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

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DOMINION ENERGY SOUTH CAROLINA (DESC)
VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1
ALTERNATIVE REQUESTS RR-4-19, "USE OF A PERFORMANCE BASED TESTING FREQUENCY FOR CHECK VALVES AS ALTERNATIVES TO THE REQUIREMENTS OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS CODE FOR OPERATION AND MAINTENANCE OF NUCLEAR POWER PLANTS" AND RR-4-21, "REQUEST FOR AN ALTERNATIVE TO THE CHECK VALVE CONDITION MONITORING PROGRAM REQUIREMENTS OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS CODE FOR OPERATION AND MAINTENANCE OF NUCLEAR POWER PLANTS"

In accordance with the provisions of 10 CFR 50.55a(z)(1), Dominion Energy South Carolina (DESC), acting for itself and as an agent for South Carolina Public Service Authority (Santee Cooper) hereby submits the attached requests for approval to use alternatives to the inservice testing requirements of the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance (O&M) of Nuclear Power Plants. DESC has determined that the proposed alternatives would provide an acceptable level of quality and safety.

On October 8, 2018, DESC submitted a request to use a performance-based testing frequency for pressure isolation valves (PIVs) at VCSNS, some of which were check valves (Reference 1). The Nuclear Regulatory Commission (NRC) approved this request by letter dated December 17, 2018 (Reference 2). The alternative proposed in Enclosure 1 of this letter would allow the use of a performance-based testing frequency for two additional check valves. These two check valves are tested in parallel with two PIVs which were previously approved to be tested on a performance-based frequency in Reference 1. This alternative will align the testing frequency of these check valves with their associated PIVs performance-based testing frequency.

The alternative proposed in Enclosure 2 of this letter would adopt certain Check Valve Condition Monitoring requirements which would allow the station to immediately extend the testing frequency for the check valves discussed in Reference 1 and Enclosure 1 to every third outage.

A detailed description of the proposed alternatives, including basis for use, are enclosed with this letter. DESC requests NRC review and approval of these requests by July 1, 2021 to support planning for the fall 2021 refueling outage (RF-26).

Should you have any questions, please contact Mr. Yan Gao at (804) 273-2768.

Respectfully,

Mark D. Sartain
Vice President – Nuclear Engineering & Fleet Support

Commitments contained in this letter: None

References:

1. Letter from G. A. Lippard (SCE&G) to NRC, Virgil C. Summer Nuclear Station (VCSNS) Unit 1, "Relief Request RR-4-14, Use of a Performance Based Testing Frequency for Pressure Isolation Valves as an Alternative to the Requirements of the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants," dated October 8, 2018 (ML18282A046).
2. Letter from M. T. Markley (NRC) to G. A. Lippard (SCE&G), "Virgil C. Summer Nuclear Station, Unit No 1 - Relief Request Regarding the Use of a Performance Based Testing Frequency for Pressure Isolation Valves," dated December 17, 2018 (ML18345A060).

Enclosures:

1. Alternative Request RR-4-19, Use of a Performance-Based Testing Frequency for Check Valves as an Alternative to the Requirements of the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants
2. Alternative Request RR-4-21, Request for an Alternative to the Check Valve Condition Monitoring Program Requirements of the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants

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Enclosure 1

Alternative Request RR-4-19

Use of a Performance-Based Testing Frequency for Check Valves as an Alternative to the Requirements of the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants

Virgil C. Summer Nuclear Station (VCSNS) Unit 1
Dominion Energy South Carolina, Inc. (DESC)

Alternative Request RR-4-19
Virgil C. Summer Nuclear Station Unit 1

Performance-Based Frequency for Check Valves

Proposed Alternative Request
In accordance with 10 CFR 50.55a(z)(1)

Acceptable Level of Quality and Safety

1.0 ASME Code Component(s) Affected

Table 1
ASME Code Component(s) Affected

Inservice Test (IST) Program Valve ID	IST Program Description*	Code Class	Code Category
XVC08703A-RH	RH Header A Bypass Check Valve (IRC)	2	A/C
XVC08703B-RH	RH Header B Bypass Check Valve (IRC)	2	A/C

2.0 Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code) 2004 Edition through OMb-2006 Addenda.

3.0 Applicable Code Requirement

ASME OM Code Subsection ISTC-3630, *Leakage Rate for Other than Containment Isolation Valves,* states, in part, that; "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 [are] 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 2 years."

4.0 Reason for Request

Pursuant to 10 CFR 50.55a, Codes and standards, paragraph (z)(1), an alternative to the requirement of ASME OM Code Subsection ISTC-3630(a) for check valves XVC08703A/B-RH is being requested. The basis for the request is that the proposed alternative would provide an acceptable level of quality and safety.

ASME OM Code Subsection ISTC-3630, paragraph (a) requires that leakage rate testing for Category A valves with a leakage requirement not based on an owner's 10 CFR 50, Appendix J program be performed at least once every two years.

V.C. Summer Nuclear Station (VCSNS) previously submitted a request to use a performance-based testing frequency for a specific set of pressure isolation valves (PIVs) in Reference 1. In the submittal, VCSNS proposed to perform testing of these PIVs at intervals ranging from every refueling outage (RFO) to every third RFO, not to exceed 60 months. Additionally, the request proposed that the specific test interval for each valve would be a function of its performance and would be established in a manner consistent with the Containment Isolation Valve (CIV) extended test eligibility process guidance under 10 CFR 50, Appendix J, Option B.

The Nuclear Regulatory Commission (NRC) approved this request in Reference 2. The approved request included valves XVG08701A/B-RH and XVG08702A/B-RH, which are the Residual Heat Removal (RHR) header isolation valves. These are 12-inch, motor operated, active gate valves located in the RHR inlet line from the Reactor Coolant (RC) hot legs. These normally closed valves are installed in series and form the pressure boundary between the RC and RHR systems.

This proposed alternative would allow the use of a performance-based testing frequency for two check valves, XVC08703A/B-RH, RHR Header Bypass Check Valves. These are ¾-inch check valves located in bypass lines around the inner RHR System Inlet Isolation valves, XVG08702A/B-RH. The purpose of these check valves is to open to relieve any pressure buildup in the piping between the XVG08701A/B-RH and XVG08702A/B-RH and to close to prevent pressure/flow from bypassing XVG08702A/B-RH. XVC08703A/B-RH are not identified in Technical Specifications (TS) Table 3.4-1 as PIVs. However, XVC08703A/B-RH are leak tested in parallel with XVG08702A/B-RH using the same test procedure as the PIVs (Reference 3) and under the same plant conditions. If leakage through both valves is unacceptable, XVC08703A/B-RH can be isolated so that XVG08702A/B-RH can be tested independently to determine the source of the leakage. XVC08703A/B-RH cannot be tested independently.

The proposed alternative would align the testing frequency of the two check valves with the performance-based testing of the PIVs. This will allow VCSNS to effectively implement the testing the frequency changes approved in Reference 2 with the following benefits:

- Eliminate unnecessary thermal cycles on the RCS cold leg safety injection piping.
- Reduce radiological dose consistent with NRC and industry As Low As Reasonably Achievable (ALARA) radiation dose principles.

A detailed explanation of these benefits is provided in Reference 1.

5.0 Proposed Alternative and Basis for Use

VCSNS proposes to perform testing of valves XVC08703A/B-RH at intervals ranging from every RFO to every third RFO, not to exceed 60 months. The specific interval for each valve would be a function of its performance and would be established in a manner consistent with the CIV extended test eligibility process guidance under 10 CFR 50, Appendix J, Option B. VCSNS uses a PIVs Leakage Testing procedure STP-215.008, "SI and RH System Valve Leakage Test," (Reference 3) to verify the close function of the PIVs as well as XVC8703A/B-RH. Historically, these check valves have been tested at the required interval, which is currently every RFO, or two years, as specified in ASME OM Code Subsection ISTC-3630, paragraph (a). Measured leakage rates of less than the leakage limits found in TS and VCSNS procedure STP-215.008 are considered acceptable.

VCSNS is proposing that if these check valves have demonstrated acceptable performance for two consecutive cycles, they may have their test interval extended to every third RFO, not to exceed 60-months. A leakage test failure would require the associated component to return to the initial test interval of every RFO or two years until acceptable performance is re-established.

The two check valves identified in this request are used in water applications. Leakage testing is performed with water at or below the function maximum pressure differential. However, where necessary the observed leakage is adjusted to the function maximum pressure differential value in accordance with ASME OM Code Subsection ISTC-3630, paragraph (b), *Differential Test Pressure*, item (4). Testing of the check valves is performed during plant startup following a refueling shutdown. The testing is performed per STP-215.008. Although the check valves have an allowable leakage rate limit, the main purpose of this limit is to prevent overpressure failure of the lower-pressure design of connecting systems. The allowable leakage rate limit provides a standard against which the check valve leakage can be compared to determine if the check valve is degraded or degrading. Excessive check valve leakage (i.e., greater than the allowable leakage rate limit) could lead to overpressure of the low-pressure piping or components, potentially resulting in a loss of coolant accident (LOCA) outside of containment.

Although these two check valves are not PIVs, much of the basis used to justify performance-based testing of PIVs in Reference 1 is applicable to the justification of acceptability for performance-based testing of the check valves. A detailed discussion of the basis can be found in Reference 1, with the summary of the applicable basis as follows:

- Nuclear Energy Institute (NEI) guidance document 94-01 was cited as an approach similar to the requested alternative method and provides reasonable assurance of continued operational readiness (Reference 4).
- Separate functional testing of check valves will continue to be conducted per the ASME OM Code. For check valves, functional testing is accomplished in accordance with ASME OM Code Mandatory Appendix II, Check Valve Condition Monitoring

Program. Performance of the separate two-year leak rate testing does not contribute any additional assurance of functional capability but rather provides added assurance of valve integrity, thereby reducing the probability of gross valve failure and consequent intersystem LOCA (ISLOCA).

(It is noted that a separate request is being submitted in Enclosure 2 that proposes an alternative to Mandatory Appendix II, 4000(b), Optimization of Condition-Monitoring Activities. 4000(b)(1)(e), states, in part, "Identify the interval of each activity. Interval extensions shall be limited to one fuel cycle per extension." VCSNS is submitting a separate alternative request to immediately implement testing every third RFO and perform the next testing in RF-27.)

- Relief valves in the low pressure (LP) piping may not provide ISLOCA mitigation for inadvertent PIVs mis-positioning, but their relief capacity can accommodate conservative seat leakage rates.
- Alarms are provided that identify high pressure to low pressure leakage. Operators are trained to recognize symptoms of an ISLOCA condition and to take appropriate actions.
- NUREG-0933, *Resolution of Generic Safety Issues*, Section 3, Issue 105, *Interfacing Systems LOCA at LWRs,* discusses the need for PIV leak rate testing based primarily on three historical (pre-1985) failures of applicable valves across the industry (Reference 5). These failures involved human errors in either operations or maintenance. The performance of PIV leak rate testing provides assurance of acceptable seat leakage with the valve in a closed position. However, leak rate testing does not typically identify functional problems which may inhibit the valve's ability to reposition from open to closed.

Table 2 below provides historical leak rate test data that demonstrates acceptable check valve performance for XVC08703A/B-RH.

Table 2
Historical Leak Rate Test Performance for Residual Heat Removal Check Valves

IST Program Valve ID	Date of Test	Measured Value (gpm)	Allowable Leakage Limit, STP-215.008 (gpm)	Comments
XVC08703A-RH	5/29/2014	0.0	3.8	Combined Leak Rate (XVC08703A-RH and XVG08702A-RH)
	11/30/2015	0.11		
	5/31/2017	0.18		
	11/22/2018	-0.13*		
XVC08703B-RH	5/29/2014	0.93	3.8	Combined Leak Rate (XVC08703B-RH and XVG08702B-RH)
	11/30/2015	1.18		
	5/31/2017	0.62		
	11/22/2018	0.86		

*The baseline leakage was more than the leakage measured through XVC08703A-RH and XVG08702A-RH in parallel. Baseline leakage is measured from the test header while XVG08702A-RH and XVC08703A-RH are isolated from the test header. This value is later subtracted from the leakage measured when XVG08702A-RH and XVC08703A-RH are aligned to the test header. This gives the "combined leak rate". In this case, the baseline leakage was 0.81 gpm and leakage through XVG08702A-RH and XVC08703A-RH in parallel was 0.68 gpm. Both are below the allowable leakage limit of 3.8 gpm.

While the difference in seat leakage from one outage to the next may seem significant, when viewed over the life of the valves, the historical trend of the measured leakage is stable. In most cases, the measured leakage has been less than 1 gpm, and thus below the procedural allowable leakage limit of 3.8 gpm. Possible explanations for the variations in valve performances between tests are listed below:

- Seating in slightly different positions may cause slightly different leak rates.
- As permitted by the applicable procedures, personnel performing the tests may observe that the seat leakage has dropped below the acceptance criteria and record the leakage value or may wait to determine if the seat leakage stabilizes at an even lower point and record the lower value.

A review of corrective maintenance for the check valves listed in Table 1 was performed. It was determined that no corrective maintenance was performed during the last four fuel cycles that would require a change to the analysis used to formulate the basis for extending the testing interval per the alternative request.

Based on valve performance history, there is continued assurance of valve operational readiness, as required by ASME OM-2004 Code, paragraph ISTC-3630. Therefore, this proposed alternative to align the testing frequency of XVC08703A/B-RH with the performance-based PIVs testing alternative previously approved by the NRC (Reference

2) will continue to provide assurance of the valves' operational readiness and provides an acceptable level of quality and safety pursuant to 10 CFR 50.55a(z)(1).

6.0 Duration of Proposed Alternative

This request, upon approval, will be applied to the remainder of the station's fourth 10-year interval, which commenced January 1, 2014, and is currently scheduled to end on December 31, 2023.

7.0 Precedence

VCSNS submitted a request for the use of a performance-based testing frequency for PIVs in Reference 1. The NRC approved this request and issued a Safety Evaluation Report in Reference 2. VCSNS did not include two check valves which are tested in parallel with two of the PIVs. This alternative request is being submitted to align the check valve testing with the associated PIVs testing.

8.0 References

1. Letter from G. A. Lippard (SCE&G) to NRC, Virgil C. Summer Nuclear Station (VCSNS) Unit 1, "Relief Request RR-4-14, Use of a Performance Based Testing Frequency for Pressure Isolation Valves as an Alternative to the Requirements of the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants," dated October 8, 2018 (ML18282A046).
2. Letter from M. T. Markley (NRC) to G. A. Lippard (SCE&G), "Virgil C. Summer Nuclear Station, Unit No 1 - Relief Request Regarding the Use of a Performance Based Testing Frequency for Pressure Isolation Valves," dated December 17, 2018 (ML18345A060).
3. VCSNS Procedure STP-215.008, "SI and RH System Valve Leakage Test."
4. Letter from NRC (S. Bahadur) to NEI (B. Bradley), "Final Safety Evaluation of Nuclear Energy Institute (NEI) Report, 94-01, Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J (TAC No. ME2164)", dated June 8, 2012 (ML121030286).
5. NUREG-0933, Resolution of Generic Safety Issues, (Main Report with Supplements 1-34); Section 3, New Generic Issues; Issue 105: Interfacing Systems LOCA at LWRs (Rev. 4); Fard, M. Reisi; U.S. NRC, Division of Risk Analysis; Published December 2011.

Enclosure 2

Alternative Request RR-4-21

Request for an Alternative to the Check Valve Condition Monitoring Program Requirements of the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants

Virgil C. Summer Nuclear Station (VCSNS) Unit 1
Dominion Energy South Carolina, Inc. (DESC)

Alternative Request RR-4-21
Virgil C. Summer Nuclear Station Unit 1

Alternative to Check Valve Condition Monitoring Program Requirements

Proposed Alternative Request
In accordance with 10 CFR 50.55a(z)(1)

Acceptable Level of Quality and Safety

1.0 ASME Code Component(s) Affected

Table 1
ASME Code Component(s) Affected

Inservice Test (IST) Program Valve ID	IST Program Description*	Code Class	Code Category
XVC08703A-RH	RH Header A Bypass Check Valve (IRC)	2	A/C
XVC08703B-RH	RH Header B Bypass Check Valve (IRC)	2	A/C
XVC08948A-SI	SI Loop A Outlet Header Check Valve	1	A/C
XVC08948B-SI	SI Loop B Outlet Header Check Valve	1	A/C
XVC08948C-SI	SI Loop C Outlet Header Check Valve	1	A/C
XVC08956A-SI	SI Accum A Disch Header Check Valve	1	A/C
XVC08956B-SI	SI Accum B Disch Header Check Valve	1	A/C
XVC08956C-SI	SI Accum C Disch Header Check Valve	1	A/C
XVC08973A-SI	RCS Loop A Cold Leg Inlet Hdr Check Valve	1	A/C
XVC08973B-SI	RCS Loop B Cold Leg Inlet Hdr Check Valve	1	A/C
XVC08973C-SI	RCS Loop C Cold Leg Inlet Hdr Check Valve	1	A/C
XVC08974A-SI	SI Header A Check Valve (IRC)	2	A/C
XVC08974B-SI	SI Header B Check Valve (IRC)	2	A/C
XVC08988A-SI	RHR Supply Header Check Valve	1	A/C
XVC08988B-SI	RHR Supply Header Check Valve	1	A/C
XVC08990A-SI	Loop A High Head Hot Leg Check Valve	1	A/C
XVC08990B-SI	Loop B High Head Hot Leg Check Valve	1	A/C
XVC08990C-SI	Loop C High Head Hot Leg Check Valve	1	A/C
XVC08992A-SI	Loop A High Head Hot Leg Check Valve	1	A/C
XVC08992B-SI	Loop B High Head Hot Leg Check Valve	1	A/C
XVC08992C-SI	Loop C High Head Hot Leg Check Valve	1	A/C
XVC08993A-SI	Loop A High Head Hot Leg Hdr Check Valve	1	A/C
XVC08993B-SI	Loop B High Head Hot Leg Hdr Check Valve	1	A/C
XVC08993C-SI	Loop C High Head Hot Leg Hdr Check Valve	1	A/C
XVC08995A-SI	Loop A High Head Cold Leg Check Valve	1	A/C
XVC08995B-SI	Loop B High Head Cold Leg Check Valve	1	A/C
XVC08995C-SI	Loop C High Head Cold Leg Check Valve	1	A/C

Inservice Test (IST) Program Valve ID	IST Program Description*	Code Class	Code Category
XVC08997A-SI	Loop A High Head Cold Leg Check Valve	1	A/C
XVC08997B-SI	Loop B High Head Cold Leg Check Valve	1	A/C
XVC08997C-SI	Loop C High Head Cold Leg Check Valve	1	A/C
XVC08998A-SI	Loop A Low Head Cold Leg Check Valve	1	A/C
XVC08998B-SI	Loop B Low Head Cold Leg Check Valve	1	A/C
XVC08998C-SI	Loop C Low Head Cold Leg Check Valve	1	A/C
* **Acronym Key**: **SI** – Safety Injection, **RH** – Residual Heat Removal			

2.0 Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code) 2004 Edition through OMb-2006 Addenda.

3.0 Applicable Code Requirement

ASME OM Code Mandatory Appendix II, 4000(b), *Optimization of Condition-Monitoring Activities*, (1)(e), states, in part, "Identify the interval of each activity. Interval extensions shall be limited to one fuel cycle per extension."

4.0 Reason for Request

Pursuant to 10 CFR 50.55a, Codes and standards, paragraph (z)(1), an alternative to Mandatory Appendix II, 4000(b)(1)(e) for all valves listed in Table 1 is being requested. The basis for the request is that the proposed alternative would provide an acceptable level of quality and safety.

V. C. Summer Nuclear Station (VCSNS) was previously granted an alternative to ISTC-3630(a) to allow a performance-based testing frequency for all valves listed in Table 1, except for XVC08703A/B-RH (Reference 1). VCSNS is also submitting a separate alternative request to allow use of a similar performance-based testing frequency for XVC08703A/B-RH in Enclosure 1.

VCSNS is requesting an alternative to Mandatory Appendix II, 4000(b) for all valves listed in Table 1. Mandatory Appendix II, 4000(b)(1)(e) requires that extensions of testing intervals be limited to one fuel cycle per extension. In Reference 1, VCSNS requested an alternative to the frequency requirements in ISTC-3630(a) for the valves listed in Table 1, and the Nuclear Regulatory Commission (NRC) approved the request in Reference 2. However, VCSNS did not specifically ask to deviate from the interval extension requirements found in Appendix II, 4000(b)(1)(e) for either the closure or leakage tests for the valves (which are the same test in this case). Therefore, VCSNS is submitting this request, which would allow immediate extension of the testing frequency of all valves listed in Table 1 to every third refueling outage (RFO). This change will allow VCSNS to

immediately recognize the benefits of the approved performance-based testing program as discussed in detail in Reference 1. The benefits include the following:

- Eliminate unnecessary thermal cycles in the reactor coolant system (RCS) cold leg safety injection piping.
- Reduce radiological dose consistent with Nuclear Regulatory Commission (NRC) and industry As Low As Reasonably Achievable (ALARA) radiation dose principles.

5.0 Proposed Alternative and Basis for Use

Mandatory Appendix II, 4000(b), *Optimization of Condition-Monitoring Activities*, (1)(e), states, in part, "Identify the interval of each activity. Interval extensions shall be limited to one fuel cycle per extension."

Leak tests on all valves in Table 1 were last performed during the fall 2018 refueling outage (RF-24). VCSNS is proposing to immediately implement a leakage testing frequency of every third RFO and perform the next testing in RF-27. A leakage test failure would require the component to return to the initial interval of every RFO or two years, until acceptable performance is re-established at which point the test interval may be extended again, consistent with the requirements of Mandatory Appendix II, 4000(b).

The previously submitted and approved alternative (References 1 and 2, respectively) and the proposed alternative in Enclosure 1, state that valves which have demonstrated good performance for two consecutive cycles may have their test interval extended to every third RFO, not to exceed 60-months. A leakage test failure would require the valve be returned to the initial test interval of every RFO, or two years, until good performance is re-established.

The results of the leakage tests performed during outages RF-20 through RF-23 for all valves listed in Table 1 are provided in Reference 1, except for XVC08703A/B-RH. The results of the leakage tests performed during outages RF-21 through RF-24 for XVC08703A/B-RH are shown in Table 2 of Enclosure 1. The results of the leakage tests performed during RF-24 for all other valves are shown in Table 2 below. All valves have successfully met the Technical Specifications (TS) allowable leakage limits for the past four fuel cycles.

Table 2

Historical Leak Rate Test Performance for Check Valves

IST Program Valve ID	Date of Test	Measured Value (gpm)	TS Allowable Leakage Limit (gpm)	Comments
XVC08948A-SI	11/22/18	0.15	5	Individual Leak Rate
XVC08948B-SI	11/22/18	0.16	5	Individual Leak Rate
XVC08948C-SI	11/22/18	0.22	5	Individual Leak Rate
XVC08956A-SI	11/22/18	0.12	5	Individual Leak Rate
XVC08956B-SI	11/22/18	0.13	5	Individual Leak Rate
XVC08956C-SI	11/22/18	0.13	5	Individual Leak Rate
XVC08973A-SI	11/22/18	1.01	3	Individual Leak Rate
XVC08973B-SI	11/22/18	0.59	3	Individual Leak Rate
XVC08973C-SI	11/22/18	0.21	3	Individual Leak Rate
XVC08974A-SI	11/22/18	0.0	5	Individual Leak Rate
XVC08974B-SI	11/22/18	0.0	5	Individual Leak Rate
XVC08988A-SI	11/22/18	0.84	3	Group Leak Rate (5 valves: XVC08990A/B/C-SI; XVC08988A/B-SI)
XVC08988B-SI	11/22/18	0.84	3	
XVC08990A-SI	11/22/18	0.84	1	
XVC08990B-SI	11/22/18	0.84	1	
XVC08990C-SI	11/22/18	0.84	1	
XVC08992A-SI	11/22/18	0.71	1	Group Leak Rate (3 valves: XVC08992A/B/C-SI)
XVC08992B-SI	11/22/18	0.71	1	
XVC08992C-SI	11/22/18	0.71	1	
XVC08993A-SI	11/22/18	1.5	3	Group Leak Rate (3 valves XVC08993A/B/C-SI)
XVC08993B-SI	11/22/18	1.5	3	
XVC08993C-SI	11/22/18	1.5	3	
XVC08995A-SI	11/22/18	0.41	1	Group Leak Rate (6 valves: XVC08995A/B/C-SI; XVC08997A/B/C-SI)
XVC08995B-SI	11/22/18	0.41	1	
XVC08995C-SI	11/22/18	0.41	1	
XVC08997A-SI	11/22/18	0.41	1	
XVC08997B-SI	11/22/18	0.41	1	
XVC08997C-SI	11/22/18	0.41	1	
XVC08998A-SI	11/22/18	1.07	3	Individual Leak Rate
XVC08998B-SI	11/22/18	0.77	3	Individual Leak Rate
XVC08998C-SI	11/22/18	0.29	3	Individual Leak Rate

Mandatory Appendix II requires check valve testing interval extensions to be limited to one RFO at a time, based on the assumption that there is no history that would support immediately extending testing to a longer interval. Extending the interval one RFO at a time also reduces the risk of not being able to detect failures that may be induced by the newly increased time between tests, by allowing earlier detection of conditions which may lead to failure. VCSNS has provided the leakage test history over the last four RFOs. The test history shows satisfactory performance for these valves. These valves are a robust design, with well understood service conditions. During normal operations, station instrumentation would show signs (high pressure) of any gross leakage, if one of these valves failed to close following testing. Based on demonstration of satisfactory testing history, low likelihood of valve failure, and ability to detect gross leakage, allowing VCSNS to immediately implement a leakage test frequency of every third outage for these valves would provide an acceptable level of quality and safety pursuant to 10 CFR 50.55a(z)(1).

6.0 Duration of Proposed Alternative

This request, upon approval, will be applied to the remainder of the station's fourth 10-year interval, which commenced January 1, 2014, and is currently scheduled to end on December 31, 2023.

7.0 Precedence

VCSNS submitted a request for the use of a performance-based testing frequency for pressure isolation valves (PIVs) in Reference 1. The NRC approved this request in Reference 2.

The NRC approved PIVs leak rate testing on a performance-based frequency for Quad Cities Nuclear Power Station, Units 1 and 2 in Reference 4. For some of the valves, it was noted that the intent of the condition monitoring plan was to align the closure test frequency to the same frequency as the PIVs seat leakage pressure test.

8.0 References

1. Letter from G. A. Lippard (SCE&G) to NRC, Virgil C. Summer Nuclear Station (VCSNS) Unit 1, "Relief Request RR-4-14, Use of a Performance Based Testing Frequency for Pressure Isolation Valves as an Alternative to the Requirements of the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants," dated October 8, 2018 (ML18282A046).
2. Letter from M. T. Markley (NRC) to G. A. Lippard (SCE&G), "Virgil C. Summer Nuclear Station, Unit No 1 - Relief Request Regarding the Use of a Performance Based Testing Frequency for Pressure Isolation Valves," dated December 17, 2018 (ML18345A060).
3. Letter from J. S. Wiebe (NRC) to M. J. Pacilio (Exelon), "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," dated February 14, 2013 (ML13042A348).