



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

February 18, 2022

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 – RE: ALTERNATIVE TO
IMPLEMENT CODE CASE OMN-22, "SMOOTH RUNNING PUMPS"
(EPID L-2021-LLR-0052)

Dear Mr. Snider:

By letter dated July 29, 2021, as supplemented by letter dated August 19, 2021, Duke Energy Carolinas, LLC (Duke Energy, the licensee) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) for the use of an alternative to certain American Society of Mechanical Engineers (ASME) *Operation and Maintenance of Nuclear Power Plants* (OM Code) requirements at Oconee Nuclear Station (ONS), Units 1, 2, and 3, during the sixth 10-year inservice testing (IST) program interval.

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 implement ASME OM Code Case OMN-22, "Smooth Running Pumps," 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 request ON-GRP-OMN-22 for the sixth 10-year IST program interval for ONS Units 1, 2, and 3.

All other ASME OM Code requirements for which relief or an alternative was not specifically requested and approved remain applicable.

S. Snider

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If you have any questions, please email 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



UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

PROPOSED ALTERNATIVE REQUEST ON-GRP-OMN-22

RELATED TO THE INSERVICE TESTING PROGRAM SIXTH 10-YEAR INTERVAL

DUKE ENERGY CAROLINAS, LLC (DUKE ENERGY)

OCONEE NUCLEAR STATION, UNITS NO. 1, 2, AND 3

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

1.0 INTRODUCTION

By a letter dated July 29, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21210A341), as supplemented by letter dated August 19, 2021 (ADAMS Accession No. ML21231A069), Duke Energy Carolinas, LLC (Duke Energy, the licensee), submitted to the U.S. Nuclear Regulatory Commission (NRC) a proposed alternative test plan (ON-GRP-OMN-22) in lieu of certain inservice testing (IST) requirements of the American Society of Mechanical Engineers (ASME) *Operation and Maintenance of Nuclear Power Plants*, Division 1, OM Code: Section IST [inservice testing] (OM Code) for the IST programs at Oconee Nuclear Station (ONS), Units 1, 2, and 3, during the sixth 10-year IST program interval.

Specifically, pursuant to subparagraph (1) in paragraph (z), "Alternatives to codes and standards requirements," of Section 55a, "Codes and standards," in Part 50, "Domestic Licensing of Production and Utilization Facilities," in Title 10, "Energy," of the *Code of Federal Regulations* (10 CFR 50.55a(z)(1)), the licensee requested to implement ASME OM Code Case OMN-22, "Smooth Running Pumps," on the basis that the alternative provides an acceptable level of quality and safety.

2.0 REGULATORY EVALUATION

The NRC regulations in 10 CFR 50.55a(f)(4), "Inservice testing standards requirement for operating plants," states, in part, "The inservice test requirements for pumps and valves that are within the scope of the ASME OM Code but are not classified as ASME B&PV [Boiler & Pressure Vessel] Code Class 1, Class 2, or Class 3 may be satisfied as an augmented IST program in accordance with paragraph (f)(6)(ii) of this section without requesting relief under paragraph (f)(5) of this section or alternatives under paragraph (z) of this section. This use of an augmented IST program may be acceptable provided the basis for deviations from the ASME OM Code, as incorporated by reference in this section, demonstrates an acceptable level of quality and safety, or that implementing the Code provisions would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety ..."

Enclosure

In proposing alternatives, a licensee must demonstrate that the proposed alternatives provide an acceptable level of quality and safety (10 CFR 50.55a(z)(1)) or compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety (10 CFR 50.55a(z)(2)).

3.0 TECHNICAL EVALUATION

3.1 Applicable ASME OM Code

The applicable ASME OM Code for the IST Programs at ONS Units 1, 2, and 3, for the sixth 10-year IST program interval, is the 2017 Edition, which is currently scheduled to commence on July 1, 2022, and end on June 30, 2032.

As provided in its submittal dated August 19, 2021, the IST requirements of the ASME OM Code, as incorporated by reference in 10 CFR 50.55a related to this alternative request are as follows:

Subparagraph (a) in paragraph ISTB-3300, "Reference Values", states, "Initial reference values shall be determined from the results of testing meeting the requirements of para. ISTB-3100, Preservice Testing, or from the results of the first inservice test."

Subparagraph (b) in paragraph ISTB-3300 states, "New or additional reference values shall be established as required by para. ISTB-3310 or ISTB-3320, or subpara. ISTB-6200(c)."

Subparagraph (f) in ISTB-3300 states, "All subsequent test results shall be compared to these initial reference values or to new reference values established in accordance with para. ISTB-3310 or ISTB-3320, or subpara. ISTB-6200(c)."

Table ISTB-5121-1, "Centrifugal Pump Test Acceptance Criteria," provides the values for the Alert Range and Required Action Range for inservice tests.

Table ISTB-5221-1, "Vertical Line Shaft Centrifugal Pump Test Acceptance Criteria," provides the values for the Alert Range and Required Action Range for inservice tests.

Table ISTB-5321-1, "Positive Displacement Pump (Except Reciprocating) Test Acceptance Criteria," provides the values for the Alert Range and Required Action Range for inservice tests.

Table ISTB-5321-2, "Reciprocating Positive Displacement Pump Test Acceptance Criteria," provides the values for the Alert Range and Required Action Range for inservice tests.

3.2 ASME Code Components Affected

The licensee requested the NRC staff to authorize the use of the proposed alternative described below for the pump listed in Table 1 and pumps in their IST program that meet the requirements of Code Case OMN-22, "Smooth Running Pumps," in the future.

Table 1: Initial Scope of ON-GRP-OMN-22 (Note 1)

Component ID	Pump Description	ASME Code Class
FO-PU-0005, SSF Diesel Engine Fuel Oil Transfer Pump	Transamerica Delaval, Model N3DBS-137	3

Note 1: OMN-22 may be applied to all pumps in the IST Program that meet OMN-22 requirements in the future.

3.3 Reason for Request

In its submittal dated August 19, 2021, the licensee stated that ASME Code Case OMN-22 allows for alternative requirements for use with smooth running pumps in lieu of use of vibration values obtained in the reference value tests. For very low reference values, hydraulic noise and instrument accuracy can represent a significant portion of the reading and affect the repeatability of subsequent measurements. A smooth running pump could be subject to unnecessary increased testing if the measured vibration parameter exceeds an acceptable range based on these very low reference values.

Smooth running pumps have a much lower reference value for stable operation and the ranges for acceptable range and higher levels listed in the Alert Range do not allow for adequate vibration monitoring techniques to be applied to smooth running pumps. Guidelines set forth in Code Case OMN-22 allow for a very low baseline vibration value with a pump vibration velocity of ≤ 0.050 inches/second (in/sec) when establishing the vibration reference value, which allows for trending of the pump vibration on a much lower scale than what is currently allowed.

The licensee noted that ASME OM Code Case OMN-22 has not been approved by the NRC, and an alternative request is required for use of this Code Case.

3.4 Proposed Alternative

The licensee is requesting authorization to implement ASME OM Code Case OMN-22 as an alternative to the pump testing requirements in the ASME OM Code, Subsection ISTB, "Inservice Testing of Pumps in Light-Water Reactor Nuclear Power Plants – Pre-2000 Plants." This Code Case is not yet included in Regulatory Guide (RG) 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code," (ADAMS Accession No. ML19128A261).

The licensee stated that for those pumps with very low vibration values (≤ 0.050 in/sec), the following vibration velocity criteria may be applied to any vibration test points qualifying for the use of the minimum reference value:

Acceptable Range: ≤ 0.125 in/sec
Alert Range: > 0.125 in/sec to 0.300 in/sec
Required Action Range: > 0.300 in/sec

Supplemental Monitoring

Pumps that will use the "minimum reference" value of Code Case OMN-22 for one or more vibration points shall be included in the Owner's Predictive Maintenance (PdM) program. The PdM program shall apply predictive monitoring techniques and perform vibration analysis beyond the trending of vibration levels specified in the ASME OM Code to provide

early identification of pump performance issues. The Owner shall determine which PdM Supplemental Monitoring activities will be utilized on the pump. At a minimum, the Owner shall perform spectral analysis of measured vibration of the applicable pumps. The Owner shall document the conclusion of the PdM performance analysis on the pump test record prior to the subsequent test with a conclusion of acceptable, degrading but acceptable, or unacceptable. Corrective action shall be initiated when an unacceptable trend in performance is identified.

Corrective Action

If a measured pump vibration parameter falls within the alert range or the required action range specified above, then the Corrective Action requirements of ISTB-6200 (2017 Edition) shall be followed. The alert and required action ranges are established in accordance with this Code Case rather than the referenced pump tables.

If a PdM Supplemental Monitoring activity identifies a parameter outside the normal operating range or identifies a trend toward an unacceptable degraded state, action shall be taken to (1) identify and document the condition in the corrective action program, (2) increase monitoring to establish the rate of change of the monitored parameter, (3) review component-specific information to identify the degradation cause, (4) develop a plan to remove the pump from service to perform maintenance prior to significant performance degradation, and (5) address potential common cause issues applicable to other pumps based on the results of the analysis of the specific pump performance.

3.5 NRC Staff Evaluation

The licensee proposes to use ASME OM Code Case OMN-22 in its entirety for the pump listed in Table 1, and other pumps in their IST program that meet the requirements of Code Case OMN-22 in the future. The Code Case has been approved by the ASME OM Standards Committee, with the NRC representative voting in the affirmative. The Code Case has also been approved by the ASME Board of Nuclear Codes and Standards.

ASME Code Case OMN-22 is expected to be included in the proposed Revision 4 of RG 1.192, where it will be listed in the table of Code Cases acceptable for use. There will be no conditions. The Code Case can be used for any pump in a licensee's IST program that meets the requirements of the Code Case. RG 1.192, Revision 4, is currently scheduled to be incorporated by reference in 10 CFR 50.55a in the spring of 2022. The Code Case is applicable to the 2017 Edition of the ASME OM Code, which will be the licensee's Code of Record for their fourth 10-year IST program interval.

Based on the above, the NRC staff finds that allowing usage of Code Case OMN-22 in its entirety provides an acceptable level of quality and safety for the pump listed in Table 1 and any pumps meeting the requirements of Code Case OMN-22 in the future because this alternative will provide adequate indication of pump performance and the licensee's predictive maintenance program will ensure the licensee's ability to detect problems involving an unacceptable condition in advance of when the pump performance may reach an unacceptable condition. The NRC staff finds that the licensee's proposed alternative to apply ASME OM Code Case OMN-22 provides an acceptable level of quality and safety.

4.0 CONCLUSION

As described above, the NRC staff concludes that the proposed alternative request ON-GRP-OMN-22 provides an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1).

Therefore, the NRC staff authorizes alternative request ON-GRP-OMN-22 for the sixth 10-year IST program interval at ONS Units 1, 2, and 3.

All other ASME OM Code requirements for which relief or an alternative was not specifically requested and approved as part of these requests remain applicable.

Principal Contributor: Robert Wolfgang, NRR

Date: February 18, 2022

SUBJECT: OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3 – RE: ALTERNATIVE TO
IMPLEMENT ASME CODE CASE OMN-22 (EPID L-2021-LLR-0052)
DATED FEBRUARY 18, 2022

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