*, dated March 12, 2012, ADAMS Accession No. ML12053A340
2. NRC Letter, *Final Determination of Licensee Seismic Probabilistic Risk Assessments Under the Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendation 2.1 "Seismic" of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident*, dated October 27, 2015, ADAMS Accession Number ML15194A015
3. NEI Letter, transmits EPRI 3002009564 for NRC endorsement, dated January 31, 2017, ADAMS Accession Number ML17031A171
4. EPRI 3002009564, *Seismic Evaluation Guidance Spent Fuel Pool Integrity Evaluation*, dated January 2017
5. NRC Letter, *Endorsement of EPRI 3002009564*, dated February 28, 2017, ADAMS Accession Number ML17034A408
6. Duke Energy Letter, *Seismic Hazard and Screening Report (CEUS Sites), Response to NRC 10 CFR 50.54(f) Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) regarding Recommendations 2.1, 2.3 and 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident*, dated March 31, 2014 ADAMS Accession No. ML14092A024
7. NRC Letter, *Oconee Nuclear Station, Units 1, 2, And 3 - Staff Assessment of Information Provided Pursuant to Title 10 of the Code of Federal Regulations Part 50, Section 50.54(f), Seismic Hazard Reevaluations For Recommendation 2.1 of the Near-Term Task Force Review of Insights From the Fukushima Dai-Ichi Accident*, dated July 22, 2015, ADAMS Accession Number ML 15201A008

ADID
NRK

Ladies and Gentlemen,

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued a Request for Information per 10 CFR 50.54(f) (Reference 1) to all power reactor licensees. By letter dated October 27, 2015 (Reference 2), the NRC transmitted final seismic information request tables which identified that Oconee Nuclear Station is to conduct a limited scope Spent Fuel Pool (SFP) Evaluation. By Reference 3, Nuclear Energy Institute (NEI) submitted Electric Power Research Institute (EPRI) report; EPRI 3002009564, *Seismic Evaluation Guidance Spent Fuel Pool Integrity Evaluation* (Reference 4) to the NRC for review and endorsement. NRC endorsement was provided by Reference 5.

EPRI 3002009564 provides criteria for evaluating the seismic adequacy of a SFP to the reevaluated ground motion response spectrum (GMRS) hazard levels. Section 4.3, lists the parameters to be verified which confirm that the results of the report are applicable to Oconee Nuclear Station, and that the SFP is seismically adequate in accordance with NTTF 2.1 Seismic evaluation criteria.

The attachment to this letter provides the Oconee Nuclear Station data and, consistent with the EPRI 3002009564 criteria, confirms that the SFP is seismically adequate in accordance with NTTF 2.1 Seismic evaluation criteria.

There are no regulatory commitments associated with this letter.

Should you have any questions regarding this submittal, please contact David Haile with Oconee Regulatory Affairs, at (864) 873-4742.

I declare under penalty of perjury that the foregoing is true and correct. Executed on December 4, 2017.

Sincerely,



J. Ed Burchfield, Jr.
Vice President
Oconee Nuclear Station

Attachment:

NTTF 2.1 Seismic Recommendation:
Site-Specific Spent Fuel Pool Criteria for Oconee Nuclear Station

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cc:

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ATTACHMENT

Duke Energy Carolinas, LLC (Duke Energy)

Oconee Nuclear Station, Units 1, 2 and 3

Docket Numbers 50-269, 50-270, 50-287

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

NTTF 2.1 Seismic Recommendation:
Site-Specific Spent Fuel Pool Criteria for
Oconee Nuclear Station

Attachment to Letter ONS-2017-087

The 50.54(f) Request for Information (Reference A-1) requested that, in response to NTTF Recommendation 2.1, a seismic evaluation be made of the SFP. More specifically, plants were asked to consider “all seismically induced failures that can lead to draining of the SFP.” Such an evaluation would be needed for any plant in which the ground motion response spectrum (GMRS) exceeds the safe shutdown earthquake (SSE) in the 1Hz to 10 Hz frequency range. The staff confirmed through References A-2 and A-7 that the Oconee Nuclear Station GMRS exceeds the SSE and thus a SFP evaluation is merited. By letter dated February 28, 2017 (Reference A-5), the staff determined that EPRI 3002009564 was an acceptable approach for performing SFP evaluations considering the GMRS hazard levels.

The table below lists the criteria from Section 4.3 of EPRI 3002009564 along with corresponding site-specific data for Oconee Nuclear Station which addresses the EPRI criteria and confirms the seismic adequacy of the SFP in accordance with the NTTF 2.1 Seismic recommendation.

SFP Criteria from EPRI 3002009564	Site-Specific Data
Site Parameters	
<p>1. The site-specific GMRS should be the same as that submitted to the NRC between March 2014 and July 2015, which the NRC has found acceptable for responding to the NRC 50.54(f) letter (Reference 7).</p>	<p>The Oconee Nuclear Station GMRS peak spectral acceleration in Reference A-6 as accepted by the NRC in Reference A-7 is 0.874g.</p>
Structural Parameters	
<p>2. Site-specific calculations, performed in accordance with Section 4.1 of EPRI 3002009564 should demonstrate that the limiting SFP HCLPF is greater than the site-specific GMRS in the frequency range of interest (e.g., 10-20 Hz).</p>	<p>A site-specific calculation (Reference A-8) performed in accordance with Section 4.1 of EPRI 3002009564, demonstrates that the limiting SFP HCLPF is 1.39g in the frequency range of interest from 10 to 20 Hz, which exceeds the GMRS peak spectral acceleration of 0.86g in that same frequency range.</p> <p>Therefore, this criterion is met for Oconee.</p>
<p>3. The SFP structure should be included in the Civil Inspection Program performed in accordance with Maintenance Rule.</p>	<p>The SFP structure is included in the Oconee Nuclear Station Civil Inspection Program in accordance with 10 CFR 50.65. Oconee Procedure AD-EG-ONS-1214 Attachment 1 lists structures included in the civil inspection program and it includes the Auxiliary Building, Units 1, 2, and 3. The SFP structures are part of the Units 1, 2, and 3 Auxiliary Building. This inspection is performed in accordance with Maintenance Rule Functions ON-0-SFP2 and ON-0-SFP3.</p> <p>Therefore, this criterion is met for the Oconee Nuclear Station.</p>

SFP Criteria from EPRI 3002009564	Site-Specific Data
Non-Structural Parameters	
<p>4. To confirm applicability of the piping evaluation in Section 4.2 of EPRI 3002009564, piping attached to the SFP should have penetrations no more than 6 ft below water surface.</p>	<p>The maximum depth of piping penetrations below the water surface is less than 6 ft.</p> <p>Per Oconee Site Drawings O-443 & O-2443, there are 4 direct penetrations to the Unit 1 & 2 SFP and the Unit 3 SFP. All 8 penetrations are located between 840'-9" and 841'-0" which is above the SFP Normal Water Level of Elev. 840'-0" as shown on Oconee Site Drawings OFD-104A-1.1 & OFD-104A-3.1.</p> <p>Therefore, this criterion is met for the Oconee Nuclear Station.</p>
<p>5. To confirm ductile behavior under increased seismic demands, SFP gates should be constructed from either aluminum or stainless steel alloys.</p>	<p>Oconee does not have SFP gates.</p> <p>Oconee does have fuel transfer tubes. The transfer tubes are sealed closed with a bolted steel flanged cover and are constructed from a stainless steel alloy as documented on Oconee Site Drawing OM-271-0235-001</p> <p>Therefore, this criterion is met for the Oconee Nuclear Station.</p>
<p>6. Anti-siphoning devices should be installed on any piping that could lead to siphoning water from the SFP. In addition, for any cases where active anti-siphoning devices are attached to 2-inch or smaller piping and have extremely large extended operators, the valves should be walked down to confirm adequate lateral support.</p>	<p>The Oconee Unit 1 & 2 SFP and Unit 3 SFP relies on passive design features to limit the amount of inventory which could be inadvertently drained. In general, the mechanical piping interfaces below the SFP normal water level are either equipped with siphon breakers, and/or the pipe elevation does not extend more than 4 ft below the normal SFP water level (Ref. DBD OSS-0254.00-00-1006, Sect. 4.1.1)</p> <p>As described, no anti-siphoning devices can lead to siphoning. In addition, no anti-siphoning devices are attached to 2-inch or smaller piping with extremely large extended operators (Ref. Duke drawings O-443 & O-2443).</p> <p>Therefore, this criterion is met for the Oconee Nuclear Station.</p>
<p>7. To confirm applicability of the sloshing evaluation in Section 4.2 of EPRI 3002009564, the maximum SFP horizontal dimension (length or width) should be less than 125 ft and the SFP depth should be greater than 36 ft.</p>	<p>The Oconee Nuclear Station Unit 1 & 2 SFP has a length of 84 ft-3 in, a width of 24 ft and a depth of 38 ft at normal SFP level of 840 ft msl (Ref. Oconee Site Drawing O-18C and OFD-104A-1.1).</p> <p>The Oconee Nuclear Station Unit 3 SFP has a length of 58 ft, a width of 24 ft and a depth of 38 ft at normal SFP level of 840 ft msl (Ref. Oconee Site Drawing O-2154-S and OFD-104A-3.1).</p> <p>Therefore, this criterion is met for the Oconee Nuclear Station.</p>

SFP Criteria from EPRI 3002009564	Site-Specific Data
8. To confirm applicability of the evaporation loss evaluation in Section 4.2 of EPRI 3002009564, the SFP surface area should be greater than 500 ft ² and the licensed reactor core thermal power should be less than 4,000 MWt per unit.	<p>The Oconee Nuclear Station Unit 1 & 2 SFP has a surface area of 2022 ft² (Ref. Oconee Site Drawing O-18C) and Unit 3 SFP has a surface area of 1392 ft² (Oconee Site Drawing O-2154-S) which are both greater than 500 ft². The licensed reactor thermal power for Oconee is 2568 MWt per unit (Ref. UFSAR Sect. 1.1) which is less than 4,000 MWt per unit.</p> <p>Therefore, this criterion is met for the Oconee Nuclear Station.</p>

References:

- A-1. NRC Letter, *Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident*, dated March 12, 2012, ADAMS Accession No. ML12053A340
- A-2. NRC Letter, Final Determination of Licensee Seismic Probabilistic Risk Assessments Under the Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendation 2.1 "Seismic" of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, dated October 27, 2015, ADAMS Accession Number ML15194A015
- A-3. NEI Letter, transmits EPRI 3002009564 for NRC endorsement, dated January 31, 2017, ADAMS Accession Number ML17031A171
- A-4. EPRI 3002009564, Seismic Evaluation Guidance Spent Fuel Pool Integrity Evaluation, dated January 2017
- A-5. NRC Letter, Endorsement of EPRI 3002009564, dated February 28, 2017, ADAMS Accession Number ML17034A408
- A-6. Duke Energy Letter, Seismic Hazard and Screening Report (CEUS Sites), Response to NRC 10 CFR 50.54(f) Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) regarding Recommendations 2.1, 2.3 and 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, dated March 31, 2014 ADAMS Accession No. ML14092A024
- A-7. NRC Letter, Oconee Nuclear Station, Units 1, 2, And 3 - Staff Assessment of Information Provided Pursuant to Title 10 of the Code of Federal Regulations Part 50, Section 50.54(f), Seismic Hazard Reevaluations For Recommendation 2.1 of the Near-Term Task Force Review of Insights From the Fukushima Dai-ichi Accident, dated July 22, 2015, ADAMS Accession Number ML 15201A008
- A-8. Jenson Hughes calculation No. 1PJA25021-AQ-CAL-001 (ONS SFP Structural Calculation) Rev. 0, dated October 27, 2017