From:	Stone, Zackary
Sent:	Thursday, July 8, 2021 4:12 PM
To:	Zaremba, Arthur H.
Cc:	Vaughan, Jordan L; Williams, Shawn
Subject:	Oconee Nuclear Station, Units 1, 2, and 3 - Request for Additional Information RE: Alternative for ISI RPV Weld Examination from 10 to 20 years (EPID-L-2021-LLR-0004)
Attachments:	July 8, 2021 - Oconee RR RAIs for RA-20-0328.docx

Dear Mr. Zaremba,

By letter dated January 19, 2021, Duke Energy Carolinas, LLC, submitted a relief request for Oconee Nuclear Station, Units 1, 2, and 3, to extend the inservice inspection interval for the reactor pressure vessel weld examinations from 10 to 20 years.

The U.S. Nuclear Regulatory Commission staff has determined that additional information is needed as discussed in the attached and a clarification call to ensure mutual understanding was conducted on July 6, 2021. Please respond within 30 days of the date of this e-mail.

If you have any questions, please contact me at 301-415-1009 or via e-mail at Shawn.Williams@nrc.gov.

Sincerely,

Shawn Williams, Senior 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

cc w/encl: Listserv

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From: Stone, Zackary

Created By: Zackary.Stone@nrc.gov

Recipients:
"Vaughan, Jordan L" <Jordan.Vaughan@duke-energy.com>
Tracking Status: None
"Williams, Shawn" <Shawn.Williams@nrc.gov>
Tracking Status: None
"Zaremba, Arthur H." <Arthur.Zaremba@duke-energy.com>
Tracking Status: None

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REQUEST FOR ADDITIONAL INFORMATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

PROPOSED ALTERNATIVE REQUEST NO. RA-20-0328 REGARDING

FIFTH AND SIXTH 10-YEAR INSERVICE INSPECTION PROGRAM INTERVALS

OCONEE UNITS 1, 2, AND 3

DUKE ENERGY CAROLINAS, LLC

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

EPID: L-2021-LLR-0004

Background

By letter dated January 19, 2021 (ADAMS Accession No. ML21019A276), Duke Energy Carolinas (Duke Energy or the licensee) requested an alternative from the requirements of the American Society of the Mechanical Engineers Boiler and Pressure Vessel, Division 1, Section XI (henceforth ASME Section XI) for Oconee Nuclear Station (ONS) Units 1, 2, and 3. The licensee's Code alternative proposed in Relief Request No. RA-20-0328 requests NRC staff authorization to eliminate the performance of the inservice inspection (ISI) volumetric examinations that are required to be performed on pressure retaining welds in the heads, flanges, and shells of the reactor pressure vessel (RPV) and on associated RPV-to-nozzle welds and nozzle inside radius locations (i.e., ASME Code Section XI Category B-A and B-D required examinations) during the ASME-defined fifth 10-Year ISI interval for Oconee Units 1, 2, and 3. The licensee requests staff authorization to defer performance of these volumetric inspections until the sixth 10-Year ISI interval for each unit, by no later than 2034, based on a risk-informed methodology in WCAP-16168-NP-A, Revision 3, "Risk-Informed Extension of the Reactor Vessel In-service Inspection Interval."

Regulatory Basis

Title 10 of the Code of Federal Regulations (10 CFR) Part 50.55a(z) establishes a process for licensees to propose alternatives to codes and standard requirements. Specifically, for alternatives requested under the criteria in 10 CFR 50.55a(z)(1), the licensee must demonstrate that the proposed alternative would provide an acceptable level of quality and safety. The following requests for additional information (RAIs) are needed to reach a conclusion that the licensee's proposed alternative achieves an acceptable level of quality and safety.

RAI 1

Table 3 in RA-20-0328 calculates through wall cracking frequency (TWCF) of reactor vessel beltline components based on methodology found in WCAP-16168-NP-A, Revision 3 (ADAMS Accession No. ML11306A084), and using inputs which include the neutron fluence at 60 years of operation. It is not apparent in the submittal whether this fluence considered the increased thermal power of the Measurement Uncertainty Uprate (MUR) request which was submitted on February 19, 2020 and supplemented by letters dated April 6, 2020, July 23, 2020, and August 17, 2020, (ADAMS Accession Nos. ML20050D379, ML20097E117, ML20205L403, and ML20230A127) and which was approved on January 26, 2021 (ADAMS Accession No. ML20335A001).

Request

Please clarify whether the fluence inputs listed in Table 3 of RA-20-0328 were calculated considering the increased thermal power of the MUR request which was approved by the NRC staff on January 26, 2021.

RAI 2

Table 3 in RA-20-0328 calculates TWCF for reactor vessel components in the beltline. The NRC staff notes that no inlet nozzles, outlet nozzles, or nozzle to nozzle belt forging welds are included in Table 3. It also appears that beltline materials include all plate, forging and weld materials if the neutron fluence is greater than or equal to $1x10^{17}$ n/cm^2 (E>1 MeV). It is not apparent whether the inlet nozzles, outlet nozzles, and nozzle to nozzle belt forging welds will be above or below this fluence threshold at the end of 60 years of operation.

Request

Please clarify if the inlet nozzles, outlet nozzles, and nozzle to nozzle belt forging welds will be above or below the fluence threshold of $1x10^{17}$ n/cm^2 (E>1 MeV) at the end of 60 years of operation. If any of these materials will be above the fluence threshold of $1x10^{17}$ n/cm^2 (E>1 MeV) at the end of 60 years of operation, please calculate the TWCF for these materials as required by the methodology found in WCAP-16168-NP-A, Revision 3, and add the information for these materials to Table 3.

RAI 3

Table 2 in RA-20-0328 states that the licensee has performed four volumetric ISI examinations of the RPV pressure retaining welds. The licensee identifies that the following numbers of indications were detected within the inner 1/10th or inner 1 inch of the RPV wall thickness.

Unit 1: 10 indications
Unit 2: 4 indications
Unit 3: 5 indications

It is not apparent whether the fourth volumetric ISI inspections of the welds containing these indications were the first inspections that revealed evidence of flaw indications or re-inspections

of the welds containing the flaw indications. Additional information relative to the risk-based assessments of these flaw indications is needed to confirm that any potential growth of the flaws is bounded by the fatigue flaw growth assumptions and values used in the WCAP-16168-NP-A, Rev. 3, methodology.

Request

Please confirm whether the fourth volumetric ISI inspections were the first ISI inspections that detected the flaw indications and whether there is any site-specific flaw growth data for the flaw indications evaluated in Table 2 of RA-20-0328. If site-specific flaw growth data for the flaw indications is available, please identify the limiting site-specific flaw growth value that was calculated for the flaws evaluated in Table 2.

RAI 4

Attachment 1 to the submittal showed a calculation summary that indicates that crack growth based on design transients (for 20 years) was bounded by crack growth based on 12 heat up/cool down cycles per year (for 20 years). Attachment 1 further specified cooldown, power change, and power loading as the top three design transients which contributed to ~90% of crack growth. However, the number of cycles assumed for the design transients was not stated.

Additional information on the design transients contributing most to crack growth is necessary to determine that the crack growth based on design transients is bounded by the crack growth based on the postulated 12 heat up/cool down cycles per year (Design Transients 1A and 1B respectively).

Request

Please identify the number of cycles assumed for Design Transients 1B (cooldown 8% to 0%), 2A (power change (0% to 15%), 2B (power change (15% to 0%), and 3 (power loading 8% to 100%).