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

August 10, 2021

Mr. Ernest J. Kapopoulos, Jr.
Site Vice President
H. B. Robinson Steam Electric Plant
Duke Energy Progress, LLC
3581 West Entrance Road, RNPA01
Hartsville, SC 29550

SUBJECT: H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT 2 – PROPOSED ALTERNATIVES TO AMERICAN SOCIETY OF MECHANICAL ENGINEERS CODE FOR OPERATION AND MAINTENANCE OF NUCLEAR POWER PLANTS (EPID L-2021-LLR-0020)

Dear Mr. Kapopoulos:

By letter dated March 29, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21088A139), Duke Energy Progress, 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) Code for Operation and Maintenance of Nuclear Power Plants (OM Code) requirements at H. B. Robinson Steam Electric Plant, Unit 2 (Robinson, RNP).

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Paragraph 50.55a(z)(1), the licensee requested to use an alternative in alternative request IST-RR-5, regarding pump inservice testing (IST), on the basis the proposed alternative would provide an acceptable level of quality or safety.

The NRC staff has reviewed the subject request and concludes, as set forth in the enclosed safety evaluation, that Duke Energy has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1). The NRC staff determines that proposed alternative IST-RR-5 provides an acceptable level of quality and safety. Therefore, the NRC staff authorizes the use of alternative request IST-RR-5 for the Sixth 10 year IST program interval at RNP, which begins on February 19, 2022, and is scheduled to end on February 18, 2032.

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

If you have any questions, please contact Project Manager, John Klos at 301-415-5136 or by e-mail to John.Klos@nrc.gov.

Sincerely,

David J. Wrona

Digitally signed by David J. Wrona
Date: 2021.08.10 12:28:32 -04'00'

David J. Wrona, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-261

Enclosure:
Safety Evaluation

cc: ListServ

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

SAFETY EVALUATION BY THE
OFFICE OF NUCLEAR REACTOR REGULATION
PROPOSED ALTERNATIVE REQUEST IST-RR-5
REGARDING THE SIXTH 10-YEAR INTERVAL
INSERVICE TESTING PROGRAM DUKE ENERGY PROGRESS, LLC
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
EPID L-2021-LLR-0021

1.0 INTRODUCTION

By letter dated March 29, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21088A139), Duke Energy Progress, LLC (Duke Energy, the licensee) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) for the use of an alternative to certain requirements of the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code), at H. B. Robinson Steam Electric Plant, Unit 2 (RNP).

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Paragraph 50.55a(z)(1), the licensee requested to use the proposed alternative in Alternative Request IST-RR-5, regarding pump inservice testing (IST), on the basis that the proposed alternative would provide an acceptable level of quality or safety.

2.0 REGULATORY EVALUATION

Paragraph 50.55a(f)(4) of 10 CFR, "Inservice testing standards requirement for operating plants," states, in part, that:

> Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, pumps and valves that are within the scope of the ASME OM Code must meet the inservice test requirements (except design and access provisions) set forth in the ASME OM Code and addenda that become effective subsequent to editions and addenda specified in [10 CFR 50.55a(f)(2) and (3)] and that are incorporated by reference in [10 CFR 50.55a(a)(1)(iv)], to the extent practical within the limitations of design, geometry, and materials of construction of the components.

The regulations in 10 CFR 50.55a(z), "Alternatives to codes and standards requirements," state, in part, that alternatives to the requirements of 10 CFR 50.55a(f) may be used, when authorized by the NRC, if the licensee demonstrates (1) the proposed alternatives would provide an acceptable level of quality and safety or (2) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Based on the above, and subject to the following technical evaluation, the NRC staff finds that regulatory authority exists for the licensee to request, and the NRC to authorize, the proposed alternative requested by the licensee.

3.0 TECHNICAL EVALUATION

The RNP Sixth 10-year IST program interval begins on February 9, 2022, and is scheduled to end on February 8, 2032. The applicable ASME OM Code edition for the RNP Sixth 10-year IST program interval is the 2017 Edition, which is incorporated by reference in 10 CFR 50.55a with conditions.

3.1 Licensee's Alternative Request IST-RR-5

The applicable code requirements that the licensee stated for this proposed relief request alternative are;

> Paragraph ISTB-3300, "Reference Values," states, in part, "Reference values shall be obtained as follows: (a) Initial reference values shall be determined from the results of testing meeting the requirements of para. [paragraph] ISTB-3100, Preservice Testing, or from the results of the first inservice test."
>
> Paragraph ISTB-3300(b), states, "New or additional reference values shall be established as required by para. ISTB-3310 or ISTB-3320, or subpara. ISTB-6200(c)."
>
> Paragraph ISTB-3300(f), 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.
>
> The licensee requested to use the proposed alternative described below for the pumps listed in Table 1 and pumps in their IST program that meet the requirements of ASME OM Code Case OMN-22, "Smooth Running Pumps," in the future.

Table 1

Component ID	Pump Description	Group	Type	ASME Code Class
BA-A Pump	Boric Acid (BA) Transfer Pump "A"	A	Centrifugal Horizontal Induction Motor	3
BA-B Pump	BA Transfer Pump "B"	A	Centrifugal Horizontal Induction Motor	3
DF-B Pump	Diesel Fuel Oil Transfer Pump "B"	A	Rotary Positive Displacement Induction Motor	3

Reason for Request

In its letter dated March 29, 2021, the licensee states, in part:

> 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 ASME OM Code Case OMN-22 allow for a very lower baseline vibration value with a pump vibration velocity of ≤ 0.050 in/sec [inches per second] when establishing the vibration reference value, which allows for trending of the pump vibration on a much lower scale than what is currently allowed.
>
> ASME OM Code Case OMN-22, "Smooth Running Pumps" has not been approved by the NRC and a relief request is required for use of this Code Case.

Proposed Alternative and Basis for Use

The licensee further states, in part:

> H. B. Robinson Steam Electric Plant (Robinson Nuclear Plant, RNP), Unit No. 2, proposes to utilize the provisions of Code Case OMN-22, 'Smooth Running Pumps'. For those pumps with very low baseline vibration values (≤ 0.050 in/sec), the following vibration velocity criteria shall 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 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 Ed.) 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.

NRC Staff’s Evaluation

The licensee proposes to use ASME OM Code Case OMN-22 in its entirety for the pumps listed in Table 1, and other pumps in its IST program that meet the requirements of ASME OM 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 OM Code Case OMN-22 is included in the proposed Revision 4 of Regulations Guide (RG) 1.192, “Operation and Maintenance Code Case Acceptability, ASME OM Code,” (ADAMS Accession No. ML20120A629) where it is listed in the table of Code Cases acceptable for use. There are 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 1990 Edition through the 2020 Edition of the ASME OM Code. This includes the 2017 Edition of the ASME OM Code, which will be the licensee’s Code of Record for its Sixth 10-year IST program interval.

The NRC staff finds that allowing the licensee use of ASME OM Code Case OMN-22 in their IST program provides an acceptable level of quality and safety for the pumps listed in Table 1, as well as any pumps meeting the requirements of Code Case OMN-22 in the future. The NRC staff finds this is acceptable because this alternative will provide adequate indication of pump performance, and the licensee's Predictive Maintenance program will ensure the ability to detect trends toward unacceptable conditions in advance of pump performance reaching an unacceptable condition.

4.0 CONCLUSION

As set forth above, the NRC staff determines that proposed alternative IST-RR-5 provides an acceptable level of quality and safety for the pumps listed in Table 1 of this safety evaluation, and any pumps meeting the requirements of ASME OM Code Case OMN-22 in the future at RNP. 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) for alternative request IST-RR-5. Therefore, the NRC staff authorizes the use of alternative request IST-RR-5 for the Sixth 10-year IST program interval at RNP, which begins on February 19, 2022, and is scheduled to end on February 18, 2032.

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

Principal Contributor: R. Wolfgang, NRR/DEX/EMIB

Date: August 10, 2021

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