



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

December 7, 2021

Mr. Steven M. Snider
Vice President, Oconee Nuclear Station
Duke Energy Carolinas, LLC
7800 Rochester Highway
Seneca, SC 29672-0752

SUBJECT: OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3 – PROPOSED
ALTERNATIVE TO ASME CODE RE: CONTAINMENT UNBONDED
POST-TENSIONING SYSTEM INSERVICE INSPECTION REQUIREMENTS
(EPID L-2021-LLR-0034)

Dear Mr. Snider:

By letter dated May 6, 2021, Duke Energy Carolinas, LLC (Duke Energy, the licensee) submitted a request to the Nuclear Regulatory Commission (NRC) for the use of an alternative to certain American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV Code), Section XI, Subsection IWL requirements at Oconee Nuclear Station, Units 1, 2, and 3 (ONS).

Pursuant to the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a "Codes and Standards," specifically 10 CFR 50.55a(z)(1), the licensee requested to use the proposed alternative to the examination requirements of the ASME Code, Section XI, Subsection IWL related to the containment unbonded post-tensioning system on the basis that the alternative provides an acceptable level of quality and safety.

The NRC staff has reviewed the subject request, and concludes, as set forth in the enclosed safety evaluation, that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(1). Therefore, the NRC staff authorizes the proposed alternative for Oconee Units 1, 2 and 3, for the remainder of the current renewed operating licenses.

All other ASME BPV Code, Section XI, requirements for which relief was not specifically requested and approved remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

If you have any questions, please email me at Shawn.Williams@nrc.gov.

Sincerely,

Michael T. Markley, Chief
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:
Safety Evaluation

cc: Listserv



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NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
DUKE ENERGY CAROLINAS, LLC (DUKE ENERGY)
PROPOSED ALTERNATIVE RELIEF REQUEST FOR
UNBONDED POST-TENSIONING SYSTEM INSERVICE INSPECTION REQUIREMENTS
OCONEE NUCLEAR STATION, UNITS NO. 1, 2, AND 3
DOCKET NOS. 50-269, 50-270, AND 50-287

1.0 INTRODUCTION

By letter dated May 6, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21126A002), Duke Energy (the licensee), requested authorization of proposed alternative request from the requirements of the American Society of Mechanical Engineers Boiler & Pressure Vessel Code (ASME Code), Section XI, Subsection IWL for Oconee Units 1, 2 and 3. Duke Energy proposed a modification to the scope and schedule required by IWL-2421(b) to eliminate the need to erect scaffolding that is required to access tendons for the examinations required by IWL-2524 and IWL-2525 at times when other IWL- 2500 examinations (i.e., physical surveillances) are not scheduled.

Pursuant to the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a "Codes and Standards," specifically 10 CFR 50.55a(z)(1), the licensee requested to use the proposed alternative to the examination requirements of the ASME Code, Section XI, Subsection IWL related to the containment unbonded post-tensioning system on the basis that the alternative provides an acceptable level of quality and safety.

2.0 REGULATORY EVALUATION

Pursuant to 10 CFR 50.55a(g)(4), throughout the service life of a nuclear power facility, components that are classified as Class CC pressure retaining components must meet the requirements set forth in Section XI of the ASME Code, Subsection IWL, as incorporated by reference in paragraph (a)(1)(ii) subject to the conditions listed in paragraph (b)(2)(ix) of 10 CFR 50.55a. Section XI, Subsection IWL of the ASME Code, provides rules for in-service inspection (ISI) and repair/replacement activities of the reinforced concrete and post-tensioning (PT) system components of Class CC containment structures. Alternatives to the requirements of 10 CFR 50.55a may be authorized by the NRC pursuant to 10 CFR 50.55a(z)(1) if the licensee demonstrates that the proposed alternative would provide an acceptable level of quality and safety.

Enclosure

The applicable Edition and Addenda of the ASME Code, Section XI, Subsection IWL, for Oconee Nuclear Station, Units 1, 2, and 3, is the 2007 Edition with the 2008 Addenda. IWL-2421(b) provides alternative scheduling requirements for examination and testing of post-tensioning systems at sites with multiple plants. As noted in the relief request, Duke Energy currently uses the provisions in IWL-2421 to modify the scope and schedule for post-tensioning system examinations at Oconee Nuclear Station, Units 1, 2, and 3, as shown in the table below.

Current Post-Tensioning System Examination Schedules (Using IWL-2421)

Unit 1	50th Year	55th Year	60th Year
All IWL-2520 Exams/Tests Required ¹	Yes		Yes
Only IWL-2524/IWL-2525 Exams/Tests Required ²		Yes	

Units 2 and 3	50th Year	55th Year	60th Year³
All IWL-2520 Exams/Tests Required ¹		Yes	
Only IWL-2524/IWL-2525 Exams/Tests Required ²	Yes		

Notes:

1. Examinations and tests required by IWL-2522, -2523, -2524, -2525, and 2526 (Table IWL-2500-1, Examination Category L-B).
2. Examinations and tests required are those specified in Table IWL-2500-1, Examination Category L-B, Item Number L2.30 (Detailed Visual Examination Tendon Anchorage Hardware and Concrete), Item Number L2.40 (Examination of Corrosion Protection Medium) and Item Number L2.50 (Examination of Free Water).
3. Based on the current renewed operating license for Units 2 and 3, these examination periods fall beyond the end of the current operating license.

Per the alternative request, in lieu of the requirements of IWL-2421(b), the alternative is proposed for use at Oconee Units 1, 2, and 3, following completion of the Unit 1 50th year examinations as follows:

1. For the containment with the first Structural Integrity Test (Unit 1), all examinations required by IWL-2520 shall be performed at 10 years and every 10 years thereafter. Examinations required by IWL-2421(b)(1) to be performed in accordance with IWL-2524 and IWL-2525 shall not be performed at year 55, but shall be added to the scope of IWL- 2524 and IWL-2525 examinations required to be performed at 60 years following completion of the Structural Integrity Test, as shown in the table below.
2. For each subsequent containment constructed at the site (Units 2 and 3), all examinations required by IWL-2520 shall be performed at 15 years and every 10 years thereafter. Examinations required by IWL-2421(b)(2) to be performed in accordance with IWL-2524 and IWL-2525 shall not be performed at year 50, but it shall be added to the scope of IWL-2524 and IWL-2525 examinations required to be performed at 55 years following completion of the Structural Integrity Test, as shown in the table below.

Proposed Alternative Post-Tensioning System Examination Schedules

Unit	Examinations/Tests	50 th Year	55 th Year	60 th Year
1	All IWL-2520 Exams/Tests ^{1,2}	Yes		Yes
2 and 3	All IWL-2520 Exams/Tests ^{1,2}		Yes	

Notes 1, and 3:

1. Examinations and tests required by IWL-2522, -2523, -2524, -2525, and -2526 (Table IWL-2500-1, Examination Category L-B).
2. Examinations include those IWL-2524 and IWL-2525 examinations currently required at 55 years (Unit 1), and at 50 years (Units 2 and 3).

The proposed alternative is requested for the remainder of the current renewed operating licenses for Oconee Units 1, 2, and 3.

The licensee requested authorization for use of the proposed alternative at Oconee Units 1, 2, and 3, following completion of the Unit 1 50th year examinations pursuant to 10 CFR 50.55a(z)(1) on the basis that it provides an acceptable level of quality and safety.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Proposed Alternative

The relief request stated that the proposed alternative will eliminate the need to erect Reactor Building scaffolding that is required to access tendons for the examinations required by IWL- 2524 and IWL-2525 at times when other IWL-2500 examinations (i.e., physical surveillances) are not scheduled. This alternative will reduce the number of times that the scaffolding will need to be erected, tested, and disassembled (every ten years as opposed to five years), resulting in efficiency gains and reducing personnel safety risk associated with performing these activities.

The relief request also stated that deferring the IWL-2524 and IWL-2525 examinations to allow these examinations to be performed in conjunction with the tendon physical testing at 10-year intervals is justified for the following reasons:

1. Results of IWL-2524 and IWL-2525 examinations performed to-date have been satisfactory, and abnormal degradation of tendon anchorage components or wires that could affect the containment structural integrity have not been detected during these examinations.
2. Examinations required by IWL-2510 and Table IWL-2500-1, Examination Category L-A shall continue to be performed every five years, as required by IWL-2410, and include examination of concrete in the vicinity of tendon anchorage areas. These examinations (L1.11 and L1.12) also include examination of tendon end anchorage areas for corrosion protection medium leakage, and tendon end caps for deformation that could indicate damage or degradation of tendon anchorage hardware. Tendon end caps are required to be removed for examination of the anchorage if there is evidence of tendon end cap deformation.

3.2 NRC Staff Evaluation

The NRC staff reviewed the information provided in the proposed alternative and finds the following:

1. The IWL-2524 and IWL-2525 examinations performed to-date have demonstrated satisfactory results, with no abnormal degradation of tendon anchorage components or wires that could affect the containment structural integrity.
2. The proposed alternative requires the same number (two) of IWL-2524 and IWL-2525 examinations to be performed on each unit during each 10- year inspection interval as that currently required by the alternative schedule permitted by IWL-2421.
3. The licensee will continue to conduct the IWL-2510 examinations, that include general visual examinations, and detailed visual examination of suspect areas, on a five-year frequency as required by Table IWL- 2500-1 (L-A) "Examination Category L-A, Concrete." Any indications identified during these examinations may lead to additional examinations in accordance with Table IWL-2500- 1 (L- B) "Examination Category L-B, Unbound Post-Tensioning System," as determined by the Responsible Engineer. As required by IWL-2511, this would include examination of the concrete surfaces and tendon end anchorage areas (end caps, bearing plates, concrete in the area) on a five-year frequency to identify evidence of damage, deformation, water intrusion, corrosion, cracking or corrosion protection medium (CPM) leakage. Tendon end caps are required to be removed for this examination if there is evidence of tendon end cap deformation or damage.

Based on the above, the NRC staff finds that the licensee's alternative request to defer the IWL-2524 and IWL-2525 examinations for Unit 1, 2, and 3, by five years provides an acceptable level of quality and safety.

4.0 CONCLUSION

As set forth above, the NRC staff determines that the proposed alternative provides an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(1). Therefore, the NRC staff authorizes the proposed alternative for Oconee Units 1, 2 and 3, for the remainder of the current renewed operating licenses.

All other ASME Code Section XI requirements for which the alternative was not specifically requested and authorized in this proposed alternative remain applicable, including a third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: J. Ma

Date: December 7, 2021

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(EPID L-2021-LLR-0034) DATED DECEMBER 7, 2021

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DATE	12/03/2021	12/03/2021	11/19/2021	12/07/2021	12/07/2021

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