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U.S. Nuclear Regulatory Commission
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Washington, DC 20555-0001

Oconee Nuclear Station, Unit Nos. 1, 2 and 3
Renewed Facility Operating License Nos. DPR-38, DPR-47 and DPR-55
Docket Nos. 50-269, 50-270 and 50-287

**Subject: Supplement to Relief Requests for Inservice Testing Plan – Sixth Interval**

**Reference:**

1. Duke Energy Letter RA-21-0169, *Relief Requests for Inservice Testing Plan – Sixth Interval,* dated July 22, 2021 (ADAMS Accession No. ML21210A341).

Ladies and Gentlemen,

On July 22, 2021 Duke Energy Carolinas, LLC (Duke Energy) submitted five relief requests to the NRC for approval for Oconee Nuclear Station, Units 1, 2 and 3 (ONS) (Reference 1). Duke Energy is seeking approval of the relief requests for use during the sixth ten-year Inservice Testing (IST) program interval, which begins on July 1, 2022.

Duke Energy hereby submits a supplement to the relief requests in Reference 1 in order to support the NRC staff's review. Specifically, each of the five relief requests provided in Reference 1 is updated with a unique serial number and a note reference in Table 3 of relief request ON-MOV-OMN-26 (Enclosure 3) is corrected. Enclosures 1 through 5 to this letter provide the five relief requests, which supersede the Reference 1 relief requests entirely.

This submittal contains no new regulatory commitments. Should you have any questions concerning this submittal, or require additional information, please contact Art Zaremba, Manager – Nuclear Fleet Licensing, at 980-373-2062.

Sincerely,

Steven M. Snider
Site Vice President
Oconee Nuclear Station

Enclosures:

1. Relief Request ON-GRP-OMN-22
2. Relief Request ON-PRV-OMN-24
3. Relief Request ON-MOV-OMN-26
4. Relief Request ON-RPI-OMN-28
5. Relief Request ON-SRP-HPI-03

cc: L. Dudes, USNRC Regional Administrator, Region II
J. Nadel, USNRC Senior Resident Inspector for ONS
S. Williams, USNRC NRR Project Manager - ONS

# Enclosure 1

# Relief Request ON-GRP-OMN-22

## 1. ASME Code Components Affected

All the pumps in the IST Program with vibration reference values of ≤ 0.05 inches per second (in/sec). See Table 1 for the initial list of pumps relief is being requested for to use the alternative requirements of ASME OM Code Case OMN-22. Relief is also requested to use these alternative requirements for other pumps in the IST Program that meet the requirements of Code Case OMN-22 in the future.

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

| Component ID | Pump Description | ASME 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.

Function:

The Table 1 pumps are required to perform a specific function in shutting down the reactor to a safe shutdown condition, maintaining a safe shutdown condition, or in mitigating the consequences of an accident.

## 2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance of Nuclear Power Plants (OM) Code, 2017 Edition.

## 3. Applicable Code Requirement

ISTB-3300, ‘Reference Values’ paragraph (a) 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.

ISTB-3300, 'Reference Values' paragraph (b) requires that new or additional reference values shall be established as required by para. ISTB-3310, or ISTB-3320, or subpara. ISTB-6200(c).

ISTB-3300, 'Reference Values' paragraph (f) requires that 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 testing.

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 testing.

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 testing.

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

## 4. Reason for Request

Pursuant to 10 CFR 50.55a(z)(1), relief is requested from the requirements of the ASME OM Code, 2017 Edition, Subsection ISTB. The ASME Code committees have approved Code Case OMN-22, 'Smooth Running Pumps'. This Code Case has not been approved for use in Regulatory Guide 1.192, Operation and Maintenance Code Case Acceptability, ASME OM Code, Revision 3, October 2019.

This Code Case 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, 'Smooth Running Pumps' allow for a very low baseline vibration value with a pump vibration velocity of ≤ 0.050 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.

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.

## 5. Proposed Alternative and Basis for Use

Oconee Nuclear Station (ONS), Units 1, 2, and 3 propose to utilize the provisions of Code Case OMN-22, 'Smooth Running Pumps'. 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.

In summary, ONS proposes to test the pumps listed in this request and other pumps in the IST Program that meet the requirements of Code Case OMN-22 in the future by implementing the requirements of ASME OM Code Case OMN-22. The use of OMN-22 requires NRC approval to implement this change since Code Case OMN-22 is not listed in Regulatory Guide 1.192.

Using the provisions of this request would provide adequate detection of component degradation and, would continue to provide reasonable assurance of the operational readiness of affected ONS components. Therefore, compliance with the requirements of ASME OM Code Case OMN-22 would result in an acceptable level of quality and safety pursuant to 10 CFR 50.55a(z)(1).

## 6. Duration of Proposed Alternative

This relief will be implemented during the ONS, Sixth Ten-Year Inservice Testing Interval for pumps required by ASME OM Code, 2017 Edition, Subsection ISTB, which starts on July 1, 2022.

## 7. Precedents

ADAMS Accession No. ML18290A602, Millstone 2 P-02 and Millstone 3 P-03, Smooth Running Pumps, for pumps with measured reference value below 0.05 ips, approved by NRC, November 2018.

ADAMS Accession No. ML20199M162, South Texas Project, Units 1 and 2 – Proposed Alternative PRR-01, PRR-02, PRR-03, and PRR-04 To The Requirements of the ASME OM Code (EPIDS L-2020-LLR-0007 to L-2020-LLR-0010), dated July 21, 2020.

## 8. References

1. ASME OM Code Case OMN-22, ‘Smooth Running Pumps’

# Enclosure 2

# Relief Request ON-PRV-OMN-24

## 1. ASME Code Components Affected

**Table 1: ONS ASME Class 2 and 3 Relief Valves in a Group of One (1)**

| Component ID | Description | Category | Class |
|---|---|---|---|
| 0FO-0052 | DIESEL ENGINE FUEL OIL TRANSFER PUMP DISCHARGE RELIEF | C | 3 |
| 1HP-0079 | LDST RELIEF | C | 2 |
| 2HP-0079 | LDST RELIEF VALVE | C | 2 |
| 3HP-0079 | LDST RELIEF VALVE | C | 2 |
| 1HP-0404 | RC MAKEUP PUMP DISCHARGE RELIEF | C | 2 |
| 2HP-0404 | RC MAKEUP PUMP DISCHARGE RELIEF | C | 2 |
| 3HP-0404 | RC MAKEUP PUMP DISCHARGE RELIEF | C | 2 |
| 1MS-0092 | MS SUPPLY TO TD EFDWP RELIEF | C | 3 |
| 2MS-0092 | MS SUPPLY TO TD EFDWP RELIEF | C | 3 |
| 3MS-0092 | MS SUPPLY TO TD EFDWP RELIEF | C | 3 |

## 2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance of Nuclear Power Plants (OM) Code, 2017 Edition.

## 3. Applicable Code Requirement

The applicable ASME OM Code Edition and Addenda for the Oconee Nuclear Station (ONS), Units No, 1, 2, and 3 Sixth 10-year IST interval is the 2017 Edition with no Addenda. Oconee is requesting an alternative to the requirements in Appendix I subparagraph I-1350, Test Frequency, Classes 2 and 3 Pressure Relief Valves Except PWR Main Steam Safety Valves. "(a)(2): For valve groups containing only one valve, the valve shall be tested at least every 48 months".

Per I-1350(a)(1), the maximum allowable time between tests for any valve, with the exception of PWR main steam safety valves, shall not exceed 10 yr, starting with initial electric power generation.

## 4. Reason for Request

ONS proposes to utilize the provisions of Code Case OMN-24. Pursuant to 10 CFR 50.55a, *Codes and Standards*, paragraph (z)(1), an alternative is proposed to ASME OM Code, I-1350(a)(2) requirements by implementing Code Case OMN-24, "*Alternative Requirements for Testing ASME Class 2 and 3 Pressure Relief Valves (For Relief Valves in a Group of One).*" The basis of the request is that the proposed performance based alternative would provide an acceptable level of quality and safety. Also, the requirement within I-1350(a)(2) for a 48 month test interval would be relaxed. The change would remain within compliance

of I-1350(a)(1) where the test interval would not exceed 10 years, with the Code Case allowing a six-month grace period to coincide with refuel outages.

The ASME Code committees have approved Code Case OMN-24, "*Alternative Requirements for Testing ASME Class 2 and 3 Pressure Relief Valves (For Relief Valves in a Group of One)"* This Code Case has not been approved for use in Regulatory Guide 1.192, Operation and Maintenance Code Case Acceptability, ASME OM Code, Revision 3, October 2019. This Code Case has been approved by ASME and is listed in the Applicability Index from ASME Codes and Standards, as applicable through the 2020 Edition of the ASME OM Code.

This Code Case establishes requirements when addressing a valve group of one (1), in lieu of the sample plan approach described by the ASME OM Code. ASME Appendix I Section I-1350(a), ASME Class 2 and 3 Relief Valves Except for PWR Main Steam Safety Valves, may be tested using the alternative method described in OMN-24

**5. <u>Proposed Alternative and Basis for Use</u>**

ONS proposes to utilize the provisions of Code Case OMN-24:

a) The relief valve shall be tracked by its plant identification number as provided by its manufacturer or as applied by the Owner.

b) Upon adoption of this Code Case, the initial test interval shall not exceed 48 months since its last set-pressure test. A 12 month period is allowed to complete testing once the relief valve is removed from the system.

c) A relief valve that satisfies the as-found set-pressure test criterion may have its test interval extended by up to 24 months. The test interval shall begin from the date of the as-left set-pressure test for the installed valve.

d) A relief valve that fails the as-found set-pressure test shall have its test interval reduced by 24 months. The minimum required test frequency for this circumstance is a 24 month interval.

e) The test interval for any individual relief valve shall not exceed 120 months except that a six (6) month grace period is allowed to coincide with refueling outages to accommodate extended operation or shutdown periods.

f) The Owner may satisfy testing requirements by installing a pretested valve to replace the valve that had been in service provided that the valve removed from service shall be tested within 12 months of removal from the system.

In summary, ONS proposes an alternative to test the Relief Valves listed in this relief request by implementing the requirements of ASME OM Code Case OMN-24, "*Alternative Requirements for Testing ASME Class 2 and 3 Pressure Relief Valves (For Relief Valves in a Group of One)*', as approved by ASME.

Using the provisions of this request would provide adequate detection of component degradation, and would continue to provide reasonable assurance of the operational readiness of affected ONS components. Therefore, compliance with the requirements of ASME OM Code Case OMN-24 would result in an acceptable level of quality and safety pursuant to 10 CFR 50.55a(z)(1).

## 6. Duration of Proposed Alternative

This relief will be implemented during the ONS Units 1, 2, and 3, Sixth Ten-Year Inservice Testing Interval, which starts on July 1, 2022 for valves required by ASME OM Code, 2017 Edition, Subsection ISTC.

## 7. Precedent

Fermi VRR-005 (ADAMS Accesion No. ML19248C707) SER for Fermi, approving VRR-005 for use of OMN-24, approved October 3, 2019.

## 8. References

1. Code Case OMN-24, '*Alternative Requirements for Testing ASME Class 2 and 3 Pressure Relief Valves (For Relief Valves in a Group of One)*.'

# Enclosure 3

# Relief Request ON-MOV-OMN-26

## 1. ASME Code Components Affected

Active safety related motor-operated valves (MOVs) that are required by Subsection ISTC of the 2017 Edition of the American Society of Mechanical Engineers (ASME) Operation and Maintenance of Nuclear Power Plants (OM) Code to be tested in accordance with Appendix III entitled "Preservice and Inservice Testing of Active Electric Motor-Operated Valve Assemblies in Water-cooled Reactor Nuclear Power Plants."

## 2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance of Nuclear Power Plants (OM) Code, 2017 Edition.

## 3. Applicable Code Requirement

The following paragraphs and subparagraphs in Mandatory Appendix III of the ASME OM Code are affected by this Relief Request to adopt Code Case OMN-26, 'Alternative Risk-Informed and Margin Based Rules for Inservice Testing of Motor Operated Valves.'

Appendix III, III-3310 "Inservice Test Interval", subparagraph (c): "The maximum inservice test interval shall not exceed 10 yr. MOV inservice tests conducted per para. III-3400 may be used to satisfy this requirement."

Appendix III, III-3700, "Risk-Informed MOV Inservice Testing": Risk-informed MOV inservice testing that incorporates risk insights in conjunction with performance margin to establish MOV grouping, acceptance criteria, exercising requirements and testing interval may be implemented.

Appendix III, Subparagraph III-3721, "HSSC MOVs": "HSSC MOVs shall be tested in accordance with para. III-3300 and exercised in accordance with para. III-3600. HSSC MOVs that can be operated during plant operation shall be exercised quarterly, unless the potential increase in core damage frequency (CDF) and large early release (LER) associated with a longer exercise interval is small."

Appendix III, III-3722 "LSSC MOVs", subparagraph (d): "LSSC MOVs shall be inservice tested at least every 10 yr. in accordance with para. III-3310.

For each of these paragraphs, relief is being requested for alternative treatments described in Section 5 of this Relief Request based on the ASME Board of Nuclear Codes and Standards (BNCS) approved Code Case OMN-26.

## 4. Reason for Request

In accordance with 10 CFR 50.55a(z)(1), Oconee Nuclear Station (ONS), Units 1, 2, and 3 is requesting approval to adopt ASME OM Code Case OMN-26, 'Alternative Risk-Informed and Margin Based Rules for Inservice Testing of Motor Operated Valves', in conjunction with implementing Mandatory Appendix III as part of the 2017 Edition of the OM Code.

Code Case OMN-26 better aligns the inservice test intervals in Mandatory Appendix III to the Risk and Margin Based Licensee Motor Operated Valve (MOV) Programs developed in response to NRC Generic Letter 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor Operated Valves," that have been in effect since 1998. There is no formal technical basis in Appendix III for limiting the maximum inservice test interval to 10

years. Code Case OMN-26 establishes a structured risk-informed approach for determining inservice intervals that provides an acceptable level of quality and safety while providing Oconee additional inservice test schedule flexibility.

## 5. Proposed Alternative and Basis for Use

**Proposed Alternative:**

ONS proposes to implement the ASME OM Code Case OMN-26 alternative risk and margin informed rules for inservice testing of MOVs in its entirety as described below:

**Proposed Alternative to III-3310(c)**

The maximum inservice test interval shall not exceed 10 years unless Risk Informed Inservice Testing under the alternative provisions of Code Case OMN-26 to para. III-3700. MOV inservice tests conducted per para. III-3400 may be used to satisfy this requirement.

**Proposed Alternative to III-3700**

Risk-informed MOV inservice testing that incorporates risk insights in conjunction with MOV Functional Margin to establish MOV grouping, acceptance criteria, exercising requirements and test interval may be implemented.

**Proposed Alternative to III-3721**

HSSC MOVs shall be tested in accordance with para. III-3300 and exercised in accordance with para. III-3600 while applying the following HSSC MOV Risk insights and limitations.

a) HSSC MOVs that can be operated during plant operation shall be exercised quarterly, unless the potential increase in core damage frequency (CDF) and large early release (LER) associated with a longer exercise interval is small.

b) For HSSC MOVs, the maximum inservice test interval shall be established in accordance with Table 1 of OMN-26 as shown below.

**Table 1**

**HSSC MOV – Margin Based Maximum Inservice Test Intervals**

| HSSC MOV Functional Margin(D) | Maximum Inservice Test Interval (Years) | If MOV is routinely(A) operated at Design Basis Pressure Conditions- Max Inservice Test Interval (Years) (B) |
|---|---|---|
| Low (< 5%) | 2 | 4 |
| Medium (≥ 5% and < 10%) | 4 | 9 |
| High (≥ 10% and < 20%) | 9 | 9 |
| Very High (≥ 20%) | 9 | 12 |

**OMN-26 Table 1 Notes:**

(A) Occurs at a periodicity no less frequent than once a refueling outage.

(B) To utilize these intervals, test strokes at or exceeding design basis system conditions must be in the applicable safety function direction(s) and have no applicable operating experience, degradation or diagnostic test anomaly with the potential for adverse impact on MOV functional margin or the capability of the MOV to perform its design basis function.

(D) For the purpose of this code case, the MOV functional margin limits apply to the As-Left MOV condition at the start of the inservice test interval and include applicable test uncertainties and allowance for service- related degradation.

**Proposed Alternative to III-3722(d)**

For LSSC MOVs, the maximum inservice test interval shall be established in accordance with Table 2 of OMN-26, as shown below.

**Table 2**

**LSSC MOV – Margin Based Maximum Inservice Test Intervals**

| LSSC MOV Functional Margin(D) | Maximum Inservice Test Interval (Years) | If MOV is routinely(A) operated at Design Basis Pressure Conditions- Max Inservice Test Interval (Years) (B) |
|---|---|---|
| Low (< 5%) | 4 | 9 |
| Medium (≥ 5% and < 10%) | 9 | 12 |
| High (≥ 10% and < 20%) | 12 | 12 |
| Very High (≥ 20%) | 12 | 16(C) |

**OMN-26 Table 2 Notes:**

(A) Occurs at a periodicity no less frequent than once a refueling outage.

(B) To utilize these intervals, test strokes at or exceeding design basis system conditions must be in the applicable safety function direction(s) and have no applicable operating experience, degradation or diagnostic test anomaly with the potential for adverse impact on MOV functional margin or the capability of the MOV to perform its design basis function.

(C) Operating plants that have acquired the requisite test data to satisfy Appendix III, paragraphs III-3310(b) or III-3722(c) must complete one cycle of collecting diagnostic test data at an extended test interval, minimum 9 and maximum 12 years, before extending the test interval by engineering evaluation to the maximum 16-year test interval.

(D) For the purpose of this code case, the MOV functional margin limits apply to the As-Left MOV condition at the start of the inservice test interval and include applicable test uncertainties and allowance for service-related degradation.

**Basis for Use:**

The requested relief to adopt OMN-26 is in line with the current JOG MOV Periodic Verification Test Program that ONS has implemented at ONS in response to NRC Generic Letter 96-05. Both the JOG MOV PV Program and Code Case OMN-26 provide a Risk-Margin based methodology that establishes limitations for maximum inservice test intervals for MOVs. Code Case OMN-26 simply provides a reasonable extension of this Risk-Informed philosophy based on the lessons learned and accumulated MOV performance data gathered during MOV Performance Verification Testing. Appendix III alone, isolated from OMN-26, provides no such methodology other than a maximum limit for the inservice test interval regardless of Risk or Margin.

The requested allowed maximum inservice test intervals are modest extensions with many of the Low Risk MOVs extending from 10 to 12 years (20% increase). This test interval change can be readily adopted with no loss of MOV performance and/or safety system reliability provided that no adverse performance trends are indicated. ONS's MOV Performance Trending Governance will ensure that only MOV's with good performance history, high stable margins and no adverse diagnostic trends would be candidates for the OMN-26 based inservice test interval extensions.

The requested High Margin Maximum interval changes afforded by OMN-26 align with ONS's desire to adopt a divisional MOV outage testing strategy that reduces the implementation burden of MOV Inservice Testing and allows greater flexibility in optimizing safety system availability. The current six and ten-year JOG Program based High-Margin Maximum Intervals do not support this strategy.

The requested relief reduces the maximum test interval for High Safety Significant Component (HSSC) MOVs allowed by Appendix III from ten years to nine years commensurate with Risk Informed Methodology. Further under this relief request, ONS will treat MOVs currently classified as Medium Risk by the 3-Tier JOG Risk Ranking as High Risk (HSSC) thereby providing more rigorous periodic verification requirements for the applicable valves especially those with less than high margin.

The requested relief takes credit for routine design basis differential pressure testing (DBDPT) of MOVs to justify extending the maximum Inservice test interval to 12 Years for Very High Margin HSSC MOVs and 16 years for Very High Margin Low Safety Significant Component (LSSC) MOVs.

With the exception of Low Risk MOVs routinely operated at design basis differential pressure (D-P) conditions, Code Case OMN-26 does not allow maximum MOV Inservice Test intervals to exceed ten years unless the associated MOVs are classified as High Margin. Most High Risk MOVs are limited to four years or less for Low/Medium Margins and most Low Risk MOVs are limited to nine years or less for Low/Medium Margins. Code Case OMN-26 provides more rigorous requirements targeted specifically to Low/Medium Margin MOVs than currently allowed under Appendix III. This Risk/Margin approach is in line with accepted Risk-Informed Strategies such as the JOG MOV Periodic Verification Program.

Use of the proposed alternative is expected to result in improved MOV Margins at ONS in order to attain higher margin status to allow use of the extended maximum inservice test intervals permitted by the OMN-26 Code Case.

For the majority of applicable MOVs (i.e., those MOVs not subject to periodic stroking under design basis D-P conditions), the Code Case limited the scope to only High Margin Valves for extending test intervals incrementally beyond current limits:

- Test intervals for High Risk MOVs go from six to nine years (Note: Nine years is aligned to Pressurized Water Reactor nuclear power plants (PWRs) on 18-month refueling cycles)
- Test intervals for Low Risk MOVs go from ten to 12 years (Note: 12 years is aligned for all Boiling Water Reactor nuclear power plants (BWRs) and PWRs with either 18- or 24- month refueling cycles).

The Table below provides a detailed comparison of the Maximum MOV Test Intervals for the JOG MOV Program, Mandatory Appendix III and Code Case OMN-26 that ONS seeks to adopt via this relief request. MOVs identified with **Bold and Underline** type have maximum MOV inservice test intervals exceeding the current Appendix III ten-year limit.

**Table 3**

**ONS Maximum MOV Test Intervals Based on Code Case OMN-26**

| | Maximum Inservice Test Intervals (Years) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | HSSC MOVs | | | | LSSC MOVs | | | |
| MOV Margin(H) | JOG MOV PV Program | Appendix III | OMN-26 | OMN-26 w/DBDPT (F) | JOG MOV PV Program | Appendix III | OMN-26 | OMN-26 w/DBDPT (F) |
| Low (<5%) | 2 | 10 | 2 (A,B) | 4 (E) | 6 | 10 | 4 (A,C,E) | 9 (E) |
| Medium (≥5% and <10%) | 4 | 10 | 4 (A,B,E) | 9 (E) | 10 | 10 | 9 (A,C,E) | **12** (D,E) |
| High (≥10% and <20%) | 6 | 10 | 9 (E) | 9 (E) | 10 | 10 | **12** (D,E) | **12** (D,E) |
| Very High (≥ 20%) | N/A | 10 | 9 (E) | **12** (D,E) | N/A | 10 | **12** (D,E) | **16** (D,E,G) |
| Description -> | Existing Industry Standard | Existing ASME OM Code | Relief Request | Relief Request | Existing Standard | Existing ASME OM Code | Relief Request | Relief Request |

Table 3 Notes

(A) Code Case Maximum Inservice Test Intervals for all Low/Medium Margin MOVs are less than or equal to current ten-year Appendix III limit. (i.e., Code Case is more conservative than Appendix III for Low/Medium Margin MOVs).

(B) Code Case Maximum Inservice Test Intervals for Low/Medium Margin HSSC MOVs are equal to the current JOG MOV PV Program limits of two/four years respectively. (Code Case intervals are aligned with JOG MOV).

(C) Code Case Maximum Inservice Test Intervals for Low/Medium Margin LSSC MOVs (four/nine years) are less than the current JOG MOV PV Program limits of six/ten years respectively.

(D) The following four categories of MOVs have maximum inservice test intervals that exceed the current ten-year limit:

a. High Margin, LSSC MOVs (12 Years)

b. Very High Margin, HSSC MOVs that are periodically stroked at design basis DP conditions (DBDPT) (12 Years)

c. Medium Margin, LSSC MOVs that are periodically DBDPT (12 Years)

d. Very High Margin, LSSC MOVs that are periodically DBDPT (16 Years).

(E) Except for Low Margin HSSC MOVs, the Maximum MOV Inservice Test Intervals are optimized for Divisional Outage Scheduling (i.e., 4, 9, 12, 16 years). Nine years is optimal for PWRs restricted to 18 month refueling outages. 12 years is optimal for both PWRs and BWRs and supports both 18-month and 24-month refueling outages.

(F) To utilize these intervals, test strokes at or exceeding design basis system conditions must occur at a periodicity no less frequent than once a refueling cycle, must be in the applicable safety function direction(s), and the MOV must have no applicable operating experience, degradation or diagnostic test anomaly with the potential for adverse impact on MOV functional margin or the capability of the MOV to perform its design basis function. These routine strokes during the inservice test interval are not required to be diagnostically monitored.

(G) Operating plants that have acquired the requisite test data to satisfy Appendix III, paragraphs III-3310(b) or III-3722(c) must complete one cycle of collecting diagnostic test data at an extended test interval, minimum 9 and maximum 12 years, before extending the test interval by engineering evaluation to the maximum 16-year test interval.

(H) The MOV functional margin limits apply to the As-Left MOV condition at the start of the inservice test interval and includes applicable test uncertainties and allowance for service-related degradation. The inservice test interval is uniquely established for each MOV based on margin and risk classification of the MOV.

## 6. Duration of Proposed Alternative

This relief will be implemented during the ONS, Sixth Ten-Year Inservice Testing Inspection for Motor Operated Valves required by ASME OM Code, 2017 Edition, Subsection ISTC and Mandatory Appendix III.

## 7. Precedents

ADAMS Accession No. ML20232A171, SER for Proposed Alternative to Utilize Code Case OMN-26 – Braidwood Units 1 and 2, Calvert Cliffs Units 1 and 2, Clinton Power Station, RE Ginna, Limerick Generating Station Units 1 and 2, Nine Mile Point Units 1 and 2, Peach Bottom Units 2 and 3.

## 8. References

1. Code Case OMN-26, ‘Alternative Risk-Informed and Margin Based Rules for Inservice Testing of Motor Operated Valves’

# Enclosure 4

# Relief Request ON-RPI-OMN-28

## 1. ASME Code Components Affected

The valves covered and affected by this Relief Request are those Oconee Nuclear Station (ONS) Units 1, 2, and 3 valves equipped with remote position indication that have been determined to be "stem-disk separation non-susceptible valve(s)" as defined in ASME Code Case OMN-28, "Alternative Valve Position Verification Approach to Satisfy ISTC-3700 for Valves Not Susceptible to Stem-Disk Separation."

## 2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance of Nuclear Power Plants (OM) Code, 2017 Edition.

## 3. Applicable Code Requirement

ISTC paragraph ISTC-3700, 'Position Verification Testing' states that valves with remote position indicators shall be observed locally at least once every 2 yr to verify that valve operation is accurately indicated. Where practicable, this local observation should be supplemented by other indications such as use of flow meters or other suitable instrumentation to verify obturator position. These observations need not be concurrent. Where local observation is not possible, other indications shall be used for verification of valve operation. Position verification for active MOVs shall be tested in accordance with Mandatory Appendix III of this Division.

Mandatory Appendix III, 'Preservice and Inservice Testing of Active Electric Motor-Operated Valve Assemblies in Water-Cooled Reactor Nuclear Power Plants', subparagraph III-3300 'Inservice Test' (e) states that remote position indication shall be verified locally during inservice testing or maintenance activities.

10 CFR Section 50.55a(b)(3)(xi) imposes the following OM condition for use of the 2012 or later editions of the OM Code for "Valve Position Indication": "When implementing paragraph ISTC-3700, "Position Verification Testing", in the ASME OM Code, 2012 Edition through the latest edition and addenda of the ASME OM Code incorporated by reference in paragraph (a)(1)(iv) of this section, licensees shall verify that valve operation is accurately indicated by supplementing valve position indicating lights with other indications, such as flow meters or other suitable instrumentation to provide assurance of proper obturator position for valves with remote position indication within the scope of Subsection ISTC including its mandatory appendices and their verification methods and frequencies."

## 4. Reason for Request

In accordance with 10 CFR 50.55a(z)(1), ONS proposes to utilize the provisions and requirements of Code Case OMN-28 for those valves that can be defined, categorized, and documented by engineering justification as "stem-disk separation non-susceptible valve(s).

Proposed NRC amendments to 50.55a(b)(3)(xi) will allow schedule flexibility for valves determined to be not susceptible to stem-disc separation by specifying that position verification testing required by ISTC-3700 may be performed on a 10-year interval (rather than the 2-year interval specified in ISTC-3700 where justification is documented and available for NRC review.

The ASME Code committees have prepared Code Case OMN-28, '*Alternative Valve Position Verification Approach to Satisfy ISTC-3700 for Valves Not Susceptible to Stem Disc Separation."* This Code Case has not been approved for use in Regulatory Guide 1.192, Operation and Maintenance Code Case Acceptability, ASME OM Code, Revision 3, October 2019. This Code Case has been approved by ASME and is listed in the Applicability Index from ASME Codes and Standards, as applicable through the 2020 Edition of the ASME OM Code.

This Code Case mirrors the philosophy and methodology of the proposed NRC modifications to 50.55a(b)(3)(xi) for valves determined to be non-susceptible to stem-disc separation. The Code Case differs in that it proposes a 12 year rather than a 10 year interval. In accordance with 10 CFR 50.55a(z)(1), the relaxation of the prescribed intervals for performing ISTC-3700 supplemental position verification requirements in accordance with the 50.55a(b)(3)(xi) condition would provide an acceptable level of quality and safety for valves meeting the OMN-28 definition of "stem-disk separation non-susceptible valve(s)".

## 5. Proposed Alternative and Basis for Use

ONS proposes to utilize the provisions of Code Case OMN-28

**Determination of Applicable Scope:**

The valves covered by this Code Case are those stem-disk separation non-susceptible valves with remote position indication within the scope of Subsection ISTC including its mandatory appendices and their verification methods and frequencies, in accordance with regulatory requirements.

Valves with remote position indication within the scope of ASME OM Code, Subsection ISTA, paragraph ISTA-1100, not satisfying the scope and provisions of this Code Case shall meet the valve position verification requirements in ASME OM Code, Subsection ISTC-3700, in accordance with regulatory requirements.

**Supplemental Definition:**

In accordance with Code Case OMN-28, a "stem-disk separation non-susceptible valve" is defined as:

"A valve with a documented justification that the stem-disk connection has been determined to not be susceptible to separation based on the internal design, service conditions, applications and evaluation of the stem-disk connection using plant specific and industry operating experience, and vendor recommendations."

**Categorization of Valves Not Susceptible to Stem-Disk Separation:**

To categorize a valve as not susceptible to stem-disc separation, the valve shall have a documented justification that the stem-disk connection is not susceptible to separation based on the internal design, service conditions, applications and evaluation of the stem-disk connection using plant-specific and industry operating experience, and vendor recommendations. For example, some valves with a threaded stem-disk connection are susceptible to stem-disk separation based on industry operating experience. A valve without such documented justification shall be categorized as a stem-disc separation susceptible valve and outside the scope of this Relief Request.

**Position Verification Testing Requirements for Valves Not Susceptible to Stem-Disk Separation:**

Valves with remote position indicators that are not susceptible to stem-disk separation shall be verified to accurately represent valve operation, open and closed. This verification shall include the following:

a) observation of evidence, such as changes in system pressure, flow rate, level, or temperature, that represent valve operation;

b) local observation of valve operation where practicable; and

c) stem-disk separation evaluation shall be documented and available for regulatory review demonstrating that the stem-disk connection is not susceptible to separation.

For active valves not susceptible to stem-disk separation, these observations shall be performed at least once every 12 yr. These observations need not be concurrent.

For passive valves not susceptible to stem-disk separation, these observations shall be performed whenever the valve is stroked from its passive position or every 12 yr., whichever is greater.

**Unsuccessful Valve Position Verification Test:**

In the event of an unsuccessful position verification test performed in accordance with this Relief Request (as described above), the failure shall be entered into the Corrective Action Program, and the cause of the condition determined. If the result of the failure is due to stem-disc separation, the valve shall not be considered a stem-disk separation non-susceptible valve and will no longer be within the scope of this Code Case along with any other valves impacted by the extent of condition review. The valve(s) will remain out of scope of this Relief Request along with any other valves impacted by the extent of condition review. The valve(s) will remain out of scope of this Relief Request unless a valve-specific test interval up to 12 years is justified and documented based on the cause of the failure. This Relief Request may be re-applied to those valves that have undergone corrective action to demonstrate that the valve is a stem-disk separation non-susceptible valve and meet the categorization requirements of a valve not susceptible to stem-disc separation.

In summary, ONS proposes to utilize the provisions and requirements of Code Case OMN-28 for those valves that can be defined, categorized, and documented by engineering justification as "stem-disk separation non-susceptible valve(s). Compliance with the requirements of ASME OM Code Case OMN-28 would result in an acceptable level of quality and safety pursuant to 10 CFR 50.55a(z)(1).

## 6. Duration of Proposed Alternative

This relief will be implemented during the ONS, Sixth Ten-Year Inservice Testing Inspection, which starts on July 1, 2022 for pumps required by ASME OM Code, 2017 Edition, Subsection ISTC.

## 7. Precedents

None.

## 8. References

1. Code Case OMN-28, '*Alternative Valve Position Verification Approach to Satisfy ISTC-3700 for Valves Not Susceptible to Stem-Disk Separation.*

# Enclosure 5

# Relief Request ON-SRP-HPI-03

## 1. ASME Code Components Affected

| Component Identification | Group |
|---|---|
| 1HPI-PU-0001, 1A HPI PUMP | A |
| 1HPI-PU-0002, 1B HPI PUMP | A |
| 1HPI-PU-0003, 1C HPI PUMP | A |
| 2HPI-PU-0001, 2A HPI PUMP | A |
| 2HPI-PU-0002, 2B HPI PUMP | A |
| 2HPI-PU-0003, 2C HPI PUMP | A |
| 3HPI-PU-0001, 3A HPI-PUMP | A |
| 3HPI-PU-0002, 3B HPI PUMP | A |
| 3HPI-PU-0003, 3C HPI PUMP | A |

## 2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance of Nuclear Power Plants (OM) Code 2017 Edition.

## 3. Applicable Code Requirement

ISTB-3540(b), On vertical line shaft pumps, measurements shall be taken on the upper motor-bearing housing in three approximately orthogonal directions, one of which is the axial direction.

## 4. Impracticality of Compliance

Pursuant to 10 CFR 50.55a(f)(6)(i), relief is requested from the requirements of the ASME OM Code, 2017 Edition, Subsection ISTB, Paragraph ISTB-3540(b), for vibration measurements on the Oconee High Pressure Injection Pumps.

The OM Code required vibration measurements on the upper motor bearing housing for the subject pumps are impractical on the basis of inaccessibility due to location and design features of the motor. Plant design does not include permanent scaffolding or ladders which provide access to the top of the motors for the subject pumps. Also, the upper motor bearing housing is contained within a cone shaped fiberglass protective shroud which obstructs access to the bearing housing and prevents performance of the axial vibration measurement (a drawing is available upon request). In order to perform the required measurements, the component would need to be redesigned to eliminate the shroud or the shroud would have to be removed for each test. Both of these options are impractical. In addition, removal of the shroud during pump operation to provide direct access to the bearing housing would create an additional equipment concern due to the potential for foreign material intrusion and component damage. Vibration measurements taken on the fiberglass shroud would not provide useful of meaningful information.

Consideration has been given to obtaining axial data at a different location such as the bottom of the motor near the pump/motor coupling area. Any axial measurement recorded at the lower bearing housing would be significantly attenuated due to distance from the thrust bearing. Axial forces applied on the thrust bearing faces would be transmitted through the upper bearing housing, down the external housing around the stator, into the lower bearing housing, and finally to a vibration probe attached to the lower housing.

Ultimately the additional vibration data proposed in this alternative (without axial vibration measurement) was determined to add more value for monitoring and trending degradation.

5. **Burden Caused by Compliance**

To facilitate compliance with the OM Code testing requirement, the plant would need to be modified to provide a permanent ladder or platform for access to the bearing on each of nine motors. Also, each pump/motor assembly would have to be redesigned to remove the bearing shroud during pump operation. Since this would subject the component to potential damage by foreign material intrusion, the pump/motor redesign would have to provide protection from foreign material intrusion while still allowing access. These modifications are impractical and create an unnecessary burden.

6. **Proposed Alternative and Basis for Use**

The HPI pumps are considered Group A, vertical line shaft pumps. Quarterly vibration readings are taken at two locations on the motor and two locations on the pump. Locations on the motor are inboard bearing and approximately midway on the motor housing. Locations on the pump are the pump inboard bearing and on the pump stand. At each location, vibration measurements are recorded in two approximately orthogonal directions perpendicular to the rotating shaft. These locations have been chosen for monitoring in an effort to identify specific failure modes and have proven to provide early indication of abnormal pump / motor performance. Monitoring of the pump / motor vibrations at these locations will ensure the health of the pumps is sufficiently examined. It is worth noting that the OM Code imposes more stringent hydraulic acceptance criteria on these vertical line shaft pumps than for horizontal centrifugal pumps. This more stringent hydraulic acceptance criteria place more emphasis on detection of degradation through hydraulic test data than through mechanical test data.

Application of the OM hydraulic testing criteria along with radial vibration monitoring in the areas described above will provide adequate data for assessing the condition of the subject pumps and for monitoring degradation. Therefore, reasonable assurance of operational readiness for these pumps will be maintained.

7. **Duration of Proposed Alternative**

This Relief Request will be implemented during the Oconee Nuclear Station (ONS), Units 1, 2 and 3, Sixth Ten-Year Inservice Testing Interval for pumps required by ASME OM Code, 2017 Edition, which starts on July 1, 2022.

**8. Precedents**

NRC Safety Evaluation Report – ON-SRP-HPI-03, dated March 28, 2011 [ADAMS Accession No. ML110660588]