

Exelon Generation Company, LLC
Byron Station
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Byron, IL 61010-9794

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10 CFR 50.55a

December 29, 2005

LTR: BYRON 2005-0155
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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

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

Subject: Byron Station, Units 1 and 2, Requests for Relief from the ASME OM
Code for the Third Inservice Test Interval

In accordance with 10 CFR 50.55a, "Codes and standards," paragraph 10 CFR 50.55a(a)(3)(i), Exelon Generating Company, LLC (EGC), is requesting NRC approval of proposed alternatives to the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants (ASME OM Code) 2001 Edition through 2003 Addenda for Byron Station, Units 1 and 2.

These proposed alternatives are for the Byron Station Third Inservice Testing (IST) interval, which will begin on June 30, 2006 and end on July 1, 2016. The attachment contains the details of the seven relief requests.

EGC requests approval of these requests by June 30, 2006 to coincide with the start of the Byron Station Third IST, 120-month interval. Should you have any questions concerning this matter, please contact Mr. William Grundmann, Regulatory Assurance Manager, at (815) 406-2800.

Respectfully,



David M. Hoots
Plant Manager
Byron Nuclear Generating Station

Attachment - Byron Station, Units 1 and 2 Third Inservice Testing Interval Relief
Requests

A047

ATTACHMENT

**Byron Station, Units 1 and 2
Third Inservice Testing Interval
Relief Requests**

Relief Request No.	Description
RP-1	Essential Service Water (SX) Makeup Pumps Vibration Limits
RP-2	Component Cooling Water Comprehensive Test
RP-3	Control Room Chilled Water Pump Comprehensive Test
RP-4	AFW ESW Booster Pump Comprehensive Test
RP-5	Essential Service Water (SX) Makeup Pumps Suction Pressure Gauge Accuracy for the Comprehensive Pump Test
RP-6	Comprehensive Pump Test Alert Range Frequency
RV-1	Containment Recirculation Sump Isolation Valve Test Frequency (1/2SI8811A/B)

10 CFR 50.55a Relief Request RP-1
Essential Service Water Makeup Pumps Vibration Limits
Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)
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

American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants (ASME OM Code), 2001 Edition through 2003 Addenda

3. Applicable Code Requirement

ISTB, "Inservice Testing of Pumps in Light-Water Reactor Nuclear Power Plants," Table ISTB-5200-1, "Vertical Line Shaft and Centrifugal Pumps Test Acceptance Criteria."

4. Reason for Request

Pursuant to 10 CFR 50.55a, "Codes and standards.", paragraph (a)(3), relief is requested from the requirement of ASME OM Code Table ISTB-5200-1. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

Table ISTB-5200-1 specifies the vibration limits (V_r) 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	$\leq 2.5 V_r$	$>2.5 V_r$ to $6.0 V_r$ or >0.325 in/sec	$>6.0V_r$ or >0.70 in/sec

Due to the unique design of these pumps, normal vibration levels may be as high 0.6 in/sec at the upper gear box location. As a result, the normal vibration levels may exceed the Acceptable and Required Action limits of Table ISTB-5200-1.

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

10 CFR 50.55a Relief Request RP-1
Essential Service Water Makeup Pumps Vibration Limits
(continued)

whether offsite power is available or not since these pumps are diesel engine driven.

The SX 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 over the past several years 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 has previously consulted an industry vibration expert and vendor representative from the gearbox company, 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

10 CFR 50.55a Relief Request RP-1
Essential Service Water Makeup Pumps Vibration Limits
(continued)

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. Since installation during plant construction, both pumps have experienced vibration levels at the gearbox locations of up to 0.6 in/sec. Byron Station 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-5200-1 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	$> 2.5 V_r$ to $6.0 V_r$ or > 0.55 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 Second 10 year interval (See Attachment 1 – Vendor Concurrence Letters).

Using the provisions of this relief request as an alternative to the specific requirements of Table ISTB-5200-1 identified above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i)

10 CFR 50.55a Relief Request RP-1
Essential Service Water Makeup Pumps Vibration Limits
(continued)

Byron Station requests relief from the specific ISTB requirements identified in this request.

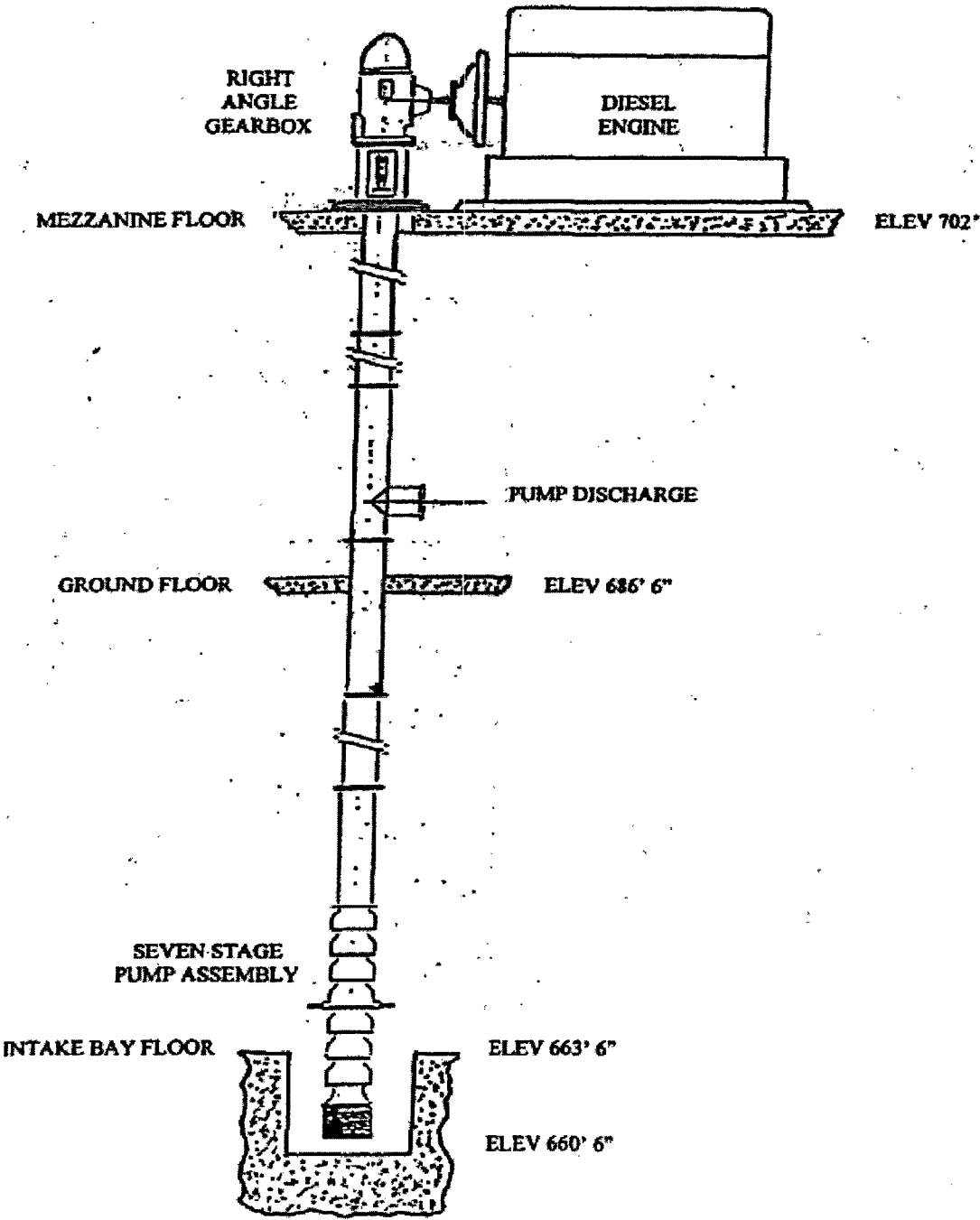
6. Duration of Proposed Alternative

This proposed alternative will be utilized for the entire Third 120 month interval.

7. Precedents

This relief request was previously approved for the Second 120 Month Interval at Byron Station as relief request PR-2 (ADAMS accession number ML020070381).

10 CFR 50.55a Relief Request RP-1
Essential Service Water Makeup Pumps Vibration Limits
Figure 1
SX Makeup Pump Layout



10 CFR 50.55a Relief Request RP-1
Essential Service Water Makeup Pumps Vibration Limits
Attachment 1
Vendor Concurrence Letters



PHILADELPHIA GEAR CORPORATION

181 South Gulph Rd.
King of Prussia, PA 19406
(610) 265-3000 Fax (610) 337-5637

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.

A handwritten signature in cursive script, appearing to read "George D Lankford".

George D Lankford
Field Service Engineer

10 CFR 50.55a Relief Request RP-1

Essential Service Water Makeup Pumps Vibration Limits
Attachment 1
Vendor Concurrence Letters

ATTACHMENT C



STEWART & STEVENSON SERVICES, INC.

P.O. BOX 1637 - HOUSTON TEXAS 77261-0337 • (713) 923-9161
ADMINISTRATION BLDG FAX (713) 923-9888 • PURCHASING DEPT FAX (713) 923-1111
TELEX 88-4871 - Telex 810-940-9884

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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 WALTER WAGNER

FROM Jim Bell

FIRM Commonwealth Edison

PHONE NO (713) 923-0337

FAX NO (815) 234-5441 X2270

FAX NO (713) 923-4917

REFERENCE: SV71N Pump Unit
W.D. N74410

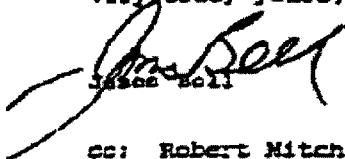
Dear Mr. Wagner,

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 us.

Very truly yours,


Jim Bell

cc: Robert Mitchem

JR021.03 - 12340307X

10 CFR 50.55a Relief Request RP-2
Component Cooling Water Pump Comprehensive Test
Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)
Alternative Provides Acceptable Level of Quality and Safety

1. ASME Code Component(s) Affected

OCC01P	Common Component Cooling Water Pump
1CC01PA	Unit 1 Component Cooling Water Pump A
1CC01PB	Unit 1 Component Cooling Water Pump B
2CC01PA	Unit 2 Component Cooling Water Pump A
2CC01PB	Unit 2 Component Cooling Water Pump B

2. Applicable Code Edition and Addenda

ASME OM Code 2001 Edition through 2003 Addenda

3. Applicable Code Requirement

ISTB-3400, "Frequency of Inservice Tests"

ISTB-5123, "Comprehensive Test Procedure"

4. Reason for Request

Pursuant to 10 CFR 50.55a, "Codes and standards," paragraph (a)(3), relief is requested from the ASME OM Code ISTB, "Inservice Testing of Pumps in Light-Water Reactor Nuclear Power Plants," requirements for performing a comprehensive pump test. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

Specifically, this request would allow Byron Station to perform a modified Group A quarterly test in lieu of a biennial comprehensive test. A substantial flow test will be performed each quarter using instruments which meet the comprehensive test requirements. A biennial comprehensive test will not be performed.

5. Proposed Alternative and Basis for Use

The component cooling (CC) pumps must operate to provide cooling water to the residual heat removal pumps and heat exchangers during a loss of coolant accident. Each pump will automatically start on receipt of a safety injection signal or an undervoltage on the associated Engineered Safety Feature (ESF) bus. Single failure analysis of the component cooling pumps credit the alternate unit specific CC pump or the common

10 CFR 50.55a Relief Request RP-2
Component Cooling Water Pump Comprehensive Test
(Continued)

CC pump with providing the minimum flow requirements in the event of a failure.

The CC pumps provide cooling water to non-essential components during plant heat-up, normal power operation, plant shutdown, and refueling. This function is not required for accident mitigation or safe shutdown.

The CC water pumps are categorized as Group A since they are operated routinely during plant operations.

As an alternative to the code requirement for performing a comprehensive pump test, each of these pumps will have a modified Group A test performed each quarter. During the quarterly test, instruments meeting the accuracy requirements of the Comprehensive Test will be used (i.e., ½ % accurate pressure gauges). The pumps will be operated at a reference flow point within +/- 20% of design flow, with pump differential pressure measured and compared to their reference values. Deviations from the reference values will be compared to the range requirements of Table ISTB-5100-1, "Centrifugal Pump Test Acceptance Criteria," for the Group A test (+/- 10%). In addition mechanical vibration measurements will be recorded. The vibration measurements will be compared to their reference values. Any deviations will be compared to the range requirements of Table ISTB-5100-1 for the Group A Test. Corrective actions will be taken in accordance with ISTB-6200, "Corrective Action."

One of the requirements of the comprehensive test is to perform the test at substantial flow (+/- 20% of design flow). Byron Station will meet this requirement each quarter.

Byron Station will perform a modified Group A test as stated above such that the instruments used will meet or exceed the Code requirement for a comprehensive test.

The component cooling water pumps will be tested at a set flow within +/- 20% of design flow. Per Table ISTB-5100-1, the required action range requirement for hydraulic performance is +/- 10 % for the Group A test. No alert range is required. Byron Station will continue to test these pumps at the above conditions each quarter, however, the comprehensive test instrument accuracy requirements of Table ISTB-3500-1, "Required Instrument Accuracy," will be applied as follows:

10 CFR 50.55a Relief Request RP-2
Component Cooling Water Pump Comprehensive Test
(Continued)

Pressure	+/- ½ %
Flow	+/- 2 %
Vibration	+/- 5 %
Differential Pressure	+/- ½ %

Beyond the requirements of the ASME OM Code, the CC Water pumps have vibration full spectral analysis performed when vibration measurements are taken during Inservice Testing surveillances.

Performance of a substantial flow test each quarter would result in eight sets of data over a two year period instead of the required one comprehensive test. Byron Station believes this testing regime provides an overall better assessment of pump mechanical and hydraulic health and will determine operational readiness on a quarterly frequency.

Using the provisions of this relief request as an alternative to the specific requirements of ISTB-5123 identified above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i) Byron Station requests relief from the specific ISTB requirements identified in this request.

6. Duration of Proposed Alternative

This proposed alternative will be utilized for the entire Third 120 month interval.

7. Precedents

None

10 CFR 50.55a Relief Request RP-3
Control Room Chilled Water Pump Comprehensive Test
Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)
Alternative Provides Acceptable Level of Quality and Safety

1. ASME Code Component(s) Affected

OWO01PA Control Room Chilled Water Pump A
OWO01PB Control Room Chilled Water Pump B

2. Applicable Code Edition and Addenda

ASME OM Code 2001 Edition through 2003 Addenda

3. Applicable Code Requirement

ISTB-3400, "Frequency of Inservice Tests"

ISTB-5123, "Comprehensive Test Procedure"

4. Reason for Request

Pursuant to 10 CFR 50.55a, "Codes and standards.", paragraph (a)(3), relief is requested from the ASME OM Code ISTB, "Inservice Testing of Pumps in Light-Water Reactor Nuclear Power Plants," requirements for performing a comprehensive pump test. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

Specifically, this request would allow Byron Station to perform a modified Group A quarterly test in lieu of a biennial comprehensive test. A substantial flow test will be performed each quarter using instruments which meet the comprehensive test requirements. A biennial comprehensive test will not be performed.

5. Proposed Alternative and Basis for Use

The Control Room Chilled Water (WO) pump must operate to provide chilled water to the Control Room HVAC system chilled water coils during emergency conditions. Single failure analysis of the control room chilled water pump credits the alternate pump with providing the minimum flow requirements in the event of a failure.

The WO water pump is categorized as Group A since it is operated routinely during plant operations.

10 CFR 50.55a Relief Request RP-3
Control Room Chilled Water Pump Comprehensive Test
(Continued)

Beyond the requirements of the ASME Code, the WO pumps have vibration full spectral analysis performed when vibration measurements are taken during Inservice Testing surveillances.

Performance of a substantial flow test each quarter would result in eight sets of data over a two year period instead of the required one comprehensive test. Byron Station believes this testing regime provides an overall better assessment of pump mechanical and hydraulic health and will determine operational readiness on a quarterly frequency.

Using the provisions of this relief request as an alternative to the specific requirements of ISTB-5123 identified above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i) Byron Station requests relief from the specific ISTB requirements identified in this request.

6. Duration of Proposed Alternative

This proposed alternative will be utilized for the entire Third 120 month interval.

7. Precedents

None

10 CFR 50.55a Relief Request RP-3
Control Room Chilled Water Pump Comprehensive Test
(Continued)

As an alternative to the code requirement for performing a comprehensive pump test, each of these pumps will have a modified Group A test performed each quarter. During the quarterly test, instruments meeting the accuracy requirements of the Comprehensive Test will be used (i.e., ½ % accurate pressure gauges). The pumps will be operated at a reference flow point within +/- 20% of design flow, with pump differential pressure measured and compared to their reference values. Deviations from the reference values will be compared to the range requirements of Table ISTB-5100-1, "Centrifugal Pump Test Acceptance Criteria," for the Group A test (+/- 10%). In addition mechanical vibration measurements will be recorded. The vibration measurements will be compared to their reference values. Any deviations will be compared to the range requirements of Table ISTB-5100-1, for the Group A Test. Corrective actions will be taken in accordance with ISTB-6200, "Corrective Action."

One of the requirements of the comprehensive test is to perform the test at substantial flow (+/- 20% of design flow). Byron Station will meet this requirement each quarter.

Byron Station will perform a modified Group A test as stated above such that the instruments used will meet or exceed the Code requirement for a comprehensive test.

The WO pumps will be tested at a set flow within +/- 20% of design flow. Per Table ISTB-5100-1, the required action range requirement for hydraulic performance is +/- 10 % for the Group A test. No alert range is required. Byron Station will continue to test these pumps at the above conditions each quarter, however, the comprehensive test instrument accuracy requirements of Table ISTB-3500-1 will be applied as follows:

Pressure	+/- ½ %
Flow	+/- 2 %
Vibration	+/- 5 %
Differential Pressure	+/- ½ %

10 CFR 50.55a Relief Request RP-4
Auxiliary Feedwater Essential Service Water Booster Pump
Comprehensive Test
Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)
Alternative Provides Acceptable Level of Quality and Safety

1. ASME Code Component(s) Affected

1SX04P Auxiliary Feedwater Essential Service Water Booster Pump
2SX04P Auxiliary Feedwater Essential Service Water Booster Pump

2. Applicable Code Edition and Addenda

ASME OM Code 2001 Edition through 2003 Addenda

3. Applicable Code Requirement

ISTB-3400, Frequency of Inservice Tests

ISTB-5123, Comprehensive Test Procedure

4. Reason for Request

Pursuant to 10 CFR 50.55a, "Codes and standards.", paragraph (a)(3), relief is requested from the ASME OM Code ISTB, "Inservice Testing of Pumps in Light-Water Reactor Nuclear Power Plants" requirements for performing a comprehensive pump test. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

Specifically, this request would allow Byron Station to perform a more rigorous quarterly test in lieu of a biennial comprehensive test. A substantial flow test will be performed each quarter using instruments which meet the comprehensive test requirements. A biennial comprehensive test will not be performed.

5. Proposed Alternative and Basis for Use

The Auxiliary Feedwater (AFW) Essential Service Water (ESW) Booster pumps have a safety function to maintain the B AFW pump and the diesel auxiliaries to within its operating temperature. This pump is engine driven to ensure cooling in the event of loss of station power.

The AFW ESW booster pump is categorized as Group B since it is in a standby system which is not operated routinely except for testing.

10 CFR 50.55a Relief Request RP-4
Auxiliary Feedwater Essential Service Water Booster Pump
Comprehensive Test
(Continued)

As an alternative to the code requirement for performing a comprehensive pump test, each of these pumps will have a modified Group A test performed each quarter. During the quarterly test, instruments meeting the accuracy requirements of the Comprehensive Test will be used (i.e., ½ % accurate pressure gauges). The pumps will be operated at a reference flow point within +/- 20% of design flow, with pump differential pressure measured and compared to their reference values. Deviations from the reference values will be compared to the range requirements of Table ISTB-5100-1, "Centrifugal Pump Test Acceptance Criteria," for the Group A test (+/- 10%). In addition mechanical vibration measurements will be recorded. The vibration measurements will be compared to their reference values. Any deviations will be compared to the range requirements of Table ISTB-5100-1 for the Group A Test. Corrective actions will be taken in accordance with ISTB-6200, "Corrective Action."

One of the requirements of the comprehensive test is to perform the test at substantial flow (+/- 20% of design flow). Byron Station will meet this requirement each quarter.

Although these pumps are categorized as Group B, the OM Code allows the substitution of a Group A or comprehensive test. Byron will perform a modified Group A test as stated above such that the acceptance criteria for hydraulic performance will meet or exceed the Code requirement for a Group A test. Additionally, Byron Station will perform vibration monitoring on these Group B pumps each quarter.

The AFW ESW Booster pumps are tested at a set flow within +/- 20% of design flow. Per Table ISTB-5100-1 the required action range requirement for hydraulic performance is +/- 10 % for the Group A test. No alert range is required. Byron Station will continue to test these pumps at the above conditions each quarter, however, the comprehensive test instrument accuracy requirements of Table ISTB-3500-1 will be applied as follows:

Pressure	+/- ½ %
Flow	+/- 2 %
Vibration	+/- 5%
Differential Pressure	+/- ½ %

Beyond the requirements of the ASME Code, the AFW ESW Booster pumps have vibration full spectral analysis performed when vibration measurements are taken during Inservice Testing surveillances.

10 CFR 50.55a Relief Request RP-4
Auxiliary Feedwater Essential Service Water Booster Pump
Comprehensive Test
(Continued)

Performance of a substantial flow test each quarter would result in eight sets of data over a two year period instead of the required one comprehensive test. Byron Station believes this testing regime provides an overall better assessment of pump mechanical and hydraulic health and will determine operational readiness on a quarterly frequency.

Using the provisions of this relief request as an alternative to the specific requirements of ISTB-5123 identified above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i) Byron Station requests relief from the specific ISTB requirements identified in this request.

6. Duration of Proposed Alternative

This proposed alternative will be utilized for the entire Third 120 month interval.

7. Precedents

None

10 CFR 50.55a Relief Request RP-5
Essential Service Water Makeup Pumps Suction Gauge Accuracy for the
Comprehensive Pump Test
Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)
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 2001 Edition through 2003 Addenda

3. Applicable Code Requirement

ISTB Table ISTB-3500-1, "Required Instrument Accuracy"

4. Reason for Request

Pursuant to 10 CFR 50.55a, "Codes and standards.", paragraph (a)(3), relief is requested from the requirement of ASME OM Code ISTB, "Inservice Testing of Pumps in Light-Water Reactor Nuclear Power Plants," Table ISTB-3500-1. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

Table ISTB-3500-1 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 2%. This accuracy does not meet the requirements of Table ISTB-3500-1 for determining pressure.

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

10 CFR 50.55a Relief Request RP-5
Essential Service Water Makeup Pumps Suction Gauge Accuracy for the
Comprehensive Pump Test
(Continued)

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 Level (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 12 inches. The accuracy of the existing level instrument is +/- 2%. This equates to a possible error of 0.24 inches. When converted to psi, the maximum error is 0.009 psi ($[0.24 \text{ inches}/12 \text{ inches/ft}] / 2.308$). For the comprehensive test of these pumps the Code required accuracy for pressure is 1/2 %. This equates to a maximum possible error of 0.06 inches. When converted to psi, the maximum error in the suction pressure is 0.0022 psi ($[0.06 \text{ inches}/12 \text{ inches/ft}] / 2.308$). The difference between the permanently installed instrument and the Code required 1/2 % accuracy amounts to 0.007 psi. This difference is inconsequential when determining the suction pressure (normal range 3.0 to 5.0 psig).

Additionally, since the differential pressure parameter is driven by the discharge pressure of the pumps, the traveling screen differential level has little bearing on the overall calculation of pump differential pressure. The reference value for differential pressure for these pumps is approximately 150 psi differential. Using the installed 2.0 % differential level instrument induces a maximum error of 0.006% (0.009 psi/150.0 psi).

Increasing the accuracy of the differential level instrument to 1/2 % would reduce the maximum error to 0.0015 % (0.0022 psi/150.0 psi).

The traveling screen differential level instrument is manufactured by Prosonic, with Model number FMU 862. This instrument is an ultrasonic level instrument. Due to the high turbulence and inherent gauge quality, it is not possible to calibrate this instrument to less than 2.0%. Byron

10 CFR 50.55a Relief Request RP-5
**Essential Service Water Makeup Pumps Suction Gauge Accuracy for the
Comprehensive Pump Test
(Continued)**

Station has also investigated the use of a different type of instrument, however, due to the application and location of the instrument, more accurate calibration does not seem realistic, especially since the level difference has little effect on overall pump differential pressure determination.

Byron Station proposes to perform the Comprehensive Test of these pumps using 2.0 % 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-3500-1 identified above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i) Byron Station requests relief from the specific ISTB requirements identified in this request.

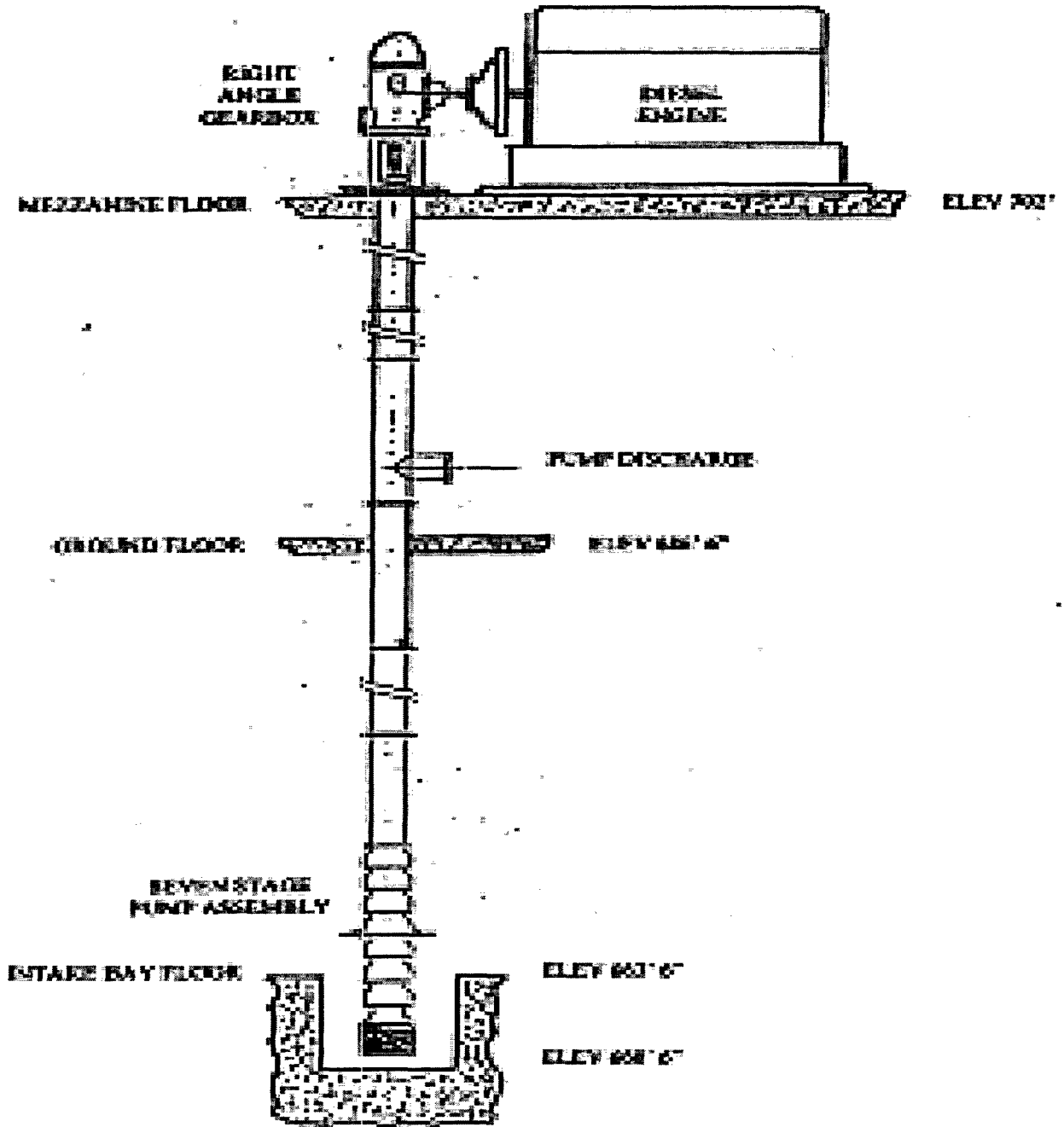
6. Duration of Proposed Alternative

This proposed alternative will be utilized for the entire Third 120 month interval.

7. Precedents

None

10 CFR 50.55a Relief Request RP-5
Essential Service Water Makeup Pumps Suction Gauge Accuracy for the
Comprehensive Pump Test
Figure 1
SX Makeup Pump Layout



**10 CFR 50.55a Relief Request RP-6
Comprehensive Pump Test Alert Range Frequency
Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)
Alternative Provides Acceptable Level of Quality and Safety**

1. ASME Code Component(s) Affected

1CV01PA	Centrifugal Charging Pump A
1CV01PB	Centrifugal Charging Pump B
2CV01PA	Centrifugal Charging Pump A
2CV01PB	Centrifugal Charging Pump B
1RH01PA	Residual Heat Removal Pump A
1RH01PB	Residual Heat Removal Pump B
2RH01PA	Residual Heat Removal Pump A
2RH01PB	Residual Heat Removal Pump B
1SI01PA	Safety Injection Pump A
1SI01PB	Safety Injection Pump B
2SI01PA	Safety Injection Pump A
2SI01PB	Safety Injection Pump B

2. Applicable Code Edition and Addenda

ASME OM Code 2001 Edition through 2003 Addenda

3. Applicable Code Requirement

ISTB-6200(a), "Alert Range"

4. Reason for Request

Pursuant to 10 CFR 50.55a, "Codes and standards.", paragraph (a)(3), relief is requested from the requirement of ASME OM Code ISTB-6200(a) for the Comprehensive Pump Test. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

ISTB-6200(a) requires the frequency of testing specified in Table ISTB-3400 to be doubled if the measure test parameters fall within the alert range of Tables ISTB-5100-1, "Centrifugal Pump Test Acceptance Criteria," ISTB-5200-1, "Vertical Line Shaft and Centrifugal Pumps Test Acceptance Criteria," ISTB-5300-1, "Positive Displacement Pump (Except Reciprocating) Test Acceptance Criteria," or ISTB-5300-2, "Reciprocating Positive Displacement Pump Test Acceptance Criteria," as applicable.

When performing the comprehensive test of the subject pumps, the plant must be in cold shutdown or refueling since substantial flow cannot be achieved during normal operations or during hot shutdown/standby conditions. Imposing the frequency requirements of ISTB-6200(a) for the

**10 CFR 50.55a Relief Request RP-6
Comprehensive Pump Test Alert Range Frequency
(continued)**

comprehensive test corrective actions, would require shutting the plant down mid-cycle to perform the comprehensive test. Specifically, for the subject pumps, relief is requested from ISTB-6200(a), Alert Range, for corrective actions during the comprehensive pump test.

5. Proposed Alternative and Basis for Use

All of the subject pumps are essential to operation of the Emergency Core Cooling system (ECCS). These pumps are designed to deliver borated water to the reactor vessel when ECCS is required. Normally the Residual Heat Removal (RH) and Safety Injection (SI) pumps are in standby while one of the Centrifugal Charging (CV) pumps are operating to maintain pressure and level control of the Reactor Coolant system (RCS). All of these pumps are tested during normal operation with minimum flow since injection in to the RCS with large amounts of borated water would cause a plant trip. These pumps are not provided with full flow test loops.

During plant shutdowns with the RCS less than 200 F, a substantial flow test may be performed. The comprehensive pump test is typically performed on each of the subject pumps during refueling when the RCS is available to receive substantial flow.

Byron Station meets the design flow requirements of ISTB for the comprehensive test. If during the comprehensive test, one of these pumps falls in to the Alert Range for either the hydraulic or mechanical vibration parameters, the test frequency of the comprehensive test would be required to be doubled in accordance with ISTB-6200(a). This would require shutting the respective unit down to perform an annual comprehensive test.

**10 CFR 50.55a Relief Request RP-6
Comprehensive Pump Test Alert Range Frequency
(continued)**

Byron Station proposes the following alternative to the ISTB-6200(a) corrective actions, in lieu of doubling the test frequency should any parameter fall within the alert range during the comprehensive pump test of the subject pumps:

1. The cause of the deviation will be identified and reasonable efforts to correct it will be made while in the refueling mode.
2. If the deviation cannot be corrected while in the refueling mode, unit startup will not be prohibited as long as:
 - An analysis to determine operational readiness with the pump in alert will be made to determine that the pump can continue to perform its intended design function(s) until the next refueling outage.
 - During the cycle, Byron Station will establish plans to correct the deviation at the next refueling outage and each pump will continue to be tested on a quarterly frequency in accordance with their respective Group A or Group B procedure.

Using the provisions of this relief request as an alternative to the specific requirements of ISTB-6200(a) identified above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i) Byron Station requests relief from the specific ISTB requirements identified in this request.

6. Duration of Proposed Alternative

This proposed alternative will be utilized for the entire Third 120 month interval.

7. Precedents

None

**10 CFR 50.55a Relief Request RV-1
Containment Recirculation Sump Isolation Valve Test Frequency
Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)
Alternative Provides Acceptable Level of Quality and Safety**

1. ASME Code Component(s) Affected

Valve Number	Category	Code Class	P&ID Number	P&ID Coordinate
1SI8811A	B	2	M-61-4	C-5
1SI8811B	B	2	M-61-4	A-5
2SI8811A	B	2	M-136-4	C-5
2SI8811B	B	2	M-136-4	A-5

2. Applicable Code Edition and Addenda

ASME OM Code 2001 Edition through 2003 Addenda

3. Applicable Code Requirement

ISTC-3510, "Exercising Test Frequency"

4. Reason for Request

Pursuant to 10 CFR 50.55a, "Codes and standards.", paragraph (a)(3), relief is requested from the requirement of ASME OM Code ISTC-3510. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

It is impracticable to exercise test these valves during normal plant operation or during cold shutdowns. In addition due to improved planning, scheduling and execution of work, it may not be practicable to exercise these valves during refueling outages. Byron Station will exercise and stroke time these valves once per refueling cycle. The proposed once per cycle test frequency is not provided by ISTC-3510 or by ISTC-3520, "Exercising Requirements."

5. Proposed Alternative and Basis for Use

The 1/2SI8811A/B valves provide an isolation boundary between the suctions of the residual heat removal (RH) and containment spray (CS) pumps, and the containment recirculation sumps. Under normal plant operating conditions, the RH and CS systems are filled with borated water and the containment recirculation sumps are maintained in a dry state.

10 CFR 50.55a Relief Request RV-1
Containment Recirculation Sump Isolation Valve Test Frequency
(Continued)

A stroke test of these valves requires the RH and CS pumps for a given train to be removed from service and the suction lines drained to prevent water flow from the refueling water storage tank (RWST) and associated system piping into the normally empty containment recirculation sump. It takes approximately 24 hours to drain the RH and CS systems, perform the required valve tests, and refill and restore the systems to their normal configuration. An estimated 600 gallons of radioactive, borated water are drained and must be processed by the radioactive waste systems. This same amount of borated water must be used to refill the system. This sequence of events is required whether the testing is done online or during a refueling outage.

It is impractical to perform these required drain, refill and associated activities on a quarterly frequency.

The history of both the maintenance and in-service testing (IST) for all eight of these valves at Braidwood Station and Byron Station show good material condition and that testing is consistent with acceptable stroke times, demonstrating that an acceptable level of quality and safety is maintained with an 18-month test frequency.

The availability of the RH and CS systems can be optimized by performing the full-stroke tests of the containment recirculation sump valves during scheduled work windows for the RH and CS systems. Due to improvements in the logistics of planning and executing work, some maintenance of the RH system is performed on line (i.e., Mode 1). At other times, the nature of the maintenance to be performed requires that the maintenance be performed during a refueling outage. Considerations, which impact when this work is performed, include the scope of the work on the system, the scheduling of work windows in the planning process, system availability requirements, personnel resources, and maintenance of an acceptable risk profile.

In order to minimize the number of drain/refill evolutions and the processing of radioactive, borated water described previously, it is advantageous to perform the containment recirculation sump valve exercise and stroke time tests during the same drain and refill evolution used to perform system maintenance.

In conclusion, due to the unique requirement of having to drain and fill the suction line associated with the containment recirculation sump valves to perform the stroke time and exercise test, it is impractical to test these valves at a quarterly frequency. As maintenance on the RH system often times requires the same suction line to be drained and filled, and many of these maintenance activities can now be performed on line, it is impractical to restrict the testing of these valves to a cold shutdown or refueling outage. An equivalent level of quality and safety would be

10 CFR 50.55a Relief Request RV-1
Containment Recirculation Sump Isolation Valve Test Frequency
(Continued)

provided by testing these valves at an 18-month frequency with a 25% allowance for flexibility in scheduling.

6. Duration of Proposed Alternative

This proposed alternative will be utilized for the entire Third 120 month interval.

7. Precedents

This relief request was previously approved for the Second 120 Month Interval at Byron Station as relief request RV-9 (ADAMS accession number ML030370743).