



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

September 26, 2022

Mr. Edward Pigott
Site Vice President
Duke Energy Carolinas, LLC
McGuire Nuclear Station
12700 Hagers Ferry Road
Huntersville, NC 28078-8985

SUBJECT: WILLIAM B. MCGUIRE NUCLEAR STATION, UNIT 2 – PRESSURIZER
POWER OPERATED RELIEF VALVE PROPOSED ALTERNATIVE
(EPID L-2020-LLR-0061)

Dear Mr. Pigott:

By letter dated August 18, 2022, Duke Energy Carolinas, LLC (Duke Energy, the licensee) submitted an alternative request to the U.S. Nuclear Regulatory Commission (NRC) related to certain Inservice Testing (IST) requirements in the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code), Section IST, “Rules for Inservice Testing of Light-Water Reactor Power Plants,” for the IST program at the McGuire Nuclear Station, Unit No. 2 (McGuire Unit 2).

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(2), the licensee requested to use an alternative on the basis that complying with the specified requirement would result in a hardship or unusual difficulty.

The NRC staff has reviewed the subject request and concludes, as set forth in the safety evaluation, that Duke Energy has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(2).

All other ASME Boiler and Pressure Vessel (BPV) Code or ASME OM Code requirements for which relief was not specifically requested and approved remain applicable.

If you have any questions, please contact John Klos, McGuire Licensing Project Manager, at (301) 415-5136 or via email at John.Klos@nrc.gov.

Sincerely,

Michael T. Markley, Branch Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-370

Enclosure: Safety Evaluation

cc: Listserv



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

PRESSURIZER POWER OPERATED RELIEF VALVE

ALTERNATIVE TESTING HARDSHIP REQUEST

DUKE ENERGY CAROLINAS, LLC

MCGUIRE NUCLEAR STATION, UNIT 2

DOCKET NO. 50-370

1.0 INTRODUCTION

By letter dated August 18, 2022 (Agencywide Documents and Access Management System (ADAMS) Accession Number ML22230A219), Duke Energy Carolinas, LLC (Duke Energy, the licensee) submitted an alternative request to the U.S. Nuclear Regulatory Commission (NRC) related to certain Inservice Testing (IST) requirements in the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code), Section IST, "Rules for Inservice Testing of Light-Water Reactor Power Plants," for the IST program at the McGuire Nuclear Station, Unit No. 2 (McGuire Unit 2).

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(2), "Hardship without a compensating increase in quality and safety," the licensee requested that the NRC authorize alternative testing for Pressurizer Power Operated Relief Valve (PORV) Block Valve 2NC-31B at McGuire Unit 2 on the basis that compliance with a specific requirement in the ASME OM Code would result in a hardship without a compensating increase in the level of quality or safety.

2.0 REGULATORY EVALUATION

The NRC regulations in 10 CFR 50.55a(f)(4), "Inservice testing standards requirement for operating plants," state, 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 editions and addenda 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 NRC regulations in 10 CFR 50.55a(z) 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.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Alternative Request

The licensee submitted this alternative request related to specific valve testing requirements in the ASME OM Code in accordance with 10 CFR 50.55a(z)(2).

The applicable ASME OM Code of Record for the McGuire Unit 2 Fourth 10-Year IST Program interval is the 2004 Edition through 2006 Addenda of the ASME OM Code, as incorporated by reference in 10 CFR 50.55a.

The IST requirements in the ASME OM Code (2004 Edition through 2006 Addenda), Subsection ISTC, "Inservice Testing of Valves in Light-Water Reactor Nuclear Power Plants," applicable to this alternative request are as follows:

Paragraph ISTC-3510, "Exercising Test Frequency," states:

Active Category A, Category B, and Category C check valves shall be exercised nominally every 3 months, except as provided by ISTC-3520, ISTC-3540, ISTC-3550, ISTC-3570, ISTC-5221, and ISTC-5222. Power-operated relief valves shall be exercise tested once per fuel cycle.

Paragraph ISTC-5120, "Motor-Operated Valves," Subparagraph ISTC-5121, "Valve Stroke Testing," states:

- (a) Active valves shall have their stroke times measured when exercised in accordance with ISTC-3500.
- (b) The limiting value(s) of full-stroke time of each valve shall be specified by the Owner.
- (c) The stroke time of all valves shall be measured to at least the nearest second.
- (d) Any abnormality or erratic action shall be recorded (see ISTC-9120), and an evaluation shall be made regarding need for corrective action.

The licensee requested the NRC staff to authorize the use of this alternative for the following valve:

ASME Boiler and Pressure Vessel Code Class 1 Pressurizer PORV Block Valve
2NC-31B

The licensee stated that the three Pressurizer PORV block valves at McGuire Unit 2 are located upstream of the PORVs and are normally open. The Pressurizer PORV block valves at McGuire Unit 2 are motor-operated valves (MOVs) that provide assurance that a stuck-open PORV can be isolated, and terminate a small break loss of coolant accident (LOCA) due to a stuck-open PORV. The licensee stated that isolation of a stuck open PORV is not required to ensure safe plant shutdown. However, the capability to isolate the PORVs under all fluid conditions that could be experienced during operating and accident conditions at McGuire Unit 2 reduces the potential number of challenges to the Emergency Core Cooling System (ECCS). The PORV and

its associated block valve operability requirements are governed by Technical Specification (TS) 3.4.11, Pressurizer Power Operated Relief Valves (PORVs).

The licensee stated that Pressurizer PORV Block Valve 2NC-31B is exercised and stroke-time tested every 3 months in accordance with ASME OM Code, paragraph ISTC-3510. The licensee performs the measurement of stroke time for this MOV in the opening and closing directions in accordance with ASME OM Code, subparagraph ISTC-5121. The licensee performs periodic verification of remote position indication for this MOV every 2 years in accordance with ASME OM Code, paragraph ISTC-3700, however, the position verification requirement is not part of this alternative request.

Reason for Request

The licensee stated that it recently identified a slow increase in the identified reactor coolant system (RCS) leakage that exceeds previous values. Based on information from a containment entry and troubleshooting, the licensee determined that the source of the increased leakage is seal leakoff from Pressurizer PORV Block Valve 2NC-31B. The licensee closed the MOV on July 26, 2022, to isolate the valve packing, which resulted in decreased reactor coolant leakage.

The licensee stated that a work activity to repair or replace the valve packing of Pressurizer PORV Block Valve 2NC-31B would require containment entry and RCS depressurization. The licensee asserted that efforts to support personnel safety and radiation exposure as low as reasonably achievable (ALARA) are maximized by performing this type of corrective maintenance during a refueling outage. Additionally, the licensee noted that maneuvering the operating condition of the reactor and depressurizing the RCS increase nuclear safety risk due to the cycling of plant equipment. The licensee reported that Pressurizer PORV Block Valve 2NC-31B is currently being administratively maintained in the closed position to minimize RCS leakage.

The licensee is requesting an alternative to the ASME OM Code requirements for quarterly exercising and stroke-time testing of Pressurizer PORV Block Valve 2NC-31B until a valve repair can be safely performed during the next scheduled Unit 2 refueling outage, which is currently scheduled to begin on February 18, 2023. The licensee asserted that continued exercising and stroke-time testing of Pressurizer PORV Block Valve 2NC-31B on a quarterly frequency has the potential to create a hardship by causing further packing degradation and reducing the operational RCS leakage margin.

Proposed Alternative

As an alternative to ASME OM Code requirements in paragraphs ISTC-3510 and ISTC-5120, the licensee requested to defer quarterly exercising and stroke-time testing of Pressurizer PORV Block Valve 2NC-31B for the remainder of the current McGuire Unit 2 operating fuel cycle. The licensee asserted that stroking the valve creates a hardship because of the possibility of further packing degradation that could increase RCS leakage. If RCS identified leakage exceeds its allowable limit, the licensee will follow the required TS action for plant shutdown. All other PORV block valves will continue to be stroked quarterly per the applicable ASME OM Code requirements.

To control valve stem leakage, the licensee is maintaining Pressurizer PORV Block Valve 2NC-31B in its closed position with emergency power available. The licensee most recently conducted quarterly stroke-time testing of the MOV on July 6, 2022, in both the closing and

opening directions with satisfactory results. The licensee considers the MOV to be operationally ready to open in its current configuration. If needed, the valve will be opened by a control room operator.

The licensee reported that Pressurizer PORV Block Valve 2NC-31B has demonstrated consistent performance with no adverse issues or abnormalities during MOV diagnostic testing. The licensee stated that the condition of the valve actuator and lubrication supports the continued reliability of the MOV until the scheduled repairs. The licensee asserted that the IST performance history of Pressurizer PORV Block Valve 2NC-31B has been excellent with no valve stroke time or position indication failures from July 6, 2012, to the present. The licensee stated that the stroke-time performance (open and closed directions) of Pressurizer PORV Block Valve 2NC-31B has been between 5.5 and 6.8 seconds compared to the maximum limit of 10 seconds.

Duration of Proposed Alternative

The licensee stated that this alternative is only intended for a limited period of time that will not exceed the reactor restart from the next McGuire Unit 2 refueling outage. The licensee intends to repair Pressurizer PORV Block Valve 2NC-31B during the next McGuire Unit 2 refueling outage M2R28, scheduled to begin on February 18, 2023. Following the refueling outage, the licensee plans to resume quarterly exercising and stroke-time testing of Pressurizer PORV Block Valve 2NC-31B per the applicable ASME OM Code requirements.

3.2 NRC Staff Evaluation

In lieu of requirements in ASME OM Code, Subsection ISTC, paragraphs ISTC-3510 and ISTC-5120, as incorporated by reference in 10 CFR 50.55a, the licensee proposed to defer quarterly exercising and stroke-time testing of Pressurizer PORV Block Valve 2NC-31B until the next McGuire Unit 2 refueling outage, currently scheduled to begin on February 18, 2023. If RCS identified leakage exceeds its allowable limit prior to the planned refueling outage, the licensee must follow the applicable plant TS for McGuire Unit 2. The licensee stated that all other PORV block valves at McGuire Unit 2 will continue to be stroked quarterly per the applicable ASME OM Code requirements. The licensee emphasized that this alternative is only requested for a limited period of time, and will not extend beyond the restart from the next McGuire Unit 2 refueling outage. The licensee is planning to repair Pressurizer PORV Block Valve 2NC-31B during the next McGuire Unit 2 refueling outage. Following the refueling outage, the licensee will resume quarterly exercising and stroke-time testing of Pressurizer PORV Block Valve 2NC-31B in accordance with the applicable ASME OM Code requirements as incorporated by reference in 10 CFR 50.55a.

The licensee is maintaining Pressurizer PORV Block Valve 2NC-31B in its closed position to minimize stem leakage with emergency power remaining available. The licensee recently stroke-time tested the MOV on July 6, 2022, in both the open and close directions with satisfactory results. The licensee reported that the IST performance history of Pressurizer PORV Block Valve 2NC-31B reveals no valve stroke timing or position indication failures from July 6, 2012, to the present, with significant margin to the maximum stroke-time limit. With respect to MOV diagnostic testing, the licensee stated that Pressurizer PORV Block Valve 2NC-31B has maintained consistent performance with no identified adverse issues or abnormalities. Further, the licensee indicated that the condition of the valve and actuator, and their lubrication, supports the continued reliability of Pressurizer PORV Block Valve 2NC-31B until the scheduled repairs are performed during the next refueling outage.

In the alternative request, the licensee asserted that continued exercising and stroke-time testing of Pressurizer PORV Block Valve 2NC-31B on a quarterly frequency has the potential to create a hardship as further packing degradation could result in increased valve stem leakage and reduce operational RCS leakage margin. The licensee stated that a work activity to repair or replace the valve stem packing in Pressurizer PORV Block Valve 2NC-31B would require containment entry and RCS depressurization. The licensee indicated that maneuvering the operating condition of the reactor and depressurizing the RCS would increase the nuclear safety risk due to the cycling of plant equipment. The licensee also noted that personnel safety and ALARA considerations would need to be addressed to perform this activity during plant operation.

In evaluating this request, the NRC staff reviewed its findings related to similar alternative requests by the licensee for McGuire Unit 2 PORV block valves that were authorized on October 20, 2016 (ML16291A303), January 17, 2017 (ML16358A696), and August 14, 2019 (ML19217A324). The licensee successfully implemented those authorized alternatives at McGuire Unit 2.

4.0 CONCLUSION

Based on its review above, the NRC staff found that the licensee's alternative request dated August 18, 2022, provides adequate justification that continued quarterly exercising and stroke-time testing of Pressurizer PORV Block Valve 2NC-31B until the next McGuire Unit 2 refueling outage in accordance with ASME OM Code, Subsection ISTC, paragraphs ISTC-3510 and ISTC-5120, would represent a hardship or unusual difficulty without a compensating increase in the level of quality or safety. In addition, the NRC staff also found that the licensee's proposed alternative will provide reasonable assurance that Pressurizer PORV Block Valve 2NC-31B is operationally ready to perform its safety function until the next McGuire Unit 2 refueling outage, which is scheduled to begin on February 18, 2023. Accordingly, the NRC staff concludes that the licensee has adequately addressed all the regulatory requirements set forth in 10 CFR 50.55a(z)(2). Therefore, the NRC staff authorizes the use of the licensee's proposed alternative for Pressurizer PORV Block Valve 2NC-31B described in its letter dated August 18, 2022, until the McGuire Unit 2 refueling outage in 2023.

All other ASME Boiler and Pressure Vessel (BPV) Code or ASME OM Code requirements for which relief or an alternative was not specifically requested and approved remain applicable.

Principal Contributor: T. Scarbrough

Date: September 26, 2022

SUBJECT: WILLIAM B. MCGUIRE NUCLEAR STATION, UNIT 2 – PRESSURIZER
POWER OPERATED RELIEF VALVE RELIEF REQUEST
(EPID L-2020-LLR-0061) DATED SEPTEMBER 26, 2022

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