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10 CFR 50.55a

RBG-48134

November 29, 2021

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Inservice Testing Program Relief Request VRR-RBS-2021-1
Pressure Isolation Valve Testing Frequency

River Bend Station, Unit 1
NRC Docket No. 50-458
Renewed Facility Operating License No. NPF-47

In accordance with 10 CFR 50.55a(z)(1), Entergy Operations, Inc. (Entergy) proposes an alternative to the requirements of American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code), Section ISTC-3522,"Category C Check Valves," and Subsection ISTC-3630(a) under Section ISTC-3630, "Leakage Rate for Other Than Containment Isolation Valves" for 13 pressure isolation valves (PIVs) at River Bend Station, Unit 1 (RBS). Entergy is currently operating RBS in the fourth 10-year interval of the Inservice Test (IST) Program in compliance with the 2004 Edition of the ASME OM Code through, and including, the 2006 Addenda.

This request is for NRC approval of an alternative to the OM Code PIV testing frequency (i.e., each refueling outage). Entergy proposes to adopt a performance-based testing frequency for the 13 PIVs, similar to that established under 10 CFR 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors," Option B, "Performance-Based Requirements." The Enclosure to this letter provides Relief Request VRR-RBS-2021-1 Revision 0. Attachment 1 to the enclosure provides historical test results for the 13 PIVs, which form the basis for acceptability of the proposed relief request.

Entergy is submitting this 10 CFR 50.55a(z)(1) request for the remainder of the fourth 10-year IST interval for RBS, which is scheduled to end on November 30, 2027. As described in Enclosure and Attachment 1, the proposed alternative provides an acceptable level of quality and safety.

There are no regulatory commitments contained in this letter. Entergy requests approval of this alternative by December 31, 2022.

Should you have any questions or require additional information, please contact Tim Schenk, RBS Regulatory Assurance Manager at (225) 381-4177 or tschenk@entergy.com.

Respectfully,

Philip Couture

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Date: 2021.11.29 10:23:03 -06'00'

Phil Couture

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Enclosure: River Bend Station, Unit 1, Request for Alternative, VRR-RBS-2021-1, Revision 0

Attachment to Enclosure:

1. River Bend Station, Unit 1, Leakage History – Pressure Isolation Valves

cc: NRC Regional Administrator – Region IV
NRC Senior Resident Inspector – River Bend Station, Unit 1
NRC Project Manager – River Bend Station, Unit 1

Enclosure

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River Bend Station, Unit 1, Request for Alternative, VRR-RBS-2021-1, Revision 0

(6 Pages Total)

Request for Alternative

VRR-RBS-2021-1, Revision 0

1. American Society of Mechanical Engineers (ASME) Code Component(s) Affected

Component Number	Description	System	ASME Code Class	OM Code Category
1E22-AOVF005	HPCS Pump Discharge Header Check Valve Inside Drywell	CSH	1	A/C
1E22-MOVF004	HPCS Pump Discharge Header Main Isolation Valve	CSH	1	A
1E21-AOVF006	LPCS Pump Injection Inside Drywell Check Valve	CSL	1	A/C
1E21-MOVF005	LPCS Pump Injection Shut Off Valve	CSL	1	A
1E12-AOVF041A	RHR Pump A Injection Line Testable Check Valve	RHS	1	A/C
1E12-AOVF041B	RHR Pump B Injection Line Testable Check Valve	RHS	1	A/C
1E12-AOVF041C	RHR Pump C Injection Line Testable Check Valve	RHS	1	A/C
1E12-MOVF042A	RHR Pump A Return Line Isolation Valve	RHS	1	A
1E12-MOVF042B	RHR Pump B Return Line Isolation Valve	RHS	1	A
1E12-MOVF042C	RHR Pump C Return Line Isolation Valve	RHS	1	A
1E12-MOVF008	RHR Pump Shutdown Cooling Outboard Isolation Valve	RHS	1	A
1E12-MOVF009	RHR Pump Shutdown Cooling Inboard Isolation Valve	RHS	1	A
1RHS-V240	RHR Pump C Shutdown Cooling Inlet Check Valve	RHS	1	A/C

2. Applicable ASME Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code) – 2004 Edition through, and including, the 2006 Addenda.

3. Applicable ASME Code Requirement(s)

ASME OM Code, Subsection ISTC-3522, "Category C Check Valves," states category C check valves shall be exercised as follows:

(a) During operation at power, each check valve shall be exercised or examined in a manner that verifies obturator travel by using the methods in ISTC-5221.

(c) If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages.

ASME OM Code, Subsection ISTC-3630, "Leakage Rate for Other Than Containment Isolation Valves," states, in part:

> Category A valves with a leakage requirement not based on an Owner's 10 CFR 50, Appendix J, program, shall be tested to verify their seat leakages within acceptable limits. Valve closure before seat leakage testing shall be by using the valve operator with no additional closing force applied.

ASME OM Code Subsection ISTC-3630(a), "Frequency," states, "Tests shall be conducted at least once every two years".

4. Reason for Request

In accordance with 10 CFR 50.55a, "Codes and standards," paragraph (z)(1), "Alternatives to codes and standards requirements," Entergy Operations, Inc. (Entergy) proposes an alternative to the requirements of ASME OM Code Section ISTC-3522, "Category C Check Valves," and Subsection ISTC-3630(a) under Section ISTC-3630, "Leakage Rate for Other Than Containment Isolation Valves," for the subject pressure isolation valves (PIVs). Approval of this alternative will allow PIV testing to be performed at the River Bend Station (RBS) on a performance-based frequency. The proposed 10 CFR 50.55a(z)(1) alternative provides for more efficient plant operation and lower cumulative radiation exposure (CRE), while maintaining an acceptable level of quality and safety.

Since PIVs may or may not be containment isolation valves, they are not necessarily included in scope for performance-based testing, as provided in 10 CFR 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors," Option B, "Performance-Based Requirements." The concept behind the 10 CFR 50, Appendix J, Option B alternative for containment isolation valve testing is that licensees should be allowed to adopt cost-effective methods, including the setting of test intervals, for complying with regulatory requirements. Nuclear Energy Institute (NEI) 94-01, "Industry Guideline for Implementing Performance Based Option of 10 CFR 50, Appendix J," Revision 3-A (Reference 1), describes a risk-informed basis for extending containment isolation valves test intervals under Option B. That justification shows that for containment isolation valves which have demonstrated good performance by successful completion of two consecutive leakage rate tests over two consecutive cycles, licensees may increase their test frequencies. Additionally, it states that if the component does not fail within two operating cycles, further failures appear to be governed by the random failure rate of the component. NEI 94-01 also presents the

results of a comprehensive risk analysis, including the conclusion that "the risk impact associated with increasing [leak rate] test intervals are negligible (i.e., less than 0.1 percent of total risk)."

NRC approval of the proposed performance-based scheduling of PIV tests at RBS will enable Entergy to implement a reduction in the resources required for testing, as well as a reduction in refueling outage duration.

NUREG-0933, "Resolution of Generic Safety Issues," Issue 105, "Interfacing Systems LOCA at LWRs," (Reference 2) discusses the need for PIV leak-rate testing based primarily on three pre-1985 historical failures of applicable valves industrywide. These failures all involved human errors in either operations or maintenance. None of these failures involved inservice equipment degradation.

The performance of PIV leak rate testing provides assurance of acceptable seat leakage with the valve in a closed condition. For check valves, functional testing is accomplished per ASME OM Code ISTC-3522, "Category C Check Valves," and ISTC-3520, "Exercising Requirements." Power-operated valves are routinely full stroke tested per ASME OM Code to ensure their functional capabilities. The functional testing of the PIV check valves will be monitored through a Condition Monitoring Plan in accordance with ISTC-5222, "Condition -Monitoring Program," and Mandatory Appendix II, "Check Valve Condition Monitoring Program." Performance of the separate two-year PIV leak rate testing does not contribute any additional assurance of functional capability; Rather, it only determines the seat tightness of the closed valves.

The use of a Condition Monitoring Plan is intended to align the frequency for the closure exercise testing with the pressure isolation valve test. By use of a Condition Monitoring Plan, the check valve closure test, based on performance, would be verified concurrently with the PIV seat leakage test. The frequency of the check valve closure test would then be the same as the PIV seat leakage test since closure performance and seat leakage performance are linked. The PIV seat leakage test would not pass if the valve failed to close.

5. Proposed Alternative and Basis for Use

In accordance with 10 CFR 50.55a, "Codes and standards," paragraph (z)(1), "Alternatives to codes and standards requirements," Entergy proposes the following alternative to the ASME OM Code requirements. The specific test interval for each PIV would be a function of its historical performance and would be established in a manner consistent with the containment isolation valve testing process under 10 CFR 50, Appendix J, Option B. Performance-based scheduling of PIV testing will be controlled in a manner similar to the methods described in NEI 94-01, Revision 3-A. PIV test performances would occur at a nominal frequency ranging from every refueling outage to every third refueling outage, subject to acceptable valve performance. Valves that have demonstrated good performance for two consecutive cycles may have their test interval extended up to 75-months, with a permissible extension (for non-routine emergent conditions) of nine months (84 months total).

A conservative control will be established such that if any valve fails the PIV test, the test interval will be reduced consistent with Appendix J, Option B, requirements. PIV test failure is defined as the low-pressure and high-pressure tests exceeding the Required Action Limit. Any PIV leakage test failure would require the component be returned to the initial ASME OM Code interval until good performance can again be established.

The primary basis for this proposed alternative is the historically good performance of the PIVs. Attachment 1, "River Bend Station, Unit 1, Leakage History – Pressure Isolation Valves," provides the leakage history for the 13 subject PIVs for five consecutive refueling outage test performances.

The functional capability of the check valves is demonstrated by the open and close exercise test. The open testing is separate and distinct from the PIV testing and is currently performed at a cold shutdown or refueling outage frequency, in accordance with ASME OM Code Section ISTC-3522, "Category C Check Valves." The closed testing will take credit for the PIV leak rate testing and will be on the same frequency as the PIV leak rate testing. The fact that the PIVs exhibit good historical performance (i.e., none of the check valve test results has exceeded the Required Action Limit) shows that the Category C check valves are exhibiting the required obturator movement to close and remain closed.

Note that NEI 94-01, Revision 3-A, is not the sole basis for this relief request, given that NEI 94-01, Revision 3-A, does not address seat leakage testing with water. The NEI document is being cited as an approach similar to the requested alternative method. If the proposed alternative is authorized and the valves exhibit good performance, the PIV test frequency will be controlled similar to the method described in NEI 94-01, Revision 3-A, so that testing of these PIVs would not be required each refueling outage.

The extension of test frequencies proposed is consistent with the guidance provided in 10 CFR 50, Appendix J, Type C leak rate tests as detailed in NEI 94-01, Revision 3-A, Paragraph 10.2.3.2, "Extended Test Interval," which states:

> Test intervals for Type C valves may be increased based upon completion of two consecutive periodic as-found Type C tests where the result of each test is within a licensee's allowable administrative limits. Elapsed time between the first and last tests in a series of consecutive passing tests used to determine performance shall be 24 months or the nominal test interval (e.g., refueling cycle) for the valve prior to implementing Option B to Appendix J. Intervals for Type C testing may be increased to a specific value in a range of frequencies from 30 months up to a maximum of 75 months. Test intervals for Type C valves should be determined by a licensee in accordance with Section 11.0.

Additional justification for NRC approval of this proposed alternative are:

- Separate functional testing of motor-operated valve (MOV) PIVs is performed in accordance with the ASME OM Code.

- Relief valves in the low pressure (LP) piping relief valves may not provide Intersystem Loss of Coolant Accident (ISLOCA) mitigation for inadvertent PIV mispositioning, but their relief capacity can accommodate conservative PIV seat leakage rates.

- Operators are highly trained to recognize symptoms of the presence of an ISLOCA (i.e., alarms that identify high pressure (HP) to low pressure (LP) leakage), and to take appropriate actions.

Following NRC approval of this alternative, leakage test intervals will be established based on performance. The leakage test intervals remain consistent with the process established under 10 CFR 50 Appendix J, Option B.

6. Duration of the Proposed Alternative

This relief is requested for the fourth ten-year IST interval, which began December 1, 2017, and is scheduled to end on November 30, 2027, for RBS.

7. Precedent

Several recently approved alternatives to allow PIV testing under a performance-based testing approach similar to that established under 10 CFR 50, Appendix J, Option B are listed below:

1. LaSalle County Station, Units 1 and 2, September 2019 (Reference 4)

2. Limerick Generating Station, Units 1 and 2, October 2019 (Reference 5)

3. Peach Bottom Atomic Power Station, Units 2 and 3, May 2018 (Reference 6)

4. Grand Gulf Nuclear Station, Unit 1, October 2021 (Reference 7)

8. References

1. Nuclear Energy Institute (NEI) 94-01, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," Revision 3-A, dated July 2012

2. U.S. Nuclear Regulatory Commission (NRC) NUREG-0933, "Resolution of Generic Safety Issues, Issue 105, Interfacing Systems LOCA at LWRs (Rev. 4) (NUREG-0933, Main Report with Supplements 1-34)"

3. NRC NUREG/CR-5928, "ISLOCA Research Program Final Report," dated July 1993 (ML072430731) (not-publicly available)

4. NRC letter to Exelon Generation Company, LLC (Exelon), "LaSalle County Station, Units 1 and 2 – Request from the Requirements of the ASME Code Related to Pressure Isolation Valve Testing Frequency (EPID L-2019-LLR-0062)," (ML19217A306), dated September 10, 2019

5. NRC letter to Exelon, "Limerick Generating Station, Units 1 and 2 – Safety Evaluation of Relief Requests GVRR-8, 11-PRR-1, 90-PRR-1 and 47-VRR-2, Regarding the Fourth 10-year Interval of the Inservice Testing Program (EPID L-2018-LLR-0384, EPID L-2018-LLR-0385, EPID L-2018-LLR-0386, and EPID L-2018-LLR-0387), (ML19228A195), dated October 28, 2019

6. NRC letter to Exelon, "Peach Bottom Atomic Power Station, Units 2 and 3 – Safety Evaluation of Relief Request GVRR-2 Regarding the Fifth 10-year Interval of the Inservice Testing Program (EPID No. L-2017-LLR-0094)," (ML18141A600), dated May 30, 2018

7. NRC letter to Entergy Operations, "Grand Gulf Nuclear Station, Unit 1 – Inservice Testing Program Relief Request VRR-GGNS-2021-1, Alternative Request for Pressure Isolation Valve Testing Frequency (EPID L-2021-LLR-0040), (ML21294A067), dated October 28, 2021

Enclosure, Attachment 1

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River Bend Station, Unit 1, Leakage History – Pressure Isolation Valves

(3 Pages Total)

As stated in the Enclosure, the primary basis for this proposed alternative is the historically good leakage test performance of the River Bend Station (RBS) Pressure Isolation Valves (PIVs). The table below provides the leakage test history for the 13 subject PIVs for five consecutive refueling outage test performances. The historical test performance for the 13 PIVs demonstrates successful leakage test results.

Valve	Month & Year Surveillance Completed	Measured Value (gpm)	Required Action Limit (gpm)	Comments
RHR Pump "A" Injection Line Testable Check Valve – STP-204-6603				
E12*AOVF041A	March 2021	0	>5.0	WO 52916200
	May 2019	0		WO 52766400
	March 2017	0		WO 52638590
	March 2015	0		WO 52499486
	March 2013	0		WO 52331871
RHR Pump "B" Injection Line Testable Check Valve – STP-204-6603				
E12*AOVF041B	March 2021	0	>5.0	WO 52916200
	May 2019	0		WO 52766400
	March 2017	0		WO 52638590
	March 2015	0		WO 52499486
	March 2013	0		WO 52331871
RHR Pump "C" Injection Line Testable Check Valve – STP-204-6603				
E12*AOVF041C	March 2021	0.10	>5.0	WO 52916200
	May 2019	0		WO 52766400
	March 2017	0		WO 52638590
	March 2015	0		WO 52499486
	March 2013	0		WO 52331871
RHR Pump "A" Return Line Isolation Valve – STP-204-6603				
E12*AOVF042A	March 2021	0	>5.0	WO 52916200
	May 2019	0		WO 52766400
	March 2017	0		WO 52638590
	March 2015	0		WO 52499486
	March 2013	0		WO 52331871
RHR Pump "B" Return Line Isolation Valve – STP-204-6603				
E12*AOVF042B	March 2021	0.46	>5.0	WO 52916200
	May 2019	0		WO 52766400
	March 2017	0		WO 52638590
	March 2015	0		WO 52499486
	March 2013	0		WO 52331871
RHR Pump "C" Return Line Isolation Valve – STP-204-6603				
E12*AOVF042C	March 2021	0	>5.0	WO 52916200
	May 2019	0		WO 52766400
	March 2017	0		WO 52638590
	March 2015	0		WO 52499486
	March 2013	0		WO 52331871

Valve	Month & Year Surveillance Completed	Measured Value (gpm)	Required Action Limit (gpm)	Comments
RHR Shutdown Cooling Outboard Isolation Valve – STP-204-6603				
E12*MOVF008	March 2021	0.11	>5.0	WO 52916200
	May 2019	0		WO 52766400
	March 2017	0		WO 52638590
	March 2015	0		WO 52499486
	March 2013	0		WO 52331871
RHR Shutdown Cooling Inboard Isolation Valve – STP-204-6603				
E12*MOVF009	March 2021	0	>5.0	WO 52916200
	May 2019	0		WO 52766400
	March 2017	0		WO 52638590
	March 2015	0		WO 52499486
	March 2013	0		WO 52331871
RHR Pump C Shutdown Cooling Inlet Check Valve – STP-204-6603				
RHS*V240	March 2021	0	>5.0	WO 52916200
	May 2019	0		WO 52766400
	March 2017	0		WO 52638590
	March 2015	0		WO 52499486
	March 2013	0		WO 52331871
HPCS Pump Discharge Header Check Valve Inside Drywell – STP-203-6603				
E22*AOVF005	March 2021	0	>5.0	WO 52916208
	April 2019	0		WO 52766970
	February 2017	0		WO 52640723
	March 2015	0		WO 52498320
	February 2013	0		WO 52331843
HPCS Pump Discharge Header Main Isolation Valve – STP-203-6603				
E22*MOVF004	March 2021	0	>5.0	WO 52916208
	April 2019	0		WO 52766970
	February 2017	0		WO 52640723
	March 2015	0		WO 52498320
	February 2013	0		WO 52331843
LPCS Pump Injection Inside Drywell Check Valve – STP-205-6603				
E21*AOVF006	March 2021	0	>5.0	WO 52900582
	May 2019	0		WO 52766001
	February 2017	0		WO 52640844
	March 2015	0		WO 52499047
	February 2013	0		WO 52331878
LPCS Pump Injection Shut Off Valve – STP-205-6603				
E21*MOVF005	March 2021	0	>5.0	WO 52900582
	May 2019	0		WO 52766001
	February 2017	0		WO 52640844
	March 2015	0		WO 52499047
	February 2013	0		WO 52331878

PIV Leakage Test Exceptions

None.