Constellation

4300 Winfield Road
Warrenville, IL 60555
630 657 2000 Office

February 17, 2022 10 CFR 50.55a

RS-22-011

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

Quad Cities Nuclear Power Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket Nos. 50-254 and 50-265

Subject: Submittal of Relief Requests Associated with the Sixth Inservice Testing Interval

The purpose of this letter is to request approval of proposed relief requests in accordance with 10 CFR 50.55a, "Codes and standards." The attached relief requests are associated with the Sixth 10-Year Inservice Testing (IST) Program Interval for Quad Cities Nuclear Power Station (QCNPS). The Sixth 10-Year Interval begins on February 18, 2023 and is required by 10 CFR 50.55a(f)(4) to comply with the requirements of the American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code (2017 Edition, no Addenda).

The QCNPS IST Sixth 10-year Interval will be in effect from February 18, 2023 to February 17, 2033. Accordingly, Constellation Energy Generation, LLC (CEG) requests approval of the enclosed relief requests by February 17, 2023.

Should you have any questions concerning this letter, please contact Ms. Rebecca L. Steinman at 630-657-2831.

Respectfully,

Patrick R. Simpson
Sr. Manager Licensing
Constellation Energy Generation, LLC

Attachment: Quad Cities Nuclear Power Station Inservice Testing Program Sixth 10-Year Interval Proposed Relief Requests

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station

ATTACHMENT

Quad Cities Nuclear Power Station
Inservice Testing Program Sixth 10-Year Interval
Proposed Relief Requests

Designator	Description	Comments
RV-03	Pressure Isolation Valve (PIV) Leak Test Frequency Consistent with Appendix J, Option B	Approved for Fifth IST Interval
RV-06	Main Steam Safety Valve Setpoint Testing, Additional Testing Requirements	Approved for Fifth IST Interval
RV-07	Main Steam Isolation Valve Technical Specification Stroke Time Limits in Lieu of ASME OM ISTC Stroke Time Limits	Approved for Fifth IST Interval
RV-08	Main Steam Relief/Safety Valve (MSRV) "Group of One" Testing Interval	Approved for Fifth IST Interval
RV-09	Reactor Pressure Vessel Main Steam Safety Valve (MSSV) Testing 8-Year Test Interval	Approved for Fifth IST Interval
RV-10	Adopt ASME OM Code Case OMN-26, "Alternative Risk-Informed and Margin Based Rules for Inservice Testing of Motor Operated Valves"	New Request
RV-11	Adopt ASME Code Case OMN-28, "Alternative Valve Position Verification Approach to Satisfy ISTC-3700 for Valves Not Susceptible to Stem-Disk Separation"	New Request

Proposed Alternative to the ASME OM Code to Revise Pressure Isolation Valve (PIV) Leak Test Frequency Consistent with Appendix J, Option B in Accordance with 10 CFR 50.55a(z)(1), "Alternate Provides Acceptable Level of Quality and Safety"

1. ASME Code Components Affected

Component Number	Valve Type	CIV, PIV, Both	System	Code Class	Category
1(2)-1001-047-MO	Gate	Both	RHR	1	A
1(2)-1001-050-MO	Gate	Both	RHR	1	A
1(2)-1001-029A-MO	Gate	Both	RHR	1	A
1(2)-1001-029B-MO	Gate	Both	RHR	1	A
1(2)-1001-068A	Check	PIV	RHR	1	A/C
1(2)-1001-068B	Check	PIV	RHR	1	A/C
1(2)-1402-009A	Check	PIV	CS	1	A/C
1(2)-1402-009B	Check	PIV	CS	1	A/C
1(2)-1402-025A-MO	Gate	Both	CS	1	A
1(2)-1402-025B-MO	Gate	Both	CS	1	A

2. Applicable Code Edition and Addenda

ASME OM Code, *Operation and Maintenance of Nuclear Power Plants*, 2017 Edition, no Addenda

3. Applicable Code Requirement

ISTC-3630, *Leakage Rate for Other Than Containment Isolation Valves*, states "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."

ISTC-3630(a), *Frequency*, states, "Tests shall be conducted at least once every 2 years."

4. Reason for Request

Pursuant to 10 CFR 50.55a, *Codes and standards*, paragraph (z)(1), an alternative is proposed to the testing requirements of ASME OM Code ISTC-3630(a) for the affected components on the basis that the alternative testing would provide an acceptable level of quality and safety.

ISTC-3630(a) requires that leakage rate testing for Pressure Isolation Valves (PIVs) be performed at least once every 2 years. PIVs are not specifically included in the scope for performance-based testing as provided for in 10 CFR 50, Appendix J, *Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors*, Option B, *Performance-Based Requirements* (Option B).

The Quad Cities Nuclear Power Station (QCNPS) Technical Specification (TS) 5.5.12, *Primary Containment Leakage Rate Testing Program*, contains a requirement to establish the leakage rate testing program in accordance with the guidelines contained in NEI 94-01, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," Revision 3-A, dated July 2012, and the conditions and limitations specified in NEI 94-01, Revision 2-A, dated October 2008.

The concept behind the Option B alternative for containment isolation valves (CIVs) is that licensees should be allowed to adopt cost effective methods for complying with regulatory requirements. Additionally, NEI 94-01 describes the risk-informed basis for extended test intervals under Option B. Specifically, valves that have demonstrated good performance by the successful completion of two consecutive leak rate tests for two consecutive cycles may increase their test frequencies. Furthermore, 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 and concludes that "the risk impact associated with increasing [leak rate] test intervals are negligible (less than 0.1% of total risk)."

The valves identified in this request are installed in water applications. While the motor-operated PIVs affected by this request are also CIVs, they are exempt from air testing because their respective lines meet the requirements for designation as closed water loops. The check valve PIVs are not CIVs and are not within the Appendix J scope. The PIV testing is performed with water pressurized to pressures lower than the function maximum pressure differential. However, the observed leakage is adjusted to the function maximum pressure differential value in accordance with ISTC-3630(b), *Differential Test Pressure*, item (4).

This relief request is intended to provide for performance-based scheduling of PIV tests at QCNPS to reduce dose maintaining it As Low As Reasonably Achievable (ALARA). Recent historical data identified that PIV testing incurs a total dose of approximately 600 millirem each refueling outage. Assuming the affected PIVs continue to remain classified as good performers, the extended test intervals would provide for a savings of approximately 1.2 rem over a 4-1/2 year period (a bounding timeframe encompassing two refueling outages). In addition, this request aids the station in the implementation of a division-based outage schedule.

NUREG-0933, *Resolution of Generic Safety Issues, Issue 105, "Interfacing Systems LOCA at LWRs,"* discussed the need for PIV leak rate testing based primarily on three pre-1980 historical failures of applicable valves industry-wide. These failures 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.

Typical PIV testing does not identify functional problems, which may inhibit the valve's ability to reposition from open to closed. For check valves, such 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. At QCNPS, these functional tests for motor-operated PIVs are performed on a 2-year frequency in accordance with Division 1, Mandatory Appendix III, *Preservice and Inservice Testing of Active Electric Motor-Operated Valve Assemblies in Water-Cooled Reactor Nuclear Power Plants*.

The functional capability of check valves 1(2)-1001-068A/B is demonstrated by the opening and closing of the valves using a valve actuator each refueling outage. This test is separate and distinct from the PIV testing; therefore, there is no need to include these two valves in the Condition Monitoring Plan.

The functional capability of check valves 1(2)-1402-009A/B is monitored through a Condition Monitoring Plan in accordance with ISTC-5222, *Condition-Monitoring Program*, and Division 1,

Mandatory Appendix II, *Check Valve Condition Monitoring Program*. Performance of the PIV leak rate test on a 2 year interval does not contribute any additional assurance of functional capability. The check valves functional capability is specifically demonstrated by the following:

1. The injection of Core Spray Flow into the Reactor Vessel, on a Cold Shutdown frequency (in accordance with ASME OM Code Subsection ISTC-3522), verifies the valve's capability of opening.

2. The capability of building pressure against the valve during PIV seat leakage testing verifies the valves are closed.

These tests provide reasonable assurance of operational readiness.

The use of a Condition Monitoring Plan is intended to align the frequency for the closure exercise testing with the PIV testing frequency. 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

QCNPS proposes to perform PIV testing at intervals ranging from every refueling outage to every third refueling outage. The specific interval for each valve would be a function of its performance and would be established in a manner consistent with the CIV process under Option B. A conservative control will be established such that if any valve fails its PIV test, the test interval will be reduced consistent with Option B requirements until good performance is reestablished.

The primary basis for this proposed alternative is the historically good performance of the PIVs. Tables RV-03-1 through RV-03-5 summarize test data that demonstrate acceptable historical PIV performance for the Residual Heat Removal (RHR) and Core Spray (CS) systems. The only recorded seat leakage failures of PIVs at QCNPS were determined to be a result of the test methodology and not due to any physical condition of the valves.

The extension of test frequencies will be consistent with the guidance provided for Appendix J, Type C leak rate tests as detailed in paragraph 10.2.3.2, *Extended Test Interval*, of NEI 94-01 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 [of NEI 94-01].

Note that NEI 94-01 is not the sole basis for this proposed alternative request. This document was cited as an approach similar to the requested alternative method. Additional basis for this request is provided below:

- Separate functional testing of MOV PIVs and condition monitoring of check valve PIVs per ASME OM Code.
- Low likelihood of valve mispositioning during power operations (e.g., procedures, interlocks).
- Relief valves in the low pressure (LP) piping – these relief valves may not provide Inner-System Loss of Coolant Accident (ISLOCA) mitigation for inadvertent PIV mispositioning but their relief capacity can accommodate conservative PIV seat leakage rates.
- Alarms that identify high pressure (HP) to LP leakage – Operators are highly trained to recognize symptoms of a present or incipient ISLOCA and to take appropriate actions.

Therefore, the proposed alternative to perform PIV testing at the specified intervals will continue to provide assurance of the PIVs' operational readiness and provides an acceptable level of quality and safety pursuant to 10 CFR 50.55a(z)(1).

6. Duration of Proposed Alternative

The proposed alternative will be utilized for the entire Sixth 120-month IST Program Interval, which is scheduled to begin on February 18, 2023, and end on February 17, 2033.

7. Precedent

1. Letter from J. Wiebe (U.S. Nuclear Regulatory Commission) to M. J. Pacilio (Exelon Nuclear), "Quad Cities Nuclear Power Station, Units 1 and 2 – Safety Evaluation in Support of Request for Relief Associated with the Fifth 10 Year Interval Inservice Testing Program (TAC Nos. ME7981, ME7982, ME7983, ME7984, ME7985, ME7986, ME7987, ME7988, ME7990, ME7991, ME7992, ME7993, ME7994, and ME7995)," dated February 14, 2013 (ADAMS Accession No. ML13042A348)

2. Letter from T. L. Tate (U.S. Nuclear Regulatory Commission) to B. C. Hanson (Exelon Generation, LLC), "Dresden Nuclear Power Station, Units 2 and 3 – Relief Request to Use an Alternative from the American Society of Mechanical Engineers Code Requirements (CAC Nos. MF5089 and MF5090)," dated October 27, 2015 (ADAMS Accession No. ML15174A303)

3. Letter from J.G. Danna (U.S. Nuclear Regulatory Commission) to B. C. Hanson (Exelon Generation, LLC), "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 L-2017-LLR-0094)," dated May 30, 2018 (ADAMS Accession No. ML18141A600)

4. Letter from J. G. Danna (U.S. Nuclear Regulatory Commission) to B. C. Hanson (Exelon Generation, LLC), "Nine Mile Point Nuclear Station, Units 1 and 2 – Relief from the Requirements of the ASME Code (EPID L-2017-LLR-0145 through EPID L-2017-LLR-0152)," dated November 13, 2018 (ADAMS Accession No. ML18275A139)

5. Letter from L. M. Regner (U.S. Nuclear Regulatory Commission) to B. C. Hanson (Exelon Generation, LLC), "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)," dated September 10, 2019 (ADAMS Accession No. ML19217A306)

6. Letter from J. G. Danna (U.S. Nuclear Regulatory Commission) to B. C. Hanson (Exelon Generation, LLC), "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)," dated October 28, 2019 (ADAMS Accession No. ML19228A195)

7. Letter from J.L. Dixon-Herrity (U.S. Nuclear Regulatory Commission) to Entergy Operations, Inc., "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)," dated October 28, 2021 (ADAMS Accession No. ML21294A067)

Leakage History of QCNPS, Units 1 and 2 PIVs

The tables below summarize the leakage history for the QCNPS Units 1 and 2 RHR and CS systems PIVs for a minimum of the last 10 years.

Table RV-03-1: RHR Shutdown Cooling Suction PIVs

Valve Number	Test Date	Measured Value (gpm)	Required Action Limit (gpm)	Comments
1-1001-047-MO	5/10/2007	2	5	
1-1001-047-MO	5/7/2009	0.39	5	
1-1001-047-MO	5/15/2011	0.1216	5	
1-1001-047-MO	3/5/2015	0.143	5	
1-1001-047-MO	3/20/2019	1.674	5	
1-1001-050-MO	5/10/2007	0.6	5	
1-1001-050-MO	5/7/2009	No measurable leakage	5	
1-1001-050-MO	5/27/2011	No measurable leakage	5	
1-1001-050-MO	3/5/2015	1.49	5	
1-1001-050-MO	3/20/2019	No measurable leakage	5	
2-1001-047-MO	4/1/2006	0.0777	5	
2-1001-047-MO	3/7/2008	0.04	5	
2-1001-047-MO	3/23/2010	3.063	5	
2-1001-047-MO	3/23/2012	0.282	5	
2-1001-047-MO	4/14/2014	0.08	5	
2-1001-047-MO	3/23/2018	2.33	5	
2-1001-050-MO	4/1/2006	No measurable leakage	5	
2-1001-050-MO	3/7/2008	No measurable leakage	5	
2-1001-050-MO	3/23/2010	No measurable leakage	5	
2-1001-050-MO	3/23/2012	0.744	5	
2-1001-050-MO	4/14/2014	No measurable leakage	5	
2-1001-050-MO	3/23/2018	No measurable leakage	5	

Table RV-03-2: Core Spray Injection PIVs

Valve Number	Test Date	Measured Value (gpm)	Required Action Limit (gpm)	Comments
1-1402-025A-MO	5/12/2007	No measurable leakage	5	
1-1402-025A-MO	5/12/2009	0.086	5	
1-1402-025A-MO	5/15/2011	0.22	5	
1-1402-025A-MO	3/12/2013	0.074	5	
1-1402-025A-MO	3/28/2017	0.074	5	
1-1402-025A-MO	3/17/2021	0.461	5	
1-1402-025B-MO	5/12/2007	No measurable leakage	5	
1-1402-025B-MO	4/28/2009	2.18	5	
1-1402-025B-MO	5/15/2011	0.003	5	
1-1402-025B-MO	3/7/2015	0.0025	5	
1-1402-025B-MO	3/29/2019	No measurable leakage	5	
2-1402-025A-MO	3/27/2006	No measurable leakage	5	
2-1402-025A-MO	3/5/2008	No measurable leakage	5	
2-1402-025A-MO	4/4/2010	No measurable leakage	5	
2-1402-025A-MO	3/21/2012	0.0013	5	
2-1402-025A-MO	3/26/2016	0.004	5	
2-1402-025A-MO	4/4/2020	0.241	5	
2-1402-025B-MO	4/5/2006	No measurable leakage	5	
2-1402-025B-MO	3/11/2008	No measurable leakage	5	
2-1402-025B-MO	3/21/2010	No measurable leakage	5	
2-1402-025B-MO	3/31/2012	0.0011	5	
2-1402-025B-MO	4/8/2014	No measurable leakage	5	
2-1402-025B-MO	3/21/2018	No measurable leakage	5	

Table RV-03-3: RHR LPCI Injection PIVs

Valve Number	Test Date	Measured Value (gpm)	Required Action Limit (gpm)	Comments
1-1001-029A-MO	5/14/2007	No measurable leakage	5	
1-1001-029A-MO	5/7/2009	No measurable leakage	5	
1-1001-029A-MO	5/21/2011	2.89	5	
1-1001-029A-MO	3/13/2013	0.0186	5	
1-1001-029A-MO	3/29/2017	No measurable leakage	5	
1-1001-029A-MO	3/17/2021	No measurable leakage	5	
1-1001-029B-MO	5/13/2007	No measurable leakage	5	
1-1001-029B-MO	4/29/2009	No measurable leakage	5	
1-1001-029B-MO	5/23/2011	No measurable leakage	5	
1-1001-029B-MO	3/5/2015	0.04	5	
1-1001-029B-MO	3/19/2019	No measurable leakage	5	
2-1001-029A-MO	4/3/2006	0.2	5	
2-1001-029A-MO	3/10/2008	No measurable leakage	5	
2-1001-029A-MO	3/29/2010	0.097	5	
2-1001-029A-MO	3/23/2012	1.146	5	
2-1001-029A-MO	3/25/2016	0.022	5	
2-1001-029A-MO	4/1/2020	No measurable leakage	5	
2-1001-029B-MO	4/4/2006	No measurable leakage	5	
2-1001-029B-MO	3/13/2008	No measurable leakage	5	
2-1001-029B-MO	3/18/2010	No measurable leakage	5	
2-1001-029B-MO	3/30/2012	0.0081	5	
2-1001-029B-MO	4/9/2014	0.007	5	
2-1001-029B-MO	3/21/2018	No measurable leakage	5	

Table RV-03-4: Core Spray Check Valve PIVs

Valve Number	Test Date	Measured Value (gpm)	Required Action Limit (gpm)	Comments
1-1402-009A	5/12/2007	1.1	5	
1-1402-009A	5/12/2009	1.43	5	
1-1402-009A	5/15/2011	0.9226	5	
1-1402-009A	3/12/2013	0.147	5	
1-1402-009A	3/28/2017	0.145	5	
1-1402-009A	3/17/2021	1.044	5	
1-1402-009B	5/12/2007	3.16	5	
1-1402-009B	4/28/2009	2.18	5	
1-1402-009B	5/15/2011	5.368	5	Valve not seated properly
1-1402-009B	5/25/2011	4.46	5	Retest
1-1402-009B	5/27/2011	No measurable leakage	5	Retest with high pressure
1-1402-009B	3/7/2015	0.15	5	
1-1402-009B	3/23/2019	No measurable leakage	5	
2-1402-009A	3/27/2006	No measurable leakage	5	
2-1402-009A	3/5/2008	No measurable leakage	5	
2-1402-009A	4/4/2010	No measurable leakage	5	
2-1402-009A	3/21/2012	0.000461	5	
2-1402-009A	3/26/2016	No measurable leakage	5	
2-1402-009A	4/4/2020	0.234	5	
2-1402-009B	4/5/2006	0.19	5	
2-1402-009B	3/11/2008	0.35	5	
2-1402-009B	3/21/2010	0.7	5	
2-1402-009B	3/31/2012	No measurable leakage	5	
2-1402-009B	4/8/2014	No measurable leakage	5	
2-1402-009B	3/21/2018	No measurable leakage	5	

Table RV-03-5: RHR Check Valve PIVs

Valve Number	Test Date	Measured Value (gpm)	Required Action Limit (gpm)	Comments
1-1001-068A	5/14/2007	No measurable leakage	5	
1-1001-068A	5/7/2009	No measurable leakage	5	
1-1001-068A	5/21/2011	0.278	5	
1-1001-068A	3/13/2013	No measurable leakage	5	
1-1001-068A	3/29/2017	0.149	5	
1-1001-068A	3/17/2021	No measurable leakage	5	
1-1001-068B	5/13/2007	0.33	5	
1-1001-068B	4/29/2009	No measurable leakage	5	
1-1001-068B	5/23/2011	0.346	5	
1-1001-068B	3/5/2015	0.29	5	
1-1001-068B	3/19/2019	0.31	5	
2-1001-068A	3/10/2008	No measurable leakage	5	
2-1001-068A	3/29/2010	No measurable leakage	5	
2-1001-068A	3/23/2012	No measurable leakage	5	
2-1001-068A	3/25/2016	No measurable leakage	5	
2-1001-068A	4/1/2020	No measurable leakage	5	
2-1001-068B	3/13/2008	0.33	5	
2-1001-068B	3/18/2010	No measurable leakage	5	
2-1001-068B	3/30/2012	0.29	5	
2-1001-068B	4/9/2014	No measurable leakage	5	
2-1001-068B	3/21/2018	No measurable leakage	5	

Proposed Alternative to the ASME OM Code to Revise Main Steam Safety Valve Setpoint Testing, Additional Testing Requirements In Accordance with 10 CFR 50.55a(z)(2), "Hardship or Unusual Difficulty Without Compensating Increase in Level of Quality or Safety"

1. ASME Code Components Affected

Component Number	System	Code Class	Category
1(2)-0203-004A	Main Steam	1	C
1(2)-0203-004B	Main Steam	1	C
1(2)-0203-004C	Main Steam	1	C
1(2)-0203-004D	Main Steam	1	C
1(2)-0203-004E	Main Steam	1	C
1(2)-0203-004F	Main Steam	1	C
1(2)-0203-004G	Main Steam	1	C
1(2)-0203-004H	Main Steam	1	C

2. Applicable Code Edition and Addenda

ASME OM Code, *Operation and Maintenance of Nuclear Power Plants*, 2017 Edition, no Addenda

3. Applicable Code Requirement

Division 1, Mandatory Appendix I, I*nservice Testing of Pressure Relief Devices in Water-Cooled Reactor Nuclear Power Plants*, I-1320, *Test Frequencies, Class 1 Pressure Relief Devices*, paragraph *(c), Requirements for Testing Additional Valves*, states:

(1) For each valve tested for which the as-found set-pressure (first test actuation) exceeds the greater of either the plus/minus tolerance limit of the Owner established set-pressure acceptance criteria of subparagraph I-1310(e) or ±3% of valve nameplate set-pressure, two additional valves shall be tested from the same valve group.

(2) If the as-found set-pressure of any of the additional valves tested in accordance with subparagraph (c)(1) exceeds the criteria noted therein, then all remaining valves of that same valve group shall be tested.

(3) The Owner shall evaluate the cause and effect of valves that fail to comply with the set-pressure acceptance criteria established in subparagraph (c)(1) or the Owner established acceptance criteria for other required tests, e.g., the acceptance of auxiliary actuating devices, compliance with Owner's seat-tightness criteria, etc. Based upon this evaluation, the Owner shall determine the need for testing in addition to the minimum tests specified in subparagraph (c) to address any generic concerns that could apply to valves in the same or other valve groups.

ASME OM Code Case (CC) OMN-17, Alternative Rules for Testing ASME Class 1 Pressure Relief/Safety Valves, 1 Test Frequencies, Class 1 Pressure Relief Valves, paragraph (c) *Requirements for Testing Additional Valves*, states:

Additional valves shall be tested in accordance with the following requirements:

(1) For each valve tested for which the as-found set-pressure (first test actuation) exceeds the greater of either the plus/minus tolerance limit of the Owner established set-pressure acceptance criteria or ±3% of valve nameplate set-pressure, two additional valves shall be tested from the same valve group.

(2) If the as-found set-pressure of any of the additional valves tested in accordance with subparagraph (c)(1) exceeds the criteria noted therein, then all remaining valves of that same valve group shall be tested.

(3) The Owner shall evaluate the cause and effect on system capability of valves that fail to comply with the set-pressure acceptance criteria established in subparagraph (c)(1), or the acceptance criteria for other required tests (e.g., acceptance of auxiliary actuating devices, compliance with Owner's seat tightness criteria). Based upon this evaluation, to address any generic concerns, the Owner shall determine the need for testing in addition to the minimum tests specified.

4. Reason for Request

Pursuant to 10 CFR 50.55a, *Codes and standards*, paragraph (z)(2), an alternative request is proposed to the requirement of ASME OM Code, Division 1, Mandatory Appendix I, I-1320(c) and ASME OM CC OMN-17, 1(c). The basis of the request is that the Code requirement presents an undue hardship without a compensating increase in the level of quality or safety.

These main steam safety valves (MSSVs) are used to terminate an abnormal pressure increase in the reactor vessel and the reactor coolant pressure boundary (i.e., they provide overpressure protection). The physical locations of the safety valves cause them to interfere with one another during transport of the valves in and out of containment. In order to create a transport path, at least half of the subject valves are removed, tested and rebuilt during each refueling outage. This accelerated maintenance schedule provides a high level of assurance that these safety valves will perform their safety function.

Quad Cities Nuclear Power Station (QCNPS) does not have the facilities required to perform setpoint tests on large relief and safety valves. These valves are unbolted from their mounting flanges, decontaminated, and shipped to an off-site test facility. Because of the lengthy period required for removal, transportation, testing and re-installation, the removal and testing of additional valves due to sample expansion would delay refueling outage unit start-up by at least several days. This represents a significant hardship.

In the event that expanded testing is required, a typical refueling outage schedule would be impacted as follows: The MSSV work starts approximately on the second day of a refueling outage. It takes three to four days to remove the valves from the Drywell and prepare them for shipment. The valves are shipped to an off-site vendor facility for as-found testing. Shipping and testing of the valves typically takes two to three days. The as-found results are then reported and scope expansion is determined. If scope expansion requires the remaining four MSSVs to be replaced, this would take approximately six to eight days (including removal and installation activities), provided sufficient resources and valve access are readily available. During a typical outage, this additional work scope would be at or near 'critical path' and result in a corresponding push to unit restart. In the event the remaining four MSSVs would be required to be replaced, then an approximate 6.4 rem and 876 resource-hours would be required to complete the

evolution. [This estimate was calculated using the dose and resource-hour data from the six refueling outages prior to the Fifth 10-year IST Interval.]

In summary, the sample expansion requirements of Division 1, Mandatory Appendix I and CC OMN-17 would require two additional valves be tested if one valve failed its setpoint test. Since no less than four of the safety valves are tested during each outage, the valves already being tested represent an increased (> 20 percent of group) sample population. Therefore, based on the larger initial sample size (four vs a minimum of two required), the sample expansion requirements already being met for one valve, the accelerated maintenance schedule, and the hardship associated with pulling additional valves, no additional valves will be tested if only one valve fails the setpoint test. This methodology helps ensure that 100 percent of the MSSV population is tested within the required test interval. This alternative request is intended to decrease the likelihood of an unplanned scope expansion of MSSV testing and maintenance and corresponding restart delays by preemptively removing and testing 50 percent of the MSSVs during each refueling outage.

5. Proposed Alternative and Basis for Use

As noted above, complying with the sample expansion requirements in Division 1, Mandatory Appendix I and CC OMN-17 would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety pursuant to 10 CFR 50.55a(z)(2). As an alternative, QCNPS proposes to remove and test at least half of the eight safety valves, during each reactor refueling outage. If only one (1) of the four (4) safety valves removed for testing fails its setpoint test, additional safety valves will not be tested. However, if more than one (1) safety valve fails its as-found initial setpoint test, then the sample expansion criteria of Division 1, Mandatory Appendix I, I-1320(c)(2) and CC OMN-17(1)(c)(2) will be implemented. This proposed alternative testing of the MSSVs provides reasonable assurance of adequate valve operational readiness.

6. Duration of Proposed Alternative

The proposed alternative is already approved for and in use in the current fifth interval and will be utilized for the entire Sixth 120-month IST Program Interval or until such time as all valves in a Unit meet the requirements of the SRV Best Practices program discussed in Alternative Request RV-09 and the Unit implements that proposed testing alternative. The Sixth 120-month interval is scheduled to begin on February 18, 2023, and end on February 17, 2033.

7. Precedent

Letter from J. S. Wiebe (U.S. Nuclear Regulatory Commission) to M. J. Pacilio (Exelon Generation Company, LLC), "Quad Cities Nuclear Power Station, Units 1 and 2 – Safety Evaluation in Support of Request for Relief Associated with the Fifth 10 Year Interval Inservice Testing Program (TAC Nos. ME7981, ME7988, ME7990, ME7994, and ME7995)," dated February 14, 2013 (ADAMS Accession No. ML13042A348)

Proposed Alternative to the ASME OM Code to Use Main Steam Isolation Valve Technical Specification Stroke Time Limits in Lieu of ASME OM ISTC Stroke Time Limits in Accordance with 10 CFR 50.55a(z)(1), "Alternative Provides Acceptable Level of Quality and Safety"

1. ASME Code Components Affected

Component Number	System	Code Class	Category
1(2)-0203-001A-AO	Main Steam	1	A
1(2)-0203-001B-AO	Main Steam	1	A
1(2)-0203-001C-AO	Main Steam	1	A
1(2)-0203-001D-AO	Main Steam	1	A
1(2)-0203-002A-AO	Main Steam	1	A
1(2)-0203-002B-AO	Main Steam	1	A
1(2)-0203-002C-AO	Main Steam	1	A
1(2)-0203-002D-AO	Main Steam	1	A

2. Applicable Code Edition and Addenda

ASME OM Code, *Operation and Maintenance of Nuclear Power Plants*, 2017 Edition, no Addenda

3. Applicable Code Requirement

Division 1, Mandatory Appendix IV, *Preservice and Inservice Testing of Active Pneumatically Operated Valve Assemblies in Nuclear Reactor Power Plants*, paragraph IV-7100, *Stroke Test Acceptance Criteria*, states, in part, "Test results shall be compared to the reference values established in accordance with paragraphs IV-3510, IV-3520, and IV-3530."

Division 1, Mandatory Appendix IV, paragraph IV-7100, subparagraph (b) states, "Valves with reference stroke times of less than or equal to 10 seconds shall exhibit no more than ± 50% change in stroke time when compared to the reference value."

4. Reason for Request

Pursuant to 10 CFR 50.55a, *Codes and standards*, paragraph (z)(1), Quad Cities Nuclear Power Station (QCNPS) proposes an alternative to the requirement of ASME OM Code Division 1, Mandatory Appendix IV, subparagraph IV-7100(b). The basis of this request is that the proposed alternative would provide an acceptable level of quality and safety.

The main steam isolation valves (MSIVs) open to admit reactor steam to the main turbine. They close to provide containment and reactor isolation.

The ASME OM Code Division 1, Mandatory Appendix IV requirement bases the stroke time acceptance criteria on a fixed reference value taken from a baseline test. However, Technical Specifications (TS) 3.6.1.3, *Primary Containment Isolation Valves (PCIVs)*, Surveillance Requirement (SR) 3.6.1.3.6, *PCIVs*, establishes an invariable acceptable stroke time range for the MSIVs of ≥ 3 seconds to ≤ 5 seconds. This fixed range is more conservative and consistent than that required by Division 1, Mandatory Appendix IV, paragraph I-7100, since the range is not dependent on a baseline value that may vary by as much as ± 1 second.

5. Proposed Alternative and Basis for Use

TS SR 3.6.1.3.6 establishes an acceptable stroke time range for the MSIVs of 3.0 seconds $\leq T_{MSIV} \leq$ 5.0 seconds. QCNPS will utilize this range for evaluating an acceptable MSIV stroke time in lieu of establishing an acceptance band based on MSIV stroke time reference values. QCNPS has also established additional limitations on stroke time based on reactor power levels to ensure that the TS SR limits are always met. Any MSIV that fails to meet the TS SR limits will be considered inoperable and any required actions would continue to be taken in accordance with the QCNPS TS and Division 1, Mandatory Appendix IV, paragraph IV-7200, *Stroke Test and Fail Safe Corrective Actions*. Therefore, this proposed testing methodology for the affected MSIVs provides an acceptable level of quality and safety pursuant to 10 CFR 50.55a(z)(1).

6. Duration of Proposed Alternative

The proposed alternative will be utilized for the entire Sixth 120-month IST Program Interval, which is scheduled to begin on February 18, 2023, and end on February 17, 2033.

7. Precedent

Letter from J. S. Wiebe (U.S. Nuclear Regulatory Commission) to M. J. Pacilio (Exelon Generation Company, LLC), "Quad Cities Nuclear Power Station, Units 1 and 2 – Safety Evaluation in Support of Request for Relief Associated with the Fifth 10 Year Interval Inservice Testing Program (TAC Nos. ME7981, ME7988, ME7990, ME7994, and ME7995)," dated February 14, 2013 (ADAMS Accession No. ML13042A348)

Proposed Alternative to the ASME OM Code to Revise Main Steam Relief/Safety Valve (MSRV) "Group of One" Testing Interval in Accordance with 10 CFR 50.55a(z)(1), "Alternative Provides Acceptable Level of Quality and Safety"

1. ASME Code Components Affected

Component Number	System	Code Class	Category
1-0203-003A	Main Steam	1	C
2-0203-003A	Main Steam	1	C

2. Applicable Code Edition and Addenda

ASME OM Code, *Operation and Maintenance of Nuclear Power Plants*, 2017 Edition, no Addenda

3. Applicable Code Requirement

Division 1, Mandatory Appendix I, *Inservice Testing of Pressure Relief Devices in Light-Water Reactor Nuclear Power Plants*, paragraph I-1320, *Test Frequencies, Class 1 Pressure Relief Valves*, subparagraph (a) *5-Year Test Interval*, which states:

> Class 1 pressure relief valves shall be tested at least once every 5 years, starting with initial electric power generation. No maximum limit is specified for the number of valves to be tested within each interval; however, a minimum of 20% of the valves from each valve group shall be tested within any 24-month interval. This 20% shall consist of valves that have not been tested during the current 5-year interval, if they exist. The test interval for any installed valve shall not exceed 5 years. The 5-year test interval shall begin from the date of the as-left set-pressure test for each valve.

4. Reason for Request

Pursuant to 10 CFR 50.55a, *Codes and standards*, paragraph (z)(1), Quad Cities Nuclear Power Station (QCNPS) proposes an alternative to the requirement of ASME OM Code Division 1, Mandatory Appendix I, subparagraph I-1320(a). The basis of this request is that an MSRV set pressure performance assessment supports the conclusion that the proposed alternative would provide an acceptable level of quality and safety.

At QCNPS, Units 1 and 2, there is a single Target Rock 3 Stage, Model 74-67F, MSRV installed on each unit's Main Steam lines inside the drywell. This valve is classified into the same Inservice Test (IST) program valve group (i.e., a group of one on a unit). Per the requirements of ASME OM Code, Division 1, Mandatory Appendix I, subparagraph I-1320(a), this valve is assigned a five-year testing interval and is required to be tested every outage in order to comply with the additional requirements that a minimum of 20% of the valves in each group are tested every 24 months. QCNPS, Units 1 and 2 are currently operating on 24-month refueling cycles. The QCNPS, Units 1 and 2 MSRVs have continued to show reliable set pressure test performance as described in Section 5 below.

A performance assessment of the QCNPS Units 1 and 2 Target Rock MSRVs concluded that there is reasonable assurance that each MSRV will retain the set pressure within the required drift tolerances after extending the test interval from the 24-month interval to a proposed 48-month interval. Extending the MSRV test interval from 24 to 48 months will permit testing the

MSRV every other refueling outage with a corresponding reduction in occupational radiological dose incurred during the MSRV removal, testing and re-installation maintenance activities.

5. Proposed Alternative and Basis for Use

Constellation proposes that the ASME OM Code, Division 1, Mandatory Appendix I, subparagraph I-1320(a) minimum testing interval for the group of one MSRVs be extended from 24 months to 48 months from the date of the as-left set pressure test for each valve.

A fleet-wide SRV Best Practices program was implemented in 2010 with several enhancements incorporated between 2010 and 2014 that resulted in improved MSRV setpoint drift performance. QCNPS, Units 1 and 2, is included as part of this fleet-wide program. Continued improvements to this program further increase the MSRV reliability.

The SRV Best Practices (Reference 1 Attachment 2) is comprised of methods and philosophies concerning maintenance, inspection and techniques which uses the equipment manufacturer's recommended maintenance practices and enhancements identified by Constellation that have been broadly termed "Best Practices." The MSRV best practices are developed from the application of the EPRI / NMAC Safety and Relief Valve Testing and Maintenance Guide (Reference 2) and from Constellation (formerly Exelon) Operational Experience (OE). The MSRV best practices have been implemented through Constellation's oversight of the valve vendor's test and rebuild processes. Major program elements include specific performance and inspection criteria and maintenance steps that exceed Original Equipment Manufacturer (OEM) specifications and/or Industry established guidelines. The main program elements include 1) Spring Testing, 2) Lapping Techniques and Tools, 3) Set Pressure Adjustment Methodology Precision, 4) Average Delay Time (ADT) trending, and 5) Internal Component Condition Variations. Collectively, use of these elements have supported a trend in improved setpoint retention of MSRVs in service at QCNPS.

An engineering program document (Reference 1) has been established to provide governance over the Constellation-approved vendor SRV maintenance procedures, to define the program elements, and to establish performance tracking and trending guidelines. This program document and the Constellation-approved vendor procedures are updated to incorporate advances in technology and operating experience from the Constellation fleet, the OEM, and the industry. Major elements of the program are further described below:

Spring Testing

Spring testing is performed periodically based on valve type. The SRV Best Practices requires the spring characteristics meet physical dimension requirements that are tighter than previous acceptance criteria based on Constellation operating experience. This has minimized spring compression rate variations.

Lapping Techniques and Tools

The lapping technique includes multiple lapping passes that develops tighter tolerances using a Constellation designed lapping tool based on internal fleet operating experience. The SRV Best Practices requires this additional lapping to meet the tighter seat leakage tightness criteria. This technique has minimized variation of the seat-to-disk surfaces.

Set Pressure Adjustment Methodology Precision

The SRV set pressure adjustment process includes a spring adjustment factor methodology for the first set pressure adjustment. The SRV Best Practices include a calculated spring adjustment factor based on the SRV set pressure adjustment during the pre-certification testing and Constellation operating experience. A more accurate set pressure adjustment is obtained with fewer lifts and will minimize introducing variations of the seat-to-disk surfaces.

Average Delay Time (ADT) Trending

For the Target Rock 3-Stage MSRVs, the ADT measures the time between the pilot valve opening and the main disk opening. The SRV Best Practices program has trended the ADTs for the Target Rock 3-Stage MSRVs for determining if additional maintenance should be performed. The program includes a tighter tolerance than the industry standard criteria for ADT. An SRV with an ADT value outside this criterion is further evaluated for additional maintenance prior to installation.

Internal Component Condition Variations

The SRV inspection and maintenance processes include additional inspections for internal components with criteria that are more restrictive than previous acceptance criteria based on internal fleet operating experience. Specifically, for the Target Rock 3-Stage MSRVs, tighter tolerances are applied to the pilot abutment and preload gaps which reduce the likelihood of vibration-induced seat leakage caused by pressure transients.

Constellation recently performed an assessment pertaining to the performance of the QCNPS, Units 1 and 2, Target Rock MSRVs. The MSRV setpoint drift performance of the QCNPS, Units 1 and 2, MSRVs has steadily improved due to this enhanced maintenance program. This assessment concluded that there is reasonable assurance that each MSRV will retain the set pressure within the required drift tolerances after extending the test interval from the current 24-month interval to a proposed 48-month interval.

This assessment reviewed as-left/as-found set pressure data going back to 1998 and identified: 1) whether the valves' set pressure drifted up or down, and 2) the absolute set pressure change between tests. Based on the time between the as-left and as-found set pressure test of each MSRV, the set pressure drift was then linearly extrapolated to determine whether the MSRV's set pressure would still be within the site's required ± 3.0% tolerance following a 48-month period. An evaluation concluded that use of linear extrapolation provides the best mathematical approach.

Since 2014, eight QCNPS, Units 1 and 2, valves were removed and as-found tested, and, using the linear extrapolation method, all eight valves were projected to have lift setpoints within the ± 3.0% set pressure tolerance for more than 48-months. Table RV-08-1 summarizes historical set pressure test performance, in years of service, predicting when each MSRV would exceed the ± 3.0% set pressure tolerance for MSRVs removed and tested between 2014 and 2021.

Table RV-08-1:
MSRV Setpoint Performance Projection

Year As-Found Tested	Setpoint Performance Projection in Years
2014	4.4
2015	21.6
2016	18.2
2017	172.2
2018	25.9
2019	35.8
2020	10.2
2021	140.8

Today's improved valve performance can be attributed to implementation of the SRV Best Practices program which requires that all valves be disassembled and inspected prior to as-left testing and installation. QCNPS will continue to disassemble and inspect each subject MSRV following as-found set pressure testing to verify that parts are free of defects resulting from time-related degradation or service-induced wear. Each valve shall be disassembled and inspected prior to as-left testing and installation in accordance with the SRV Best Practices.

Extending the test interval from 24 months to 48 months is viewed as acceptable based upon past performance and a mathematical evaluation which shows that the QCNPS Target Rock MSRVs are capable of maintaining their setpoint within tolerance over a 48-month period. This proposed alternative to the testing requirements will also contribute to the principals of maintaining radiation dose As Low As Reasonably Achievable (ALARA).

Using recent dose measurements associated with QCNPS, Units 1 and 2, MSRVs removal and replacement, the average radiological exposure incurred per valve has been 0.54 rem. Extending the MSRV testing interval from 24 to 48 months would allow extending the schedule of testing of the MSRV on each unit from every refueling outage to every other refueling outage, potentially providing a reduction of two MSRVs tested every ten years per unit. This amounts to a potential radiological exposure savings of approximately 2 rem for the station over a ten-year IST interval.

Since 2014, Constellation has been collecting, trending, and analyzing SRV test, maintenance, inspection and performance data across the fleet. Trending and analyzing data between the stations, which have the same SRV model, reduces the effective maximum elapsed time between the same model SRV tests (in this case Target Rock 3-Stage SRV Model 67F at Dresden, Peach Bottom, and Quad Cities). The tracking and trending guidelines for maintaining this effort are established in Reference 1.

Based on the application of the SRV Best Practices, the past performance of the MSRVs at QCNPS and a mathematical evaluation of valve performance, there is reasonable assurance that each MSRV will remain within the setpoint tolerance over the extended 48-month testing interval. This proposal provides an alternative which would maintain an acceptable level of valve operational readiness, provides an acceptable level of quality and safety pursuant to 10 CFR 50.55a(z)(1) and provides for reduced occupational radiological exposure.

6. Duration of Proposed Alternative

The proposed alternative will be utilized for the entire Sixth 120-month IST Program Interval, which is scheduled to begin on February 18, 2023, and end on February 17, 2033.

7. Precedent

Letter from N. L. Salgado (U.S. Nuclear Regulatory Commission) to D. P. Rhoades (Exelon Generation Company, LLC), "Clinton Power Station, Unit No. 1; Dresden Nuclear Power Station, Units 2 and 3; Nine Mile Point Nuclear Station, Unit 2; Peach Bottom Atomic Power Station, Units 2 and 3; and Quad Cities Nuclear Power Station, Units 1 and 2 — Proposed Alternatives to Extend the Safety Relief Valve Testing Interval (EPID L-2020-LLR-0014 through -0018)," Enclosure 5, "Safety Evaluation by the Office of Nuclear Reactor Regulation Proposed Alternative RV-08 Regarding Extension of the Safety Relief Valve Testing Interval Exelon Generation Company, LLC Quad Cities Nuclear Power Station, Units 2 and 3 Docket Nos. 50-254 and 50-265," dated January 14, 2021 (ADAMS Accession No. ML21005A061)

8. References

1. Constellation Procedure ER-AA-400-1000, Safety & Relief Valve (SRV) Testing, Tracking, and Trending

2. Electric Power Research Institute / Nuclear Maintenance Applications Center (EPRI/NMAC) Safety and Relief Valve Testing and Maintenance Guide, Revision of TR-105872, Technical Report 3002005362, August 2015

Proposed Alternative to the ASME OM Code to Revise Reactor Pressure Vessel Main Steam Safety Valve (MSSV) Testing 8-Year Test Interval in Accordance with 10 CFR 50.55a(z)(1), "Alternative Provides Acceptable Level of Quality and Safety"

1. ASME Code Components Affected

Component Number	System	Code Class	Category
1(2)-0203-004A	Main Steam	1	C
1(2)-0203-004B	Main Steam	1	C
1(2)-0203-004C	Main Steam	1	C
1(2)-0203-004D	Main Steam	1	C
1(2)-0203-004E	Main Steam	1	C
1(2)-0203-004F	Main Steam	1	C
1(2)-0203-004G	Main Steam	1	C
1(2)-0203-004H	Main Steam	1	C

2. Applicable Code Edition and Addenda

ASME OM Code, *Operation and Maintenance of Nuclear Power Plants*, 2017 Edition, no Addenda

3. Applicable Code Requirement

Division 1, Mandatory Appendix I, Inservice Testing of Pressure Relief Devices in Light-Water Reactor Nuclear Power Plants, paragraph I-1320, *Test Frequencies, Class 1 Pressure Relief Valves*, subparagraph (a) *5-Year Test Interval*, which states:

> Class 1 pressure relief valves shall be tested at least once every 5 years, starting with initial electric power generation. No maximum limit is specified for the number of valves to be tested within each interval; however, a minimum of 20% of the valves from each valve group shall be tested within any 24-month interval. This 20% shall consist of valves that have not been tested during the current 5-year interval, if they exist. The test interval for any installed valve shall not exceed 5 years. The 5-year test interval shall begin from the date of the as-left set-pressure test for each valve.

ASME OM Code Case (CC) OMN-17, *Alternative Rules for Testing ASME Class 1 Pressure Relief/Safety Valves, 1 Test Frequencies, Class 1 Pressure Relief Valves*, paragraph (a) *72-Month Test Interval*, states:

> Class 1 pressure relief valves and PWR Main Steam Safety Valves shall be tested at least once every 72 months (6 years), starting with initial electric power generation. A minimum of 20% of the valves from each valve group shall be tested within any 24-month interval. This 20% shall consist of valves that have not been tested during the current 72-month interval, if they exist. The test interval for any individual valve that is in service shall not exceed 72 months except that a 6-month grace period is allowed to coincide with refueling outages to accommodate extended shutdown periods.

4. Reason for Request

Pursuant to 10 CFR 50.55a, *Codes and standards*, paragraph (z)(1), Quad Cities Nuclear Power Station (QCNPS) proposes an alternative to the requirement of ASME OM Code Division 1, Mandatory Appendix I, subparagraph I-1320(a). The basis of this request is that an MSSV set pressure performance assessment supports the conclusion that the proposed alternative would provide an acceptable level of quality and safety.

At QCNPS, Units 1 and 2, there are eight Dresser Model 3777Q MSSVs installed on each unit's Main Steam lines inside the drywell. These valves are classified into the same Inservice Test (IST) program valve group. Division 1, Mandatory Appendix I, subparagraph I-1320(a) requires the installed MSSVs be tested within five years from the date of the as-left set pressure test for each valve.

ASME Code Case (CC) OMN-17 is being utilized to extend the I-1320(a), five-year test interval to six years, along with the potential use of a six-month grace period. QCNPS, Units 1 and 2 are currently operating on 24-month refueling cycles. Use of CC OMN-17 allows QCNPS Units 1 and 2, to go from testing all the MSSVs on each unit over two refueling outages, to testing all the MSSVs on each unit over three refueling outages, potentially reducing the number of MSSVs being tested over three refueling outages by four MSSVs per unit. The QCNPS, Units 1 and 2 MSSVs have continued to show reliable set pressure test performance as described in Section 5 below.

A performance assessment of the QCNPS Units 1 and 2 Dresser MSSVs concluded that there is reasonable assurance that each MSSV will retain the set pressure within the required drift tolerances after extending the test interval from the CC OMN-17 allowed six-year interval to a proposed eight-year interval. Extending the MSSV test interval from six to eight years will further reduce the number of valves required to be tested every outage, reducing occupational radiological exposures.

5. Proposed Alternative and Basis for Use

As an alternative to the Code-required 5-year test interval per Division 1, Mandatory Appendix I, paragraph I-1320(a), QCNPS Units 1 and 2 have been utilizing NRC approved Alternative Request RV-05 (Reference 1). This Alternative Request allows QCNPS Units 1 and 2 to establish a six-year test interval for the subject Class 1 MSSVs provided each QCNPS unit adheres to the additional requirements stipulated within ASME CC OMN-17.

Constellation proposes that the subject MSSVs be tested at least once every eight years from the date of the as-left set pressure test for each valve. Additionally, Constellation proposes two modifications to the utilization of ASME CC OMN-17. The first change extends the CC OMN-17 testing interval from six years to eight years, with an allowed six-month grace period to coincide with the combined certification testing and refueling outage time periods, and with the interval not to exceed 8.5 years. The second change increases the minimum number of MSSVs from each valve group to be tested from '20% within any 24-month interval' to '40% within any 48-month interval' with the 40% population made up of MSSVs which have not been tested during the current 96-month interval, if they exist. The additional requirements stipulated within ASME CC OMN-17 will be retained.

At QCNPS, Units 1 and 2, Constellation implemented the fleet-wide SRV Best Practices program (Reference 3 Attachment 2) in 2010 and incorporated several enhancements between 2010 and

2014 that resulted in improved MSSV setpoint drift performance. Continued improvements to this program further increase the MSSV reliability.

The SRV Best Practices program is comprised of methods and philosophies concerning maintenance, inspection and techniques which uses the MSSV manufacturer's recommended maintenance practices and enhancements identified by Constellation that have been broadly termed "Best Practices." MSSV Best Practices are developed from the application of the EPRI/NMAC Safety and Relief Valve Testing and Maintenance Guide (Reference 2) and from internal fleet operational experience (OE). The SRV best practices have been implemented through Constellation's oversight of the valve vendor's test and rebuild processes.

Major program elements include specific performance and inspection criteria and maintenance steps that exceed Original Equipment Manufacturer (OEM) specifications and/or Industry established guidelines. The main program elements include 1) Spring Testing, 2) Lapping Techniques and Tools, 3) Set Pressure Adjustment Methodology Precision, and 4) Internal Component Condition Variation Limitations. Collectively, use of these elements have supported a trend in improved setpoint retention of MSSVs in service at QCNPS.

An engineering program document (Reference 3) has been established to provide governance over the Constellation-approved vendor SRV maintenance procedures, to define the program elements, and to establish performance tracking and trending guidelines. This program document and the Constellation-approved vendor procedures are updated to incorporate advances in technology and operating experience from the Constellation fleet, the OEM, and the industry. Major elements of the program are further described below:

<u>Spring Testing</u>

Spring testing is performed periodically based on valve type. The SRV Best Practices program requires the spring characteristics meet physical dimension requirements that are tighter than previous acceptance criteria based on Constellation operating experience. This has minimized spring compression rate variations.

<u>Lapping Techniques and Tools</u>

The lapping technique includes multiple lapping passes that develops tighter tolerances using a Constellation designed lapping tool based on Constellation operating experience. The SRV Best Practices program requires this additional lapping to meet the tighter seat leakage tightness criteria. This technique has minimized variation of the seat-to-disk surfaces.

<u>Set Pressure Adjustment Methodology Precision</u>

The SRV set pressure adjustment process includes a spring adjustment factor methodology for the first set pressure adjustment. The SRV Best Practices document includes a calculated spring adjustment factor based on the SRV set pressure adjustment during the pre-certification testing and Constellation operating experience. A more accurate set pressure adjustment is obtained with fewer lifts and will minimize introducing variations of the seat-to-disk surfaces.

Internal Component Condition Variation Limitations

The SRV inspection and maintenance processes include additional inspections for internal components with criteria that are more restrictive than previous acceptance criteria based on Constellation operating experience. Specifically for the Dresser 3777Q SRVs, tighter tolerances are applied to the spindle dimensions, replacement criteria for spindle runout, and disk to spindle movement (spindle tip rock), which reduce the likelihood of flow-induced vibration concerns. These additional inspections have minimized variation of the SRV internal components.

Constellation recently performed an assessment pertaining to the performance of the QCNPS, Units 1 and 2, Dresser MSSVs. The MSSV setpoint drift performance of the QCNPS, Units 1 and 2, MSSVs has steadily improved due to this enhanced maintenance program. This assessment concluded that there is reasonable assurance that each MSSV will retain the set pressure within the required drift tolerances after extending the test interval from the six-year interval to a proposed eight-year interval which is two years longer than the current CC OMN-17, six-year allowed test interval.

This assessment reviewed as-left/as-found set pressure data going back to 1998 and identified: 1) whether the valves' set pressure drifted up or down, and 2) the absolute set pressure change between tests. Based on the time between the as-left and as-found set pressure test of each MSSV, the set pressure drift was then linearly extrapolated to determine whether the MSSV's set pressure would still be within the site's required ± 3.0% tolerance following an eight-year period. An evaluation concluded that use of linear extrapolation provides the best mathematical approach.

Since 2014, 32 QCNPS, Units 1 and 2, valves were removed and as-found tested, and, using the linear extrapolation method, 29 valves were projected to have lift setpoints within the ± 3.0% set pressure tolerance for more than eight years. Table RV-09-1 summarizes the setpoint drift projection, in years of service, predicting when each MSSV would exceed the ± 3.0% set pressure tolerance for MSSVs removed and tested since 2014. An evaluation of the three valves that did not meet the eight-year setpoint tolerance criteria was performed and the table notes provide a summary identifying the cause for the setpoint drift, how the Constellation SRV Best Practices program addresses the cause, and the corrective actions performed.

Table RV-09-1
MSSV Setpoint Performance Projection

Year As-Found Tested	1	2	3	4
2014 U2	6.1[1]	7.8[2]	9.0	11.6
2015 U1	7.7[3]	15.3	51.8	11.6
2016 U2	104.2	180.4	38	83.4
2017 U1	200+[4]	139.0	16.7	17.0
2018 U2	12.1	32.8	43.8	22.6
2019 U1	14.8	10.8	22.9	13.4
2020 U2	15.0	29.2	21.8	8.2
2021 U1	15.7	19.4	41.2	54.5

Notes:

1. This valve was disassembled, inspected and tested before being re-installed in 2009 and was then removed in 2014 and as-found tested. The 2009 maintenance and testing occurred prior to procedure steps to replace the original bronze set screws with an approved stainless-steel set screw that were added to the Constellation SRV Maintenance Best Practices in 2014. Consequently, the 2014 as-found test results were out of tolerance low. The Constellation SRV Maintenance Best Practices were completed during the valve refurbishment and increased valve performance is expected. (6.1, Valve BK6529, Cell AC112)

2. This valve was disassembled, inspected and tested before being re-installed in 2010 and was then removed in 2014 and as-found tested. The 2010 maintenance and testing occurred prior to a refinement of the as-left setpoint adjustment procedure that was added to the Constellation SRV Maintenance Best Practices in 2014. Consequently, the 2014 as-found test results were out-of-tolerance low. The Constellation SRV Maintenance Best Practices were completed during the valve refurbishment and increased valve performance is expected. (7.8, Valve BL2467, Cell T232)

3. This valve was disassembled, inspected and tested before being re-installed in 2010 and was then removed in 2015 and as-found tested. It appears that this valve was still utilizing the original main spring. The 2010 refurbishment occurred prior to instituting the detailed inspection criteria of the spindle to disk fit-up that was added to the Constellation SRV Maintenance Best Practices in 2014. The main spring no longer met the revised/current height criteria and was also replaced in 2015. Consequently, the 2015 as-found test results were out-of-tolerance high. The Constellation SRV Maintenance Best Practices were completed during the valve refurbishment and increased valve performance is expected. (7. 7, Valve BL 1132, Cell AL222)

4. This valve retained its setpoint during the 2017 as-found test and there was no drift so the setpoint drift projection is very high. (200+ AL 192, BK7165)

The improved valve performance can be attributed to both the utilization of ASME CC OMN-17 which requires that all valves be disassembled and inspected prior to as-left testing and installation, and the implementation of the SRV Best Practices.

CC OMN-17 includes a requirement that at least 20% of the MSSVs be tested every 24 months, with these 20% made up of MSSVs which have not been tested during the current 72-month interval, if they exist. Testing of a minimum number of MSSVs from each valve group within any 24-month interval is intended to have some MSSVs tested throughout the six-year interval that would allow for more timely discovery of performance issues than would happen if all the testing was scheduled at the end of the six-year interval. This request proposes to revise the 20% and 24-month testing requirements to a '48-month interval' with at least a minimum of 40% of the MSSVs to be tested every 48 months, with these 40% made up of MSSVs which have not been tested during the current 96-month interval, if they exist. The '40% sample size testing within any 48-month interval' continues to meet the intent of this CC OMN-17 requirement.

QCNPS will continue to implement all other requirements contained within ASME CC OMN-17. During outages when there is only a partial complement of MSSVs replaced, those MSSVs removed shall be as-found tested prior to resumption of electrical generation. For each MSSV that fails to meet the QCNPS set pressure acceptance criteria tolerance, two additional MSSVs

shall be tested. If either of these two additional MSSVs are found to not meet their QCNPS set pressure acceptance criteria, then all remaining MSSVs within the same group shall be tested.

QCNPS shall also continue to disassemble and inspect each subject MSSV following as-found set pressure testing to verify that parts are free of defects resulting from time-related degradation or service-induced wear. Each valve shall be disassembled and inspected prior to as-left testing and installation to the requirements provided above as well as all other requirements stipulated in CC OMN-17.

Extending the test interval from six to eight years and revising the intervening outage testing sample size and frequency are viewed acceptable based upon past performance and a mathematical evaluation which shows that the QCNPS Dresser MSSVs are capable of maintaining their setpoint within tolerance over an eight-year period. This proposed alternative request to the testing requirements will also contribute to the principals of maintaining radiation dose As Low As Reasonably Achievable (ALARA).

Since 2014, Constellation has been collecting, trending, and analyzing SRV test, maintenance, inspection and performance data across the fleet. Trending and analyzing data between the stations, which have the same SRV model, reduces the effective maximum elapsed time between the same model SRV tests. The tracking and trending guidelines for maintaining this effort are established in Reference 3.

Using recent dose measurements associated with QCNPS, Units 1 and 2, MSSVs removal and replacement, the average radiological exposure incurred per valve has been 0.54 rem. Extending the CC OMN-17 MSSV testing interval from six to eight years would allow extending the schedule of testing of the eight MSSVs on each unit from three to four refueling outages, potentially providing a reduction of two MSSVs tested every ten years per unit. This can result in a potential radiological exposure savings of approximately 2 rem for the station over a ten-year IST interval.

Based on the application of the SRV Best Practices, the past performance of the MSSVs at QCNPS and a mathematical evaluation of valve performance, there is reasonable assurance that each MSSV will remain within the setpoint tolerance over the extended eight-year testing interval. This proposal provides an alternative which would maintain an acceptable level of valve operational readiness, provide an acceptable level of equality and safety pursuant to 10 CFR 50.55a(z)(1) and provide for reduced occupational radiological exposure.

6. Duration of Proposed Alternative

The proposed alternative will be utilized in lieu of Alternative Request RV-06 once all valves in a Unit meet the requirements of the SRV Best Practices program discussed in this request for the applicable portion of or the entire Sixth 120-month IST Program Interval, which is scheduled to begin on February 18, 2023, and end on February 17, 2033.

7. Precedent

Letter from N. L. Salgado (U.S. Nuclear Regulatory Commission) to D. P. Rhoades (Exelon Generation Company, LLC), "Clinton Power Station, Unit No. 1; Dresden Nuclear Power Station, Units 2 and 3; Nine Mile Point Nuclear Station, Unit 2; Peach Bottom Atomic Power Station, Units 2 and 3; and Quad Cities Nuclear Power Station, Units 1 and 2 — Proposed Alternatives to Extend the Safety Relief Valve Testing Interval (EPID L-2020-LLR-0014 through -0018)," Enclosure 6, "Safety Evaluation by the Office of Nuclear Reactor Regulation Proposed Alternative

RV-09 Regarding Extension of the Safety Relief Valve Testing Interval Exelon Generation Company, LLC Quad Cities Nuclear Power Station, Units 2 and 3 Docket Nos. 50-254 and 50-265," dated January 14, 2021 (ADAMS Accession No. ML21005A061)

8. References

1. Letter from J. S. Wiebe, (USN RC Acting Chief Plant Licensing Branch 111-2) to M. J. Pacilio (Exelon Generation Company, LLC), "Quad Cities Nuclear Power Station, Units 1 and 2 - Safety Evaluation in Support of Request for Relief Associated with the Fifth 10 Year Interval Inservice Testing Program (TAC Nos. ME7981, ME7982, ME7983, ME7984, ME7985, ME7986, ME7987, ME7988, ME7990, ME7991, ME7992, ME7993, ME7994, and ME7995), dated February 14, 2013, (ADAMS Accession No. ML13042A348)

2. Electric Power Research Institute / Nuclear Maintenance Applications Center (EPRI/NMAC) Safety and Relief Valve Testing and Maintenance Guide, Revision of TR-105872, Technical Report 3002005362, August 2015

3. Constellation Procedure ER-AA-400-1000, Safety & Relief Valve Testing, Tracking, And Trending

Proposed Alternative to Adopt ASME OM Code Case OMN-26, "Alternative Risk-Informed and Margin Based Rules for Inservice Testing of Motor Operated Valves" in Accordance with 10 CFR 50.55a(z)(1), "Alternative Provides Acceptable Level of Quality and Safety"

1. ASME Code Components Affected

Active safety-related motor-operated valves (MOVs) that are required by Subsection ISTC of the 2017 Edition of the ASME Operation and Maintenance (OM) Code to be tested in accordance with ASME OM Code Division 1, Mandatory Appendix III "Preservice and Inservice Testing of Active Electric Motor-Operated Valve Assemblies in Water-cooled Reactor Nuclear Power Plants."

2. Applicable Code Edition and Addenda

ASME OM Code, *Operation and Maintenance of Nuclear Power Plants*, 2017 Edition, no Addenda

3. Applicable Code Requirement

Appendix III, paragraph III-3310, *Inservice Test Interval*, subparagraph (c): states "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, paragraph III-3700, *Risk-Informed MOV Inservice Testing*, states "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, paragraph III-3721, *HSSC MOVs*, states "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, paragraph III-3722, *LSSC MOVs*, subparagraph (d) states "LSSC MOVs shall be inservice tested at least every 10 years in accordance with paragraph III-3310."

4. Reason for Request

In accordance with 10 CFR 50.55a, *Codes and standards*, paragraph (z)(1), Quad Cities Nuclear Power Station (QCNPS) is requesting approval to adopt ASME OM Code Case (CC) OMN-26, *Alternative Risk-Informed and Margin Based Rules for Inservice Testing of Motor Operated Valves*, in conjunction with implementing Division 1, Mandatory Appendix III of the 2017 Edition of the OM Code. The basis of the request is that CC OMN-26 alternative testing would provide an acceptable level of quality and safety.

CC OMN-26 better aligns the inservice test intervals in Division 1, Mandatory Appendix III to the Risk and Margin Based Licensee 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 for the current

Appendix III ten-year maximum interval that applies to all MOVs regardless of Risk and Margin. CC OMN-26 establishes a structured risk-informed approach for determining inservice test intervals that provides an acceptable level of quality and safety while providing QCNPS additional inservice test schedule flexibility.

5. Proposed Alternative and Basis for Use

QCNPS proposes to implement the ASME OM CC OMN-26 alternative risk and margin informed rules for inservice testing of MOVs in its entirety.

The requested alternative to adopt CC OMN-26 is in line with the current Joint Owners Group (JOG) MOV Periodic Verification (PV) Test Program that QCNPS has implemented since the late 1990's in response to NRC Generic Letter 96-05. Both the JOG MOV PV Program and CC OMN-26 provide a Risk-Margin based methodology that establishes limitations for maximum inservice test intervals for MOVs. CC OMN-26 simply provides a reasonable extension of this Risk-Informed philosophy based on the lessons learned and accumulated MOV performance data gathered over more than 25 years of MOV PV testing. Appendix III alone, in isolation 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. QCNPS'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 QCNPS'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 alternative reduces the maximum test interval for High Safety Significant Component (HSSC) MOVs allowed by Appendix III from ten years to nine years commensurate with a risk-informed methodology. Further under this CC, QCNPS 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 alternative 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, CC 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. CC OMN-26 provides more rigorous requirements

targeted specifically to low/medium margin MOVs. This risk/margin approach is in line with accepted risk-informed strategies such as the JOG MOV PV Program.

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

For the majority of applicable MOVs (i.e., those MOVs not subject to periodic stroking under design basis D-P conditions), the CC limits the scope to only high margin valves for extending test intervals incrementally beyond current limits.

In summary, QCNPS proposes to utilize the provisions and requirements of CC OMN-26 for active safety-related MOVs within the scope of ASME OM Code 2017 Edition Mandatory Appendix III. Compliance with the requirements of CC OMN-26 will result in an acceptable level of quality and safety pursuant to 10 CFR 50.55a(z)(1).

6. Duration of Proposed Alternative

The proposed alternative will be utilized for the entire Sixth 120-month IST Program Interval, which is scheduled to begin on February 18, 2023, and end on February 17, 2033.

7. Precedent

Letter from N. L. Salgado (U. S. Nuclear Regulatory Commission) to B. C. Hanson (Exelon Generation Company, LLC), "Braidwood Station, Units 1 and 2; Calvert Cliffs Nuclear Power Plant, Units 1 and 2; Clinton Power Station, Unit No. 1; R. E. Ginna Nuclear Power Plant; Limerick Generating Station, Units 1 and 2; Nine Mile Point, Units 1 and 2; and Peach Bottom Atomic Power Station, Units 2 and 3 – Request to Use Alternative Code Case OMN-26," dated September 1, 2020 (ADAMS Accession No. ML20232A171)

8. References

ASME OM Code Case OMN-26, *Alternative Risk-Informed and Margin Based Rules for Inservice Testing of Motor Operated Valves*, approved by ASME Board of Nuclear Codes and Standards (BNCS) December 2019.

Proposed Alternative to Adopt ASME OM Code Case OMN-28, "Alternative Valve Position Verification Approach to satisfy ISTC-3700 for Valves Not Susceptible to Stem-Disk Separation" in Accordance with 10 CFR 50.55a(z)(1), "Alternative Provides Acceptable Level of Quality and Safety"

1. ASME Code Components Affected

The valves covered by Code Case (CC) OMN-28, *Alternative Valve Position Verification Approach to Satisfy ISTC-3700 for Valves Not susceptible to Stem-Disk Separation*, 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.

A listing of the valves requiring position indication testing in accordance with ISTC-3700 will be submitted as part of the new 10-year interval Inservice Testing Program for Quad Cities Nuclear Power Station (QCNPS) which is scheduled to begin on February 18, 2023.

2. Applicable Code Edition and Addenda

ASME OM Code, *Operation and Maintenance of Nuclear Power Plants*, 2017 Edition, no Addenda

3. Applicable Code Requirement

ISTC-3700, Position Verification Testing, states: "Valves with remote position indicators shall be observed locally at least once every 2 years 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."

ISTC-3700 is supplemented by 10 CFR 50.55a(b)(3)(xi), *OM condition: Valve Position Indication*, which states: "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

Pursuant to 10 CFR 50.55a, Codes and standards, paragraph (z)(1), an alternative is proposed to the requirement of ASME OM Code ISTC-3700. The position verification with Supplemental Position Indication (SPI) requires the valves to be exercised in the open and closed direction and the valve's position verified by other indications such as use of flow meters or other suitable instrumentation to verify obturator position.

CC OMN-28 has been determined to satisfy the valve position verification requirements in ASME OM Code, Subsection ISTC, paragraph ISTC-3700, for valves that are not susceptible to stem-disk separation. This CC revises the periodicity of required SPI for non-susceptible valves from every two (2) years to every 12 years. The revised periodicity is advantageous, allowing for greater flexibility in maintenance scheduling for valves requiring position verification.

5. Proposed Alternative and Basis for Use

In lieu of compliance with paragraph ISTC-3700, QCNPS proposes to implement CC OMN-28 on the basis that it provides an acceptable level of quality and safety in accordance with 10 CFR 50.55a, *Codes and standards*, paragraph (z)(1).

The valves covered by this CC 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 CC shall meet the valve position verification requirements in ASME OM Code, Subsection ISTC-3700, in accordance with regulatory requirements.

To categorize a valve as not susceptible to stem-disk 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 as outlined in Electric Power Research Institute (EPRI) Technical Report 3002019621, *Susceptibility of Valve Applications to Failure of the Stem-to-Disk Connection*.

Valves with remote position indicators that are not susceptible to stem-disk separation shall be verified to accurately represent valve operation as discussed in Section 1.4, "Position Verification Testing Requirements for Valves Not Susceptible to Stem-Disk Separation" of the CC.

CC OMN-28 was approved for use by ASME on March 4, 2021, and no deviations from the CC are being proposed.

6. Duration of Proposed Alternative

The proposed alternative will be utilized for the entire Sixth 120-month IST Program Interval, which is scheduled to begin on February 18, 2023, and end on February 17, 2033.

7. Precedent

Letter from S. P. Wall (U. S. Nuclear Regulatory Commission) to D. P. Rhoades (Exelon Generation Company, LLC), "Braidwood Station, Units 1 and 2; Calvert Cliffs Nuclear Power Plant, Units 1 and 2; Clinton Power Station, Unit No. 1; Limerick Generating Station, Units 1 and 2; Nine Mile Point Nuclear Station, Units 1 and 2; Peach Bottom Atomic Power Station, Units 2 and 3; and R.E. Ginna Nuclear Power Plant Proposed Alternative To Use ASME OM Code Case OMN-28," dated September 3, 2021 (ADAMS Accession No. ML21230A206)

8. References

1. Electric Power Research Institute (EPRI) Technical Report 3002019621, "Susceptibility of Valve Applications to Failure of the Stem-to-Disk Connection"

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