UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 30, 2015

Mr. C. R. Pierce
Regulatory Affairs Director
Southern Nuclear Operating Company, Inc.
Post Office Box 1295, Bin - 038
Birmingham, AL 35201-1295

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2 – INSERVICE TESTING PROGRAM RELIEF REQUEST AND ALTERNATIVES FOR PUMPS AND VALVES – FIFTH TEN-YEAR INTERVAL (CAC NOS. MF6238, MF6239, MF6240, MF6241, MF6242, MF6243, MF6244, MF6245, MF6246, and MF6247)

Dear Mr. Pierce:

By letter dated May 4, 2015, as supplemented by letters dated June 18, July 16 (two letters), September 15, and October 26, 2015, Southern Nuclear Operating Company (SNC, the licensee) submitted pump requests RR-P-2, RR-P-3, RR-P-4, RR-P-5, RR-P-6, RR-P-7, RR-P-8, RR-P-9, RR-P-11, RR-P-12, and RR-P-13 and valve requests RR-V-1, RR-V-2, RR-V-3, RR-V-5, RR-V-8, RR-V-9, and RR-V-10 for its fifth 10-year inservice testing (IST) program interval at the Edwin I. Hatch Nuclear Plant, Unit Nos. 1 and 2 (Hatch 1 and 2), which begins on January 1, 2016, and is scheduled to end on December 31, 2025. By letter dated June 18, 2015, SNC withdrew request RR-V-3, by letter dated July 16, 2015, SNC withdrew request RR-V-2 and determined that RR-V-1 only applies to Hatch, Unit 1, and by letter dated September 15, 2015, SNC withdrew RR-P-2. In addition, in the June 18, 2015, letter SNC requested that RR-P-3 be granted pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), section 50.55a(z)(1) instead of 10 CFR 50.55a(z)(2).

The Nuclear Regulatory Commission (NRC) staff has determined that proposed alternatives RR-P-3, RR-P-4, RR-P-6, RR-P-7, RR-P-8, RR-P-12, RR-P-13, RR-V-5, RR-V-9, and RR-V-10 for Hatch, Units 1 and 2, provide an acceptable level of quality and safety. Accordingly, the NRC staff concludes that SNC has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1) for these alternatives. Therefore, pursuant to 10 CFR 50.55a(z)(1) the NRC staff authorizes the use of these ten alternatives for Hatch, Units 1 and 2, for the fifth 10-year IST program interval.

The NRC staff has determined that proposed alternatives RR-P-5, RR-P-9, RR P-11, and RR-V-8, provide reasonable assurance that the affected components are operationally ready. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(2) for these proposed alternatives Therefore, pursuant to 10 CFR 50.55a(z)(2) the NRC staff authorizes the use of these four alternatives for Hatch, Units 1 and 2, for the fifth 10-year IST program interval.

The NRC staff has determined that for relief request IST-RR-V-1 for Hatch, Unit 1, granting relief pursuant to 10 CFR 50.55a(f)(6)(i) for the fifth 10-year IST program interval is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. The proposed testing provides reasonable assurance that the valves listed in Table 1 in Section 3.12.2 of the Enclosure are operationally ready.

All other ASME OM Code requirements for which relief was not specifically requested and approved in the subject requests remain applicable.

If you have any questions, please contact the Project Manager, Bob Martin at 301-415-1493.

Sincerely,

Shawn Williams for

Michael Markley, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-321 and 50-366

Enclosure:
Safety Evaluation

cc w/encl: Distribution via ListServ

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

INSERVICE TESTING PROGRAM ALTERNATIVES AND RELIEF REQUEST

FOR PUMPS: RR-P-2, RR-P-3, RR-P-4, RR-P-5, RR-P-6, RR-P-7, RR-P-8, RR-P-9, RR-P-11,

RR-P-12, AND RR-P-13 AND FOR VALVES: RR-V-1, RR-V-2, RR-V-3, RR-V-5, RR-V-8,

RR-V-9, AND RR-V-10

SOUTHERN NUCLEAR OPERATING COMPANY

HATCH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-321 AND 50-366

1.0 INTRODUCTION

By letter dated May 4, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15124A904), supplemented by letters dated June 18, 2015 (ADAMS Accession No. ML15170A192), July 16, 2015 (ADAMS Accession No. ML15197A187), July 16, 2015 (ADAMS Accession No. ML15198A158) September 15, 2015 (ADAMS Accession No. ML15258A247) and October 26, 2015 (ADAMS Accession No. ML15299A464), Southern Nuclear Operating Company (SNC, the licensee) submitted proposed pump alternatives RR-P-2, RR-P-3, RR-P-4, RR-P-5, RR-P-6, RR-P-7, RR-P-8, RR-P-9, RR-P-11, RR-P-12, and RR-P-13, valve alternatives RR-V-2, RR-V-3, RR-V-5, RR-V-8, RR-V-9, and RR-V-10 and valve relief request RR-V-1 for its fifth 10-year inservice testing (IST) program interval at the Edwin I. Hatch Nuclear Plant, Unit Nos. 1 and 2 (Hatch 1 and 2).

As a result of discussions with the U.S. Nuclear Regulatory Commission (NRC) staff during the review, SNC withdrew RR-V-3 by letter dated June 18, 2015, withdrew RR-V-2 and determined that RR-V-1 only applies to Hatch 1 by letter dated July 16, 2015, and withdrew RR-P-2 by letter dated September 15, 2015. In addition, in the June 18, 2015, letter SNC requested that RR-P-3 be granted pursuant to 10 CFR 50.55a(z)(1) instead of 10 CFR 50.55a(z)(2). SNC has requested that the proposed alternatives be approved for its fifth 10-year IST program interval scheduled to begin on January 1, 2016, and end on December 31, 2026.

The remaining requests are addressed, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) as follows:

- Proposed alternatives RR-P-3, RR-P-4, RR-P-6, RR-P-7, RR-P-8, RR-P-12, RR-P-13, RR-V-5, RR-V-9, and RR-V-10 pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(z)(1) on the basis that the proposed alternatives will provide an acceptable level of quality and safety,

Enclosure

- Proposed alternatives RR-P-5, RR-P-9, RR-P-11, and RR-V-8 pursuant to 10 CFR 50.55a(z)(2) based on the determination that compliance with the specified ASME Code requirements would result in a hardship without a compensating increase in the level of quality and safety, and reasonable assurance of operational readiness.

- Proposed IST request for relief RR-V-1 pursuant to 10 CFR 50.55a(f)(6)(i) on the basis that compliance with the ASME Code requirements is impractical.

2.0 REGULATORY EVALUATION

10 CFR 50.55a(f), "Inservice Testing Requirements," requires, in part, that IST of certain American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 pumps and valves be performed in accordance with the specified ASME OM Code and applicable addenda incorporated by reference in the regulations. Exceptions are allowed where alternatives have been authorized by the NRC pursuant to paragraphs 10 CFR 50.55a(z)(1), 10 CFR 50.55a(z)(2), or 10 CFR 50.55a(f)(6)(i). In proposing alternatives, the licensee must demonstrate that (1) the proposed alternatives provide an acceptable level of quality and safety (10 CFR 50.55a(z)(1)); (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety (10 CFR 50.55a(z)(2)); or (3) conformance is impractical for its facility (10 CFR 50.55a(f)(5)(iii)). Section 50.55a allows the NRC to authorize alternatives from ASME OM Code requirements upon making the necessary findings.

In proposing alternatives or requesting relief, the licensee must demonstrate that (1) the proposed alternatives provide an acceptable level of quality and safety (10 CFR 50.55a(z)(1)); (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety (10 CFR 50.55a(z)(2)); or (3) conformance is impractical for its facility (10 CFR 50.55a(f)(5)(iii)). Section 50.55a allows the NRC to authorize alternatives and to grant relief from ASME OM Code requirements upon making necessary findings.

Based on the above, and subject to the following technical evaluation, the NRC staff finds that regulatory authority exists for the licensee to request and the Commission to authorize the alternative requested by the licensee.

3.0 TECHNICAL EVALUATION

3.01 Applicable ASME OM Code Edition and Addenda

The Hatch 1 and 2, fifth 10-year IST program interval begins on January 1, 2016, and is scheduled to end on December 31, 2025. The applicable ASME OM Code edition and addenda for the Hatch 1 and 2, fifth 10-year IST program interval is the 2004 Edition through the 2006 Addenda.

3.1 Licensee's Alternative Request RR-P-2

By letter dated September 15, 2015, the licensee withdrew this request.

3.2 Licensee's Alternative Request RR-P-3

3.2.1 Applicable Code Requirements

ISTB-3510(b)(1) requires that the full-scale range for each analog instrument shall not be greater than three times the reference value.

Table ISTB-3510-I requires a total instrument loop accuracy of ±2% of full scale for pump IST.

3.2.2 Components for Which Relief is Requested

1 E 11-C002A, B, C, D (Centrifugal Pumps) - Group A
2 E 11-C002A, B, C, D (Vertical Line Shaft Pumps) - Group A

3.2.3 Licensee's Reason for Relief

In its September 15, 2015 submittal, the licensee states in part:

> This alternative is a re-submittal of NRC approved 4th Interval relief request RR-P-3 that was based on the ASME OM Code-2001 Edition. This 5th Interval request for relief, RR-P-3, is based on the ASME OM Code - 2004 Edition with Addenda through OMb-2006. There have been no substantive changes to this alternative or to the basis for use, which would alter the previous NRC Safety Evaluation [SE] conclusions.
>
> The original installed instrumentation associated with these pumps was not designed with the instrument range limits of OM Code ISTB-3510(b)(1) taken into consideration. The actual instrument ranges are itemized below.

INSTRUMENT	RANGE	REF VALUE	ALLOWED RANGE *	ACCURACY
IE11-PI-R003A-D	0-600 psig	171-185 psig	0-513 psig	±0.5%
2E11-PI-R003A-D	0-600 psig	180-195 psig	0-540 psig	±0.5%

> * Allowed Range corresponds to 3 times the lowest reference value

3.2.4 Licensee's Proposed Alternative and Basis

In its September 15, 2015, submittal, the licensee states in part:

> Hatch proposes to use installed instrumentation during [Residual Heat Removal (RHR)] Group A pump testing. Even though 1 (2) E11-PI-R003A-D exceed the Code allowable range limit of three times the reference value, this additional gage range coupled with the better-than-Code-required accuracy of ±0.5% results in only a 3 psi (600x0.005) maximum variance compared with the Code allowable variance of 10.26 psi (513x0.02) for Unit 1 and 10.8 psi (540x.02) for Unit 2.
>
> Using other (temporary) instrumentation during Group A testing is not justifiable considering the difficulty and dose associated with such a requirement. The installed

> pressure indicators will provide data that is sufficiently accurate to allow assessment of pump condition and to detect degradation during the performance of the Group A IST pump testing.
>
> The above proposed alternative provides an acceptable level of quality and safety since the variance in the actual test results is less than the maximum variance allowed by the Code.

Note that the similar alternative has been authorized for the Hatch fourth 10-year IST Program Interval by NRC letter dated February 14, 2006 (ADAMS No. ML060450286).

3.2.5 NRC Staff Evaluation

The licensee requests relief from the OM Code instrumentation requirements of ISTB-3510(b)(1) for pressure gauges which are used to measure the discharge pressure of the RHR pumps. ISTB-3510(b)(1) requires that the full range of each instrument be no greater than three times the reference value.

The installed discharge pressure gauges for the RHR pumps have a range of 0-600 psig and an accuracy of ± 0.5 percent. The typical value or reference value for the discharge pressure of the RHR pumps during Group A testing is 171 psig for Unit 1 and 180 psig for Unit 2. To meet the requirement of ISTB-3510(b)(1), the pressure gauge shall have a range limit of 0-513 psig (3x171) for Unit 1 and 0-540 psig (180x3) for Unit 2. Therefore, the installed pressure gauge with a range 0-600 psig does not meet the Code requirement. In lieu of Code requirements, the licensee proposed to use the installed instrumentation of 0-600 psig but combined with a better than Code required instrument accuracy of ±0.5% during Group A testing.

Based on the Code required pressure gauge and the accuracy of ± 2 percent, the NRC staff concludes that the Code would allow up to a maximum variance of 10.26 psig (513x0.02) for Unit 1 and 10.8 psig (540x0.02) for Unit 2 in the measured parameters. Although the installed pressure gauges exceed the Code allowable range limit of three times the reference value, the higher installed gauge range of 0-600 psig, but when combined with the better than Code required accuracy of ±0.5%, would result in only a 3 psi (0.005x600) maximum variance, which is more conservative than the Code allowable variance of 10.26 psi for Unit 1 or 10.8 psi for Unit 2. The NRC staff concludes that the proposed alternative will provide a more accurate measured value of the parameters than the Code requires, and, therefore, is acceptable.

The use of the existing instrument is also supported by NUREG-1482, Revision 2, "Guidelines for Inservice Testing at Nuclear Power Plants," paragraph 5.5.1, which addresses NRC approval when the combination of range and accuracy yields a reading at least equivalent to that achieved using instruments that meet the Code requirements.

3.3 <u>Licensee's Alternative Request RR-P-4</u>

3.3.1 Applicable Code Requirements

ISTB-3510(b)(1) requires that the full-scale range for each analog instrument shall not be greater than three times the reference value.

Table ISTB-3510-I requires a total instrument loop accuracy of ±2% of full scale for pump inservice testing.

3.3.2 Components for Which Relief is Requested

I E I I-C002A, B, C, D (Centrifugal Pumps) - Group A
2 E I I-C002A, B, C, D (Vertical Line Shaft Pumps) - Group A

3.3.3 Licensee's Reason for Relief

The licensee states in part:

This alternative is a re-submittal of NRC approved 4th Interval relief request RR-P-4 that was based on the ASME OM Code-2001 Edition. This 5th Interval request for relief, RR-P-4, is based on the ASME OM Code 2004 Edition with Addenda through OMb-2006. There have been no substantive changes to this alternative, to the OM Code requirements, or to the basis for use, which would alter the previous NRC Safety Evaluation conclusions.

The original installed instrumentation associated with these pumps was not designed with the instrument range limits of OM Code ISTB-3510(b)(1) taken into consideration. The actual instrument ranges are itemized below.

INSTRUMENT	RANGE	REF VALUE	ALLOWED RANGE [*]	ACCURACY (LOOP)
IE11-FI-R608A&B	0-25000 gpm	7700 gpm	0-23100 gpm	±0.87%
2E11-F1-R608A&B	0-25000 gpm	7700 gpm	0-23100 gpm	±0.87 %

[* Allowed Range corresponds to 3 times the lowest reference value.]

1 (2) E11-FI-R608A&B exceed the Code allowable full scale range limit of three times the reference value. The design of the indicator range includes consideration for Low Pressure Coolant Injection (LPCI) flow rate (17,000 gpm for two pumps), whereas the minimum IST pump flow rate reference value is 7,700 gpm for Unit 1 and Unit 2. The Code maximum allowable inaccuracy in measured flow rate would be 462 gpm (i.e., .02 x 23,100) for Units 1 and 2, whereas the actual maximum inaccuracy in measured flow is 218 gpm (i.e., .0087 x 25,000) for both Unit 1 and Unit 2. Therefore, the actual accuracy of the installed flow indicators is better than required by the Code, thus the range of the indicator exceeding the Code limit of three times the reference value is of no consequence.

3.3.4 Licensee's Proposed Alternative and Basis

The licensee states in part:

Hatch proposes to use the existing installed instrumentation [with an accuracy of ±0.87%] for Group A, Comprehensive Pump, and Preservice Testing.

Even though 1 (2) E11-FI-R608A&B exceed the Code allowable range limit of three times the reference value, the overall loop accuracy is better than required by the Code. Therefore, the measured parameter is more accurately displayed than the Code requires. The above proposed alternative is acceptable since the variance in the actual test results is more conservative than that allowed by the Code.

Note that the proposed alternative has been authorized for the Hatch fourth 10-year IST Program Interval by NRC letter dated February 14, 2006 (ADAMS No. ML060450286).

3.3.5 NRC Staff Evaluation

The licensee requests relief from the OM Code instrumentation requirements of ISTB-3510(b)(1) for instruments that are used to measure the flowrate of the RHR pumps. ISTB-3510(b)(1) requires that the full-range of each instrument be no greater than three times the reference value.

The installed flow instrumentation associated the RHR pumps have a range of 0-25000 gpm and loop accuracy of ± 0.87 percent. The typical value or reference value for the flowrate of the RHR pumps during testing is 7700 gpm. To meet the requirement of ISTB-3510(b)(1), the flow instrument shall have a range limit of 0-23,100 gpm (3x7,700). Therefore, the installed flow instrument with a range 0-25,000 gpm does not meet the Code requirement. In lieu of Code requirements, the licensee proposed to use the installed instrumentation of 0-25,000 gpm but combined with a better than Code required instrument accuracy of ±0.87% during Group A, Comprehensive, and Preservice Testing.

Based on the Code required flow instrument range and the accuracy of ± 2 percent, the NRC staff fconcludes that the Code would allow up to a maximum variance of 462 gpm (0.02x23,100) in the measured parameters. Although the installed flowrate instrument exceed the Code allowable range limit of three times the reference value, the higher installed gauge range of 0-25000 gpm, but when combined with the better than Code required accuracy of ±0.87%, would result in only a 218 gpm maximum variance which is more conservative than the Code allowable variance of 462 gpm. The NRC staff concludes that the proposed alternative will provide a more accurate measured value of the parameters than the Code requires, and therefore, is acceptable.

The use of the existing instrument is also supported by NUREG-1482, Revision 2, "Guidelines for Inservice Testing at Nuclear Power Plants," paragraph 5.5.1, which addresses potential NRC approval when the combination of range and accuracy yields a reading at least equivalent to that achieved using instruments that meet the Code requirements.

3.4 Licensee's Alternative Request RR-P-5

3.4.1 Applicable Code Requirements

The licensee requested an alternative to the ASME OM Code requirements of ISTB-3540(b). Paragraph ISTB-3540(b) requires that on vertical line shaft pumps, vibration measurements shall be taken on the upper motor-bearing housing in three approximately orthogonal directions, one of which is the axial direction.

3.4.2 Components for Which Alternative is Proposed

The licensee requested to use an alternative to the applicable ASME OM Code requirements for the RHR service water (RHRSW) and plant service water (PSW) pumps listed in Table 1 below. By letter dated February 14, 2006 (ADAMS Accession No. ML060450286), a similar alternative request was authorized for Hatch Units 1 and 2.

Table 1

Hatch Nuclear Plant	Pump Number	Pump Name	ASME OM Code Group	Code Class
Units 1 and 2	1(2)E11-C001A	RHRSW Pump	Group A	2
	1(2)E11-C001B	RHRSW Pump	Group A	2
	1(2)E11-C001C	RHRSW Pump	Group A	2
	1(2)E11-C001D	RHRSW Pump	Group A	2
	1(2)P41-C001A	PSW Pump	Group A	2
	1(2)P41-C001B	PSW Pump	Group A	2
	1(2)P41-C001C	PSW Pump	Group A	2
	1(2)P41-C001D	PSW Pump	Group A	2

The Hatch, Units 1 and 2, fifth 10-year interval IST program "Code of Record" is the ASME OM Code, 2004 Edition through 2006 Addenda.

3.4.3 Licensee's Reason for its Request provides the following information:

Performing the ASME OM Code-required vibration measurements on the upper motor-bearing housing for the subject pumps is a hardship on the basis of inaccessibility due to the location and design features of the motors. The plant design does not provide access to the top of the motors for the subject pumps and the plant would need to be modified to provide a permanent scaffolding or ladder and platform for access to the bearing on each of the eight motors to allow obtaining the ASME OM Code vibration measurements. Also, a relatively thin cover plate bolted to the top-center of each motor which prevents measurements in line with motor-bearing and prevents performance of the axial vibration measurement. In order to perform the required measurements, the component would need to be redesigned to eliminate the cover plate or the cover plate would have to be removed for each test. Any modifications to the plant and to the upper motor-bearing housings represent a hardship and create unnecessary burden. In addition, removal of the cover plate during pump operation to provide direct access to the bearing housing would create an additional equipment concern due to the potential for foreign material intrusion and component damage.

3.4.4 Licensee's Proposed Alternative Provides the Following Information:

The licensee proposed to measure vibration readings in three orthogonal directions, one of which is in the axial direction in the area of the pump-to-motor mounting flange when conducting Group A, Comprehensive Pump and Preservice Tests. This location is the closest accessible location to the pump bearing housing and this location is easily and safely accessible for vibration measurements. Monitoring of the pump/motor vibrations at these locations will ensure the health of the pump is sufficiently examined.

The ASME OM Code imposes more stringent hydraulic acceptance criteria on these vertical line shaft pumps than for horizontal centrifugal pumps. This hydraulic acceptance criteria places more emphasis on detection of degradation through hydraulic test data than through mechanical test data. Application of the ASME OM Code hydraulic testing acceptance criteria along with radial vibration monitoring in the areas described above will provide adequate data for assessing the condition of the subject pumps and for monitoring degradation. Therefore, reasonable assurance of operational readiness for these pumps will be maintained.

3.4.5 NRC Staff Evaluation

The licensee proposed an alternative to the ASME OM Code vibration measurement requirements of ISTB-3540(b) for the RHRSW and PSW pumps because the upper motor-bearing housing is inaccessible to test personnel.

The ASME OM Code recognizes the value of implementing a vibration analysis strategy for monitoring vertical line shaft pumps by requiring measurements to be taken on the upper motor-bearing housing in three orthogonal directions, one of which is the axial direction. The licensee proposes to obtain vibration measurements on the vertical line shaft RHR and PSW pumps (Table-1 above) at three orthogonal directions, one of which is in the axial direction in the area of the pump-to-motor mounting flange. The vibration measurements will be tracked and trended along with the hydraulic performance test data. The licensee indicated that measurement at the upper motor-bearing is difficult due to an obstruction from a cover plate which prevents measurements in line with the motor-bearing. Accessing the upper motor-bearing housing would require installation of scaffolding or ladders and a redesign of the cover plate so that it could be removed.

Obtaining vibration measurements in three orthogonal directions, one of which is in the axial direction in the area of the pump-to-motor mounting flange along with the hydraulic performance will provide performance data as to the mechanical integrity of the pump and motor assembly. Parameters such as bearing health, pump/motor unbalance, pump/motor looseness, electrical faults, and resonance issues can be monitored using these measurement points. The licensee has obtained vibration measurements at these locations for these pumps and motors in the previous IST interval. Measuring vibration at these locations has proven to provide early indication of abnormal pump/motor performance. The collected data at three orthogonal locations, one of which is in the axial direction in the area of the pump to motor mounting flange, coupled with the trending of pump hydraulic performance data, provides an acceptable alternative for monitoring component health.

Requiring the licensee to meet the requirements for the vibration measurement locations for these pumps as noted in the ASME OM Code results in a hardship without a compensating increase in the level of quality and safety. These pumps operated without notable degradation while measuring vibration at the requested alternate locations during the previous IST interval. Based on the good performance history of these pumps while using the alternate vibration measurement locations and the acceptance by the NRC staff of alternate vibration measurement locations for other pumps and motors for other licensees, the NRC staff concludes that measuring vibrations at the locations requested by the licensee for these pumps and motors is acceptable. Allowing vibration measurements at the requested locations provides reasonable assurance of the operational readiness of these pumps.

3.5 Licensee's Alternative Request RR-P-6

3.5.1 Applicable Code Requirements

ISTB-3510(b)(1) requires that the full-scale range for each analog instrument shall not be greater than three times the reference value.

Table ISTB-3510-I requires a total instrument loop accuracy for pressure indicators of ±2% of full scale for Group B pump tests.

3.5.2 Components for Which Alternative is Requested

1 E21-COO1 A&B (Centrifugal Pumps) - Group B
2 E21-COO1 A&B (Vertical Line Shaft Pumps) - Group B

3.5.3 Licensee's Reason for its Request Provides the Following Information:

This alternative is a re-submittal of NRC approved 4th Interval relief request RR-P-6 that was based on the ASME OM Code-2001 Edition. This 5th Interval request for relief, RR-P-6, is based on the ASME OM Code 2004 Edition with Addenda through OMb-2006. There have been no substantive changes to this alternative, to the OM Code requirements or to the basis for use, which would alter the previous NRC SE conclusions. The installed instrumentation associated with Core Spray (CS) pumps exceed the maximum code allowable total loop accuracy of ± 2 percent. The actual instrument ranges are itemized below.

INSTRUMENT	RANGE	REF VALUE	ALLOWED RANGE *	ACCURACY
1E21-PI-R600A&B	0-500 psi	273-282.6 psi	0-847.8 psi	±2.06%
2E21-PI-R600A&B	0-500 psi	332.3-335 psi	0-1005 psi	±2.06%

* NRC staff notes the Allowed Range corresponds to 3 times the reference value.

The indicators used have full scale ranges less than that allowed by the Code. The maximum code allowable variance in measurement is 16.96 psig (.02 x 847.8) for Unit I and 20.1 psig for Unit 2 (.02 x 1005). By using an indicator with a range less than the allowed limit, the actual maximum variance is 10.5 psig (.021 x 500) which is more accurate than required by the Code. Therefore, the actual accuracy of the instruments is within the Code allowable as specified in Table ISTB-3510-1 for a Group B pump test.

3.5.4 Licensee's Proposed Alternative Provides the Following Information

The licensee proposes to use the installed instrumentation with an accuracy of ±2.06% for Group B Testing. Even though 1(2) E21-PI-R600A&B exceed the Code allowable accuracy of ±2% of full scale for Group B tests, the pressure indicators used have full scale ranges less than that allowed by the Code. By using an indicator with a range less than the allowed limit, the actual maximum variance is 10.5 psig (.021 x 500) which is more accurate than required by the Code. Therefore, the actual accuracy of the instruments is within the Code allowable as specified in Table ISTB-3510-1 for a Group B pump test.

Note that the proposed alternative has been authorized for the Hatch fourth 10-year IST Program Interval by NRC letter dated February 14, 2006 (ADAMS No. ML060450286).

3.5.5 NRC Staff Evaluation

The licensee proposes an alternative to the OM Code instrumentation requirements of Table ISTB-3510-1 which requires a total instrument loop accuracy for pressure indicators of ±2% of full scale for Group B pump tests. The installed instrumentation associated with CS pumps exceed the maximum code allowable total loop accuracy of ± 2 percent.

The installed discharge pressure gauges for the CS pumps have a range of 0-500 psig and an accuracy of ± 2.06 percent. The reference value for the CS pumps during Group B testing is 273-282.6 psi for Hatch 1 and 332.3-335 psi for Hatch 2. To meet the requirement of Table ISTB-3510-1, the total instrument loop accuracy for pressure indicators shall be within ±2% of full scale for Group B pump tests. Therefore, the installed pressure gauge with an accuracy of ± 2.06 percent does not meet the Code requirements. In lieu of Code requirements, the licensee proposed to use the installed instrumentation of an accuracy ± 2.06 percent but combined with a better than Code required gage range limits during Group B testing.

ISTB-3510(b)(1) allows that the full-range limit of each instrument be up to three times the reference value. Therefore, the allowable full range limit for the pressure gauge would be 847.8 psi (3x282.6) for Hatch 1 and 1005 psi for Hatch 2. Based on the Code allowed pressure gauge range limit and the accuracy of ± 2 percent, the NRC staff concludes that the Code would allow up to a maximum variance of 16.96 psig (.02 x 847.8) for Unit I and 20.1 psig for Unit 2 (.02 x 1005) in the measured parameters. Although the installed pressure gauges exceed the Code allowable accuracy limit of ± 2 percent, the slightly higher accuracy, when combined with the better than Code required range limit of 0-500 psig, would result in only a 10.3 psi (0.0206x500) maximum variance which is more conservative than the Code allowable variance of 16.96 psi for Hatch 1 or 20.1 psi for Hatch 2. The NRC staff concludes that the proposed alternative will provide a more accurate measured value of the parameters than the Code requires, and, therefore, is acceptable.

The use of the existing instrument is also supported by NUREG-1482, Revision 2, "Guidelines for Inservice Testing at Nuclear Power Plants," paragraph 5.5.1, which addresses potential NRC approval when the combination of range and accuracy yields a reading at least equivalent to that achieved using instruments that meet the Code requirements.

3.6 <u>Licensee's Alternative Request RR-P-7</u>

3.6.1 Applicable Code Requirements

ISTB-3510(b)(1) requires that the full-scale range for each analog instrument shall not be greater than three times the reference value.

Table ISTB-3510-1 requires a total instrument loop accuracy of ±2% of full scale for pump inservice testing.

3.6.2 Components for Which Relief is Requested

1 E 41-C001 (Centrifugal Pump) - Group B
2 E 41-C001 (Centrifugal Pump) - Group B

3.6.3 Licensee's Reason for its Request Provides the Following Information:

This alternative is a re-submittal of NRC approved 4th Interval relief request RR-P-7 that was based on the ASME OM Code-2001 Edition. This 5th Interval request for relief, RR-P-7, is based on the ASME OM Code 2004 Edition with Addenda through OMb-2006. There have been no substantive changes to this alternative, to the OM Code requirements or to the basis for use, which would alter the previous NRC SE conclusions. The High Pressure Coolant Injection (HPCI) pump suction pressure gauges exceed the range limit of three times of the reference value. The actual instrument ranges are itemized below.

INSTRUMENT	RANGE	REF VALUE	ALLOWED RANGE *	ACCURACY
IE41-PI-R004	0-100 psig	32.2 psig	0-96.6 psig	±1%
2E41-PI-R004	0-100 psig	26.4 psig	0-79.2 psig	±1%

* NRC staff notes Allowed Range corresponds to 3 times the reference value.

3.6.4 Licensee's Proposed Alternative Provides the Following Information:

The licensee proposes to use installed instrumentation with an accuracy of ±1% during Group B pump testing. Even though 1 (2) E41-PI-R004 exceed the Code allowable range limit of three times the reference value, the higher gage range coupled with the better than Code required accuracy of ±1% results in only a 1.0 psi (100x.01) maximum variance compared with the Code allowable variance of 1.93 psi (96.6x.02) for Unit 1 and 1.58 psi (79.2x.02) for Unit 2. Therefore, the better than required accuracy of the indicators overcomes the inaccuracy created by the full scale range being greater than 3 x reference values.

The above proposed alternative provides an acceptable level of quality and safety since the variance in the actual test results is less than the maximum variance allowed by the Code. Based on the determination that the use of installed instrumentation provides an acceptable level of quality and safety, this proposed alternative should be authorized pursuant to 10 CFR 50.55a(z)(1).

Note that the proposed alternative has been authorized for the Hatch fourth 10-year IST Program Interval by NRC letter dated February 14, 2006 (ADAMS No. ML060450286).

3.6.5 NRC Staff Evaluation

The licensee proposed an alternative to the OM Code instrumentation requirements of ISTB-3510(b)(1) for pressure gauges which are used to measure the pressure of the HPCI pumps. ISTB-3510(b)(1) requires that the full-range of each instrument be no greater than three times the reference value.

The installed pressure gauges for the HPCI pumps have a range of 0-100 psig and an accuracy of ± 1 percent. The typical value or reference value for the discharge pressure of the RHR pumps during Group B testing is 32.2 psig for Hatch 1 and 26.4 psig for Hatch 2. To meet the requirement of ISTB-3510(b)(1), the pressure gauge shall have a range limit of 0-96.6 psig (3x32.2) for Hatch 1 and 0-79.2 psig (26.4x3) for Hatch 2. Therefore, the installed pressure gauge with a range 0-100 psig does not meet the Code requirement. In lieu of Code requirements, the licensee proposed to use the installed instrumentation of 0-100 psig but combined with a better than Code required instrument accuracy of ±1% during Group B testing.

Based on the Code required pressure gauge and the accuracy of ± 2 percent, the NRC staff concludes that the Code would allow up to a maximum variance of 1.93 psig (96.6x0.02) for Hatch 1 and 1.58 psig (79.2x0.02) for Hatch 2 in the measured parameters. Although the installed pressure gauges exceed the Code allowable range limit of three times the reference value, the higher installed gauge range of 0-100 psig, when combined with the better than Code required accuracy of ±1%, would result in only a 1 psi (0.01x100) maximum variance which is more conservative than the Code allowable variance of 1.93 psi for Hatch 1 or 1.58 psi for Hatch 2. The NRC staff concludes that the proposed alternative will provide a more accurate measured value of the parameters than the Code requires, and therefore, is acceptable.

The use of the existing instrument is also supported by NUREG-1482, Revision 2, "Guidelines for Inservice Testing at Nuclear Power Plants," paragraph 5.5.1, which addresses potential NRC approval when the combination of range and accuracy yields a reading at least equivalent to that achieved using instruments that meet the Code requirements.

3.7 <u>Licensee's Alternative Request RR-P-8</u>

3.7.1 Applicable Code Requirements

ISTB-3510(b)(1) requires that the full-scale range for each analog instrument shall not be greater than three times the reference value.

Table ISTB-3510-1 requires a total instrument loop accuracy for flow indicators of ±2% of full scale for pump inservice testing.

3.7.2 Components for Which Relief is Requested

1 E41-COO1 (Centrifugal Pumps) - Group B
2 E41-COO1 (Vertical Line Shaft Pumps) - Group B

3.7.3 Licensee's Reason for its Request Provides the Following Information:

This alternative is a re-submittal of NRC approved 4th Interval relief request RR-P-8 that was based on the ASME OM Code-2001 Edition. This 5th Interval request for relief, RR-P-8, is based on the ASME OM Code 2004 Edition with Addenda through OMb-2006. There have been no substantive changes to this alternative, to the OM Code requirements or to the basis for use, which would alter the previous NRC SE conclusions. The installed instrumentation associated with HPCI pumps exceed the maximum code allowable total loop accuracy of ± 2 percent. The actual instrument ranges are itemized below.

INSTRUMENT	RANGE VALUE	REF RANGE*	ALLOWED ACCURACY	LOOP
1E41-FI-R612	0-5000gpm	4250gpm	0-12750gpm	±2.12%
2E41-FI-R612	0-5000gpm	4250gpm	0-12750gpm	±2.12%

* NRC staff notes Allowed Range corresponds to 3 times the reference value

The indicators used have full scale ranges less than that allowed by the Code. The maximum code allowable variance in measurement is 255 gpm (.02 x 12,750) whereas the actual maximum variance is 106 gpm (.0212x5000). Therefore, the actual accuracy of the instrument loop is better than that allowable by the Code.

3.7.4 Licensee's Proposed Alternative Provides the Following Information:

The licensee proposes to use the installed instrumentation with an accuracy of ±2.12% for pump inservice testing. Even though 1 (2) E41-FI-R612 exceeds the Code allowable accuracy of ± 2 percent of full scale for pump testing, the flow indicators used have full scale ranges less than that allowed by the Code. By using an indicator with a range less than the allowed limit, the actual maximum variance is 106 gpm (.021 x 5000) which is more accurate than required by the Code. Therefore, the actual accuracy of the instruments is within the Code allowable as specified in Table ISTB-3500-1 for Group A, Group B and Comprehensive pump test.

Note that the proposed alternative has been authorized for the Hatch fourth 10-year IST Program Interval by NRC letter dated February 14, 2006 (ADAMS No. ML060450286).

3.7.5 NRC Staff Evaluation

The licensee proposed an alternative to the OM Code instrumentation requirements of Table ISTB-3510-1 which requires a total instrument loop accuracy for flow indicators of ± 2 percent of full scale for HPCI pump tests.

The installed flow indicators for the HPCI pumps have a range of 0-5,000 gpm and an accuracy of ± 2.12 percent. The reference value for the HPCI pumps during inservice pump testing is 4,250 gpm. To meet the requirement of Table ISTB-3510-1, the total instrument loop accuracy for flow indicators shall be within ±2% of full scale for pump tests. Therefore, the installed flow indicators with an accuracy of ± 2.12 percent does not meet the Code requirements. In lieu of Code requirements, the licensee proposed to use the installed instrumentation of an accuracy ± 2.12 percent but combined with a better than Code required gage range during Group A, Group B and Comprehensive pump test.

Based on the Code allowed flow gauge range and the accuracy of ± 2 percent, the NRC staff concludes that the Code would allow up to a maximum variance of 255 gpm (.02 x 12750) in the measured parameters. Although the installed flow indicators exceed the Code allowable accuracy limit of ± 2 percent, the slightly higher accuracy of installed instrument (2.12 percent) when combined with the better than Code required range limit of 5,000 gpm, would result in only a 105 gpm (0.0212x5000) maximum variance which is more conservative than the Code allowable variance of 255 gpm. The NRC staff concludes that the proposed alternative will provide a more accurate measured value of the parameters than the Code requires, and therefore, is acceptable.

The use of the existing instrument is also supported by NUREG-1482, Revision 2, "Guidelines for Inservice Testing at Nuclear Power Plants," paragraph 5.5.1, which addresses potential NRC approval when the combination of range and accuracy yields a reading at least equivalent to that achieved using instruments that meet the Code requirements.

3.8 Licensee's Alternative Request RR-P-9

3.8.1 Applicable Code Requirements

The licensee requested an Alternative to the ASME OM Code requirements of ISTB-3540(b). Paragraph ISTB-3540(b) requires that on vertical line shaft pumps, vibration measurements shall be taken on the upper motor-bearing housing in three approximately orthogonal directions, one of which is the axial direction.

3.8.2 Components for Which Relief is Requested

The licensee requested to use an alternative to the applicable ASME OM Code requirements for the Hatch, Unit 2, Standby Diesel Generator Service Water Pump 2P41-C002. The pump is classified as ASME OM Code Group B, and ASME Code Class 3. By letter dated February 14, 2006, (ADAMS Accession No. ML060450286, a similar alternative request was authorized for Hatch, Unit 2.

3.8.3 Licensee's Reason for its Request Provides the Following Information

Performing the ASME OM Code-required vibration measurements on the upper motor-bearing housing for the Hatch, Unit 2, standby diesel generator service water vertical line shaft pump is a hardship on the basis of inaccessibility due to the location and design features of the motor. The motor has a cooling fan mounted at the top which is attached to the rotating shaft. The fan is protected by a relatively thin cover plate which prevents access to the motor housing for vibration measurements. Removing the cover does not provide for transducer placement since the rotating fan would still be in the way. The plant design does not provide access to the top of the motor of the pump and the plant would need to be modified to provide a permanent access to the bearing on the motor to allow obtaining the ASME OM Code vibration measurements. In order to perform the required measurements, the component would need to be redesigned to eliminate the cover plate of the fan or the cover plate would have to be removed for each test. Any modifications to the plant and to the upper motor-bearing housings represent a hardship and create unnecessary burden.

3.8.4 Licensee's Proposed Alternative Provides the Following Information:

The licensee proposed to measure vibration readings in three orthogonal directions, one of which is in the axial direction in the area of the pump-to-motor mounting flange when conducting Comprehensive Pump and Preservice Testing. This location is the closest accessible location to the pump bearing housing and this location is easily and safely accessible for vibration measurements. Monitoring of the pump/motor vibrations at these locations will ensure the health of the pump is sufficiently examined.

The ASME OM Code imposes more stringent hydraulic acceptance criteria on these vertical line shaft pumps than for horizontal centrifugal pumps. This hydraulic acceptance criteria places more emphasis on detection of degradation through hydraulic test data than through mechanical test data. Application of the ASME OM Code hydraulic testing acceptance criteria along with radial vibration monitoring in the areas described above will provide adequate data for assessing the condition of the subject pumps and for monitoring degradation. Therefore, reasonable assurance of operational readiness for these pumps will be maintained.

3.8.5 NRC Staff Evaluation

The licensee requests an alternative to the ASME OM Code vibration measurement requirements of ISTB-3540(b) for the standby diesel generator service water pump 2P41-C002. The licensee has requested an alternative for the standby diesel generator service water pump because the upper motor-bearing housing is inaccessible to test personnel.

The ASME OM Code recognizes the value of implementing a vibration analysis strategy for monitoring vertical line shaft pumps by requiring measurements to be taken on the upper motor-bearing housing in three orthogonal directions, one of which is the axial direction. The licensee proposes to obtain vibration measurements on the vertical line shaft standby diesel generator service water pump 2P41-C002 at three orthogonal directions, one of which is in the axial direction in the area of the pump-to-motor mounting flange. The vibration measurements cannot be measured directly because the motor has a cooling fan mounted at the top that is attached to the rotating shaft. The fan is protected by a relatively thin cover plate which prevents access to the motor housing for vibration measurements. Removing the cover does not provide for transducer placement since the rotating fan would still be in the way. Therefore, the pump vibration measurements for the vertical line shaft pump be taken on the upper motor-bearing housing is not feasible and will be hardship. The proposed testing provides reasonable assurance of operational readiness because the licensee will be taking vibration measurements in three orthogonal directions, one of which is axial at the pump-to-motor mounting flange which provides some information as to the mechanical integrity of the pump. The vibration measurements will be tracked and trended along with the hydraulic performance test data.

Obtaining vibration measurements in three orthogonal directions, one of which is in axial direction in the area of the pump-to-motor mounting flange along with the hydraulic performance will provide performance data as to the mechanical integrity of the pump and motor assembly. Parameters such as bearing health, pump/motor unbalance, pump/motor looseness, electrical faults, and resonance issues can be monitored using these measurement points. The licensee has obtained vibration measurements at these locations for these pumps and motors in the previous IST interval. Measuring vibration at these locations has proven to provide early indication of abnormal pump/motor performance. The collected data at three orthogonal locations, one of which is in the axial direction in the area of the pump to motor mounting flange, coupled with the trending of pump hydraulic performance data, provides an acceptable alternative for monitoring component health.

Requiring the licensee to meet the requirements for the vibration measurement locations for these pumps as noted in the ASME OM Code results in a hardship without a compensating increase in the level of quality and safety. These pumps operated without notable degradation while measuring vibration at the requested alternate locations during the previous IST interval. Based on the good performance history of these pumps while using the alternate vibration measurement locations and the acceptance by the NRC staff of alternate vibration measurement locations for other pumps and motors for other licensees, the NRC staff concludes that measuring vibrations at the locations requested by the licensee for these pumps and motors is acceptable. Allowing vibration measurements at the requested locations provides reasonable assurance of the operational readiness of these pumps.

3.9 Licensee's Alternative Request RR-P-11

3.9.1 Applicable Code Requirements

ISTB-3520, "Pressure," (b), "Differential Pressure," states, "When determining differential pressure across a pump, a differential pressure gage or a differential pressure transmitter that provides direct measurement of the pressure difference or the difference between the pressure at a point in the inlet and the pressure at a point in the discharge pipe shall be used."

3.9.2 Components for Which Alternative is Proposed

The licensee requested to use an alternative to the applicable ASME OM Code requirements for the pumps listed in Table 1.

Table 1

Pump Number	Pump Name	ASME OM Code Group	Pump Type
1E11-C002A	Residual Heat Removal (RHR) Pump	A	Centrifugal
1E11-C002B	RHR Pump	A	Centrifugal
1E11-C002C	RHR Pump	A	Centrifugal
1E11-C002D	RHR Pump	A	Centrifugal
2E11-C002A	RHR Pump	A	Vertical Line Shaft
2E11-C002B	RHR Pump	A	Vertical Line Shaft
2E11-C002C	RHR Pump	A	Vertical Line Shaft
2E11-C002D	RHR Pump	A	Vertical Line Shaft
1E21-C001A	Core Spray (CS) Pump	B	Centrifugal
1E21-C001B	CS Pump	B	Centrifugal
2E21-C001A	CS Pump	B	Vertical Line Shaft
2E21-C001B	CS Pump	B	Vertical Line Shaft

3.9.3 Licensee's Reason for its Request Provides the Following Information:

The residual heat removal (RHR) and CS pumps are aligned to the suppression pool (torus) during all modes of normal plant operation. The installed suction pressure gauges do not meet ASME OM Code requirements. Suction pressure to these pumps is primarily a function of suppression pool level, which is controlled within a 4 inch range, and this results in a virtually constant suction pressure. IST is performed utilizing a full flow test line which circulates water to and from the suppression pool.

The Plant's Technical Specifications (TSs) require that the suppression pool be maintained within a narrow range of level, temperature, and internal pressure during plant operation which results in a suction pressure of approximately 5 pounds per square inch gage (psig). The Unit 1 and 2 TS operability limits for the suppression pool are itemized below:

Level	≥146 inches (") & ≤150"
Internal Pressure	≤1.75 psig
Water Temperature	≤100°F

These TS operability limits for the suppression pool result in a maximum difference in calculated pump suction pressure of < 2 psig.

This 2 psig variance (ΔPi) is insignificant in relation to nominal discharge pressure and the calculation of differential pressure (ΔP = Po – Pi) when considering the Group A pump test acceptable operating range (i.e., 95-110 percent for vertical line shaft pumps from Table ISTB-5200-1 and 90-110 percent for centrifugal pumps from Table ISTB-5100-1) and the allowable ± 2 percent instrument accuracy from Table ISTB-3500-1; or when considering the Group B pump test acceptable operating range (i.e., 90-110 percent for centrifugal and vertical line shaft pumps from Table ISTB-5100-1 and Table ISTB-5200-1) and the allowable ± 2 percent instrument accuracy from Table ISTB-3500-1. Therefore, direct suction pressure measurement for differential pressure derivation provides no added benefit for determining pump operational readiness or for monitoring pump degradation.

Table 2

Pump	Lowest Reference Discharge Pressure (Po)	Maximum Variance (ΔPi/Po)
1E11-C002A-D	171 psig	1.17% max
1E21-C001A&B	273 psig	0.73% max
2E11-C002A-D	180 psig	1.11% max
2E21-C001A&B	332.3 psig	0.60% max

The following table summarizes several years' worth of IST pump suction pressure data. This summary confirms that the RHR and CS pumps' suction pressures are consistent and are relatively insignificant in comparison with the pumps' discharge pressure. Applying an average suction pressure of 5 psig, when calculating differential pressure, will provide data that is meaningful for assessing operational readiness and for monitoring pump degradation.

Table 3

Pump Number	Minimum Pressure	Maximum Pressure	Average Pressure	Reference Values
1E11-C002A	3.9	6.8	5.1 (52)	Qr = 8000 gpm, ΔPr = 166 psid
1E11-C002B	3.2	6.25	4.8 (47)	Qr = 7700 gpm, ΔPr = 175 psid
1E11-C002C	3.0	6.2	4.8 (46)	Qr = 7700 gpm, ΔPr = 176 psid
1E11-C002D	3.4	6.0	4.6 (40)	Qr = 7700 gpm, ΔPr = 180 psid

1E21-C001A	2.5	5.8	4.1 (68)	Qr = 4620 gpm, ΔPr = 277.6 psid
1E21-C001B	1.7*	5.9	3.7 (47)	Qr = 4300 gpm, ΔPr = 268 psid
2E11-C002A	3.0	6.8	5.2 (50)	Qr = 7700 gpm, ΔPr = 184.6 psid
2E11-C002B	4.3	7.1	5.3 (48)	Qr = 7800 gpm, ΔPr = 190 psid
2E11-C002C	3.0	6.9	5.3 (55)	Qr = 7700 gpm, ΔPr = 184.9 psid
2E11-C002D	3.8	6.2	4.9 (47)	Qr = 7700 gpm, ΔPr = 175 psid
2E21-C001A	4.15	6.9	5.1 (43)	Qr = 4250 gpm, ΔPr = 327.3 psid
2E21-C001B	3.3	6.4	5.0 (53)	Qr = 4250 gpm, ΔPr = 330 psid
AVERAGE	3.3	6.4	4.9	N/A

Note 1 - Number in parenthesis "( )" indicates the number of test values averaged to get indicated value.
Note 2 - *One time occurrence only.
Note 3 – Qr is the pump reference flow value, and ΔPr is the pump reference differential pressure value.

The permanently installed pump suction pressure gages encompass a wider range of pressures than does IST and thus exceed the ASME OM Code allowable range limit (three times the reference value). The installed RHR pump gages must account for the pressure experienced with the RHR loop in the shutdown cooling mode of operation. The installed CS pump gages must account for the pressure experienced with the CS suction aligned to the Condensate Storage Tank. Therefore, a temporary test gage which satisfies the ASME OM Code range limits would have to be installed each time that IST is required.

Applying a constant pump suction pressure, when calculating differential pressure, will allow the Group A and B testing to be performed with the installed pressure gages, thus lessening the burden on operations personnel responsible for the testing. Since temporary test gages are required to be calibrated both prior to and after usage, it also eliminates the possibility of invalidating test data due to a gage being damaged during transportation, installation, or removal. Mechanical degradation of centrifugal pumps which experience significant differences in suction (inlet) pressure would be indicated by changes in the differential pressure. However, for these pumps, the suction pressure variance is insignificant in comparison to the developed head (pressure). Therefore, monitoring discharge pressure and calculating differential pressure assuming a constant 5 psig suction pressure provides an adequate method to determine operational readiness and detect potential degradation.

3.9.4 Licensee's Proposed Alternative Provides the Following Information:

Pump suction pressure will be assumed to be 5 psig based on a review of several years of IST data which support suction pressure being virtually constant when performing Group A and Group B testing. During these tests pump differential pressure will be calculated by measuring pump discharge pressure and subtracting 5 psig. This value will then be compared to the corresponding reference value. The acceptance criteria of Tables ISTB-5100-1 and ISTB-5200-1 will be applied for assessing pump operational readiness and for monitoring potential pump degradation during the applicable Group A or Group B pump test. This testing method meets the intent of the ASME OM Code for monitoring pump operational readiness and degradation, and relieves the licensee of the burden associated with the use of temporary test gages.

This request is not applicable to Comprehensive Pump or Preservice Testing.

3.9.5 NRC Staff Evaluation

The licensee requests an alternative to the ASME OM Code instrumentation requirements of ISTB-3520(b) for differential pressure measurement for the pumps listed in Table 1. ISTB-3520(b) requires that differential pressure be determined by the difference between the pressure at a point in the inlet pipe and the pressure at a point in the discharge pipe if a direct indicating instrument is not provided. The licensee proposes to measure the discharge pressure and calculate the differential pressure by assuming a constant suction pressure of 5 psig (based on historical data). The range of the permanently installed pressure gauges at the pumps' inlet exceed the OM Code allowable range limit (3 times the reference valve), and so temporary gauges would need to be installed for each test. Accordingly, these temporarily installed gauges would need to be calibrated both prior to and after usage. These extra steps, which are necessary for compliance with the requirements of ISTB-3520(b), create a hardship for the licensee without a compensating increase in the level of quality and safety.

Discharge pressure can be used in lieu of differential pressure for evaluating pump hydraulic performance if variations in pump suction (inlet) pressure are small. NUREG/CR-6396, "Examples, Clarifications, and Guidance on Preparing Requests for Relief from Pump and Valve Inservice Testing Requirements," Section 3.3.2 provides the following five considerations for justifying the use of discharge pressure instead of differential pressure.

1. The inlet pressure is small in comparison with the discharge pressure (maximum deviation of 2 percent).

2. The maximum expected variation in inlet pressure from test to test is relatively small as determined by control procedures and TS limits and as verified by historical data.

3. The ASME OM Code required acceptance criteria are not relaxed.

4. Even though some uncertainty is introduced by this method, applying the ASME OM Code acceptance criteria for differential pressure to discharge pressure for this application adds conservatism.

5. If a significant blockage occurs at the pump suction, this condition would affect the discharge pressure and/or flow rate measurement and would be detected.

The licensee's submittal meets all the above considerations. The licensee proposes to measure the discharge pressure and calculate the differential pressure by assuming a constant suction pressure of 5 psig (based on historical data). The maximum difference in calculated pump suction pressure is < 2 psig. This 2 psig maximum difference is insignificant when performing quarterly Group A or Group B tests considering the normal discharge pressure range (maximum variation 1.17 percent) of the RHR and CS pumps.

The 2 psig variance is insignificant in the calculation of differential pressure (Po-Pi) when considering the Group A pump test ASME OM Code acceptable operating range (95-110 percent for vertical line shaft pumps from Table ISTB-5200-1 and 90-110 percent for centrifugal pumps from Table ISTB-5100-1) and the allowable ± 2 percent instrument accuracy from Table ISTB-3500-1; or when considering the Group B pump test acceptable operating range (i.e., 90-110 percent for centrifugal and vertical line shaft pumps from Table ISTB-5100-1 and Table ISTB-5200-1) and the allowable ±2 percent instrument accuracy from Table ISTB-3500-1.

Based on the above, the NRC staff concludes that the proposed alternative provides reasonable assurance that the pumps listed in Table 1 are operationally ready.

3.10 Licensee's Alternative Request RR-P-12

3.10.1 Applicable Code Requirements

ISTB-3510(b)(1) requires that the full-scale range for each analog instrument shall not be greater than three times the reference value.

Table ISTB-3510-1 requires a total instrument loop accuracy of ±2% of full scale for pump inservice testing.

3.10.2 Components for Which Alternative is Proposed

2P41-COO2 (Vertical Line Shaft Pump) - Group B

3.10.3 Licensee's Reason for its Request Provides the Following Information;

This alternative is a re-submittal of NRC approved 4th Interval relief request RR-P-12 that was based on the ASME OM Code-2001 Edition. This 5th Interval request for relief, RR-P-12, is based on the ASME OM Code 2004 Edition with Addenda through OMb-2006. There have been no substantive changes to this alternative, to the OM Code requirements or to the basis for use, which would alter the previous NRC SE conclusions.

The flowrate for the Unit 2 Standby Diesel Generator Service Water (SDSW) pump is determined by measuring the differential pressure (dp), in inches of water, across a flow element and then using the vendor correlation chart to convert dp to flowrate in gpm. The dp indicator (2P41- R383) has a full-scale range of -178 inches of water to +178 inches (356 inches total range) of water, which is greater than three times the reference value, and is calibrated to

± 4 inches of water (i.e., ± 1.125% of full-scale). The indicator has a range which allows measurement of the flowrate in either direction across the flow element, thus the negative and positive scale ranges. The vendor supplied dp to flow correlation chart has a range of 50~145 inches of water which corresponds to a flowrate range of 500 - 850 gpm.

The reference flow for this pump is 707 gpm which corresponds to l00 inches of water. The OM Code would allow a full-scale range of 0-300 inches of water (i.e., 3X100) and a calibration accuracy of ± 6.0 inches of water (i.e., 0.02X300).

The combined range and accuracy of the installed instruments is within the maximum allowable of ISTB-3510(b)(1) and Table ISTB-3510-1. The maximum Code allowable dp variance would be ±6.0 inches of water whereas the actual dp variance is ± 4.0 inches of water. Therefore, use of the existing dp indicators and the vendor correlation chart provides flowrate measurements for 1ST that are at least as accurate as required by the OM Code.

3.10.4 Licensee's Proposed Alternative Provides the Following Information:

The installed instrumentation will be utilized to determine flowrate for the SDSW pump test. The use of this instrumentation is supported by the guidance contained in NRC NUREG-1482, Revision 2 Section 5.5.1, since the combined range and accuracy variance of the installed instrumentation is within the maximum allowable variance of the OM Code. This request applies to flowrate measurements for Group B, Comprehensive Pump, and Preservice Testing.

The above proposed alternative is acceptable since the accuracy of the instrumentation is better than the absolute accuracy required by the Code. Based on the determination that this alternative provides an acceptable level of quality and safety, the proposed alternative should be granted pursuant to 10 CFR 50.55a(z)(1).

Note that the proposed alternative has been authorized for the Hatch fourth 10-year IST Program Interval by NRC letter dated February 14, 2006 (ADAMS No. ML060450286).

3.10.5 NRC Staff Evaluation

The licensee proposes an alternative to ISTB-3510(b)(1), which requires that the full-scale range for each analog instrument shall not be greater than three times the reference value for pump tests.

In lieu of measuring flow rate using Code allowed instrument with required loop accuracy of ± 2 percent, the flowrate for the Hatch 2 SDSW pump is determined by measuring the differential pressure (dp), in inches of water, across a flow element and then using the vendor correlation chart to convert dp to flowrate in gpm. The dp indicator (2P41- R383) has a full-scale range of -178 inches of water to + 178 inches (356 inches total range) of water. The vendor supplied dp to flow correlation chart has a range of 50-145 inches of water which corresponds to a flowrate range of 500 - 850 gpm. The reference flow for this pump is 707 gpm which corresponds to l00 inches of water. To meet the requirement of ISTB-3510(b)(1), the flow instrument shall have a range limit of 300 inches of water (3x100). Therefore, the installed flow instrument with a range 356 inches of water does not meet the Code requirement. In lieu of the Code requirements, the licensee proposed to use the installed instrumentation and flow correlation chart, but proposes to calibrate the dp indicator to ±4 inches of water.

Based on the Code required flow instrument range of 300 inches of water and the loop accuracy of ± 2 percent, the NRC staff concludes that the Code would allow a calibration accuracy up to ± 6.0 inches of water (i.e., 0.02X300) for a Code allowed range of 0-300 inches of water. Although the installed flowrate instrument (356 inches of water) exceed the Code allowable range limit of three times the reference value, the licensee's proposal to calibrate the dp indicator to ±4 inches of water would yield an actual dp variance that is more conservative than the Code allowable variance of ±6 inches of water. The NRC staff concludes that the proposed alternative will provide a more accurate measured value of the parameters than the Code requires, and therefore, is acceptable.

The use of the existing instrument is also supported by NUREG-1482, Revision 2, "Guidelines for Inservice Testing at Nuclear Power Plants," paragraph 5.5.1, which addresses potential NRC approval when the combination of range and accuracy yields a reading at least equivalent to that achieved using instruments that meet the Code requirements.

3.11 Licensee's Alternative Request RR-P-13

3.11.1 Applicable Code Requirements

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

ISTB-5122, "Group B Test Procedure," (c) states, in part, "System resistance may be varied as necessary to achieve the reference point."

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

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

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

ISTB-5223, "Comprehensive Test Procedure," (b) states, in part, that "The resistance of the system shall be varied until the flow rate equals the reference point."

ASME OM Code Case, OMN-21, "Alternate Requirements for Adjusting Hydraulic Parameters to Specified Reference Points," 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 a practical to the specified reference point where the variance from the reference point does not exceed + 2% or - 1% of the reference point when the reference point is flow rate, or + 1% or – 2% of the reference point when the reference point is differential pressure or discharge pressure."

3.11.2 Components for Which Alternative is Proposed

The licensee has requested an alternative to the pump testing reference value requirements of ISTB-5121, ISTB-5122, ISTB-5123, ISTB-5221, ISTB-5222, and ISTB-5223. The components affected by this alternative request are the pumps listed in Table 4 below.

Table 4

Pump Number	Pump Name	ASME OM Code Group	Pump Type
1C41-C001A	Standby Liquid Control (SLC) Pump	B	Positive Displacement
1C41-C001B	SLC Pump	B	Positive Displacement
2C41-C001A	SLC Pump	B	Positive Displacement
2C41-C001B	SLC Pump	B	Positive Displacement
1E11-C001A	RHR Service Water (RHRSW) Pump	A	Centrifugal
1E11-C001B	RHRSW Pump	A	Centrifugal
1E11-C001C	RHRSW Pump	A	Centrifugal
1E11-C001D	RHRSW Pump	A	Centrifugal
2E11-C001A	RHRSW Pump	A	Vertical Line Shaft
2E11-C001B	RHRSW Pump	A	Vertical Line Shaft
2E11-C001C	RHRSW Pump	A	Vertical Line Shaft
2E11-C001D	RHRSW Pump	A	Vertical Line Shaft
1E11-C002A	RHR Pump	A	Centrifugal
1E11-C002B	RHR Pump	A	Centrifugal
1E11-C002C	RHR Pump	A	Centrifugal
1E11-C002D	RHR Pump	A	Centrifugal
2E11-C002A	RHR Pump	A	Vertical Line Shaft
2E11-C002B	RHR Pump	A	Vertical Line Shaft
2E11-C002C	RHR Pump	A	Vertical Line Shaft
2E11-C002D	RHR Pump	A	Vertical Line Shaft
1E21-C001A	CS Pump	B	Centrifugal
1E21-C001B	CS Pump	B	Centrifugal
2E21-C001A	CS Pump	B	Vertical Line Shaft
2E21-C001B	CS Pump	B	Vertical Line Shaft
1E41-C001	High Pressure Coolant Injection (HPCI) Pump	B	Centrifugal
2E41-C001	HPCI Pump	B	Centrifugal
1E51-C001	Reactor Core Isolation Cooling (RCIC) Pump (1)	B	Centrifugal
2E51-C001	RCIC Pump (1)	B	Centrifugal

1P41-C001A	Plant Service Water (PSW) Pump	A	Vertical Line Shaft
1P41-C001B	PSW Pump	A	Vertical Line Shaft
1P41-C001C	PSW Pump	A	Vertical Line Shaft
1P41-C001D	PSW Pump	A	Vertical Line Shaft
2P41-C001A	PSW Pump	A	Vertical Line Shaft
2P41-C001B	PSW Pump	A	Vertical Line Shaft
2P41-C001C	PSW Pump	A	Vertical Line Shaft
2P41-C001D	PSW Pump	A	Vertical Line Shaft
1Y52-C001A	Diesel Fuel Oil Transfer Pump (1)	B	Vertical Line Shaft
1Y52-C001B	Diesel Fuel Oil Transfer Pump (1)	B	Vertical Line Shaft
1Y52-C001C	Diesel Fuel Oil Transfer Pump (1)	B	Vertical Line Shaft
1Y52-C101A	Diesel Fuel Oil Transfer Pump (1)	B	Vertical Line Shaft
1Y52-C101B	Diesel Fuel Oil Transfer Pump (1)	B	Vertical Line Shaft
2Y52-C001A	Diesel Fuel Oil Transfer Pump (1)	B	Vertical Line Shaft
2Y52-C001C	Diesel Fuel Oil Transfer Pump (1)	B	Vertical Line Shaft
2Y52-C101A	Diesel Fuel Oil Transfer Pump (1)	B	Vertical Line Shaft
2Y52-C101C	Diesel Fuel Oil Transfer Pump (1)	B	Vertical Line Shaft
2P41-C002	Standby Diesel Service Water Pump	B	Vertical Line Shaft

(1) These are augmented components but the alternative commitments will also apply to these pumps.

3.11.3 Licensee's Reason for its Request Provides the Following Information:

For pump testing, there is difficulty adjusting system throttle valves with sufficient precision to achieve exact flow 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, "Guidelines for Inservice Testing at Nuclear Power Plants," Revision 2, Section 5.3, acknowledges that certain pump system designs do not allow for the licensee to set the flow or 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 reference flow/pressure to within a specified tolerance during IST. 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 +2% or -1% of the reference point when the reference point is flow rate, or + 1% or -2% of the reference point when the reference point is differential pressure or discharge pressure.

3.11.4 Licensee's Proposed Alternative Provides the Following Information:

The licensee requests to perform IST for the pumps listed in Table 4 in a manner consistent with the requirements as stated in ASME OM Code Case OMN-21. The testing of the centrifugal pumps listed in Table 4 will be performed such that flow rate is adjusted as close as practical to the reference value and within proceduralized limits of +2%/-1% of the reference value. For the positive displacement pumps, the discharge pressure will be adjusted as close as practical to the reference value and within proceduralized limits of + 1%/-2% of the reference value.

The licensee's plant operators will still strive to achieve the exact test flow reference values during testing. Typical test guidance will be to adjust flow/pressure to the specific reference value with additional guidance that if the reference value cannot be achieved with reasonable effort, the test will be considered valid if the steady state flow rate is within the procedural limits of +2%/-1% of the reference value or discharge pressure within proceduralized limits of +1%/-2% of the reference value.

3.11.5 NRC Staff Evaluation

An inquiry was submitted to the ASME OM Code to determine what alternatives may be used when it is impractical to operate a pump at a specified reference point for either flow rate, differential pressure, or discharge pressure. ASME OM Code Case OMN-21 was developed to provide guidance on alternatives. The guidance in ASME OM Code Case OMN-21 states that when it is impractical to operate a pump at 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. ASME OM Code Case OMN-21 specifies that the variance from the reference point shall not exceed +2 percent or -1 percent of the reference point when the reference point is flow rate, or +1 percent or -2 percent of the reference point when the reference point is differential pressure or discharge pressure.

ASME OM Code Case OMN-21 was approved by the ASME Operation and Maintenance Standards Committee on April 20, 2012, with the NRC representative voting in the affirmative. The Code Case has not yet been incorporated into Regulatory Guide 1.192. The licensee proposes to adopt ASME OM Code Case OMN-21. The applicability of ASME OM Code Case OM-21 is the ASME OM Code 1995 Edition through the 2011 Addenda. The NRC staff notes that the language from ASME OM Code Case OMN-21 has been included in the ASME OM Code, 2012 Edition.

The NRC staff notes that in certain situations, it is not possible to operate a pump at a precise reference point. The NRC staff has reviewed the alternatives proposed in ASME OM Code Case OMN-21 and found that the proposed alternatives are reasonable and appropriate when a pump cannot be operated as a specified reference point. Operation within the tolerance bands specified in ASME OM Code Case OMN-21 provides reasonable assurance that licensees will be able to utilize the data collected to detect degradation of the pumps. Based on the NRC staff's review of ASME OM Code Case OMN-21 and the licensee's plans to use the bands specified in ASME OM Code Case OMN-21 for flow rate, the NRC staff concludes that implementation of the alternatives contained in ASME OM Code Case OMN-21 is acceptable for the pumps listed in Table 4. Therefore, the NRC staff concludes that the licensee's proposed alternative provides an acceptable level of quality and safety.

3.12 Licensee's Relief Request RR-V-1 for Hatch, Unit 1

3.12.1 Applicable Code Requirements:

ISTC-5131(b), "Valve Stroke Testing," states that "The Limiting value(s) of full-stroke time of each valve shall be specified by the Owner."

3.12.2 Components for Which Relief is Requested

Table 1			
Valve ID	**System**	**Cat**	**Class**
1C11-F010A	Scram Discharge Volume (SDV) Vent Valve	B	2
1C11-F010B	SDV Vent Valve	B	2
1C11-F011	SDV Drain Valve	B	2
1C11-F035A	SDV Vent Valve	B	2
1C11-F035B	SDV Vent Valve	B	2
1C11-F037	SDV Drain Valve	B	2

3.12.3 Licensee's Reason for its Request Provides the Following Information:

A limiting value of stroke time cannot be specified for HNP Unit 1 air operated scram discharge volume vent and drain valves and they cannot be individually stroked and timed. In order to prevent water hammer induced damage to the system during a full Control Rod Drive (CRD) scram, plant Technical Specifications require that system valve operation is adjusted so that the outboard vent and drain valves (F035A&B, F037) fully close at least five seconds after each respective inboard vent and drain valve (F010A&B, F011). All valves must be fully closed in less than forty five (45) seconds.

The system is adjusted so that the inboard vent and drain valves (F010A&B, F011) start to open at least five seconds after each respective outboard vent and drain valve (F035A&B, F037) upon reset of a full core scram. The valves are not equipped with individual valve control switches and cannot be individually stroked timed during normal operation without disabling the Reactor Protection System Scram Signal to the valves. Disabling this signal requires the installation of electrical jumpers and the opening of links in energized control circuits which increases the potential for a Reactor Scram.

Also, HNP Unit 1 CRD system timing is adjustable by manipulating needle valves which would also change the stroke times for the applicable Unit 1 valves; therefore stroke timing the Unit 1 valves would not provide any meaningful information with respect to valve degradation. HNP Unit 2 does not contain the needle valves and cannot be adjusted like Unit 1. Consequently, the Unit 2 valves can be stroke time tested and no relief is needed from the requirements.

3.12.4 Licensee's Relief Request Provides the Following Information:

The valves will be exercised quarterly but not timed. Additionally, the total valve sequence response time will be verified to be less than Technical Specifications requirements during each refueling outage when a complete stroke time test is performed. The above proposed relief provides reasonable assurance of operational readiness since the valves will be exercised quarterly and total valve response time will be tested each refueling outage.

3.12.5 NRC Staff Evaluation

The ASME OM Code Section ISTC-5131(b) "Valve Stroke Testing" requires a limiting value(s) of full stroke time of each valve be specified by the Owner. Monitoring a valve stroke time trend is one of the key parameters for assessing valve condition and overall performance. The scram and discharge volume vent valves listed in Table 1 are not designed to be individually actuated.

For request RR-V-1, the NRC staff has concluded that requiring these valves to be stroke timed individually is impractical and a burden on the licensee because of the extensive modifications that would be required to the system. The licensee has proposed to use the TS quarterly surveillance requirement (SR) testing in lieu of meeting the ASME OM Code requirements. The valves are required by TS SR to close within 45 seconds upon receipt of a scram signal. If the TS SR quarterly test cannot meet the 45 second requirement, then an orderly shutdown shall be initiated. The TS SR quarterly surveillance test provides reasonable assurance of operational readiness because changes in valve stroke time will provide an indication of a valve or valve group degraded condition.

3.13 Licensee's Alternative Request RR-V-2

By letter dated July 16, 2015, the licensee withdrew this request.

3.14 Licensee's Alternative Request RR-V-3

By letter dated June 18, 2015, the licensee withdrew this request.

3.15 Licensee's Alternative Request RR-V-5

3.15.1 Applicable Code Requirements

The licensee requested relief from ASME OM Code – 2004 Edition with Addenda through 2006, Appendix I, paragraph I-1360, which requires that Class 2 and 3 non-reclosing pressure relief devices (rupture discs) be replaced every 5 years unless historical data indicates a requirement for more frequent replacement.

3.51.2 Components for Which Alternative is Proposed:

1E41-D003, 1E41-D004, HPCI system rupture discs.
2E41-D003, 2E41-D004, HPCI system rupture discs.

3.15.3 Licensee's Reason for its Request Provides the Following Information:

The subject rupture discs are supplied by Continental Disc Corporation. Southern Nuclear Operating Company requested the supplier to perform cyclic testing, to destruction, of a disc that had previously been installed in the HPCI system at Plant Hatch. The test disc was installed in an appropriate disc holder and flange assembly which simulated the installed configuration. The rupture disc assembly was cycled from full vacuum to 70% of the ambient burst pressure (219 psig). The cycle testing was conducted at ambient room temperature. Since a rupture disc is a differential pressure relief device, cycling conditions were achieved by placing a constant 15 psig pressure on the downstream side of the rupture disc and cycling the upstream pressure from zero to 70% of the ambient burst pressure plus 15 psig. The 15 psig added to the upstream cycling pressure compensates for the constant 15 psig pressure on the downstream side. An electronic counter recorded each cycle. The test disc completed 2,788 cycles before failure occurred. The rupture disc burst in the normal fashion as with disc of this design.

The HPCI system is typically tested every 3 months, but for conservatism a test frequency of each month will be assumed. Monthly testing would result in approximately 72 tests during 3 operating cycles (i.e., 72 months). To meet the Code 5-year replacement frequency, the disc must be replaced every 2nd refueling outage (48 months) or after approximately 48 HPCI system tests. Therefore, a change from replacement every 48 months to every 72 months is insignificant when compared to the expected life of the disc as proven by the number of cycles required for disc rupture by vendor testing.

Plant Hatch operates on a 24-month fuel cycle. Replacement every 6 years results in replacement every third refueling outage whereas a 5-year replacement results in replacement every second refueling outage. Extension of the replacement frequency by 1 year will coincide with the fuel cycle for Plant Hatch.

3.15.4 Licensee's Proposed Alternative Provides the Following Information:

The rupture discs will be replaced at least once every third refueling outage, corresponding to once every 6 years.

3.15.5 NRC Staff Evaluation

The licensee proposed an alternative to the requirements of OM Code, Appendix I, which requires that Class 2 and 3 rupture discs be replaced every 5 years, unless historical data indicates a requirement for more frequent replacement. This corresponds to the licensee replacing the discs every second refueling outage. The licensee proposes an alternative in which the rupture discs would be replaced every 6 years, resulting in their replacement every third refueling outage.

Cyclic testing of a previously installed rupture disc was performed by the licensee by Continental Disc Corporation. During testing, the rupture disc was cycled from full vacuum to 70 percent of the ambient burst pressure. Failure occurred after the disc was cycled 2,788 times. The cyclic testing performed was a conservative simulation of the pressure differential experienced by the rupture discs during quarterly testing of the HPCI system.

The licensee proposes a 6-year replacement frequency for these rupture discs. At this frequency, the discs would be exposed to approximately 72 HPCI system tests or cycles. This is significantly less than the 2,788 cycles needed for failure of the test disc to occur. As proven by the vendor testing, the subject rupture discs have adequate margin for operation well beyond the requested 6-year replacement frequency. The licensee's proposed alternative provides reasonable assurance of the operational readiness of the HPCI rupture discs. Therefore, the proposed alternative provides an acceptable level of quality and safety.

Based on the above evaluation, the NRC staff concludes that the licensee's proposed alternative in RR-V-5 is authorized pursuant to pursuant to 10 CFR 50.55a(z)(1) on the basis that the proposed alternative provides an acceptable level of quality and safety. This alternative is authorized for the fifth 10-year IST interval which will begin January 1, 2016 and conclude on December 31, 2025.

3.16 Licensee's Alternative Request RR-V-8

3.16.1 Applicable Code Requirements

The licensee proposed an alternative to the following exam frequency requirements of the ASME OM Code – 2004 Edition with Addenda through 2006:

ISTA-3120(a)	The frequency for the inservice testing shall be in accordance with the requirements of Section IST.
ISTB-3400	Frequency of Inservice Tests
ISTC-3510	Exercising Test Frequency
ISTC-3540	Manual Valves
ISTC-3630(a)	Frequency
ISTC-3700	Position Verification Testing
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	Test Frequencies, Class 1 Pressure Relief Valves
Appendix I, I-1330	Test Frequencies, Class 1 Nonreclosing Pressure Relief Devices
Appendix I, I-1340	Test Frequencies, Class 1 Pressure Relief Devices That Are Used For Thermal Relief Applications
Appendix I, I-1350	Test Frequencies, Class 2 and 3 Pressure Relief Valves

Appendix I, I-1360	Test Frequencies, Class 2 and 3 Nonreclosing Pressure Relief Devices
Appendix I, I-1370	Test Frequencies, Class 2 and 3 Primary Containment Vacuum Relief Valves
Appendix I, I-1380	Test Frequencies, Class 2 and 3 Vacuum Relief Valves
Appendix I, I-1390	Test Frequencies, Class 2 and 3 Pressure Relief Devices That Are Used For Thermal Relief Applications
Appendix II, II-4000(a)(1)	Performance Improvement Activities Interval
Appendix II, II-4000(b)(1)(e)	Optimization of Condition Monitoring Activities Interval

3.16.2 Component for Which Alternative is Proposed

All pumps and valves contained within the Inservice Testing Program scope.

3.16.3 Licensee's Reason for its Request Provides the Following Information:

Pursuant to 10 CFR 50.55a, "Codes and Standards," paragraph (z)(2), relief is requested from the frequency specifications of the ASME OM Code. The basis of the relief request is that the Code requirement presents an undue hardship without a compensating increase in the level of quality or safety.

ASME OM Code Section IST establishes the inservice test frequency 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 the 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 5.5.6, "Inservice Testing Program," invokes SR 3.0.2 for various OM Code frequencies).

The lack of a tolerance band on the ASME OM Code inservice test frequency restricts operational flexibility. There may be a conflict where a surveillance test could be required but where it is not possible or not desired that it be performed until sometime after a certain restricted plant condition is cleared. Therefore, to avoid this conflict, the surveillance test should be performed as soon as it is practicable. 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 extending OM Code testing intervals. Interval 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). Such extensions are not intended to be used repeatedly merely as an operational convenience to extend test intervals beyond those specified.

3.16.4 Licensee's Proposed Alternative Provides the Following Information:

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 undergo Inservice Testing at frequencies as specified in the Hatch Technical Specifications (TS 5.5.6) and shown in the following table:

Frequency	Specified Time Period Between Tests
Weekly	At least once per 7 days
Monthly	At least once per 31 days
Quarterly	At least once per 92 days
Semiannually	At least once per 184 days
Yearly or Annually	At least once per 366 days

b. The specified time period between tests may be extended as follows:

   i. For periods specified as less than 2 years, the period may be extended by up to 25% for any given test.

   ii. 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.

c. 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.

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

e. Period extensions of 25% 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.

This relief is requested citing the guidance found in ASME approved Code Case OMN-20.

3.16.5 NRC Staff Evaluation

Historically, licensees have applied and the NRC staff has accepted the standard TS definitions for IST intervals (including allowable interval extensions) to ASME OM Code required testing. (Reference NUREG-1482 Revision 2, Section 3.1.3). Recently, the NRC staff reconsidered the allowance of using TS testing intervals and interval extensions for IST not associated with TS SRs. As noted in Regulatory Issue Summary (RIS) 2012-10, "*NRC Staff Position on Applying Surveillance Requirements 3.0.2 and 3.0.3 to Administrative Controls Program Tests*," the NRC determined that programmatic test frequencies cannot be extended in accordance with the TS SR 3.0.2. This includes all IST described in the ASME OM Code not specifically required by the TS SRs.

Following this development, the NRC staff sponsored and co-authored an ASME OM Code inquiry and Code Case to modify the ASME OM Code to include TS-like test interval definitions and interval extension criteria. The resultant ASME Code Case OMN-20 was approved by the ASME Operation and Maintenance Standards Committee on February 15, 2012, with the NRC representative voting in the affirmative. ASME Code Case OMN-20 was subsequently published in conjunction with the ASME OM Code, 2012 Edition. The licensee proposes to adopt an alternative which is consistent with Code Case OMN-20.

Requiring the licensee to meet the ASME OM Code requirements, without an allowance for defined frequency and frequency extensions for IST of pumps and valves, results in a hardship without a compensating increase in the level of quality and safety. Based on the prior acceptance by the NRC staff of the similar TS test interval definitions and interval extension criteria, the NRC staff concludes that implementation of the test interval definitions and interval extension criteria contained in ASME OM Code Case OMN-20 is acceptable. Allowing usage of ASME Code Case OMN-20 provides reasonable assurance of operational readiness of pumps and valves subject to the ASME OM Code IST.

Based on the above evaluation, the NRC staff concludes that the licensee's proposed alternative in RR-V-8 is authorized pursuant to 10 CFR 50.55a(z)(2) on the basis that compliance with the specified test frequency requirements of the ASME OM Code would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The licensee's proposed alternative provides reasonable assurance of the operational readiness of the various components tested in the IST Program. This alternative is authorized for the fifth 10-year IST interval which will begin January 1, 2016, and concludes on December 31, 2025.

3.17 <u>Licensee's Alternative Proposal RR-V-9</u>

3.17.1 Applicable Code Requirements

ISTC-3522(a), "Category C Check Valves," states that "During operation at power, each check valve shall be exercised or examined in a manner that verifies obturator travel by using the methods in ISTC-5221."

ISTC-3522(c), "Category C Check Valves," states that "If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages."

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

3.17.2 Components for Which Alternative is Proposed

Table 2			
Valve ID	**System**	**Cat**	**Class**
1B21-F015A	Instrument Excess Flow Check Valve (IEFCV)	A/C	1
1B21-F015B	IEFCV	A/C	1
1B21-F015C	IEFCV	A/C	1
1B21-F015D	IEFCV	A/C	1
1B21-F015E	IEFCV	A/C	1
1B21-F015F	IEFCV	A/C	1
1B21-F015G	IEFCV	A/C	1
1B21-F015H	IEFCV	A/C	1
1B21-F015J	IEFCV	A/C	1
1B21-F015K	IEFCV	A/C	1
1B21-F015L	IEFCV	A/C	1
1B21-F015M	IEFCV	A/C	1
1B21-F015N	IEFCV	A/C	1
1B21-F015P	IEFCV	A/C	1
1B21-F015R	IEFCV	A/C	1
1B21-F015S	IEFCV	A/C	1
1B21-F041	IEFCV	A/C	1
1B21-F043A	IEFCV	A/C	1
1B21-F043B	IEFCV	A/C	1
1B21-F045A	IEFCV	A/C	1
1B21-F045B	IEFCV	A/C	1
1B21-F047A	IEFCV	A/C	1
1B21-F047B	IEFCV	A/C	1
1B21-F049A	IEFCV	A/C	1
1B21-F049B	IEFCV	A/C	1
1B21-F051A	IEFCV	A/C	1
1B21-F051B	IEFCV	A/C	1
1B21-F051C	IEFCV	A/C	1
1B21-F051D	IEFCV	A/C	1
1B21-F053A	IEFCV	A/C	1
1B21-F053B	IEFCV	A/C	1
1B21-F053C	IEFCV	A/C	1
1B21-F053D	IEFCV	A/C	1
1B21-F055	IEFCV	A/C	1
1B21-F057	IEFCV	A/C	1

Table 2			
Valve ID	**System**	**Cat**	**Class**
1B21-F059A	IEFCV	A/C	1
1B21-F059B	IEFCV	A/C	1
1B21-F059C	IEFCV	A/C	1
1B21-F059D	IEFCV	A/C	1
1B21-F059E	IEFCV	A/C	1
1B21-F059F	IEFCV	A/C	1
1B21-F059G	IEFCV	A/C	1
1B21-F059H	IEFCV	A/C	1
1B21-F059L	IEFCV	A/C	1
1B21-F059M	IEFCV	A/C	1
1B21-F059N	IEFCV	A/C	1
1B21-F059P	IEFCV	A/C	1
1B21-F059R	IEFCV	A/C	1
1B21-F059S	IEFCV	A/C	1
1B21-F059T	IEFCV	A/C	1
1B21-F059U	IEFCV	A/C	1
1B21-F061	IEFCV	A/C	1
1B31-F003A	IEFCV	A/C	1
1B31-F003B	IEFCV	A/C	1
1B31-F004A	IEFCV	A/C	1
1B31-F004B	IEFCV	A/C	1
1B31-F009A	IEFCV	A/C	1
1B31-F009B	IEFCV	A/C	1
1B31-F009C	IEFCV	A/C	1
1B31-F009D	IEFCV	A/C	1
1B31-F010A	IEFCV	A/C	1
1B31-F010B	IEFCV	A/C	1
1B31-F010C	IEFCV	A/C	1
1B31-F010D	IEFCV	A/C	1
1B31-F011A	IEFCV	A/C	1
1B31-F011B	IEFCV	A/C	1
1B31-F011C	IEFCV	A/C	1
1B31-F011D	IEFCV	A/C	1
1B31-F012A	IEFCV	A/C	1
1B31-F012B	IEFCV	A/C	1
1B31-F012C	IEFCV	A/C	1
1B31-F012D	IEFCV	A/C	1
1B31-F040A	IEFCV	A/C	1
1B31-F040B	IEFCV	A/C	1
1B31-F040C	IEFCV	A/C	1
1B31-F040D	IEFCV	A/C	1
1E21-F018A	IEFCV	A/C	1
1E21-F018B	IEFCV	A/C	1
1E21-F018C	IEFCV	A/C	1
1E41-F024A	IEFCV	A/C	1

Table 2			
Valve ID	**System**	**Cat**	**Class**
1E41-F024B	IEFCV	A/C	1
1E41-F024C	IEFCV	A/C	1
1E41-F024D	IEFCV	A/C	1
1E51-F044A	IEFCV	A/C	1
1E51-F044B	IEFCV	A/C	1
1E51-F044C	IEFCV	A/C	1
1E51-F044D	IEFCV	A/C	1
2B21-F041	IEFCV	A/C	1
2B21-F043A	IEFCV	A/C	1
2B21-F043B	IEFCV	A/C	1
2B21-F045A	IEFCV	A/C	1
2B21-F045B	IEFCV	A/C	1
2B21-F047A	IEFCV	A/C	1
2B21-F047B	IEFCV	A/C	1
2B21-F049A	IEFCV	A/C	1
2B21-F049B	IEFCV	A/C	1
2B21-F051A	IEFCV	A/C	1
2B21-F051B	IEFCV	A/C	1
2B21-F051C	IEFCV	A/C	1
2B21-F051D	IEFCV	A/C	1
2B21-F053A	IEFCV	A/C	1
2B21-F053B	IEFCV	A/C	1
2B21-F053C	IEFCV	A/C	1
2B21-F053D	IEFCV	A/C	1
2B21-F055	IEFCV	A/C	1
2B21-F057	IEFCV	A/C	1
2B21-F059A	IEFCV	A/C	1
2B21-F059B	IEFCV	A/C	1
2B21-F059C	IEFCV	A/C	1
2B21-F059D	IEFCV	A/C	1
2B21-F059E	IEFCV	A/C	1
2B21-F059F	IEFCV	A/C	1
2B21-F059G	IEFCV	A/C	1
2B21-F059H	IEFCV	A/C	1
2B21-F059L	IEFCV	A/C	1
2B21-F059M	IEFCV	A/C	1
2B21-F059N	IEFCV	A/C	1
2B21-F059P	IEFCV	A/C	1
2B21-F059R	IEFCV	A/C	1
2B21-F059S	IEFCV	A/C	1
2B21-F059T	IEFCV	A/C	1
2B21-F059U	IEFCV	A/C	1
2B21-F061	IEFCV	A/C	1
2B21-F070A	IEFCV	A/C	1
2B21-F070B	IEFCV	A/C	1

Table 2			
Valve ID	**System**	**Cat**	**Class**
2B21-F070C	IEFCV	A/C	1
2B21-F070D	IEFCV	A/C	1
2B21-F071A	IEFCV	A/C	1
2B21-F071B	IEFCV	A/C	1
2B21-F071C	IEFCV	A/C	1
2B21-F071D	IEFCV	A/C	1
2B21-F072A	IEFCV	A/C	1
2B21-F072B	IEFCV	A/C	1
2B21-F072C	IEFCV	A/C	1
2B21-F072D	IEFCV	A/C	1
2B21-F073A	IEFCV	A/C	1
2B21-F073B	IEFCV	A/C	1
2B21-F073C	IEFCV	A/C	1
2B21-F073D	IEFCV	A/C	1
2B31-F003A	IEFCV	A/C	1
2B31-F003B	IEFCV	A/C	1
2B31-F004A	IEFCV	A/C	1
2B31-F004B	IEFCV	A/C	1
2B31-F009A	IEFCV	A/C	1
2B31-F009B	IEFCV	A/C	1
2B31-F009C	IEFCV	A/C	1
2B31-F009D	IEFCV	A/C	1
2B31-F010A	IEFCV	A/C	1
2B31-F010B	IEFCV	A/C	1
2B31-F010C	IEFCV	A/C	1
2B31-F010D	IEFCV	A/C	1
2B31-F011A	IEFCV	A/C	1
2B31-F011B	IEFCV	A/C	1
2B31-F011C	IEFCV	A/C	1
2B31-F011D	IEFCV	A/C	1
2B31-F012A	IEFCV	A/C	1
2B31-F012B	IEFCV	A/C	1
2B31-F012C	IEFCV	A/C	1
2B31-F012D	IEFCV	A/C	1
2B31-F040A	IEFCV	A/C	1
2B31-F040B	IEFCV	A/C	1
2B31-F040C	IEFCV	A/C	1
2B31-F040D	IEFCV	A/C	1
2E21-F018A	IEFCV	A/C	1
2E21-F018B	IEFCV	A/C	1
2E21-F018C	IEFCV	A/C	1
2E41-F024A	IEFCV	A/C	1
2E41-F024B	IEFCV	A/C	1
2E41-F024C	IEFCV	A/C	1
2E41-F024D	IEFCV	A/C	1

Table 2			
Valve ID	**System**	**Cat**	**Class**
2E51-F044A	IEFCV	A/C	1
2E51-F044B	IEFCV	A/C	1
2E51-F044C	IEFCV	A/C	1
2E51-F044D	IEFCV	A/C	1

3.17.3 Licensee's Reason for its Request Provides the Following Information:

Pursuant to 10 CFR 50.55a, "Codes and Standards", paragraph (z)(1), relief is requested from the requirements of ASME OM Code ISTC-3522 and ISTC-3700 for the subject valves. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

3.17.4 Licensee's Proposed Alternative Provides the Following Information:

Excess flow check valves (EFCV) will be tested on a representative sample basis at the frequency specified in Technical Specifications (TS) Surveillance Requirement (SR) 3.6.1.3.8.

Functional testing with verification that flow is checked will be performed per TS 3.6.1.3.8 during refueling outages. SR 3.6.1.3.8 allows a "representative sample" of EFCVs to be tested every refueling outage, such that each EFCV will be individually tested approximately every 10 years. The sample groups are representative of the various plant configurations, models, sizes, and operating environments.

Any EFCV failure requires the particular component to be declared inoperable and a Required Action Statement (RAS) issued by Operations. A Condition Report (CR) must be written to document the failure and to ensure the appropriate corrective actions are taken. After the Operations department screens the CR and takes the appropriate actions required by the TS, the CR is screened by the plant's Corrective Action Program (CAP) Coordinators. The CR is assigned a priority based upon the importance of the component as defined by the CAP procedure. For example, high priority components would typically require some sort of Cause Analysis (CA) such as an Apparent Cause Determination. CAs for items not deemed as high priority would typically be closed to a work management process. TS components are typically assigned high priorities.

The Engineering Programs/Components group and management review the CAs daily and immediate feedback is available for the Component/IST Engineer of the failure. Also, Engineering tracks and trends IST component failures and any increasing trends would be detected by Engineering and/or through the CAP process (if the component has had repetitive failures it would normally be identified by cognitive trending and additional analysis be assigned to ensure the causes were understood and corrected.)

The second feedback mechanism is the review of the actual IST surveillance packages. Acceptance criteria for valve operability are provided in the applicable surveillance procedure and the surveillance packages require a review by the IST Engineer. Any increase in failure trends that could potentially change the plant's justification for EFCV testing would be documented in the CAP to ensure that an evaluation is performed to determine if the current EFCV test interval is appropriate.

The EFCVs have position indication in the control room. Check valve remote position indication is excluded from Regulatory Guide (RG) 1.97 as a required parameter for evaluating containment isolation. The remote position indication will be verified accurate at the same frequency as the functional test prescribed in TS SR 3.6.1.3.8. Although inadvertent actuation of an EFCV during operation is highly unlikely due to the spring poppet design, Plant Hatch monitors the EFCVs indications on a daily basis as part of the Operations routine. Corrective Action documents are initiated for any EFCVs with abnormal position indication displays and repairs are scheduled for the next refueling outage.

EFCVs are provided in each instrument process line that is part of the reactor coolant pressure boundary. The excess flow check valve is designed so that it will not close accidentally during normal operation, will close if a rupture of the instrument line occurs downstream of the valve, and can be reopened, when appropriate, after a closure.

As detailed in Final Safety Analysis Report (FSAR) 5.2.2.5.4, Plant Hatch has incorporated into the design of each instrument source line a 0.25-inch restricting orifice as close to the RPV as possible. This is a redundant design feature which, along with the EFCV, will limit leakage to a level where the integrity and functional performance of the secondary containment and its associated air treatment systems (e.g., filters and the standby gas treatment system) are maintained. The coolant loss is well within the capabilities of the reactor coolant makeup system, and the potential offsite exposure is substantially below the guidelines of 10 CFR 100. Additionally, the design and installation of the excess flow check valves at Plant Hatch follow the guidance of RG 1.11.

10 CFR 50, Appendix J testing is only applicable to EFCVs if they perform a containment isolation function. EFCVs are not required to close in response to a containment isolation signal and are not required to operate under post-loss-of-coolant-accident (LOCA) conditions. As discussed in GE Nuclear Energy topical report NEDO-32977-A, "Excess Flow Check Valve Testing Relaxation" as evaluated in safety evaluation report (SER) dated March 14, 2000 (ADAMS accession No. ML003729011), the functioning of EFCVs is not necessary to remain within 10 CFR 100 limits. Consequently, for purpose of 10 CFR 50, Appendix J, containment isolation valve (CIV) testing, EFCVs do not provide a containment isolation function and are exempt from consideration under Appendix J.

Testing on a cold shutdown frequency is impractical considering the large number of valves to be tested and the locations in which the test fixtures must be located. Considering the number of valves to be tested and the conditions required for testing, it is also a hardship to test all of these valves during refueling outages. Improvements in refueling outage schedules have minimized the time that is planned for refueling and testing activities during the outages.

Industry experience as documented in GE Nuclear Energy topical report NEDO-32977-A, "Excess Flow Check Valve Testing Relaxation," indicates the EFCVs have a very low failure rate. The report indicates similarly that many reported test failures at other plants were related to test methodologies and not actual EFCV failures. In addition, the SER for that report assumed a 5 fold increase in failure rate to account for any potential aging influence and the resultant failure potential over 10 years was still found to not be significant. Test history at Plant

Hatch shows a very low failure rate and no evidence of common mode failure, which is consistent with the findings of the NEDO report. The EFCVs at Plant Hatch, consistent with the industry, have exhibited a high degree of reliability, availability, and provide an acceptable level of quality and safety.

The Plant Hatch 2 TSs detail what frequency is required to maintain a high degree of reliability and availability and as an alternative will provide an acceptable level of quality and safety.

3.17.5 NRC Staff Evaluation

EFCVs are installed on instrument lines to limit the release of fluid in the event of an instrument line break. Examples of EFCV installations include: reactor pressure vessel level and pressure instrumentation, main steam line flow instrumentation, recirculation pump suction pressure, and RCIC steam line flow instrumentation. EFCVs are not required to close in response to a containment isolation signal and are not required to operate under post-LOCA conditions.

EFCVs are required to be tested in accordance ASME OM Code ISTC-3510 which states in part that "Active Category A, Category B, and Category C check valves shall be exercised nominally every 3 months." The ASME OM Code recognizes that some valves cannot be tested at this frequency. Deferral of this requirement is allowed by ISTC-3522(c) which states "If exercising is not practical during operation at power and cold shutdowns, it shall be performed during refueling outages." The EFCVs listed in Table 2 cannot be exercised during normal operation because closing these valves would isolate instrumentation required for power operation. These valves can only be tested during a refueling outage. The licensee has proposed an alternative to the required test interval. The proposed change revises the surveillance frequency by allowing a "representative sample" of EFCVs to be tested every refueling outage. The "representative sample" is based on approximately equal number of EFCVs being tested each refueling outage such that each valve is tested at least once every 10 years. As noted in the licensee's technical specification surveillance requirements, the surveillance frequency is governed by the Surveillance Frequency Control Program (SFCP). Changes to the frequencies in the SFCP shall be made in accordance with NEI 04-10 "Risk Informed Method for Control of Surveillance Frequencies," Revision 1. The NRC staff reviewed NEI 04-10 Revision 1 and issued its evaluation on September 19, 2007 (ADAMS Accession No. ML072570267). In its evaluation, the NRC staff found that the methodology is acceptable, with conditions, for licensees to amend their TS to establish a SFCP.

The licensee's justification for the alternative is based on GE Topical Report NEDO-32977-A "Excess Flow Check Valve Testing Relaxation" dated June 2000. The topical report provided: (1) an estimate of steam release frequency (into the reactor building) due to a break in an instrument line concurrent with an EFCV failure to close, (2) and assessment of the radiological consequences of such a release. The NRC staff reviewed the GE topical report and issued its evaluation on March 14, 2000 (ADAMS Accession No. ML003691722). In its evaluation, the NRC staff concluded that the test interval could be extended up to a maximum of 10 years. In conjunction with this conclusion, the NRC staff noted that each licensee that adopts the relaxed test interval program for EFCVs must have a failure feedback mechanism and corrective action program (CAP) to ensure EFCV performance continues to be bounded by the topical report results. Also, each licensee is required to perform a plant-specific radiological dose assessment, EFCV failure analysis, and release frequency analysis to confirm that they are bounded by the generic analyses of the topical report.

The NRC staff reviewed the licensee's proposal for its applicability to GE Topical Report NEDO-32977-A and conformance with the NRC staff's guidance regarding radiological dose assessment, EFCV failure rate and release frequency, and the proposed failure feedback mechanism and corrective action program. Based on its review, the NRC staff concludes that the radiological consequences of an EFCV failure are sufficiently low and acceptable, and that the alternative testing in conjunction with the corrective action plan and the SFCP provides a high degree of valve reliability and operability. Additionally, an orifice is installed upstream of the EFCVs to limit reactor water leakage in the event of rupture. The orifice limits leakage to a level where the integrity and functional performance of secondary containment and associated safety systems are maintained. Therefore, the NRC staff concludes that the licensee's proposed test alternative provides an acceptable level of quality and safety.

3.18 Licensee's Alternative Request RR-V-10

3.18.1 Applicable Code Requirements

The licensee proposed an alternative to the ASME OM Code – 2004 Edition with Addenda through 2006, ISTC-3630(a) - *Leakage Rate for other than Containment Isolation Valves - Frequency*: "Tests shall be conducted at least once every 2 years."

3.18.2 Components for Which Alternative is Requested

The alternative was proposed for the following Pressure Isolation Valves (PIV):

Valve No.	Description	ASME Class
1E11-F008	RHR SDC Suction Outtboard Isol. Valve	1
1E11-F009	RHR SDC Suction Inboard Isol. Valve	1
1E11-F015A	LPCI Inboard Isol. Valve	1
1E11-F015B	LPCI Inboard Isol. Valve	1
1E11-F050A	LPCI Injection Check Valve	1
1E11-F050B	LPCI Injection Check Valve	1
1E11-F122A	RHR F050A Bypass Valve	1
1E11-F122B	RHR F050B Bypass Valve	1
1E21-F005A	CS Injection Inboard Valve	1
1E21-F005B	CS Injection Inboard Valve	1
1E21-F006A	CS Injection Check Valve	1
1E21-F006B	CS Injection Check Valve	1
1E21-F037A	CS F006A Bypass Valve	1
1E21-F037B	CS F006B Bypass Valve	1

Valve No.	Description	ASME Class
1E41-F005	HPCI Injection Check Valve	2
1E41-F006	HPCI Injection Outboard Isol. Valve	2
1E51-F013	RCIC Injection Outboard Isol. Valve	2
1E51-F014	RCIC Injection Check Valve	2
2E11-F008	RHR SDC Suction Outboard Isol. Valve	1
2E11-F009	RHR SDC Suction Inboard Isol. Valve	1
2E11-F015A	LPCI Inboard Isol. Valve	1
2E11-F015B	LPCI Inboard Isol. Valve	1
2E11-F050A	LPCI Injection Check Valve	1
2E11-F050B	LPCI Injection Check Valve	1
2E11-F122A	RHR F050A Bypass Valve	1
2E11-F122B	RHR F050B Bypass Valve	1
2E21-F005A	CS Injection Inboard Valve	1
2E21-F005B	CS Injection Inboard Valve	1
2E21-F006A	CS Injection Check Valve	1
2E21-F006B	CS Injection Check Valve	1
2E21-F037A	CS F006A Bypass Valve	1
2E21-F037B	CS F006B Bypass Valve	1
2E41-F005	HPCI Injection Check Valve	2
2E41-F006	HPCI Injection Outboard Isol. Valve	2
2E51-F013	RCIC Injection Outboard Isol. Valve	2
2E51-F014	RCIC Injection Check Valve	2

3.18.3 Licensee's Reason for its Request Provides the Following Information:

Pursuant to 10 CFR 50.55a, "Codes and Standards", paragraph (z)(1), relief is requested from the requirement of ASME OM Code ISTC-3630(a). The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

ISTC-3630(a) requires that leakage rate testing for pressure isolation valves (PIVs) be performed at least once every 2 years. PIVs are not specifically included in the scope for performance-based testing as provided for in 10 CFR 50 Appendix J, Option B. The concept behind the Option B alternative for containment isolation valves (CIVs) is that licensees should be allowed to adopt cost effective methods for complying with regulatory requirements. Additionally, NEI 94-01 describes the risk-informed basis for the extended test intervals under

Option B. That justification shows that for valves which have demonstrated good performance by passing their leak rate tests for two consecutive cycles, further failures appear to be governed by the random failure rate of the component. NEI 94-01 also presents the results of a comprehensive risk analysis, including the statement that "the risk impact associated with increasing [leakrate] test intervals is negligible (less than 0.1% of total risk)." The valves identified in this relief request are all in water applications. CIVs are tested in accordance with Appendix J requirements using air. PIV testing is typically performed at lower pressures, such as for Appendix J requirements, and are acceptable provided the results are extrapolated to system functional differential pressure. Plant Hatch applies the extrapolated values to both PIV and CIV values. This relief request is intended to provide for a performance-based scheduling of PIV tests at Hatch. The reason for requesting this relief is dose reduction / ALARA. Recent historical data was used to identify that PIV testing alone each refuel outage incurs a total dose of approximately 400 milliRem. Assuming all of the PIVs remain classified as good performers the extended test intervals would provide for a savings of 800 mR over a 6 year period per unit.

NUREG 0933 Issue 105 (Interfacing Systems LOCA at LWRs) discussed the need for PIV leak rate testing based primarily on three pre-1980 historical failures of applicable valves industry-wide. These failures all involved human errors in either operations or maintenance. None of these failures involved inservice equipment degradation. The performance of PIV leak rate testing provides assurance of acceptable seat leakage with the valve in a closed condition. Typical PIV testing does not identify functional problems which may inhibit the valves ability to reposition from open to close. For check valves, such functional testing is accomplished per ASME OM Code ISTC-3522. Power-operated valves are routinely full stroke tested per ASME OM Code to ensure their functional capabilities. At Hatch, these functional tests for PIVs are performed at a Cold Shutdown or Refuel Outage frequency. Such testing is not performed online in order to prevent any possibility of an inadvertent ISLOCA condition. The 24 month functional testing of the PIVs is adequate to identify any abnormal condition that might affect closure capability. Performance of the separate 24 month PIV leak rate testing does not contribute any additional assurance of functional capability. It only determines the seat tightness of the closed valves.

3.18.4 Licensee's Proposed Alternative Provides the Following Information:

Hatch proposes to perform PIV testing at intervals ranging from every refuel to every third refuel. The specific interval for each valve would be a function of its performance and would be established in a manner consistent with the Containment Isolation valve (CIV) process under 10 CFR 50 Appendix J Option B. 12 of the 36 valves listed are also classified as CIVs and are currently leak rate tested with air according to 10 CFR 50 Appendix J methodology every 2 years to satisfy their PIV leakage test requirement (with acceptance criteria correlated to water at function maximum pressure differential). Whether the valve is a CIV/PIV or PIV only, the valve must have two consecutive leakage tests which meet its acceptance criteria to be considered a good performer. That is, the test interval may be extended to every third refuel outage upon completion of two consecutive periodic PIV tests with results within prescribed acceptance criteria. The test interval will be extended to a specific value in a range of frequencies from 30 months up to a maximum of 75 months (as described in NEI 94-01 Revision 3-A). The test interval shall not exceed 75 months with a 3 month grace period (i.e., a total of 78 months). Any test failure will require a return to the initial (every RFO) interval until good performance can again be established.

The primary basis for this relief request is the historically good performance of the PIVs and desire to reduce personnel dose (ALARA). With the testing being performed every refueling outage has resulted in approximately 180 tests with 2 failures which yields a failure rate of approximately 1 percent.

Additional basis for this alternative includes:

- Separate functional testing of power-operated PIVs and Condition Monitoring of Check Valve PIVs is also performed per ASME OM Code.
- Low likelihood of valve mispositioning during power operations (procedures, interlocks).
- Air test vs. water test - degrading seat conditions tend to be identified sooner with air testing.
- Relief valves in the low pressure (LP) piping - these relief valves may not provide Inner-System Loss of Coolant Accident (ISLOCA) mitigation for inadvertent PIV mispositioning but their relief capacity can accommodate conservative PIV seat leakage rates.
- Alarms that identify high pressure (HP) to LP leakage - Operators are highly trained to recognize symptoms of a present ISLOCA and to take appropriate actions.

3.18.5 NRC Staff Evaluation

The PIVs are defined as two valves in a series within the reactor coolant pressure boundary which separate the HP reactor coolant system from an attached LP system. Failure of a PIV could result in an over-pressurization event which could lead to a system rupture and possible release of fission products to the environment. This type of failure event was analyzed under NUREG/CR-5928, "Interfacing System LOCA (ISLOCA) Research Program," (Accession No. ML072430731). The purpose of NUREG/CR-5928 was to quantify the risk associated with an ISLOCA event. NUREG/CR-5928 analyzed BWR and PWR designs.

10 CFR 50, Appendix J Option B references specific guidance concerning acceptable leakage rate test methods, procedures, and analyses that may be used to implement a performance-based leakage test program. The guidance and acceptance criteria are provided in RG 1.163, "Performance-Based Containment Leak-Test Program" (ADAMS Accession No. ML003740058). RG 1.163 endorsed NEI Topical Report 94-01, Revision 0, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J" dated July 26, 1995, with the limitation that "Type C Tests" intervals could not be extended beyond 60 months. Type C Tests, per 10 CFR Part 50, Appendix J, are tests intended to measure CIV leakage rates. On June 8, 2012, NEI 94-01, Revision 3, was reviewed and endorsed by the NRC staff (ADAMS Accession No. ML121030286). Revision 3 of NEI 94-01 allowed the extension of Type C test intervals up to 75 months.

The licensee has proposed an alternative test in lieu of the requirements in the ASME OM Code Section ISTC-3630(a) for all of the PIVs listed in the request. Specifically, the licensee proposed to verify the leakage rate of PIVs using the Option B performance-based schedule. Valves would initially be tested at the required interval schedule which is currently every refueling outage (RFO) or two years. Valves that have demonstrated good performance for two consecutive cycles may have their test interval extended from every RFO to every third RFO (i.e., six years). Any PIV leakage test failure would require the component to return to the initial interval of every RFO or two years until it can be reclassified as a good performer per the performance evaluation of Option B. The leakage test interval for these PIVs shall not exceed 75 months with a 3 month grace period based on the performance (i.e., a total of 78 months). The specific interval for each valve will be a function of its performance and will be established in a manner consistence with the CIV process under Option B.

Currently, all PIVs in this request are being leak tested every RFO or two years and have maintained a history of good performance. In addition, the licensee routinely functionally tests the full stroke capability of these PIVs in accordance with ASME OM Code requirements, to ensure their close functional capabilities. Based on excellent valve maintenance history, coupled with stroking each valve every RFO and the low risk factor, as noted in NUREG/CR-5928, the proposed alternative provides an acceptable level of quality and safety.

Based on the above evaluation, the NRC staff concludes that the licensee's proposed alternative in RR-V-10 is authorized pursuant to pursuant to 10 CFR 50.55a (z)(1) on the basis that the proposed alternative provides an acceptable level of quality and safety. This alternative is authorized for the fifth 10-year IST interval which will begin January 1, 2016, and conclude on December 31, 2025.

4.0 CONCLUSION

As set forth above, the NRC staff determined that proposed alternatives numbered RR-P-3, RR-P-4, RR-P-6, RR-P-7, RR-P-8, RR-P-12, RR-P-13, RR-V-5, RR-V-9, and RR-V-10 for Hatch, Units 1 and 2, provide an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1) for these proposed alternatives. Therefore, pursuant to 10 CFR 50.55a(z)(1) the NRC staff authorizes the use of alternatives RR-P-3, RR-P-4, RR-P6, RR-P-7, RR-P-8, RR-P-12, RR-P-13, RR-V-5, RR-V-9, and RR-V-10 for Hatch, Units 1 and 2, for the fifth 10-year IST program interval, which begins on January 1, 2016, and is scheduled to end on December 31, 2025.

As set forth above, the NRC staff determined that proposed alternatives numbered RR-P-5, RR-P-9, RR-P-11, and RR-V-8, provide reasonable assurance that the affected components are operationally ready. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(2) for these proposed alternatives. Therefore, pursuant to 10 CFR 50.55a(z)(2) the NRC staff authorizes the use of alternatives RR-P-5, RR-P-9, RR-P-11, and RR-V-8 for Hatch, Units 1 and 2, for the fifth 10-year IST program interval, which begins on January 1, 2016, and is scheduled to end on December 31, 2025.

As set forth above, the NRC staff determined that for Relief Request IST-RR-V-1 for Hatch, Unit 1, granting relief pursuant to 10 CFR 50.55(f)(6)(i) is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. The proposed testing provides reasonable assurance that the valves listed in Table 1 in Section 3.12.2 are operationally ready.

All other ASME OM Code requirements for which relief was not specifically requested and approved in the subject requests remain applicable.

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Date: December 30, 2015

otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. The proposed testing provides reasonable assurance that the valves listed in Table 1 in Section 3.12.2 of the Enclosure are operationally ready.

All other ASME OM Code requirements for which relief was not specifically requested and approved in the subject requests remain applicable.

If you have any questions, please contact the Project Manager, Bob Martin at 301-415-1493.

Sincerely,

/RA/ Shawn Williams for

Michael Markley, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-321 and 50-366

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RidsRgn2MailCenter Resource
GBedi, NRR
MFarnan, NRR
RWolfgang, NRR

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NAME	AWang	BMartin	DAlley
DATE	11/30/15	12/29/15	11/17/15
OFFICE	DORL/LPL2-1/LA	DORL/LPL2-1/BC	
NAME	SFigueroa	Markley (SWilliams for)	
DATE	11/30/15	12/30/15	

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