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June 22, 2015

10 CFR 50.55a

RS-15-170

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

Byron Station, Units 1 and 2
Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN-50-454 and STN 50-455

Subject: Submittal of Relief Requests Associated with the Fourth 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 Fourth 10-Year Inservice Testing (IST) Program Interval for Byron Station. The Fourth 10-Year Interval begins on July 1, 2016 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, 2004 Edition through the 2006 Addenda.

The Byron Station Fourth 10-year IST Interval will be in effect from July 1, 2016 to June 30, 2026. Accordingly, we request approval of the enclosed relief requests by June 22, 2016.

There are no regulatory commitments contained within this letter. Should you have any questions concerning this letter, please contact Ms. Dwi Murray at (630) 657-3695.

Respectfully,

David M. Gullott
Manager – Licensing
Exelon Generation Company, LLC

Attachments:
1. 10 CFR 50.55a Request Number RG-1 – Inservice Test Frequency per Code Case OMN-20
2. 10 CFR 50.55a Request Number RP-1 – Essential Service Water Makeup Pumps Vibration Limits
3. 10 CFR 50.55a Request Number RP-2 – Essential Service Water Makeup Pumps Suction Gauge Accuracy for the Comprehensive Pump Test
4. 10 CFR 50.55a Request Number RP-3 – Adjusting Hydraulic Parameters to Specified Reference Points per Code Case OMN-21
5. 10 CFR 50.55a Request Number RV-1 – Use of Code Case OMN-1, Revision 1 for Various Motor Operated Valves

cc: NRC Regional Administrator – Region III
NRC Senior Resident Inspector – Byron Station
NRC Project Manager, NRR – Byron Station
Illinois Emergency Management Agency – Division of Nuclear Safety

ATTACHMENT 1
10 CFR 50.55a Request Number RG-1

Inservice Test Frequency Per Code Case OMN-20
Proposed Alternative Requested In Accordance with 10 CFR 50.55a(z)(2)
-- Hardship or Unusual Difficulty without Compensating Increase in Level of Quality and Safety --

1. **ASME Code Component(s) Affected**

All Pumps and Valves contained within the Byron Station Inservice Testing (IST) Program scope.

2. **Applicable Code Edition and Addenda**

ASME OM Code 2004 Edition through the 2006 Addenda.

3. **Applicable Code Requirement(s)**

This request applies to the frequency specifications of the ASME OM Code. The frequencies for tests given in the ASME OM Code do not include a tolerance band.

ISTA-3120(a) – "The frequency for inservice testing shall be in accordance with the requirements of Section IST."

ISTB-3400 – Frequency of Inservice Tests; "An inservice test shall be run on each pump as specified in Table ISTB-3400-1." Table ISTB-3400-1 lists two frequencies – quarterly and biennially.

ISTC-3510 – Exercising Test Frequency; "Active Category A, Category B, and Category C check valves shall be exercised nominally every 3 months,..."

ISTC-3540 – Manual Valves; "Manual Valves shall be full-stroke exercised at least once every 2 years, except where adverse conditions may require the valve to be tested more frequently to ensure operational readiness."

ISTC-3630(a) – Frequency; "Tests shall be conducted at least once every 2 years."

ISTC-3700 – Position Verification Testing; "Valves with remote position indicators shall be observed locally at least once every 2 years to verify that valve operation is accurately indicated."

ISTC-5221(c)(3) – "At least one valve from each group shall be disassembled and examined at each refueling outage; all valves in a group shall be disassembled and examined at least once every 8 years."

Appendix I, I-1320(a) – Test Frequencies, Class 1 Pressure Relief Valves; "Class 1 pressure relief valves shall be tested at least once every 5 years..."

Appendix I, I-1330 – Test Frequency, Class 1 Nonreclosing Pressure Relief Devices; "Class 1 nonreclosing pressure relief devices shall be replaced every 5 years..."

Appendix I, I-1340 – Test Frequency, Class 1 Pressure Relief Valves that are used for Thermal Relief Application; Refers to I-1320 for test frequency.

Appendix I, I-1350 – Test Frequency, Classes 2 and 3 Pressure Relief Valves; "Classes 2 and 3 pressure relief valves, with the exception of PWR main steam safety valves, shall be tested every 10 years, ..."

Appendix I, I-1360 – Test Frequency, Classes 2 and 3 Nonreclosing Pressure Relief Devices; "Classes 2 and 3 nonreclosing pressure relief devices shall be replaced every 5 years, ..."

Appendix I, I-1370 – Test Frequency, Classes 2 and 3 Primary Containment Vacuum Relief Valves; "Tests shall be performed on all Classes 2 and 3 containment vacuum relief valves at each refueling outage or every 2 years, ..."

Appendix I, I-1380 – Test Frequency, Classes 2 and 3 Vacuum Relief Valves Except for Primary Containment Vacuum Relief Valves; "All Classes 2 and 3 vacuum relief valves shall be tested every 2 years, ..."

Appendix I, I-1390 – Test Frequency, Classes 2 and 3 Pressure Relief Devices that are used for Thermal Relief Application; "Tests shall be performed on all Classes 2 and 3 relief devices used in thermal relief application every 10 years, ..."

Appendix II, II-4000(a)(1)(e) – Performance Improvement Activities; Subparagraph (1)(e) requires the identification of the interval for each activity.

Appendix II, II-4000(b)(1)(e) – Optimization of Condition-Monitoring Activities; Subparagraph (1)(e) requires the identification of the interval for each activity.

4. **Reason for Request**

In accordance with 10 CFR 50.55a, "Codes and standards," paragraph (z)(2), an alternative is requested to the frequency specifications of the ASME OM Code. The basis of this request is that the Code requirements present an undue hardship without a compensating increase in the level of quality or safety.

ASME OM Code Section IST establishes the inservice test frequencies for all components within the scope of the Code. The frequencies (e.g., quarterly) have always been interpreted as "nominal" frequencies (generally as defined in Table 3.2 of NUREG-1482, Revision 2) and Owners routinely applied the surveillance extension time period (i.e., grace period) contained in the plant Technical Specifications (TS) Surveillance Requirements (SRs). The TS typically allow for a less than or equal to 25% extension of the surveillance test interval to accommodate plant conditions that may not be suitable for conducting the surveillance (SR 3.0.2). However, regulatory issues have been raised concerning the applicability of the TS "Grace Period" to ASME OM Code required inservice test frequencies irrespective of allowances provided under TS Administrative Controls (i.e., TS 5.5.8, "Inservice Testing Program," invokes SR 3.0.2 for various OM Code frequencies of 2 years or less).

The lack of a tolerance band on the ASME OM Code inservice test frequencies restricts operational flexibility. There may be a conflict where a surveillance test could be required (i.e., its Frequency could expire), but where it is not possible or not desired that it be performed until sometime after a plant condition or associated Limiting Condition for Operation (LCO) is within its applicability. Therefore, to avoid this conflict, the surveillance test should be performed when plant conditions allow.

The NRC recognized this potential issue in the TS by allowing a frequency tolerance as described in TS SR 3.0.2. The lack of a similar tolerance applied to OM Code testing places an unusual hardship on the plant to adequately schedule work tasks without operational flexibility.

Thus, just as with TS required surveillance testing, some tolerance is needed to allow adjusting OM Code testing intervals to suit the plant conditions and other maintenance and testing activities. This assures operational flexibility when scheduling surveillance tests that minimize the conflicts between the need to complete the surveillance and plant conditions.

5. Proposed Alternative and Basis for Use

The ASME OM Code establishes component test frequencies that are based either on elapsed time periods (e.g., quarterly, 2 years, etc.) or on the occurrence of plant conditions or events (e.g., cold shutdown, refueling outage, upon detection of a sample failure, following maintenance, etc.).

a. Components whose test frequencies are based on elapsed time periods shall be tested at the frequencies specified in ASME OM Code Section IST with a specified time period between tests as shown in Table 1.

Table 1 – Specified Test Frequency

Frequency	Specified Time Period Between Tests (all values are 'not to exceed'; no minimum periods are specified)
Quarterly (or every 3 months)	92 days
Semiannually (or every 6 months)	184 days
Annually (or every year)	366 days
x Years	x calendar years where 'x' is a whole number of years ≥ 2

The specified time period between tests may be reduced or extended as follows:

1) For periods specified as less than 2 years, the period may be extended by up to 25% for any given test. This is consistent with Byron Station TS Section 5.5.8, "Inservice Testing Program."

2) For periods specified as greater than or equal to 2 years, the period may be extended by up to 6 months for any given test.

3) All periods specified may be reduced at the discretion of the owner (i.e., there is no minimum period requirement).

Period extension is to facilitate test scheduling and considers plant operating conditions that may not be suitable for performance of the required testing (e.g., performance of the test would cause an unacceptable increase in the plant risk profile due to transient conditions or other ongoing surveillance, test or maintenance activities). Period extensions are not intended to be used repeatedly merely as an operational convenience to extend test intervals beyond those specified.

Period extensions may also be applied to accelerated test frequencies (e.g., pumps in Alert Range) and other less than two year test frequencies not specified in the table above.

Period extensions may not be applied to the test frequency requirements specified in Subsection ISTD, Preservice and Inservice Examination and Testing of Dynamic Restraints (i.e., snubbers) in Light-Water Reactor Nuclear Power Plants, as Subsection ISTD contains its own rules for period extensions.

b. Components whose test frequencies are based on the occurrence of plant conditions or events (e.g., cold shutdown, refueling outage, upon detection of a sample failure, following maintenance, etc.) may not have their period between tests extended except as allowed by the ASME OM Code.

Previous versions of the ASME Code and the current Byron Station TS provide operational flexibility for the performance of ASME OM Code testing. As currently written, ASME OM Code requirements do not allow testing period extensions that provide an allowance for the performance of ASME OM Code testing. As a result, this places an unusual hardship on Byron Station's ability to schedule and perform ASME OM Code testing without a compensating increase in the level of quality and safety.

6. Duration of Proposed Alternative

The proposed alternative will be utilized during the entire fourth 120-month Inservice Test interval (which will begin on July 1, 2016 and conclude on June 30, 2026).

7. Precedents

Similar requests were approved for:

a. Callaway Plant Unit 1, (Docket No. 50-483), Request No. PR-04, as discussed in NRC Safety Evaluation Report (SER) dated July 15, 2014 (TAC NOS. MF2784 through MF2789). This report may be found in ADAMS via accession number ML14178A769.

b. Dresden Nuclear Power Station, 10 CFR 50.55a Request RV-01, NRC Safety Evaluation Report (SER) dated October 31, 2013, TAC NOS. ME9865, ME9866, ME9869, ME9870 and ME9872. This report may be found in ADAMS via accession number ML13297A515.

c. Three Mile Island Nuclear Station, 10 CFR 50.55a request VR-01, NRC SER dated August 15, 2013, TAC NOS. MF0046, MF0047 and MF0048. This report may be found in ADAMS via accession number ML13227A024.

d. Quad Cities Nuclear Power Station, Units 1 and 2 (NRC Dockets 50-254 and 50-265), Request No. RV-01, as discussed in NRC Safety Evaluation Report (SER) dated February 14, 2013 (TAC NOS. ME7981 through ME7995). This report may be found in ADAMS via accession number ML13042A348.

8. References

Byron Station Technical Specifications:

a. Section 1.4 – Frequency

b. Section 3.0 – Limiting Conditions for Operations (LCO) Applicability

c. Section 5.5.8 – Inservice Testing Program

ATTACHMENT 2
10 CFR 50.55a Request Number RP-1

Essential Service Water Makeup Pumps Vibration Limits
Proposed Alternative Requested In Accordance with 10 CFR 50.55a(z)(1)
-- Alternative Provides Acceptable Level of Quality and Safety --

1. **ASME Code Component(s) Affected**

   0SX02PA Essential Service Water Makeup Pump A
   0SX02PB Essential Service Water Makeup Pump B

2. **Applicable Code Edition and Addenda**

   ASME OM Code 2004 Edition through the 2006 Addenda.

3. **Applicable Code Requirement**

   Table ISTB-5221-1, "Vertical Line Shaft and Centrifugal Pumps Test Acceptance Criteria."

4. **Reason for Request**

   In accordance with 10 CFR 50.55a, "Codes and standards," paragraph (z)(1), relief is requested from the requirement of ASME OM Code Table ISTB-5221-1. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

   Table ISTB-5221-1 specifies the vibration limits for vertical line shaft pumps operating at or above 600 rpm as the following for both the Group A and the comprehensive pump test:

Reference Value	Acceptable	Alert	Required Action
V_r	$\leq 2.5\ V_r$	$>2.5\ V_r$ - $6.0\ V_r$ or >0.325 - 0.70 in/sec	$>6.0V_r$ or >0.70 in/sec

   Due to the unique design of these pumps, normal vibration levels have been as high as approximately 0.5 in/sec at the gearbox locations. As a result, the normal vibration levels may exceed the Acceptable and Required Action limits of Table ISTB-5221-1.

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

   The objective of the essential service water (SX) make-up pump is to maintain cooling tower basin level to compensate for drift losses, evaporation, and blowdown. These pumps automatically start on a low level signal in the cooling tower basin. The pump will continue to operate regardless of whether offsite power is available or not since these pumps are diesel engine driven.

   The essential service water make-up pumps are categorized as Group B since they are in a standby system which is not operated routinely except for testing.

The SX Makeup Pumps are a unique design (see Figure 1). A horizontal diesel drives a right angle gearbox located approximately 39 feet above the pump. The driveshaft from the gearbox to the pump consists of five coupled sections and is located in the pump discharge piping column. Pump thrust is carried by bearings physically located within the gearbox. The pump is submerged in river water.

Although these pumps are considered vertical line shaft pumps, the unique design configuration is not addressed by the ASME OM Code. Due to monitoring limitations of this design, and because of the similarity to the requirements for vertical line shaft pumps, vibration is monitored on the gearbox. The limitation of taking the vibration readings at this location is that the resultant vibration readings are not attributable to the pump. Vibration analysis has indicated the vibration readings obtained are the result of vibration induced by the diesel engine and the gearbox itself, along with a resonant condition of the gearbox and its foundation.

Maintenance and inspection activities to date have indicated that the angle gearboxes have been operating properly and without degradation. Maintenance and inspection activities on the pumps have indicated that there has not been any pump degradation due to the vibration observed on the gearboxes. Likewise, the pump units have not caused vibration degradation of the gearboxes. As expected, since these pumps are Group B, little to any degradation has been identified.

The pump impellers have been replaced with stainless steel units and the wear rings replaced with a more resistant alloy, due to the adverse service application associated with these pumps. The new pump assemblies were tested at the vendor's facility and exhibited very low vibration levels.

Byron Station had consulted an industry vibration expert and vendor representative from the gearbox company in 2001 (see Figure 2), in an effort to ensure vibration levels are as low as achievable with this particular pump design, and to assure the existing vibration levels are not indicative of pump degradation. These efforts included the following activities:

- Field service representatives from the gearbox company supervised the refurbishment of the two gearboxes. Both refurbished units were then installed on the pumps. The units that were refurbished had seen a significant amount of service under the historically higher vibration conditions and when inspected did not show any vibration related degradation.

- Bi-directional support braces were installed on the gearboxes to address the vibration resonance problem.

- The gearboxes were precision aligned and the couplings were balance checked upon installation.

All of these efforts combined have resulted in some reduction in the vibration levels; however, not enough to remove the pumps from the ASME OM Code Alert Range. Both pumps have experienced vibration levels at the gearbox locations of up to approximately 0.5 in/sec during the third 10 year inservice testing interval. Byron has concluded that vibration levels recorded at the gearbox locations are normal for the unique design configuration and do not indicate an unusual condition of the gearbox or the pump. The proposed alternative limits below will ensure that required action is taken if vibration levels increase while ensuring the pump is not prematurely declared inoperable.

Since the gearbox normally exhibits relatively high vibration levels, which are not indicative of degradation, the use of Table ISTB-5221-1 would not be practical in that it would require double test frequency when the vibration levels are normal.

Byron Station proposes the use of the following limits when performing vibration testing of the SX Makeup Pumps:

Reference Value	Acceptable	Alert	Required Action
V_r	$\leq 2.5\ V_r$ or ≤ 0.55 in/sec	$>2.5\ V_r$ - $6.0\ V_r$ or $>0.55 - 0.70$ in/sec	$>6.0 V_r$ or >0.70 in/sec

Increasing the Alert Range limits for these pumps would ensure that pumps are placed in double test frequency at a vibration level that would be abnormal for the SX Makeup Pumps' design configuration.

The basis of the >0.55 in/sec Alert limit was based on vendor concurrence and previous approval of this request during the third 10-year IST interval (See Figure 2 – Vendor Concurrence Letters).

Using the provisions of this relief request as an alternative to the specific requirements of Table ISTB-5221-1 identified above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety. Therefore, in accordance with 10 CFR 50.55a(z)(1) Byron Station requests relief from the specific ISTB requirements identified in this request.

6. Duration of Proposed Alternative

The proposed alternative will be utilized during the entire fourth 120-month Inservice Test interval (which will begin on July 1, 2016 and conclude on June 30, 2026).

7. Precedents

This relief request was previously approved for the third 120-month Interval at Byron Station as relief request RP-1. That approval was documented in NRC SER dated September 7, 2006, TAC NOS. MC9642, MC9643, MC9752, MC9753, MC9754, MC9755, MC9758, MC9759, MC9764 and MC9765. This report may be found in ADAMS via accession number ML062230351.

Figure 1
SX Makeup Pump Layout

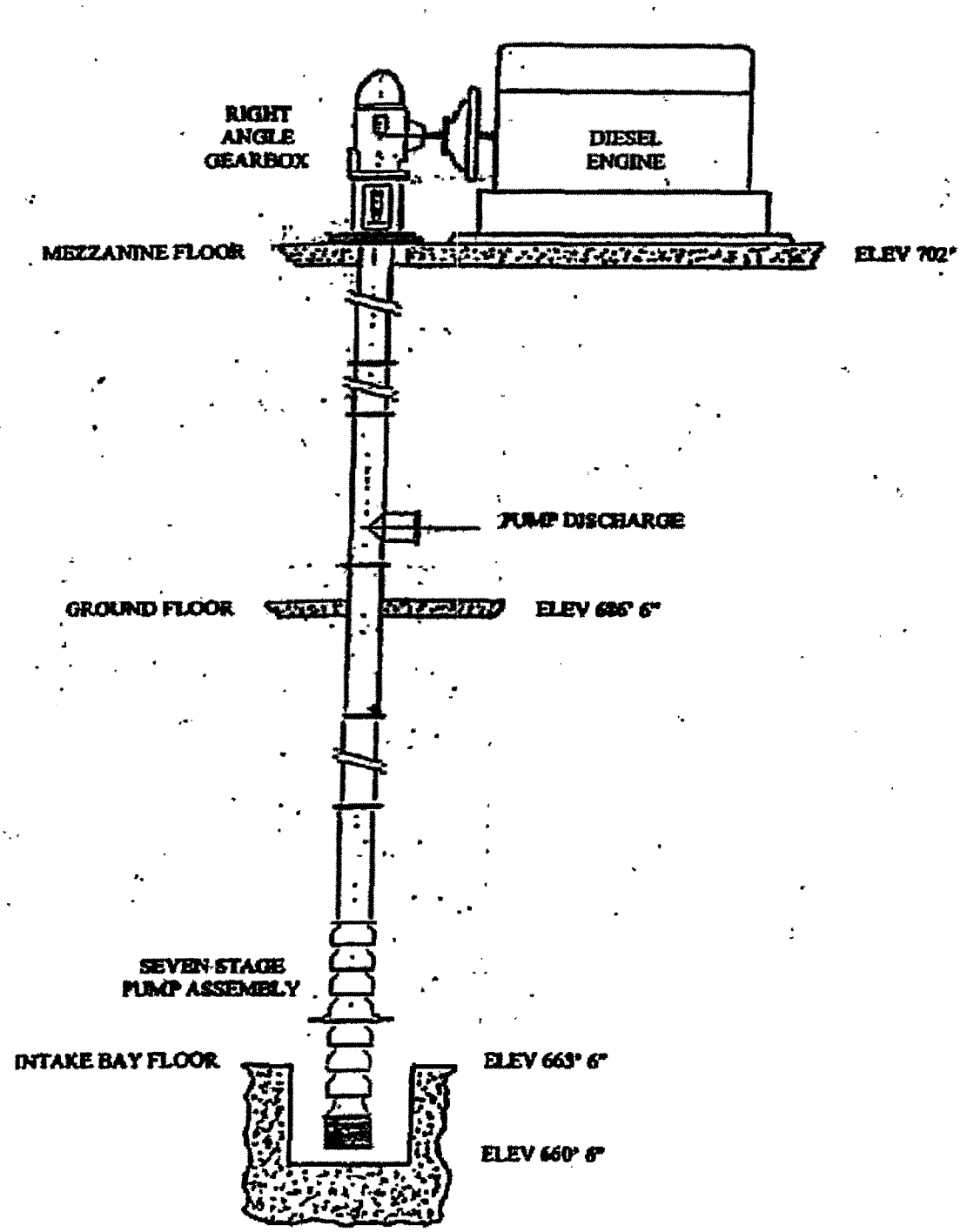


Figure 2
Vendor Concurrence Letters
Page 1 of 2

PHILADELPHIA GEAR CORPORATION
181 South Gulph Rd.
King of Prussia, PA 19406
(610) 265-3000 Fax (610) 337-5657

March 1, 2001

Exelon Nuclear
Byron Station
4450 N. German Church Rd.
Byron IL 61010

Attention: Mike Robinson

Subject: Relief request for Essential Service Water Make-Up Pumps vibration

The AGMA (American Gear Manufacturer Assoc.) standard 6000-A88 for measurement of linear vibration applies to this unit. This standard identifies subject unit as a class "B" type gear unit, (gears with a pitch line velocity of ≥ 5000 fpm). Under section 7.1 of this standard the recommended maximum allowable levels of filtered housing vibration in terms of velocity is 0.3 inches per second peak.
The level of allowable vibration in the AGMA specification is established as a gear manufacturer standard for gear unit testing in the manufacturers shop and does not generally apply to associated equipment in the drive train. Acceptable test and operating limits for additional equipment should be independently specified. In field installation gearbox vibration levels are sometimes higher due to environmental and system influences. The standard can be applied for this particular type of moderate speed system as a good barometer of overall machine health.

The Byron Station Essential Service Water Make-Up Pumps have routinely experienced vibration levels above 0.3 inches per second. Historically the higher vibration levels have never been associated with poor pump performance to our knowledge. During the recent disassemble and inspection of the gear units overseen by a Philadelphia Gear serviceman, there was no evidence that the higher levels were detrimental to the gearbox gears bearings or other associated rotating components. Based on the duty that these units would see if their use were required, the following action levels would be considered acceptable.

Alarm (Alert) = 0.55 IPS overall in any plane
Shutdown (Action) = 0.7 IPS overall in any plane

Should the measured vibration readings taken periodically indicate an upward trend of overall or discreet frequencies or if the spectrum displays frequencies previously undetected, then further diagnoses shall be required at that time.

PHILADELPHIA GEAR CORP.

George D Lankford

George D Lankford
Field Service Engineer

Figure 2
Vendor Concurrence Letters
Page 2 of 2

ATTACHMENT C

STEWART & STEVENSON SERVICES, INC.

[illegible]

1-21-9[illegible]
TRANSMISSION DATE

RECIPROCATING ENGINE DIVISION

We are transmitting 1 pages (including cover letter). If transmission is incomplete, please call (713) 923-0317.

Please deliver to: Page 1 of 1

NAME Warren Wagner FROM Jim Bell

FIRM Commonwealth Edison PHONE NO (713) 923-0317

FAX NO (815) 234-5441 X2270 FAX NO (713) 923-4917

REFERENCE: SV71M Pump Unit
W.O. N74410

Dear Mr. Wagner,

As per our telephone conversation Stewart & Stevenson's minimum standard for vibration peak to peak is 6 mils displacement at 1800 RPM horizontal and vertical. This corresponds to .56 inches per second velocity peak.

The existing .55 inches per second velocity peak corresponds to 5.8 mils displacement peak to peak which is within tolerance.

If you have any further questions, please get back with me.

Very truly yours,

[signature]
James Bell

cc: Robert Mitchem

JB021.93 - 1234030[illegible]

ENGINEERED POWER FOR THE MARINE, AVIATION, POWER GENERATION, DEFENSE AND PETROLEUM INDUSTRIES

ATTACHMENT 3
10 CFR 50.55a Request Number RP-2

Essential Service Water Makeup Pumps Suction Gauge Accuracy for the Comprehensive Pump Test
Proposed Alternative Requested In Accordance with 10 CFR 50.55a(z)(1)
-- Alternative Provides Acceptable Level of Quality and Safety --

1. **ASME Code Component(s) Affected**

   0SX02PA Essential Service Water Makeup Pump A
   0SX02PB Essential Service Water Makeup Pump B

2. **Applicable Code Edition and Addenda**

   ASME OM Code 2004 Edition through the 2006 Addenda.

3. **Applicable Code Requirement**

   Table ISTB-3510-1, "Required Instrument Accuracy."

4. **Reason for Request**

   In accordance with 10 CFR 50.55a, "Codes and standard," paragraph (z)(1), relief is requested from the requirement of ASME OM Code ISTB Table ISTB-3510-1. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

   Table ISTB-3510-1 specifies the instrument accuracy to be +/- ½% for pressure during the comprehensive pump test. Due to the design of these pumps (vertical line shaft), the suction pressure is determined using a combination of river level, traveling screen differential level and pump elevation. The traveling screen differential level instrument accuracy is 1.8% or approximately 2%. This accuracy does not meet the requirements of Table ISTB-3510-1 for determining pressure.

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

   The objective of the essential service water make-up pump is to maintain cooling tower basin level to compensate for drift losses, evaporation, and blowdown. These pumps automatically start on a low level signal in the cooling tower basin. The pump will continue to operate regardless of whether offsite power is available or not since these pumps are diesel engine driven.

   The essential service water make-up pumps are categorized as Group B since they are in a standby system which is not operated routinely except for testing.

Differential pressure is determined by subtracting the suction pressure from the discharge pressure. Due to the vertical design of these pumps, suction pressure is determined as follows:

$P_s = [L_r - (DL/12) - 661.75]/ 2.31$

Where;

P_s = Suction Pressure (psig)
L_r = River Lever (feet)
DL = Traveling Screen Differential Level (inches)
661.75 = Pump Elevation (feet)
2.31 = Constant Conversion for Water (feet of head to psi)

The river elevation (L_r) is the determining factor in the calculation of suction pressure. River elevation varies between approximately 670 and 680 feet based on seasonal factors. The traveling screen differential level is normally less than 6 inches. The accuracy of the existing level instrument is +/- 2%. This equates to a possible error of 0.12 inches. When converted to psi, the maximum error is 0.0043 psi ([0.12 inches/12 inches/ft.] / 2.308). For the comprehensive test of these pumps the Code required accuracy for pressure is ½%. This equates to a maximum possible error of 0.03 inches. When converted to psi, the maximum error in the suction pressure is 0.0011 psi ([0.03 inches/12 inches/ft.] / 2.308). The difference between the permanently installed instrument and the Code required ½% accuracy amounts to 0.0032 psi. This difference is inconsequential when determining the suction pressure (normal range 3.0 to 5.0 psig).

The traveling screen differential level instrument is an ultrasonic level instrument. Due to the high turbulence and inherent gauge quality, it is not possible to calibrate this instrument to the Code required ½% accuracy.

Byron Station proposes to perform the Comprehensive Test of these pumps using the 1.8% or approximately 2% accurate instruments for determining suction pressure. All other measurements and methods will meet the ½% accuracy requirements for determining pump differential pressure.

Using the provisions of this relief request as an alternative to the specific requirements of Table ISTB-3510-1 identified above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety. Therefore, in accordance with 10 CFR 50.55a(z)(1), Byron Station requests relief from the specific ISTB requirements.

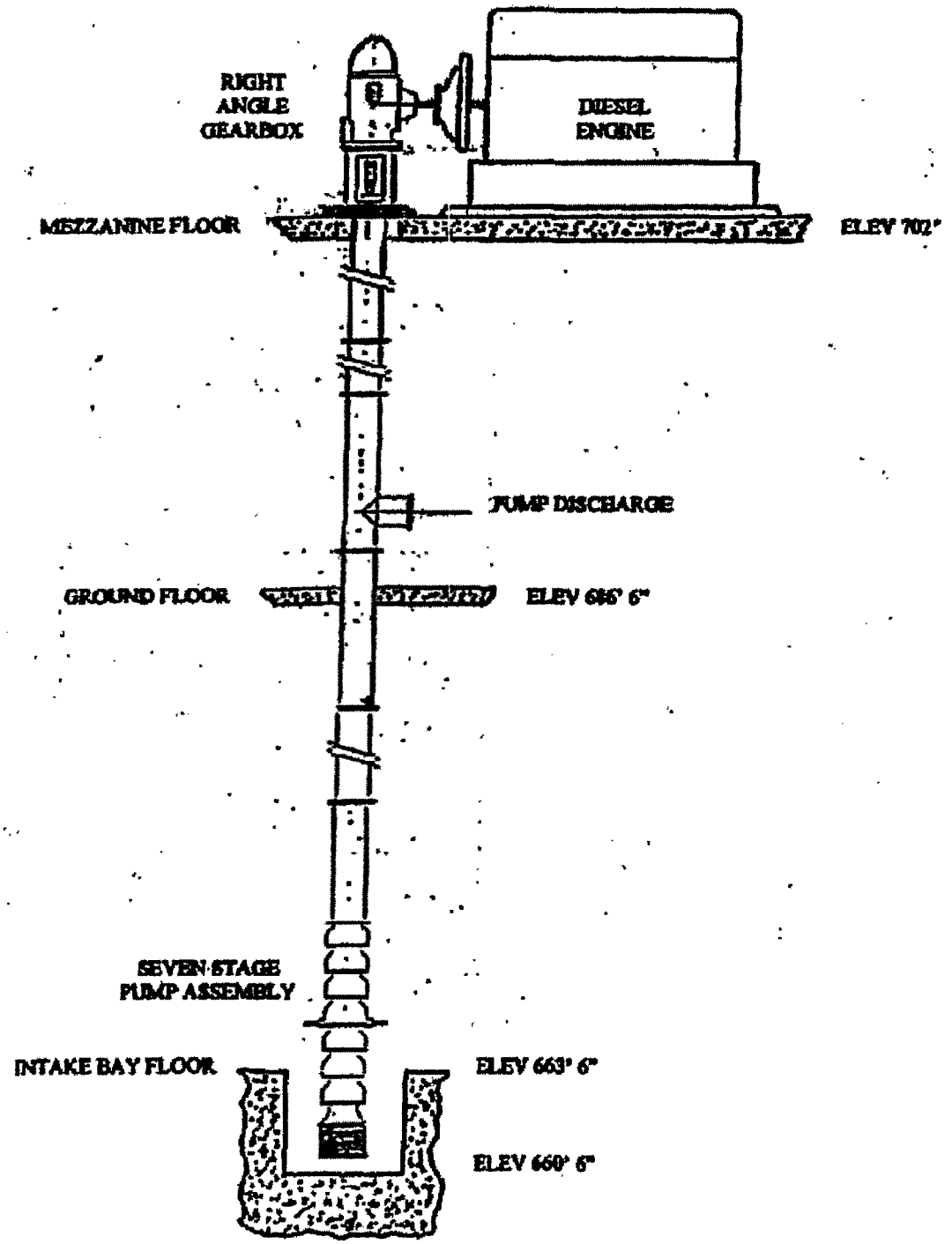
6. Duration of Proposed Alternative

The proposed alternative will be utilized during the entire fourth 120-month Inservice Test interval (which will begin on July 1, 2016 and conclude on June 30, 2026).

7. Precedents

This relief request was previously approved for the third 120-month Interval at Byron Station as relief request RP-5. That approval was documented in NRC SER dated September 7, 2006, TAC NOS. MC9642, MC9643, MC9752, MC9753, MC9754, MC9755, MC9758, MC9759, MC9764 and MC9765. This report may be found in ADAMS via accession number ML062230351.

Figure 1
SX Makeup Pump Layout



ATTACHMENT 4
10 CFR 50.55a Request Number RP-3

Adjusting Hydraulic Parameters to Specified Reference Points per Code Case OMN-21
Proposed Alternative In Accordance with 10 CFR 50.55a(z)(1)
-- Alternative Provides an Acceptable Level of Quality and Safety --

1. ASME Code Component(s) Affected

All pumps tested within the Byron Station Inservice Test (IST) program. A summary list of pumps currently included in that scope is provided below:

Pump Number	Description	Pump Type	ASME Code Class	OM Code Category
0CC01P 1/2CC01PA/B	Component Cooling Pump	Centrifugal	3	A
0SX02PA/B	Essential Service Water Makeup Pump	Vertical Line Shaft	3	B
0WO01PA/B	Control Room Chilled Water Pump	Centrifugal	3	A
1/2AF01PA/B	Auxiliary Feedwater Pump	Centrifugal	3	B
1/2CS01PA/B	Containment Spray Pump	Centrifugal	2	B
1/2CV01PA/B	Centrifugal Charging Pump	Centrifugal	2	A
1/2DO01PA - D	Diesel Fuel Oil Transfer Pumps	Positive Displacement	3	B
1/2RH01PA/B	Residual Heat Removal Pump	Centrifugal	2	A
1/2SI01PA/B	Safety Injection Pump	Centrifugal	2	A
1/2SX01PA/B	Essential Service Water Pump	Centrifugal	3	A

2. Applicable Code Edition and Addenda

ASME OM Code 2004 Edition through the 2006 Addenda.

3. Applicable Code Requirements

ISTB-5121, "Group A Test Procedure," subparagraph (b) states in part: The system resistance shall be varied until flow rate or alternatively, differential pressure equals the reference point.

ISTB-5122, "Group B Test Procedure," subparagraph (c) states: The system resistance may be varied as necessary to achieve the reference point.

ISTB-5123, "Comprehensive Test Procedure," subparagraph (b) states, in part: For centrifugal and vertical line shaft pumps, the system resistance shall be varied until flow rate or alternatively, differential pressure equals the reference point.

ISTB-5221, "Group A Test Procedure," subparagraph (b) states, in part: The system resistance shall be varied until flow rate or alternatively, differential pressure equals the reference point.

ISTB-5222, "Group B Test Procedure," subparagraph (c) states: The system resistance may be varied as necessary to achieve the reference point.

ISTB-5223, "Comprehensive Test Procedure," subparagraph (b) states in part: The system resistance shall be varied until flow rate or alternatively, differential pressure equals the reference point.

ISTB-5321, "Group A Test Procedure," subparagraph (b) states in part: The resistance of the system shall be varied until the discharge pressure equals the reference point.

ISTB-5322, "Group B Test Procedure," subparagraph (c) states: System resistance may be varied as necessary to achieve the reference point.

ISTB-5323, "Comprehensive Test Procedure," subparagraph (b) states in part: The resistance of the system shall be varied until the discharge pressure equals the reference point.

4. Reason for Request

In accordance with 10 CFR 50.55a, "Codes and standards," paragraph (z)(1), an alternative is proposed to the pump testing reference value requirements of the ASME OM Code. The basis of the request is that the proposed alternative would provide an acceptable level of quality and safety. Specifically, this alternative is requested for all inservice testing of IST Program pumps identified above.

For pump testing, there is difficulty adjusting system throttle valves with sufficient precision to achieve exact flow, differential pressure or discharge pressure to exact reference values during subsequent IST exams. Section ISTB of the ASME OM Code does not allow for variance from a fixed reference value for pump testing. However, NUREG-1482, Revision 2, Section 5.3, acknowledges that certain pump system designs do not allow for the licensee to set the flow, differential pressure or discharge pressure at an exact value because of limitations in the instruments and controls for maintaining steady flow.

ASME OM Code Case OMN-21 provides guidance for adjusting flow, differential pressure or discharge pressure to reference values within a specified tolerance during Inservice Testing. The Code Case states "It is the opinion of the Committee that when it is impractical to operate a pump at a specified reference point and adjust the resistance of the system to a specified reference point for either flow rate, differential pressure or discharge pressure, the pump may be operated as close as practical to the specified reference point with the following requirements. The Owner shall adjust the system resistance to as close as practical to the specified reference point where the variance from the reference point does not exceed plus 2% or minus 1% of the reference point when the reference point is flow rate, or plus 1% or minus 2% of the reference point when the reference point is differential pressure or discharge pressure."

5. Proposed Alternative and Basis for Use

Byron Station requests to perform future Inservice Pump testing in a manner consistent with the requirements as stated in ASME OM Code Case OMN-21. Specifically, for those tests in which flow is adjusted to the Reference value, tests will be conducted such that flow rate is adjusted as close as practical to the reference value and within procedural limits of plus 2% / minus 1% of the reference value. Conversely, if the Reference parameter is differential pressure or discharge pressure, tests will be conducted such that differential pressure or discharge pressure is adjusted as close as practical to the reference value and within procedural limits of plus 1% / minus 2% of the reference value.

Code Case OMN-21 was approved by the ASME Operations and Maintenance Standards Committee. The applicability of Code Case OMN-21 is the ASME OM Code 1995 Edition through 2011 Addenda. The language from Code Case OMN-21 has been incorporated in the ASME OM Code 2012 Edition.

Using the provisions of this request, as described above, as an alternative to the specific requirements of ISTB-5121, ISTB-5122, ISTB-5123, ISTB-5221, ISTB-5222, ISTB-5223, ISTB-5321, ISTB-5322 and ISTB-5323 will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety.

6. Duration of Proposed Alternative

The proposed alternative will be utilized during the entire fourth 120-month Inservice Test interval (which will begin on July 1, 2016 and conclude on June 30, 2026).

7. Precedents

Callaway Plant, Unit 1 – Safety Evaluation – Requests for Relief PR-01 through PR-06, Alternatives to ASME OM Code Requirements for Inservice Testing for the Fourth Program Interval (TAC Nos. MF2784, MF2785, MF2786, MF2787, MF2788 and MF2789) July 15, 2014. PR-06 requested use of Code Case OMN-21 for pump ISTs. This report may be found in ADAMS via accession number ML14178A769.

ATTACHMENT 5
10 CFR 50.55a Request Number RV-1

Use of Code Case OMN-1, Revision 1 for Various Motor Operated Valves Proposed Alternative Requested In Accordance with 10 CFR 50.55a(z)(1) -- Alternative Provides Acceptable Level of Quality and Safety --

1. ASME Code Component(s) Affected

All Byron Station Motor Operated Valves (MOVs) scoped into the Inservice Testing Program that are also included in the scope of the Byron Station Motor-Operated Valve Program.

2. Applicable Code Edition and Addenda

ASME OM Code 2004 Edition through the 2006 Addenda.

3. Applicable Code Requirement(s)

ISTA-3130, "Application of Code Cases," ISTA-3130(b) states: "Code Cases shall be applicable to the edition and addenda specified in the test plan." ISTA-3130(c) states: "Code Cases shall be in effect at the time the test plan is filed, except as provided in ISTA-3130(d)."

ISTC-3100, "Preservice Testing," subparagraph (a) states "Any valve that has undergone maintenance that could affect its performance after the preservice test shall be tested in accordance with ISTC-3310."

ISTC-3310, "Effects of Valve Repair, Replacement, or Maintenance on Reference Values," states in part that "When a valve or its control system has been replaced, repaired, or undergone maintenance that could affect the valve's performance, a new reference value shall be determined or the previous value reconfirmed by an inservice test..."

ISTC-3510, "Exercising Test Frequency," states in part: "Active Category A, Category B and Category C check valves shall be exercised nominally every 3 months, ..."

ISTC-3521, "Category A and Category B Valves," specifies exercising requirements and associated exercise frequencies for Category A and B MOVs.

ISTC-3700, "Position Indication Verification," states in part: Valves with remote position indicators shall be observed locally at least once every 2 years to verify that valve position is accurately indicated.

ISTC-5120, "Motor-Operated Valves," in paragraphs ISTC-5121, "Valve Stroke Testing," ISTC-5122, "Stroke Test Acceptance Criteria," and ISTC-5123, "Stroke Test Corrective Action," specify requirements for stroke time testing MOVs when exercised in accordance with ISTC-3510.

4. Reason for Request

In accordance with 10 CFR 50.55a, "Codes and standards," paragraph (z)(1), approval of an alternative is requested to the listed requirements of the OM Code. NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," Revision 2, Section 4.2.5, "Alternative to POV Stroke-Time Testing," recommends that licensees implement ASME Code Case OMN-1, "Alternative Rules for Preservice and Inservice Testing of Active Electric Motor Operated Valve Assemblies in Light-Water Reactor Power Plants," as accepted by the NRC (with certain conditions) in the regulations or Regulatory Guide (RG) 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code," as an alternative to the MOV stroke-time testing requirements in Subsection ISTC of the OM Code. The periodic exercising and diagnostic testing requirements in Code Case OMN-1 provide an improved method in assessing the operational readiness of MOVs.

RG 1.192, Revision 1, states within Table 2, "Conditionally Acceptable OM Code Cases," that the alternative rules of ASME Code Case OMN-1, "Alternative Rules for Preservice and Inservice Testing of Active Electric Motor-Operated Valve Assemblies in Light-Water Reactor Power Plants," 2006 Addenda, when applied in conjunction with the provisions of leakage rate testing in ISTC-3600, may be applied with the following provisions:

1. The adequacy of the diagnostic test interval for each valve must be evaluated and adjusted as necessary but not later than 5 years or three refueling outages (whichever is longer) from the initial implementation of ASME Code Case OMN-1.
2. When extending the exercise test intervals for high risk MOVs beyond a quarterly frequency, licensees shall ensure the potential increase in core damage frequency (CDF) and risk associated with the extension is small and consistent with the intent of the Commission's Safety Goal Policy Statement.
3. When applying risk insights as part of the implementation of OMN-1, licensees must categorize MOVs according to their safety significance using the methodology described in Code Case OMN-3, "Requirements for Safety Significance Categorization of Components Using Risk Insights for Inservice Testing of LWR Power Plants," with the conditions discussed in this regulatory guide or use other MOV specific risk-ranking methodologies accepted by the NRC on plant-specific or industry-wide basis with the conditions in the applicable safety evaluations.

RG 1.192 referenced the 2006 Addenda version of OMN-1, which has subsequently undergone a revision, with the latest revision first published in the 2009 Edition of the OM Code. The current OMN-1 revision is titled Code Case OMN-1, Revision 1 (OMN-1-1). OMN-1-1 was modified to address and incorporate the RG 1.192 listed provisions, where those changes were required. The Code of Record for Byron Station's Fourth 10-Year IST Interval is OM Code 2004 Edition through the 2006 Addenda. This request proposes the use of OMN-1-1.

5. Proposed Alternative and Basis for Use

Exelon Generating Company, LLC (EGC) proposes to adopt the requirements of Code Case OMN-1-1 (as delineated in the ASME OM Code 2009 Edition) at Byron Station in lieu of the performance of stroke time testing and positon indication testing as described by ASME OM Code 2004 Edition through the 2006 Addenda, ISTC paragraphs listed above. Byron Station will implement the Code Case in conjunction with provisions for leakage rate testing in ISTC-3600. The provision to allow motor control center testing, as contained in Section 6.1, is excluded from this request.

The Byron Station MOV testing program was developed as a result of NRC Generic Letter (GL) 89-10, "Safety Related Motor Operated Valve Testing and Surveillance," and GL 96-05, "Periodic Verification of Design Basis Capability of Safety Related Motor Operated Valves," utilizing Topical Report MPR-1807, "Joint BWR, Westinghouse and Combustion Engineering Owners' Group Program on Motor Operated Valve (MOV) Periodic Verification," Revision 2.

Byron Station is currently utilizing MPR-2524-A, "Joint Owners' Group (JOG) Motor Operated Valve Periodic Verification Summary," (November 2006) as guidance for the MOV program. The adoption of Code Case OMN-1-1 will consolidate testing between the station's IST and MOV Programs. The following positions describe how Byron Station interprets and complies with the various requirements of Code Case OMN-1-1 (ASME OM Code 2009 edition).

a. OMN-1-1, Section 3.1 allows for the use of testing that was conducted prior to the implementation of OMN-1-1 if it meets the requirements of the Code Case. Byron Station intends to utilize the testing credited under its GL 89-10 and GL 96-05 responses to satisfy the requirement for a one-time test to verify the capacity of each individual or group of MOV's safety-related design basis requirements.

b. OMN-1-1, Section 3.2 requires that each MOV be tested during the preservice test period or before implementing inservice inspection. Byron Station intends to utilize the testing credited under its GL 96-05 response to satisfy this requirement.

c. OMN-1-1, Section 3.3(b) states that inservice tests shall be conducted in the as-found condition, and activities shall not be conducted if they invalidate the as-found condition for in service testing. Byron Station maintenance activities that would affect the as-found condition of the valve, such as motor operator preventive maintenance or stem lubrication, are typically scheduled to occur in conjunction with the performance of the MOV Periodic Verification Testing, and are performed after as-found testing. Any other activities that could affect the as-found test results are not performed until after the as-found testing has been conducted.

d. OMN-1-1, Section 3.3(c) requires the inservice test program to include a mix of static and dynamic MOV performance testing. Byron Station has utilized the JOG program's mix of static and dynamic MOV performance testing

(MPR-2524-A) to develop its current MOV testing program. Additionally, Byron Station will continue to utilize the existing procedures, which are consistent with the JOG standards, to justify any changes to the mix of required MOV performance testing. The use of such an evaluation will serve to ensure Byron Station continues to meet this requirement.

e. OMN-1-1, Section 3.3(e) requires that Remote Position Indication shall be verified locally during inservice testing or maintenance activities. Byron Station will continue to verify the operability of each MOV's position indication system as part of each MOV's diagnostic test. In addition, the function of each MOV's position indication system will be verified during the performance of maintenance activities affecting remote position indication.

f. OMN-1-1, Section 3.3.1(b) requires MOV inservice testing to be conducted every 2 refueling cycles or 3 years (whichever is longer), if insufficient data exists to determine inservice test frequencies. Byron Station has sufficient MOV testing data to justify its current testing frequencies, and therefore meets this requirement. If in the future, modification or replacement results in the necessity to re-baseline a valve or group of valves, the requirements of OMN-1-1 Section 3.3.1(b), or 3.7.2.2(c) as applicable, will be followed.

g. OMN-1-1, Section 6.4.4 requires that calculations for determining the MOV's functional margin are evaluated to account for potential performance-related degradation. The Byron Station MOV Program, including the corporate MIDAS Software (or similar updated product), takes into account performance-related degradation, to calculate valve margin.

Using the provisions of this request as an alternative to the listed requirements of ISTC provides a reasonable alternative to the Code requirements based upon the determination that the proposed alternative will provide an acceptable level of quality and safety. Therefore, in accordance with 10 CFR 50.55a(z)(1), EGC requests approval of this alternative to the specific ISTC requirements identified in this request.

6. Duration of Proposed Alternative

The proposed alternative will be utilized during the entire fourth 120-month Inservice Test interval (which will begin on July 1, 2016 and conclude on June 30, 2026).

7. Precedents

Similar requests were submitted by EGC and NRC approved as follows:

a. Dresden Nuclear Power Station, Units 2 and 3 (NRC Dockets 50-237 and 50-249), Request No. RV-02, as discussed in NRC Safety Evaluation dated October 30, 2013 (TAC NOS. ME9867 and ME9868).

b. Quad Cities Nuclear Power Station, Units 1 and 2 (NRC Dockets 50-254 and 50-265), Request No. RV-02, as discussed in NRC Safety Evaluation dated February 14, 2013 (TAC NOS. ME7981 through ME7995).

c. Clinton Power Station, Unit 1 (NRC Docket No. 50-461), Request No. 2201, as discussed in NRC Safety Evaluation dated June 10, 2010 (TAC No. ME1546).

d. Peach Bottom Atomic Power Station, Units 2 and 3 (NRC Docket NOS. 50-277 and 50-278), as discussed in NRC Safety Evaluation dated September 3, 2008 (TAC NOS. MD7461 and MD7462).

e. LaSalle County Station, Units 1 and 2 (NRC Docket Nos. 50-373 and 50-374), Request No. RV-02, as discussed in NRC Safety Evaluation dated September 26, 2007 (TAC NOS. MD5988, MD5989, MD5992, MD5993, MD5994, MD5995).