April 5, 2007

Mr. William Levis
Senior Vice President & Chief Nuclear Officer
PSEG Nuclear LLC - N09
Post Office Box 236
Hancocks Bridge, NJ 08038

SUBJECT: SAFETY EVALUATION OF RELIEF REQUESTS FOR THE THIRD 10-YEAR INTERVAL OF THE INSERVICE TESTING PROGRAM FOR HOPE CREEK GENERATING STATION (TAC NOS. MD3300, MD3301, MD3337, MD3338, MD3353, AND MD3354)

Dear Mr. Levis:

By letter dated October 12, 2006, PSEG Nuclear LLC submitted requests for relief from the requirements of the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants for the Hope Creek Generating Station (HCGS). The subject relief requests are for the third 10-year inservice testing (IST) interval at HCGS which began on December 23, 2006.

The Nuclear Regulatory Commission (NRC) staff has completed its review of the subject relief requests as documented in the enclosed Safety Evaluation (SE). Our SE concludes the following.

1) With respect to relief requests V-02, V-04, and V-07, the proposed alternatives will provide an acceptable level of quality and safety. Therefore, pursuant to Section 50.55a(a)(3)(i) of Title 10 of the *Code of Federal Regulations* (10 CFR), the proposed alternatives are authorized for the remainder of the third 10-year IST interval at HCGS.

2) With respect to relief requests P-01 and P-02, the proposed alternatives will provide reasonable assurance of the operational readiness of the pumps and compliance with the specified requirements would result in hardship without a compensating increase in the level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternatives are authorized for the remainder of the third 10-year IST interval at HCGS.

One of the relief requests, P-04, submitted in your letter dated October 12, 2006, was subsequently withdrawn by your letter dated February 21, 2007.

If you have any questions concerning this matter, please contact the HCGS Project Manager, Mr. Richard Ennis, at (301) 415-1420.

Sincerely,

/ra/

Harold K. Chernoff, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-354

Enclosure:
Safety Evaluation

cc w/encl: See next page

If you have any questions concerning this matter, please contact the HCGS Project Manager, Mr. Richard Ennis, at (301) 415-1420.

Sincerely,

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Hope Creek Generating Station

cc:

Mr. Dennis Winchester
Vice President - Nuclear Assessments
PSEG Nuclear
P.O. Box 236
Hancocks Bridge, NJ 08038

Mr. George P. Barnes
Site Vice President - Hope Creek
PSEG Nuclear
P.O. Box 236
Hancocks Bridge, NJ 08038

Mr. George H. Gellrich
Plant Support Manager
PSEG Nuclear
P.O. Box 236
Hancocks Bridge, NJ 08038

Mr. Michael J. Massaro
Plant Manager - Hope Creek
PSEG Nuclear
P.O. Box 236
Hancocks Bridge, NJ 08038

Mr. James Mallon
Manager - Licensing
200 Exelon Way - KSA 3-E
Kennett Square, PA 19348

Jeffrie J. Keenan, Esquire
PSEG Nuclear - N21
P.O. Box 236
Hancocks Bridge, NJ 08038

Mr. Michael Jesse
Manager - Regulatory Assurance
P.O. Box 236
Hancocks Bridge, NJ 08038

Township Clerk
Lower Alloways Creek Township
Municipal Building, P.O. Box 157
Hancocks Bridge, NJ 08038

Mr. Paul Bauldauf, P.E., Asst. Director
Radiation Protection Programs
NJ Department of Environmental
Protection and Energy
CN 415
Trenton, NJ 08625-0415

Mr. Brian Beam
Board of Public Utilities
2 Gateway Center, Tenth Floor
Newark, NJ 07102

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Senior Resident Inspector
Hope Creek Generating Station
U.S. Nuclear Regulatory Commission
Drawer 0509
Hancocks Bridge, NJ 08038

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUESTS FOR THE

THIRD 10-YEAR INTERVAL OF THE INSERVICE TESTING PROGRAM

PSEG NUCLEAR LLC

HOPE CREEK GENERATING STATION

DOCKET NO. 50-354

1.0 INTRODUCTION

By letter dated October 12, 2006, PSEG Nuclear LLC (PSEG or the licensee) submitted relief requests V-02, V-04, V-07, P-01, P-02, and P-04 for the third 10-year inservice testing (IST) program interval at the Hope Creek Generating Station (HCGS). The licensee requested relief from certain IST requirements of the 2001 Edition through 2003 Addenda of the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code). The HCGS third 10-year IST interval commenced on December 23, 2006. In a letter dated February 21, 2007, the licensee withdrew relief request P-04.

2.0 REGULATORY EVALUATION

Section 50.55a of Title 10 of the *Code of Federal Regulations* (10 CFR), requires that IST of certain ASME Code Class 1, 2, and 3 pumps and valves be performed at 120-month (10-year) IST program intervals in accordance with the specified ASME Code incorporated by reference in the regulations, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Nuclear Regulatory Commission (NRC or the Commission) pursuant to paragraphs (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. In accordance with 10 CFR 50.55a(f)(4)(ii), licensees are required to comply with the requirements of the latest edition and addenda of the ASME Code incorporated by reference in the regulations 12 months prior to the start of each 120-month IST program interval. In accordance with 50.55a(f)(4)(iv), inservice tests of pumps and valves may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in 10 CFR 50.55a(b), subject to NRC approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions and addenda are met.

In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for the facility. Section 50.55a authorizes the Commission to approve alternatives and to grant relief from ASME Code requirements upon making necessary findings. NRC guidance contained in Generic Letter (GL) 89-04,

"Guidance on Developing Acceptable Inservice Testing Programs," provides alternatives to ASME Code requirements which are acceptable. Further guidance is given in GL 89-04, Supplement 1, and NUREG-1482, Revision 1, "Guidance for Inservice Testing at Nuclear Power Plants."

The HCGS third 10-year IST interval commenced December 23, 2006. The program was developed in accordance with the 2001 Edition through 2003 Addenda of the ASME OM Code. By letter dated October 12, 2006, PSEG requested relief from certain requirements of the OM Code for the third 10-year IST interval at HCGS. The NRC's evaluation of the IST program relief requests is provided in Safety Evaluation (SE) Section 3.0 below.

3.0 TECHNICAL EVALUATION

3.1 Valve Relief Request V-02

3.1.1 Code Requirements

Paragraph I-3310 of Mandatory Appendix I to the OM Code specifies the periodic testing requirements of ASME Class 1 main steam pressure relief valves with auxiliary actuating devices. The frequency of the required testing is specified in Paragraph I-1320 of Mandatory Appendix I.

Paragraph I-1320 of Mandatory Appendix I requires that these main steam relief valves be periodically tested at least once every 5 years, with a minimum of 20 percent of the valves tested within any 24-month interval. This 20 percent shall consist of valves that have not been tested during the current 5-year interval, if they exist. The test interval for any individual valve shall not exceed 5 years.

The Code-required periodic testing for these valves includes, in part: seat tightness determination, set pressure determination, determination of electrical characteristics and pressure integrity of solenoid valve(s), determination of pressure integrity and stroke capability of air actuator, and determination of operation and electrical characteristics of position indicators.

3.1.2 Licensee's Basis for Requesting Relief

The licensee requested relief from the OM Code requirements of Mandatory Appendix I for testing safety relief valves (SRVs) 1SNPSV-F013A, 1SNPSV-F013B, 1SNPSV-F013C, 1SNPSV-F013D, 1SNPSV-F013E, 1ABPSV-F013F, 1ABPSV-F013G, 1ABPSV-F013H, 1ABPSV-F013J, 1ABPSV-F013K, 1ABPSV-F013L, 1ABPSV-F013M, 1ABPSV-F013P, and 1ABPSV-F013R in the Main Steam and Automatic Depressurization systems. These valves have a safety function in the open position to provide overpressure protection for the main steam header and reactor vessel. Additionally, valves 1SNPSV-F013A through E also serve an Emergency Core Cooling System (ECCS) function in the Automatic Depressurization System (ADS) to depressurize the reactor vessel in the event of a small break loss-of-coolant accident (LOCA) coincident with a failure of the High-Pressure Coolant Injection (HPCI) system.

The licensee is requesting to apply the SRV testing frequency required by Mandatory Appendix I to the pilot portion of these valves and not to the main body (mechanical portion) of these valves. The valves are classified as OM Code Category C.

Relief is requested pursuant to 10 CFR 50.55a, “Codes and standards,” paragraph (a)(3)(i), as the proposed alternative would provide an acceptable level of quality and safety.

The licensee’s basis for relief is as follows:

Section 5.2.2.4.2.1.3 of the HCGS Updated Final Safety Analysis Report (UFSAR) discusses the testing frequency of the SRVs. This section states that HCGS “can achieve optimum SRV operability by disassembly of the pilot section of at least 50 percent of the operating SRVs after each cycle.” The licensee implements the appropriate inspection guidance specified in General Electric (GE) Service Information Letter (SIL) No. 196.

The SIL recommends that refurbishment of the pilot disc and seat be performed at least once every other outage or every 3 years, whichever comes first, or if the “as received” condition indicates that a sticking pilot disc to seat condition exists (GE SIL No. 196, Supplement 14, recommended action #2).

Based on SIL recommendations, it is evident that the concern associated with SRV operation centers on the pilot portion of the valve, and its ability to perform its intended function. A review of NRC Information Notices 82-41, 83-39, 83-82, 86-12, and 88-30 supports this conclusion, indicating that the pilot portions of these valves require diligent testing.

HCGS Technical Specification (TS) Surveillance Requirement (SR) 4.4.2.2 requires that at least one-half of the SRV pilot stage assemblies be removed, set pressure tested and reinstalled or replaced with spares that have been previously set pressure tested and stored per manufacturer’s recommendations at least once per 18 months. Additionally, those removed shall be rotated such that all 14 SRV pilot stage assemblies are removed, set pressure tested, and reinstalled or replaced with spares at least once per 40 months.

HCGS TS SR 4.4.2.3 requires that the SRV main (mechanical) stage assemblies be removed, set pressure tested and reinstalled or replaced with spares that have been previously set pressure tested at least once every 5 years.

The HCGS Main Steam SRVs are of a two-stage design. The first stage (pilot stage) utilizes a spring-loaded pilot disc to sense the set pressure and a pressure-loaded stabilizer disc to sense the reseat pressure. Spring force (preload force) is applied to the pilot disc by means of a pilot rod. Thus, the adjustment of the spring preload force will determine the set pressure of the valve. The second stage (main stage) is tightly seated by the combined forces exerted by the preload spring on the main disc and the system internal pressure acting over the area of the disc. In the closed position, the static pressures will be equal in the valve inlet nozzle and in the chamber over the main stage. This pressure equalization is made possible by the internal passages provided (i.e., piston ring gap, vent hole, drain groove and stabilizer disc seat). When the system pressure increases to the valve set pressure, pilot stage operation will vent the chamber over the main stage piston to the downstream of the valve via inlet porting. This venting produces a differential pressure across the main stage piston in the direction tending to

unseat the valve. The main stage piston is sized such that the resultant opening force is greater than the combined spring preload and the system pressure seating force.

The true setpoint adjustment (and operability determination) of theses valves is contained within the pilot portion of the SRV. By applying the SRV testing frequency required by Mandatory Appendix I to the pilot portion (achieved by meeting TS 4.4.2.2), setpoint accuracy and pilot sticking verification can be maintained, providing an acceptable level of safety. Testing of the main body (mechanical portion), which contains only the main disc, piston rings, and a preload spring that is non-adjustable, at the Mandatory Appendix I specified frequency will not result in a significant increase in the level of safety. Testing of the mechanical portion of all 14 SRVs to provide verification of blowdown and flow rates is conducted every 5 years when the valves are tested as a complete assembly per TS 4.4.2.3.

3.1.3 Licensee's Proposed Alternative Testing

The HCGS Main Steam SRVs will be tested in accordance with TS 4.4.2.2 and 4.4.2.3. One-half of the SRV's pilot stages will be removed and set pressure tested or replaced with previously tested assemblies every 18 months. In the event the "as-found" setpoint fails the setpoint testing, sample expansion of the other pilot valves will be conducted in accordance with paragraph I-1320(c) of Mandatory Appendix I. All 14 main stages (with the entire assembly) will be removed, tested, and reinstalled or replaced every 5 years. The licensee anticipates that this maintenance activity will occur in a single outage every 5 years.

3.1.4 Evaluation

The valves listed in paragraph 3.1.2 above have a safety function to provide over pressure protection for the main steam header and the reactor vessel. Additionally, valves 1SNPSV-F013A through E also serve an ECCS function in the ADS to depressurize the reactor vessel in the event of a small-break LOCA coincident with a failure of the HPCI system. The valves are two stage Target Rock valves. Each valve consists of a main stage and a pilot stage. The licensee has classified these valves as OM Code Category C, and they are required to be tested in accordance with the ASME OM Code 2001 Edition through the 2003 Addenda.

Paragraph I-1320 of Mandatory Appendix I to the ASME OM Code states that all Class 1 pressure relief valves shall be tested at least once every 5 years. A minimum of 20 percent of the valves from each valve group shall be tested within any 24- month interval. This 20 percent shall consist of valves that have not been tested during the current 5-year interval, if they exist. The test interval shall not exceed 5 years. Paragraph I-3310 requires that the following tests be performed:

(a) visual examination;

(b) seat tightness determination, if practicable;

(c) set-pressure determination;

(d) determination of electrical characteristics and pressure integrity of solenoid valve(s);

(e) determination of pressure integrity and stroke capability of air actuator;

(f) determination of operation and electrical characteristics of position indicators;

(g) determination of operation and electrical characteristics of bellows alarm switch;

(h) determination of actuating pressure of auxiliary actuating device sensing element, where applicable, and electrical continuity; and

(i) determination of compliance with the Owner's seat tightness criteria.

The licensee has proposed to test the Main Steam SRVs in accordance with the TSs. The pilot stage will be tested separately from the main valve using a schedule of seven pilot stage assemblies (i.e., 50 percent) every 18 months. At least one-half of the SRV pilot stage assemblies shall be removed, set pressure tested, and reinstalled or replaced with spares that have been previously set pressure tested and stored per manufacturer's recommendations at least once per 18 months. Additionally, those removed shall be rotated such that all fourteen SRV pilot stage assemblies are removed, set pressure tested, and reinstalled or replaced with spares at least once per 40 months. This would result in the pilot stage assemblies being tested more frequently than required by the Code (i.e., once every 3.5 years versus once every 5 years), however, the complete sequence of tests will not be performed. The main stage with the entire assembly will be tested once every 5 years, during a single outage. Although the proposed testing does not meet the sampling approach required by the Code, given the increased frequency of the pilot stage assembly test and that the test frequency complies with the Code required frequency (i.e., once every 5 years), this proposal should provide an acceptable level of quality and safety. Therefore, the NRC staff finds that the licensee's proposed alternative to the requirements of Paragraphs I-1320 and I-3310 of Mandatory Appendix I to the ASME OM Code is acceptable.

3.1.5 Conclusion

As described above, the NRC staff has determined that the licensee has demonstrated that the proposed alternative would provide an acceptable level of quality and safety. The NRC staff concludes that, pursuant to 10 CFR 50.55a(a)(3)(i), the licensee's Relief Request V-02 is authorized for the remainder of the third 10-year IST interval.

3.2 Valve Relief Request V-04

3.2.1 Code Requirements

Paragraph I-3410(d) of Mandatory Appendix I of the OM Code requires that each valve that has been maintained or refurbished in place, removed for maintenance and testing, or both, and reinstalled shall be remotely actuated at reduced or normal system pressure to verify open and close capability of the valve before resumption of electric power generation. Set-pressure verification is not required.

3.2.2 Licensee's Basis for Requesting Relief

The licensee requests authorization of the proposed alternative to the requirements to actuate ADS/SRV valves (valves 1SNPSV-F013A, 1SNPSV-F013B, 1SNPSV-F013C, 1SNPSV-F013D, 1SNPSV-F013E, 1ABPSV-F013F, 1ABPSV-F013G, 1ABPSV-F013H, 1ABPSV-F013J, 1ABPSV-F013K, 1ABPSV-F013L, 1ABPSV-F013M, 1ABPSV-F013P, and 1ABPSV-F013R in the Main Steam and Automatic Depressurization systems) after reinstallation to verify their open and close capability as stated in paragraph I-3410(d) of Mandatory Appendix I of the OM Code.

Relief is requested pursuant to 10 CFR 50.55a, "Codes and standards," paragraph (a)(3)(i), as the proposed alternative would provide an acceptable level of quality and safety.

The licensee contends that in-situ testing imposes unnecessary challenges on the subject valves and has been linked to SRV degradation (e.g., pilot and/or valve leakage). Pilot degradation, while not a concern with respect to the ADS safety function, could, if severe enough, lead to SRV setpoint drift, spurious SRV actuation and/or failure to properly reseat. If any of these valves fail to re-close after testing, the plant would be placed in a LOCA condition requiring plant shutdown in accordance with TS 3.4.2.1.b. In addition, an earlier study (Boiling Water Reactor Owner's Group Evaluation of NUREG 0737, Item II.K.3.16, "Reduction of Challenges and Failures of Relief Valves") recommends that the number of ADS openings be reduced as much as possible. This evaluation further contends that adequate demonstration of ADS/SRV operability is still provided through the remaining existing tests and inspections. Overall, this change should reduce SRV leakage and improve ADS/SRV leakage and improve ADS/SRV reliability by reducing the potential for spurious SRV actuation.

The licensee believes that the in-situ testing of the ADS/SRVs is not necessary because the remaining ADS surveillance tests and SRV inspections provide the necessary assurance of ADS valve operability. These tests and inspections of the ADS/SRVs are described in SE Section 3.2.3 below.

3.2.3 Licensee's Proposed Alternative Testing

The licensee proposes to perform ADS/SRV exercise testing as follows:

ADS Logic System Functional Test - This test, performed during each refueling cycle, verifies the ECCS logic functions to actuate the ADS on low reactor water level - Level 1, and high drywell pressure. Verification of ADS from the start of the automatic initiation logic to, but not including, instrument gas/accumulator solenoids is demonstrated. It is important to note that the TS basis for this functional test does not require actual stroking of the ADS/SRV. Refer to TS 4.5.1.d.2.a.

Steam Relief Valve Cycling Testing - This test, performed each refueling outage, verifies proper operation of the ADS solenoid valves, air operators, and pilot assembly in accordance with TS 4.0.5.

ADS Accumulator Leak Test - This test, performed during each refueling cycle and each time maintenance is performed on the ADS valve, verifies that ADS instrument gas/accumulator leakage is low enough to ensure that there will be sufficient pneumatic pressure for design

basis ADS/SRV operation. The ADS design basis calls for two ADS/SRV actuations at 70% of the maximum drywell pressure (62 psig) to depressurize the reactor pressure vessel down to Residual Heat Removal Shutdown Cooling operating pressure range. Refer to UFSAR Section 5.2.2.4.1.

SRV Setpoint/Leakage Testing - These functional tests and inspections are performed on at least 50 percent of the SRV pilot stage assemblies during each refueling outage. These tests verify the pilot valve and setpoint spring assembly open and close at the required set-pressure, and that leakage is within strict vendor-specified criteria. Refer to TS 4.4.2.2 and UFSAR Section 5.5.5.10.

Main Disc Exercise Test - SRV main disc actuation and leakage is also verified when the entire valve assembly is shipped to the certified test facility. In addition, the test verifies, at least once every 5 years, that all the SRV main discs can freely open as specified in TS SR 4.4.2.3.

3.2.4 Evaluation

The NRC staff agrees with the licensee that the ASME Code requirement to perform in-situ stroke testing of the SRVs could result in seat leakage degradation and possible inadvertent actuation of the valves during power operation. The licensee's proposed testing provides for verification of the important SRV components similar to the currently required testing except for the stroking of the main stage discs. The licensee's proposed testing of the valve assemblies every 5 years at a certified test facility provides assurance that all SRV main discs can freely open. The NRC staff agrees with the licensee that industry data indicates that the main stage is very reliable for performing its safety function such that the proposed frequency for exercising the main disc is acceptable. The NRC staff finds that the testing proposed by the licensee provides an acceptable level of safety and quality. Therefore, the NRC staff finds that the licensee's proposed alternative to the requirements of Paragraph I-3410(d) of Mandatory Appendix I of the ASME OM Code is acceptable.

3.2.5 Conclusion

As described above, the NRC staff has determined that the licensee has demonstrated that the proposed alternative would provide an acceptable level of quality and safety. The NRC staff concludes that, pursuant to 10 CFR 50.55a(a)(3)(i), the licensee's Relief Request V-04 is authorized for the remainder of the third 10-year IST interval.

3.3 <u>Valve Relief Request V-07</u>

3.3.1 Code Requirements

Paragraph ISTC-5131 (Valve Stroke Testing) of the OM Code requires that (a) active valves shall have their stroke times measured when exercised in accordance with ISTC-3500, (b) the limiting value(s) of full-stroke time of each valve shall be specified by the Owner, (c) the stroke time of all valves shall be measured to at least the nearest second, and (d) any abnormality or erratic action shall be recorded, and an evaluation shall be made regarding need for corrective action.

Paragraph ISTC-5132 (Stroke Test Acceptance Criteria) of the OM Code requires that (a) valves with reference stroke times of greater than 10 seconds shall exhibit no more than ±25 percent change in stroke time when compared to the reference value, (b) valves with reference stroke times of less than or equal to 10 seconds shall exhibit no more than ±50 percent change in stroke time when compared to the reference value, and (c) valves that stroke in less than 2 seconds may be exempted from ISTC-5132(b). In such cases, the maximum limiting stroke time shall be 2 seconds.

Paragraph ISTC-5133(b) of the OM Code requires that valves with measured stroke times that do not meet the acceptance criteria of ISTC-5132 shall be immediately retested or declared inoperable. If the valve is retested and the second set of data also does not meet the acceptance criteria, the data shall be analyzed within 96 hours to verify that the new stroke time represents acceptable valve operation, or the valve shall be declared inoperable. If the second set of data meets the acceptance criteria, the cause of the initial deviation shall be analyzed and the results documented in the record of tests.

3.3.2 Licensee's Basis for Requesting Relief

The licensee is requesting to apply Code Case OMN-8, "Alternative Rules for Preservice and Inservice Testing of Power-Operated Valves That Are Used for System Control and Have a Safety Function per OM-10," in lieu of the ISTC Code provisions for valve stroke testing, stroke time acceptance criteria, and stroke test corrective action for the following valves:

1EGPCV-2393A
1EGPCV-2393B
1EGPCV-2499A
1EGPCV-2499B
1GJTV-9634A
1GJTV-9634B
1GJTV-9637A
1GJTV-9637B
1GJTV-9667A
1GJTV-9667B
1GJTV-9762A
1GJTV-9762B
1GJTV-9768A
1GJTV-9768B

These valves are in the Safety Auxiliaries Cooling Water System and the Auxiliary Building Chilled Water System. The valves are power-operated valves that are used for system control with an associated fail-safe position and have a safety function. The valves are classified as OM Code Category B valves.

The licensee's basis for relief is as follows:

NUREG-1482, Revision 1, paragraph 4.2.9 states, in part, that control valves that perform a safety or fail-safe function must be tested in accordance with the Code provisions for IST to monitor the valves for degrading conditions.

The NRC staff recommends that licensees should apply ASME Code Case OMN-8, as accepted in Regulatory Guide (RG) 1.192, if concerns exist regarding IST of control valves with fail-safe conditions.

Code Case OMN-8 states that stroke-time testing need not be performed for power-operated valves when the only safety-related function of those valves is to fail safe. Any abnormality or erratic action experienced during the valve exercising should be recorded in the test record and an evaluation should be performed.

RG 1.192 allows licensees with an applicable Code of record to implement ASME Code Case OMN-8 in lieu of the Code provisions for valve stroke testing, stroke time acceptance criteria, and stroke test corrective action, without the need to submit a relief request. The latest applicable Code for OMN-8, as stated in the code case, is OM Code-1995.

Licensees with a Code of record that is not applicable to the acceptance of this ASME Code Case OMN-8 may submit a request for relief to apply the code case consistent with the indicated conditions to provide an acceptable level of quality and safety.

3.3.3 Licensee's Proposed Alternative Testing

The licensee proposes to test these valves in accordance with Code Case OMN-8. The valves shall be exercised in accordance with Subsection ISTC requirements and the fail-safe position on a loss of power signal shall be verified. Any abnormality or erratic action experienced during the valve exercising shall be evaluated per the Corrective Action Program.

3.3.4 Evaluation

The HCGS IST program will comply with the OM Code, 2001 Edition through 2003 Addenda, and the Code Case OMN-8 contained in this edition states that it is applicable to ASME/ANSI OMa-1988 Part 10 through OM Code-1995. It also states that the code case shall expire on November 20, 2006, unless previously annulled or reaffirmed.

Code Case OMN-8 was reaffirmed in the 2005 Addenda to the OM Code with the same expiration date of November 20, 2006. Code Case OMN-8 was again reaffirmed in the 2006 Addenda to the OM Code with a new expiration date of November 20, 2009. Application of ASME OM Code Cases is addressed in 10 CFR 50.55a(b)(6) through reference to RG 1.192, which lists acceptable and conditionally acceptable code cases for implementation in IST programs. RG 1.192, Table 1, approves the use of Code Case OMN-8 in lieu of stroke-time testing of power-operated control valves that have only a fail-safe safety function in subsection ISTC of the ASME OM Code and references the code case that is attached to the 2000 Addenda of the Code. This reference does not intend to preclude the use of Code Case OMN-8 with later editions and addenda of the Code. Code Case OMN-8 provides an acceptable level of quality and safety for testing of power-operated control valves that have only a fail-safe safety function and is an acceptable alternative for use in the licensee's IST program.

The OM Code, paragraph ISTC 5131(c), requires that the stroke time of all pneumatically-operated valves be measured to at least the nearest second. The measured stroke times are to be compared to the acceptance criteria in paragraph ISTC-5132, and

paragraph ISTC-5133 requires that corrective action be taken if the measured stroke times do not meet the acceptance criteria in ISTC-5132.

All of the power-operated valves associated with this Relief Request are in the Safety Auxiliaries Cooling Water System and the Auxiliary Building Chilled Water System as shown in SE Section 3.3.2 above.

In lieu of the provisions of the ASME Code, the licensee has proposed to implement the provisions of Code Case OMN-8, "Alternative Ruled for Preservice and Inservice Testing of Power-Operated Valves that are used for System Control and have a Safety Function per OM-10." This Code Case, in the 2006 Addenda to the OM Code, is applicable to ASME/ANSI OMa-1988 through OM Code-2004. The code case states that for power-operated control valves that have only a fail-safe safety function, the requirements for valve stroke-time measurement testing, the associated requirements for stroke test acceptance criteria, and the associated resulting requirements for stroke-time testing corrective actions need not be met. All other requirements applicable for these valves shall be met. If a valve fails to exhibit the required change of obturator position during the exercise test, the valve shall immediately be declared inoperable and corrective actions initiated. Any abnormality or erratic action observed during exercise testing of these power-operated control valves shall be recorded in the record of tests, and an evaluation shall be made regarding the need for corrective action.

ISTC-1200(b) excludes "valves used only for system control, such as pressure regulating valves." It is not the intent of the Code to test the regulating function of control valves. However, if these valves have a safety function to fail in an open or closed position, then the testing requirements for the power-operated valves are imposed. Code Case OMN-8 provides alternative rules for IST of power-operated valves that are used for system control and have a fail-safe function.

The licensee will use the proposed criteria in Code Case OMN-8. The NRC staff finds that the criteria in Code Case OMN-8 are technically adequate and provide an acceptable level of quality and safety.

3.3.5 Conclusion

Based on a review of the information provided by the licensee, the NRC staff concludes that the licensee's proposed alternative to use Code Case OMN-8 in lieu of the requirements of Code paragraphs ISTC-5131, ISTC-5132, and ISTC-5133(b) for power-operated valves listed in paragraph 3.3.2 above is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the remainder of the third 10-year IST interval, on the basis that the alternative provides an acceptable level of quality and safety.

3.4 Pump Relief Request P-01

3.4.1 Code Requirements

The licensee requested relief from ISTB-3510 of the ASME OM Code. ISTB-3510(a) requires that flow instrument accuracy shall be within ±2% of full-scale as defined in Table ISTB-3500-1.

Relief was requested for the following HPCI pumps:

10P204	(HPCI Pump)
10P217	(HPCI Booster Pump)

The HPCI pump is an ECCS component that is also used to maintain reactor vessel inventory following reactor isolation and coincident failure of the non-ECCS Reactor Core Isolation Cooling (RCIC) system.

The HPCI booster pump is integral with HPCI pump in that they are driven off the same turbine and ensures that the minimum net positive suction head requirements of the HPCI pump are maintained for the design-basis accident flow rates.

3.4.2 Licensee's Basis for Requesting Relief

In its letter dated October 12, 2006, the licensee stated:

> The permanently installed flow instrument 1BJFIC-R600-E41 does not meet the 2 percent acceptable instrument accuracy specified in Table ISTB-3500-1. The table below lists the actual instrument loop accuracy. This loop accuracy has been calculated from the transmitter to the indicator in the main control room.
>
> Pump testing requires operation of the HPCI turbine, adding heat to the suppression pool throughout the test. Use of temporary field instrumentation would create an unusual difficulty since speed and flow must be set and controlled at the reference values from the main control room. Use of temporary field instrumentation would require additional communication with personnel in the field, prolonging the test, while the test duration is severely limited due to the heat addition to the suppression pool.
>
> As indicated in the table below, the installed instrumentation has a full-scale range of 6000 gpm [gallons per minute], which slightly exceeds the pump flow reference value of 5600 gpm (full-scale equals 1.07 times reference) with an accuracy of +3.83% and -0.67% of full-scale. This results in flow rate measurement accurate to +4.1% or -0.72% of indicated flow at reference conditions (5600 gpm), which is more conservative than the 6% required accuracy allowed by the combination of instrument full-scale range and accuracy allowed in Subsection ISTB. The current instrumentation provides sufficient repeatability to allow for an evaluation of the pump hydraulic condition and detect pump degradation. Installation of a new flow rate instrument would constitute a hardship and a burden without a compensating increase in plant safety since it would be expensive and would not provide better indication accuracy or readability.

Supporting Data Table

Instrument Number	1BJFIC-R600
Actual Instrument Range	0 - 6000 gpm
Actual Gauge (Loop) Accuracy	+3.83% of full-scale -0.67% of full-scale
Test Reference Value	5600 gpm
Code Allowable Instrument Range (3X ref. Value)	16,800 gpm
Code Allowable Instrument Tolerance (2% full-scale at 3X ref. value)	±336 gpm
Actual Instrument Tolerance	+229.8 gpm -40.2 gpm
Actual Indicated Accuracy (at ref. value)	+4.1% -0.72%

3.4.3 Licensee's Proposed Alternative Testing

In its letter dated October 12, 2006, the licensee stated:

> NUREG-1482, Rev. 1, Section 5.5.1, "Range and Accuracy of Analog Instruments," states; When the range of a permanently installed analog instrument is greater than three times the reference value, but the accuracy of the instrument is more conservative than that required by the Code, the staff may grant relief when the combination of the range and accuracy yields a reading that is as at least equivalent to that achieved using instruments that meet the Code requirements (i.e., up to +/-6 percent for Group A and B tests, and +/-1.5 percent for pressure and differential pressure instruments for Preservice and Comprehensive tests). The instruments identified on the above Table are permanent plant instrumentation that satisfy the guidance provided in NUREG-1482, Rev. 1, Section 5.5.1.
>
> Using the provisions of this 10 CFR 50.55a Request, as an alternative to the requirements of ISTB-3510(a), the permanent plant instrument yields a reading that is as at least equivalent to that achieved using instruments that meet the Code requirements as described in NUREG-1482, Rev. 1, Section 5.5.1.
>
> The existing permanently installed flow instrumentation is acceptable for pump inservice testing.

3.4.4 Evaluation

The 2001 Edition of the OM Code, ISTB-3510(a) requires that the accuracy of flow rate instruments be within ±2% of full-scale for analog instruments. Additionally, ISTB-3510(b)(1) requires the full-scale range of each analog instrument be no greater than three times the reference value. The NRC in NUREG-1482, Revision 1, Section 5.5.1, addresses the situation

where the range of an analog instrument is greater than 3 times the reference value, but the accuracy is more conservative than the Code. The NUREG states that the NRC will grant relief when the combination of the range and accuracy yields a reading that is at least equivalent to the reading achieved from instruments that meet the Code requirements (i.e., up to ±6%.)

In this relief request, the range meets the Code requirements, however, the accuracy slightly exceeds the Code requirements. Considered together, the reading accuracy achieved from the installed instruments is +4.1% or -0.72%, which meets the intent of the Code and provides reasonable assurance of the operational readiness of the pumps. Compliance with the Code would require the purchase of new instrumentation which would be burdensome to the licensee without a compensating increase in the level of quality and safety.

3.4.5 Conclusion

Based on the above evaluation, the NRC staff concludes that the proposed alternative will provide reasonable assurance of the operational readiness of the pumps and compliance with the specified requirements would result in hardship without a compensating increase in the level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternative is authorized for the remainder of the third 10-year IST interval at HCGS.

3.5 Pump Relief Request P-02

3.5.1 Code Requirements

The licensee requested relief from ISTB-3510 of the ASME OM Code. ISTB-3510(a) requires that flow instrument accuracy shall be within ±2% of full-scale as defined in Table ISTB-3500-1. Relief was requested for the RCIC system pump 10P203. While not credited as an ECCS component, the RCIC pump is safety-related and supplies demineralized water to the reactor vessel in the event that the reactor vessel is isolated.

3.5.2 Licensee's Basis for Requesting Relief

In its letter dated October 12, 2006, the licensee stated:

> The permanently installed flow instrument 1 BDFIC-R600-E51 does not meet the 2 percent acceptable instrument accuracy specified in Table ISTB-3500-1. The table below lists the actual instrument loop accuracy. This loop accuracy has been calculated from the transmitter to the indicator in the main control room.
>
> Pump testing requires operation of the RCIC turbine, adding heat to the suppression pool throughout the test. Installation of temporary field instrumentation is not preferable since speed and flow must be set and controlled at the reference values from the main control room. Use of temporary field instrumentation would require additional communication with personnel in the field, prolonging the test, while the test duration is limited due to heat addition to the suppression pool.
>
> As indicated in the table below, the installed instrumentation has a full-scale range of 700 gpm, which only slightly exceeds the pump flow reference value of 600 gpm

(full-scale equals 1.17 times reference) with an accuracy of +2.49% and -2.49% of full scale. This results in flow rate measurement accurate to +2.9% or -2.9% of indicated flow at reference conditions (600 gpm), which is more conservative than the 6% required accuracy allowed by the combination of instrument full-scale range and accuracy allowed in Subsection ISTB. The current instrumentation provides sufficient repeatability to allow for an evaluation of the pump hydraulic condition and detect pump degradation.

Supporting Data Table

Instrument Number	1 BDFIC-R600
Actual Instrument Range	0 - 700 gpm
Actual Gauge (Loop) Accuracy	+2.49% of full-scale -2.49% of full-scale
Test Reference Value	600 gpm
Code Allowable Instrument Range (3X ref. Value)	1,800 gpm
Code Allowable Instrument Tolerance (2% full-scale at 3X ref. value)	±36 gpm
Actual Instrument Tolerance	+17.43 gpm -17.43 gpm
Actual Indicated Accuracy (at ref. value)	+2.9% -2.9%

3.5.3 Licensee's Proposed Alternative Testing

In its letter dated October 12, 2006, the licensee stated:

> NUREG-1482, Rev. 1, Section 5.5.1, "Range and Accuracy of Analog Instruments," states; When the range of a permanently installed analog instrument is greater than three times the reference value, but the accuracy of the instrument is more conservative than that required by the Code, the staff may grant relief when the combination of the range and accuracy yields a reading that is as at least equivalent to that achieved using instruments that meet the Code requirements (i.e., up to +/-6 percent for Group A and B tests, and +/-1.5 percent for pressure and differential pressure instruments for Preservice and Comprehensive tests). The instruments identified on the above table are permanent plant instrumentation that satisfy the guidance provided in NUREG-1482, Rev. 1, Section 5.5.1.
>
> Using the provisions of this 10 CFR 50.55a request, as an alternative to the requirements of ISTB-3510(a), the permanent plant instrument yields a reading that is as at least equivalent to that achieved using instruments that meet the Code requirements as described in NUREG-1482, Rev. 1, Section 5.5.1.

The existing permanently installed flow instrumentation is acceptable for pump inservice testing.

3.5.4 Evaluation

The 2001 Edition of the OM Code, ISTB-3510(a) requires that the accuracy of flow rate instruments be within ±2% of full-scale for analog instruments. Additionally, ISTB-3510(b)(1) requires the full-scale range of each analog instrument be no greater than three times the reference value. The NRC in NUREG-1482, Revision 1, Section 5.5.1, addresses the situation where the range of an analog instrument is greater than 3 times the reference value, but the accuracy is more conservative than the Code. The NUREG states that the NRC will grant relief when the combination of the range and accuracy yields a reading that is at least equivalent to the reading achieved from instruments that meet the Code requirements (i.e., up to ±6%.)

In this relief request, the range meets the Code requirements, however, the accuracy slightly exceeds the Code requirements. Considered together, the reading accuracy achieved from the installed instruments is +2.9% or -2.9%, which meets the intent of the Code and provides reasonable assurance of the operational readiness of the pump. Compliance with the Code would require the purchase of new instrumentation which would be burdensome to the licensee without a compensating increase in the level of quality and safety.

3.5.5 Conclusion

Based on the above evaluation, the NRC staff concludes that the proposed alternative will provide reasonable assurance of the operational readiness of the pumps and compliance with the specified requirements would result in hardship without a compensating increase in the level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternative is authorized for the remainder of the third 10-year IST interval at HCGS.

4.0 CONCLUSION

The following summarizes the conclusions as discussed in SE Sections 3.1 through 3.5:

1) With respect to relief requests V-02, V-04, and V-07, the proposed alternatives will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternatives are authorized for the remainder of the third 10-year IST interval at HCGS.

2) With respect to relief requests P-01 and P-02, the proposed alternatives will provide reasonable assurance of the operational readiness of the pumps and compliance with the specified requirements would result in hardship without a compensating increase in the level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternatives are authorized for the remainder of the third 10-year IST interval at HCGS.

Principal Contributors: R. Wolfgang
Y. Wong

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