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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE THIRD TEN-YEAR INTERVAL INSERVICE TESTING PROGRAM

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

DOCKET NO. 50-298

1.0 INTRODUCTION

The Code of Federal Regulations, 10 CFR 50.55a, requires that inservice testing (IST) of certain ASME Code Class 1, 2, and 3 pumps and valves be performed in accordance with Section XI of the American Society of Mechanical Engineer (ASME) Boiler and Pressure Vessel Code and applicable addenda, except where relief has been requested and granted or proposed alternatives have been authorized by the Commission pursuant to 10 CFR 50.55a(f)(6)(i), (a)(3)(i), or (a)(3)(ii). In order to obtain authorization or relief, the licensee must demonstrate that: (1) conformance is impractical for its facility; (2) the proposed alternative provides an acceptable level of quality and safety; or (3) compliance would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety. Section 50.55a (f)(4)(iv) provides that 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 the limitations and modifications listed, and subject to Commission approval. Nuclear Regulatory Commission (NRC) guidance contained in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," provided alternatives to the Code requirements determined to be acceptable to the staff and authorized the use of the alternatives in Positions 1, 2, 6, 7, 9, and 10, provided the licensee follows the guidance delineated in the applicable position. When an alternative is proposed which is in accordance with GL 89-04 guidance and is documented in the IST program, no further evaluation is required; however, implementation of the alternative is subject to NRC inspection.

Section 50.55a authorizes the Commission to grant relief from ASME Code requirements or to approve proposed alternatives upon making the necessary findings. The NRC staff's findings with respect to granting or not granting the relief requested or authorizing the proposed alternative as part of the licensee's IST program are contained in this Safety Evaluation (SE).

By letter dated November 21, 1995, the Nebraska Public Power District (licensee) submitted relief requests RP-01, RP-02, RP-03, RP-04, RV-01, RV-02, RV-03, RV-04, RV-05, RV-06, RV-07, RV-08, RV-09, RV-10, RV-11, RV-12, RV-13, and RV-14 for Cooper Nuclear Station (CNS), third ten-year interval program for inservice testing of pumps and valves. The Cooper Nuclear Station IST Program was developed to the 1989 Edition of ASME Section XI for the third ten-year interval that began March 1, 1996.

2.0 RELIEF REQUEST RP-01

RP-01 requests relief from *Operations and Maintenance (OM) Standards*, Part 6 (OM6), Paragraph 4.6.1.2.(a), which states that the full-scale range of each analog instrument shall be not greater than three times the reference value. This relief request pertains to the following pumps:

core spray system: CS-P-A, CS-P-B
residual heat removal system: RHR-P-A, RHR-P-B, RHR-P-C, RHR-P-D
high pressure coolant injection system: HPCI-P-MP/BP
reactor core isolation cooling system: RCIC-P-MP

2.1 Licensee's Basis For Request

The licensee provided the following basis for the relief request:

> The permanently installed suction pressure gauge of a pump is generally sized to accommodate the maximum pressure it would experience under normal or emergency conditions. In many cases, this results in an instrument range that exceeds the Code requirements since, under test conditions, normal or emergency condition suction pressures are typically not experienced.
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> Suction pressure measurements serve two primary functions. First, they provide assurance that the pump has an adequate suction pressure head for proper operation. For suction head determination, the accuracy and range requirements are overly restrictive. Since, in most cases, plant pumps are provided with a considerable margin of suction head, an accuracy of 1.0% or better is adequate.
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> Secondly, the suction pressure is used to determine the pump differential pressure. When used in determining differential pressure, the accuracy of the suction pressure measurement has little or no effect on the calculation since, generally, the pump discharge pressure is higher than the suction pressure by two or three orders of magnitude.

2.2 Proposed Alternate Testing

When measuring pump suction pressure, the range requirement of OM-6, Paragraph 4.6.1, will not be followed; however, instruments used will have an accuracy of 1.0% or better.

2.3 Evaluation

The instrument accuracy and range requirements of OM-06, Paragraph 4.6, are to ensure that test measurements are sufficiently sensitive to changes in pump condition to allow detection of degradation. OM-6, Paragraph 4.6, states that (1) accuracy for instruments used in the measurement of pressure shall be ± 2% and (2) full-scale range of analog instruments shall be three times the reference value or less. A range of greater than three times the reference

value can be acceptable if the instrument is proportionately more accurate than required. As indicated in Section 5.5.1 of NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," an alternative can be approved if the combination of range and accuracy yields a reading that meets ± 6% of reference value.

It appears that the suction pressure instrumentation is used in combination with the discharge pressure instrumentation to determine the differential pressure. The licensee states that the suction pressure instruments will have an accuracy of 1.0% or better; however, the licensee did not identify all error components associated with the differential pressure measurement or address whether or not the error components are effectively combined. Licensees are expected to properly address instrument measurement error when calculating the value of a specific parameter from multiple instruments.

Meeting the Code requirements would involve purchasing and installing alternative instruments without a significant benefit in improved measurement accuracy. Making these modifications would involve undue hardship for the licensee.

2.4 Conclusion

Based on the determination that the proposal provides a reasonable assurance of operational readiness and that compliance with the Code would result in hardship without a compensating increase in the level of quality and safety, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the condition that the combination of range and accuracy yields a measurement that meets ± 6% of differential pressure reference value.

3.0 RELIEF REQUEST RP-02

RP-02 requests relief from OM-6, Paragraph 4.6.1.1, which states that the instrument accuracy shall be within the limits of Table 1. For pressure and flowrate measurements, Table 1 specifies an acceptable accuracy limit of ± 2% of total loop accuracy for combination of instrumentation. This relief request pertains to the following pumps:

core spray system: CS-P-A, CS-P-B,
residual heat removal system: RHR-P-A, RHR-P-B, RHR-P-C, RHR-P-D
high pressure coolant injection system: HPCI-P-MP/BP
reactor core isolation cooling system: RCIC-P-MP
service water booster system: SW-P-BPA, SW-P-BPB, SW-P-BPC, SW-P-BPD

3.1 Licensee's Basis For Request

The licensee provided the following basis for the relief request:

The percentages of total loop accuracy for the combination of instruments listed below do not meet the requirements of Table 1:

FUNCTION	LOOP ACCURACY (%)
CS Pump Discharge Pressure	2.06
CS Pump Flowrate	2.02
RHR Pump Flowrate	2.08
HPCI Pump Flowrate	2.03
RCIC Pump Flowrate	2.03
SWB Pump Flowrate	2.03

The difference between the existing loop accuracy for instrument combinations and that required by the Code is a maximum of 0.08% as exhibited above. This difference is insignificant when compared to the cost of manpower required to obtain the 2% accuracy without providing a compensating increase in the level of quality or safety.

3.2 Proposed Alternate Testing

Inservice test measurements of pressure and flowrate, as described above, will be made using existing instruments with loop accuracies as indicated.

3.3 Evaluation

The licensee requested relief from the Code requirements for pressure and flow rate instrumentation loop accuracy for the pumps listed in the relief request. The licensee proposed to use a combination of instrumentation with loop accuracies between ± 2.02% and ± 2.08%.

OM-6, Paragraph 4.6.1, provides the requirements for instrument accuracy. For analog instruments, OM-6 effectively allows uncertainty in the measurements as much as ± 6% since it requires loop accuracy of ± 2% of full scale and a full scale range of three times reference value or less. However, for digital instrumentation, OM-6 calls for an instrument accuracy of ± 2% over the calibrated range.

The use of a combination of instruments specified in this relief request would not compromise the operational readiness of pumps to perform their safety function if the additional uncertainty above ± 2% is considered in the analysis of pump data and the acceptance criteria adjusted to account for the additional uncertainty, as necessary. For example, the additional inaccuracy can be offset for the RHR pump flow rate by changing the Required Action Range and the Alert Range by adding 0.08% to the low limits and by subtracting 0.08% from the high limits. Meeting the Code requirements would involve purchasing and installing alternative instruments. Where the licensee accounts for the additional uncertainty, requiring the ± 2% accuracy for instrument loop would be a hardship without a compensating increase in the level of safety.

3.4 Conclusion

Based on the determination that the alternative testing provides a reasonable assurance of operational readiness and compliance with the Code requirements would result in hardship without a compensating increase in the level of

quality and safety, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the condition that the licensee accounts for the additional uncertainty beyond ± 2% in the analysis of the pump data.

4.0 RELIEF REQUEST PR-03

RP-03 requests relief from OM-6, Paragraph 4.6.1.2.(a), which states that the full-scale range of each analog instrument shall be not greater than three times the reference value. This relief request pertains to pumps REC-P-A, B, C, and D in the reactor equipment cooling system.

4.1 Licensee's Basis For Request

The licensee provided the following basis for the relief request:

> Permanent plant flow gauges, REC-FI-450A and REC-FI-450B, for measurement of REC pump flowrate have ranges of 0 - 4,000 gpm. These gauges do not meet the range limitation imposed by OM-6, Paragraph 4.6.1.2(a), in that the instrument ranges exceed the respective reference value (1,000 gpm) by greater than a factor of three. However. the full scale accuracy of these gauges is 1.5%, which corresponds to 60 gpm. 60 gpm accuracy on a range of 0 - 3000 gpm is 2%, which is acceptable per OM-6, Paragraph 4.6.1.1. Therefore, flow gauges REC-FI-450A and REC-FI-450B are acceptable for flowrate measurements.

4.2 Proposed Alternate Testing

REC pump inservice test flowrates will be measured via flow indicators REC-FI-450A and REC-FI-450B.

4.3 Evaluation

The instrument accuracy and range requirements of OM-06, Paragraph 4.6 are to ensure that test measurements are sufficiently sensitive to changes in pump condition to allow detection of degradation. OM-6, Paragraph 4.6 states that (1) accuracy for instrument used in the measurement of flow shall be ± 2% and (2) full-scale range of analog instruments shall be three times the reference value or less. A range of greater than three times the reference value can be acceptable if the instrument is proportionately more accurate than required. As indicated in Section 5.5.1 of NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," an alternative can be approved if the combination of range and accuracy yields a reading that meets ± 6% of reference value.

Meeting the Code requirements would involve purchasing and installing alternative instruments. Making these modifications would involve undue hardship for the licensee without a significant benefit in improved measurement accuracy. Although the range is greater than three times the reference value, the flow gauges are more accurate than required. The combination of range and accuracy effectively yields a reading that meets the NUREG-1482, Section 5.5.1 guideline of ± 6% of reference value. The staff, therefore, considers the proposed alternative to the Code to be acceptable.

4.4 Conclusion

Based on the determination that the proposal provides a reasonable assurance of operational readiness and that compliance with the Code would result in hardship without a compensating increase in the level of quality and safety, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

5.0 RELIEF REQUEST RP-04

For the reactor core isolation cooling pump, RCIC-P-MP, RP-04 requests relief from OM-6, Paragraph 4.6.1.2.(a), which states that the full-scale range of each analog instrument shall be not greater than three times the reference value.

5.1 Licensee's Basis For Request

The licensee provided the following basis for the relief request:

> Based on previous work history, permanent plant tachometer RCIC-SI-3067, for measurement of RCIC pump/turbine speed, may not provide the required consistency needed for inservice testing unless instrument calibration is performed immediately prior to each test. This places an additional burden on limited personnel resources without a compensating increase in the level of quality and safety.
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> Hand-held tachometers have proven to be more reliable as far as producing consistent readings. The tachometers available for IST have ranges of 10 - 99,999 rpm or 6 - 30,000 rpm. The respective reference value is 4,500 rpm. Therefore, the range limitation imposed by OM-6, Paragraph 4.6.1.2(a) of three times the reference value or less is not met by these hand held tachometers.
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> However, the accuracy of the 10 - 99,999 rpm tachometer is ± 9 rpm. An accuracy of ± 9 rpm on a full range of 0 - 13,500 rpm (3 x 4,500 rpm) would be ± 0.07% of the full range, which is more accurate than required by OM-6, Paragraph 4.6.1.1 (i.e., ± 2% of full scale). For the 6 - 30,000 rpm tachometer, the accuracy is ± 99 rpm. An accuracy of ± 99 rpm on a range of 0 - 13,500 rpm is ± 0.73%.
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> Therefore, the proposed range and accuracy result in measurement more accurate than Code requirements and will provide reasonable assurance of component operational readiness.

5.2 Proposed Alternate Testing

RCIC pump/turbine speed will be measured via available tachometers identified in Section 5.1.

5.3 Evaluation

The instrument accuracy and range requirements of OM-06, Paragraph 4.6, are to ensure that test measurements are sufficiently sensitive to changes in pump condition to allow detection of degradation. OM-6, Paragraph 4.6, states that (1) accuracy for instruments used in the measurement of speed shall be ± 2%, and (2) full-scale range of analog instruments shall be three times the reference value or less. A range of greater than three times the reference value can be acceptable if the instrument is proportionately more accurate than required. As indicated in Section 5.5.1 of NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," an alternative can be approved if the combination of range and accuracy yields a reading that meets ± 6% of reference value.

Meeting the Code requirements would involve purchasing and installing alternative instruments. Making these modifications would involve undue hardship for the licensee without a significant benefit in improved measurement accuracy. Although the range is greater than three times the reference value, the hand-held tachometers are more accurate than required. The combination of range and accuracy effectively yields readings that meet the NUREG-1482, Section 5.5.1 guideline of ± 6% of reference value. The staff, therefore, considers the proposed alternative to the Code to be acceptable.

5.4 Conclusion

Based on the determination that the proposal provides a reasonable assurance of operational readiness and that compliance with the Code would result in hardship without a compensating increase in the level of quality and safety, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

6.0 RELIEF REQUEST RV-01

RV-01 requests relief from OM-10, Paragraph 1.1, regarding the IST program scope to verify operational readiness of certain valves that are required to perform a specific function in shutting down a reactor to the cold shutdown condition, in maintaining the cold shutdown condition, or in mitigating the consequences of an accident.

6.1 Licensee's Basis For Request

The licensee provided the following basis for the relief request:

> Cooper Nuclear Station's accident analyses do not carry the response to an accident (e.g., design basis LOCA) to a point beyond the hot shutdown condition (i.e., to a cold shutdown condition). The licensing basis does not require the plant to go to the cold shutdown condition in order to satisfy 10 CFR 100 radiological release guidelines.

Since safe shutdown is defined in the licensing basis as the hot shutdown condition, inservice testing of components that are required to achieve cold shutdown is unwarranted and does not provide any increase in the level of program quality or safety to the public.

6.2 Proposed Alternate Testing

Cooper Nuclear Station's IST programs will implement the rules and requirements for inservice testing to verify operational readiness of certain Class 1, 2, 3 (and their actuating and position indicating systems) that are required to perform a specific function in shutting down the reactor to the safe shutdown (hot shutdown) condition, in maintaining the hot shutdown condition, or in mitigating the consequences of an accident.

6.3 Evaluation

The earlier plants were licensed with hot standby or hot shutdown as the "safe" shutdown condition. For such plants, components and systems necessary to achieve cold shutdown may not be safety-related and subject to quality assurance requirements, and therefore, are not credited in plant safety analysis for accident recovery.

The fact that the licensing bases for Cooper Nuclear Station do not continue beyond hot shutdown indicates that the capability to establish this condition provides an acceptable level of quality and safety. NUREG-1482, Section 2.2, "Criteria for Selecting Pumps and Valves for the IST Program," states that "although a relief request is not required for plants licensed with hot shutdown or hot standby as the 'safe' shutdown condition, the IST program document submitted to the NRC must state the special condition for the plant in the introductory section." Any component that performs a safety function to mitigate the consequences of an accident, bring the plant to the safe shutdown condition, or maintain the plant in the safe shutdown is required to be in the IST program.

6.4 Conclusion

As indicated in Section 2.2 of NUREG-1482, relief is not required for plants licensed with hot shutdown as the "safe" shutdown condition to base the scope of the IST program on "safe" shutdown rather than cold shutdown; however, the IST program document submitted to the NRC must state the special condition for the plant in an introductory section.

7.0 RELIEF REQUESTS RV-02, RV-03, RV-04, AND RV-05

With respect to RV-02, 03, 04, and 05, the licensee requests relief from OM-10, Paragraphs 4.2.1.1 and 4.3.2.1. Paragraph 4.2.1.1 requires Category A and B power-operated valves to be exercised nominally every 3 months, except as provided by Paragraphs 4.2.1.2, 4.2.1.5, 4.2.1.7. Paragraph 4.3.2.1 requires check valves to be individually exercised nominally every 3 months,

except as provided by Paragraphs 4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5. These relief requests pertain to the following valves in the control rod drive (CRD) system:

CRD-AOV-CV126, which opens on a scram signal to pressurize the lower side of the CRD pistons from the accumulator or from the charging water header;

CRD-AOV-CV127, which opens on a scram signal to vent the top of the CRD pistons to the scram discharge header;

CRD-CV-114CV,...(137 valves in total), which open to allow flow from the top of the CRD pistons to the scram discharge header;

CRD-CV-115CV,...(137 valves in total), which prevent bypassing scram water from the accumulator to the charging water header;

CRD-CV-138[illegible] ...(137 valves in total), which close in the event of a scram to prevent diversion of pressurized hydraulic control unit accumulator water to the cooling water header; and

CRD-SOV-SO120,...(137 valves in total), which close to provide Class I to Non-Code Class boundary isolation.

The licensee proposes to test these valves in accordance with GL 89-04, Position 7, "Testing Individual Control Rod Scram Valves in Boiling Water Reactors."

BWRs are equipped with bottom-entry hydraulically driven control rod drive mechanisms with high-pressure water providing the hydraulic power. Each control rod is operated by a hydraulic control unit (HCU), which consists of valves and an accumulator. The HCU is supplied charging and cooling water from the control rod drive pumps, and the control rod operating cylinder exhausts to the scram discharge volume. Various valves in the control rod drive system perform an active function in scramming the control rods to rapidly shut down the reactor.

The control rod drive system valves that perform an active safety function in scramming the reactor are the scram discharge volume vent and drain valves, the scram inlet and outlet valves, the scram discharge header check valves, the charging water header check valves, and the cooling water header check valves. With the exception of the scram discharge volume vent and drain valves, exercising the other valves quarterly during power operations could result in the rapid insertion of one or more control rods more frequently than desired.

Licensees should test these control rod drive system valves at the Code-specified frequency if they can be practically tested at that frequency. However, for those control rod drive system valves where testing could result in the rapid insertion of one or more control rods, the rod scram test

frequency identified in the facility Technical Specifications (TSs) may be used as the valve testing frequency to minimize rapid reactivity transients and wear of the control rod drive mechanisms. This alternate test frequency should be clearly stated and documented in the IST program.

Industry experience has shown that normal control rod motion may verify the cooling water header check valve moving to its safety function position. This can be demonstrated because rod motion may not occur if this check valve were to fail in the open position. If this test method is used at the Code-required frequency, the licensee should clearly explain in the IST program that this is how these valves are being verified to close quarterly.

Closure verification of the charging water header check valves requires that the control rod drive pumps be stopped to depressurize the charging water header. This test should not be performed during power operation because stopping the pumps results in loss of cooling water to all control rod drive mechanisms and seal damage could result. Additionally, this test cannot be performed during each cold shutdown because the control rod drive pumps supply seal water to the reactor recirculation pumps and one of the recirculation pumps is usually kept running. Therefore, the HCU accumulator pressure decay test as identified in the facility TS may be used as the charging water header check valve alternate testing frequency for the reasons stated above. If this test is not addressed in the licensee's TS, this closure verification should be performed at least during each refueling outage, and this alternate test frequency should be specifically documented in the IST program.

The scram inlet and outlet valves are power-operated valves that full-stroke in milliseconds and are not equipped with indication for both positions; therefore, measuring their full-stroke time as required by the Code may be impractical. Verifying that the associated control rod meets the scram insertion time limits defined in the plant TSs can be an acceptable alternate method of detecting degradation of these valves. Also, trending the stroke times of these valves may be impractical and unnecessary since they are indirectly stroke-timed, and no meaningful correlation between the scram time and valve stroke-time may be obtained, and furthermore, conservative limits are placed on the control rod scram insertion times. If the above test is used to verify the operability of scram inlet and outlet valves, it should be specifically documented in the IST program.

The NRC staff position on exercising the CRD system valves and measuring their full-stroke times is contained in GL 89-04, Position 7. NRC guidance contained in GL 89-04 provided alternatives to the Code requirements determined to be acceptable to the staff and authorized the use of the alternatives in Position 7 provided the licensee follows the guidance delineated in the applicable position. The licensee indicates that the proposed alternatives for testing these valves are consistent with GL 89-04, Position 7 guidelines. The licensee has documented the bases in the relief requests. When an alternative is proposed which is in accordance with GL 89-04 guidance and is documented in the IST program, no further evaluation

is required. The licensee's proposals are therefore approved per GL 89-04; however, implementation of the alternative in accordance with GL 89-04, Position 7 is subject to NRC inspection.

8.0 RELIEF REQUEST RV-06

RV-06 requests relief from OM-10, Paragraph 4.3.2.1, which requires check valves to be individually exercised nominally every 3 months, except as provided by Paragraphs 4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5. This relief request pertains to core spray (CS) loops pressure maintenance check valves CS-C-12CV, CS-CV-13CV, CS-CV-14CV, and CS-CV-15CV.

8.1 Licensee's Basis For Request

The licensee provided the following basis for the relief request:

> These valves open to maintain the CS system water-filled and close to prevent diversion of CS flow. These valves are normally closed check valves (two in series). They open as necessary to keep the CS system in a water-filled standby condition, which is not a safety function. When the CS pumps start, these valves close to ensure maximum flow to the reactor. The current system design does not allow testing to ensure that both valves have closed.
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> Only one valve is required to close to prevent diversion of flow. However, the valves cannot be tested individually. Thus both valves will be tested together. When a CS pump is started, should both valves fail to close, a relief valve would lift or a pressure sensor would alarm on the condensate supply side of the valves.

8.2 Proposed Alternate Testing

The check valves in each loop will be tested closed simultaneously to assess the operational readiness of each pair of valves.

8.3 Evaluation

These normally closed valves (two in series) have a safety function to prevent diversion of core spray flow. The open function is not safety related. The Code requires valves performing safety functions to be stroked to the position(s) required for the valves to perform those functions; however, the licensee states that the current system design does not allow testing to ensure both valves have closed.

The guidance in NUREG-1482, Section 4.1.1, addresses testing series check valve pairs as a unit. Group testing should not be used if it permits a required redundant capability to be compromised. Therefore, as indicated in NUREG-1482, the licensee should review the plant safety analysis to determine if group testing would permit a capability for which credit is taken to go untested. If only one of the redundant series valves is credited in the

safety analysis (that is, the other could be removed without creating an unreviewed safety question or creating a conflict with regulatory or license requirements), then verification that the group of valves is capable of performing the required function should be acceptable for inservice testing. On this basis, all group check valves must be included in the IST program and be subject to equivalent quality assurance criteria. Testing is required during each quarter or at an extended interval in accordance with the Code. If the licensee finds indication that the closure capability of the group of valves is questionable, all valves in the group must be declared inoperable and corrective actions taken for all valves, as necessary, before being returned to service.

There are several restrictions and limitations for inservice testing of series valves as a pair. Both valves in a series pair must be verified to function if the plant safety analysis credits or otherwise requires both valves. Inservice testing of series valves as a pair cannot be used as an alternate means of verifying leak-tightness (Category A/C valves). Inservice testing to verify the closure of series check valves as a pair does not enable the licensee to verify the operational readiness of each component as intended in the Code, because this testing method would not detect if one valve of the pair failed open.

The following should be considered when developing relief requests for these cases:

(1) Indicate in the request that a safety analysis review was performed to determine that only one of the valves is necessary to perform the safety function.

(2) Indicate in the request that neither valve performs a function that requires leakage to be limited to a specific amount.

(3) Indicate in the request that both valves are subject to equivalent quality assurance criteria.

(4) Demonstrate that the acceptance criteria are appropriate for the safety function performed.

(5) Indicate that both valves will be declared inoperable until they are repaired or replaced if an acceptance criterion is exceeded.

Requests that meet the items listed above can be approved. Where all of the above items are not met, a request for relief may still be found to be acceptable. However, in these cases the licensee must clearly demonstrate that the proposed alternative provides an adequate assessment of valve operational readiness. Alternative such as non-intrusive testing or Position 2 of GL 89-04 for sample disassembly and inspection can be acceptable to the NRC.

The basis provided by the licensee is not in sufficient detail to justify the relief request. The licensee should expand the basis to satisfy items (1) through (5), identified above, or propose an alternative that provides an adequate assessment of valve operational readiness. The relief request should be revised appropriately and resubmitted.

8.4 Conclusion

If the licensee determines that a single valve would meet the plant safety analysis, the relief request should be revised to satisfy the items in Section 8.3, above. However, if both valves are required for meeting the safety analysis, the licensee should propose an alternative that provides an adequate assessment of valve operational readiness. If the guidance of Position 2 is followed, GL 89-04 indicates that the alternative is acceptable and no further NRC approval is necessary. If the licensee later proposes to follow Position 2 in part, as if for example extending the interval for inspecting all of the valves, NRC approval will be required. The relief request is therefore denied and should be revised based upon further review by the licensee and resubmitted within 120 days from the date of this SE.

9.0 RELIEF REQUEST RV-07

RV-07 requests relief from OM-10, Paragraph 4.3.2.1, which requires check valves to be individually exercised nominally every 3 months, except as provided by Paragraphs 4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5. This relief request pertains to high pressure coolant injection (HPCI) system pressure maintenance check valves HPCI-CV-18CV and HPCI-CV-19CV.

9.1 Licensee's Basis For Request

The licensee provided the following basis for the relief request:

> These valves open to maintain the HPCI system water-filled and close to prevent diversion of HPCI flow. These valves are normally closed check valves (in series). They are open as necessary to keep the HPCI system in a water-filled standby condition, which is not a safety function. When the HPCI pumps start, these valves close to ensure maximum flow to the reactor. The current system design does not allow testing to ensure that both valves have closed.
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> Only one valve is required to close to prevent diversion of flow. However, the valves cannot be tested individually. Thus both valves will be tested together. When a HPCI pump is started, should both valves fail to close, a relief valve would lift or a pressure sensor would alarm on the condensate supply side of the valves.

9.2 Proposed Alternate Testing

The check valves will be tested closed simultaneously to assess the operational readiness of the pair of valves.

9.3 Evaluation

These normally closed valves (two in series) have a safety function to prevent diversion of HPCI flow. The open function is not safety related. The Code requires valves performing safety functions to be stroked to the position(s) required for the valves to perform those functions; however, the licensee states that the current system design does not allow testing to ensure both valves have closed.

The guidance in NUREG-1482, Section 4.1.1, addresses testing series check valve pairs as a unit. Group testing should not be used if it permits a required redundant capability to be compromised. Therefore, as indicated in NUREG-1482, the licensee should review the plant safety analysis to determine if group testing would permit a capability for which credit is taken to go untested. If only one of the redundant series valves is credited in the safety analysis (that is, the other could be removed without creating an unreviewed safety question or creating a conflict with regulatory or license requirements), then verification that the group of valves is capable of performing the required function should be acceptable for inservice testing. On this basis, all group check valves must be included in the IST program and be subject to equivalent quality assurance criteria. Testing is required during each quarter or at an extended interval in accordance with the Code. If the licensee finds indication that the closure capability of the group of valves is questionable, all valves in the group must be declared inoperable and corrective actions taken for all valves, as necessary, before being returned to service.

There are several restrictions and limitations for inservice testing of series valves as a pair. Both valves in a series pair must be verified to function if the plant safety analysis credits or otherwise requires both valves. Inservice testing of series valves as a pair cannot be used as an alternate means of verifying leak-tightness (Category A/C valves). Inservice testing to verify the closure of series check valves as a pair does not enable the licensee to verify the operational readiness of each component as intended in the Code, because this testing method would not detect if one valve of the pair failed open.

The following should be considered when developing relief requests for these cases:

(1) Indicate in the request that a safety analysis review was performed to determine that only one of the valves is necessary to perform the safety function.

(2) Indicate in the request that neither valve performs a function that requires leakage to be limited to a specific amount.

(3) Indicate in the request that both valves are subject to equivalent quality assurance criteria.

(4) Demonstrate that the acceptance criteria are appropriate for the safety function performed.

(5) Indicate that both valves will be declared inoperable until they are repaired or replaced if an acceptance criterion is exceeded.

Requests that meet the items listed above can be approved. Where all of the above items are not met, a request for relief may still be found to be acceptable. However, in these cases the licensee must clearly demonstrate that the proposed alternative provides an adequate assessment of valve operational readiness. Alternative such as non-intrusive testing or Position 2 of GL 89-04 for sample disassembly and inspection can be acceptable to the NRC.

The basis provided by the licensee is not in sufficient detail to justify the relief request. The licensee should expand the basis to satisfy items (1) through (5), identified above, or propose an alternative that provides an adequate assessment of valve operational readiness. The relief request should be revised appropriately and resubmitted.

9.4 Conclusion

If the licensee determines that a single valve would meet the plant safety analysis, the relief request should be revised to satisfy the items in Section 9.3, above. However, if both valves are required for meeting the safety analysis, the licensee should propose an alternative that provides an adequate assessment of valve operational readiness. If the guidance of Position 2 is followed, GL 89-04 indicates that the alternative is acceptable and no further NRC approval is necessary. If the licensee later proposes to follow Position 2 in part, as if for example extending the interval for inspecting all of the valves, NRC approval will be required. The relief request is therefore denied and should be revised based upon further review by the licensee and resubmitted within 120 days from the date of this SE.

10.0 RELIEF REQUEST RV-08

RV-08 requests relief from OM-10, Paragraphs 4.2.1 and 4.2.1.6, for valves HPCI-SOV-SSV64 and HPCI-SOV-SSV87. OM-10, Paragraph 4.2.1, requires Category A and B power-operated valves to be individually full-stroke exercised and stroke-timed nominally every 3 months except as provided by Paragraphs 4.2.1.2, 4.2.1.5, and 4.2.1.7. OM-10, Paragraph 4.2.1.6, requires valves with fail-safe actuators to be tested by observing the operation of the actuator upon loss of valve actuating power in accordance with the exercising frequency of Paragraph 4.2.1.1.

10.1 Licensee's Basis For Request

The licensee provided the following basis for the relief request:

> The HPCI turbine and exhaust steam drip leg drain to gland condenser valve (HPCI-SOV-SSV64) and HPCI turbine and exhaust steam drip leg drain to equipment drain isolation valve (HPCI-SOV-SSV87) have an active safety function in the closed position to maintain pressure boundary integrity of the HPCI turbine exhaust line. These valves serve as a Class 2 to Non-Code boundary barrier.
>
> These are rapid acting, encapsulated, solenoid-operated valves (SOVs). Their control circuitry is provided with a remote manual switch for valve actuation to the open position and an automatic function that allows the valves to actuate from signals received from the associated level switches HPCI-LS-98 and HPCI-LS-680. Both valves receive a signal to change disc position during operability testing of drain pot level switches. However, remote position indication is not provided for positive verification of disc position. Additionally, their design prohibits the ability to visually verify the physical position of the operator, stem, or internal components. Modification of the system to verify valve closure capability and stroke-timing is not practicable or cost beneficial since no commensurate increase in safety would be derived. Quarterly partial-stroke exercising of these valves is impracticable for the same reasons.

10.2 Proposed Alternate Testing

One solenoid valve shall be disassembled and inspected each refueling outage. If the disassembled valve exhibits signs of degradation of either valve internals or coil electrical characteristics, the other valve shall be disassembled and inspected prior to restart.

10.3 Evaluation

These SOVs are rapid acting and function in the closed position to maintain pressure boundary integrity of the HPCI turbine exhaust line. The remote position indication is not provided with positive verification of disc position. Further, their design prohibits the ability to visually verify the physical position of the operator, stem, or internal components. The licensee states that making system modification to meet the Code requirements for exercise testing, stroke-timing, and fail-safe testing is not practicable. However, the basis provided by the licensee does not show that these valves can be confirmed as moving to their safety position or are adequately monitored for degradation.

The licensee should develop a method to adequately monitor for valve degradation. It may be possible to demonstrate that the use of acoustic monitors, indirect measurement of valve position and stroke-time, measurement of coil current/resistance, radiography, and/or performance of enhanced

maintenance procedures during the periodic disassembly and inspection of these valves can provide adequate assurance that the valves are not degraded. The basis should be revised to address these potential alternative methods and address the practicality of exercise testing, stroke-timing, and fail-safe testing the valves quarterly and during cold shutdowns, as applicable. The alternative methods should be described in detail in order for the staff to determine their acceptability.

An interim period of 1 year would allow the licensee time to develop methods to provide positive indication of valve travel and to adequately monitor for valve degradation. The licensee's proposed disassembly and inspection program should provide an acceptable level of quality and safety during this interim period.

10.4 Conclusion

Based on the determination that the proposed disassembly and inspection program for these valves should provide an acceptable level of quality and safety during the interim period, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for 1 year to allow the licensee time to develop methods to provide positive indication of valve travel to their safety position and to monitor for valve degradation.

11.0 RELIEF REQUEST RV-09

Relief is requested from OM-10, Paragraph 4.2.1.1, which requires Category A and B power-operated valves to be individually full-stroke exercised and stroke-timed nominally every 3 months, except as provided by Paragraphs 4.2.1.2, 4.2.1.5, and 4.2.1.7. This relief request pertains to valves MS-RV-71ARV, BRV, CRV, DRV, ERV, FRV, GRV, and HRV.

11.1 Licensee's Basis For Request

The licensee provided the following basis for the relief request:

> The main steam power-operated safety valves have an active safety function in the open position to prevent over pressurization of the reactor vessel. These safety valves have an active safety function in the closed position to maintain reactor vessel integrity.
>
> These valves are power actuated safety relief valves for the main steam lines. Each valve is exercised during startup following refueling outages. Exercising these valves during power operations can cause pressure, temperature, and reactivity transients.
>
> Exercising during cold shutdown is impracticable since a minimum of 50 psig steam pressure is required to open the valves. The valve supplier does not recommend exercising these valves below 150 psig steam pressure because of the risk of valve seat damage and resultant leakage.

The TSs require testing once each refueling cycle at a reactor pressure > 100 psig, which is adequate to assess the operational readiness of these valves.

These relief valves are quick acting and their stroke times cannot be measured by conventional means. They do not have position indication in the usual sense. The pressure switches in the SRV discharge lines annunciate in the control room and indicate when the valve is open or closed. Successful exercising will verify operational readiness. Should a relief valve fail to function as designed, corrective action is required.

11.2 Proposed Alternate Testing

Full-stroke exercise tests of these valves open and closed, without stroke-timing, will be performed during each refueling outage, in addition to testing to the requirements of OM-1 (1987), Paragraph 3.3.1.1.

11.3 Evaluation

The main steam power-operated safety valves function in the open position to prevent over pressurization of the reactor vessel and function in the closed position to maintain reactor vessel integrity. Each valve is exercised per TSs during startup following refueling outages. Exercising these valves during power operations can cause pressure, temperature, reactivity transients, and LOCA. Reactor steam pressure is necessary to full-stroke exercise these valves, therefore exercising these valves is not practical during cold shutdowns or refueling outages when the steam pressure is low.

The licensee's proposal to exercise test the main steam power-operated safety valves on a refueling outage frequency is not a deviation from the Code requirements. No relief request from IST requirements for this exercise testing is required since OM-10, Paragraph 4.3.2 specifies full-stroke exercising at each refueling outage if exercising is impracticable quarterly during power operation and during cold shutdowns. The licensee's basis for impracticality of closure testing quarterly and during cold shutdowns is documented in the IST program as required by OM-10, Paragraph 6.2. The basis for deferral of testing is subject to review during NRC inspections.

Regarding stroke-timing requirements, these SRVs operate rapidly and are not equipped with direct sensing position indication. Further, their stroke times may vary with changes in system operational parameters, such as steam pressure. Therefore, trending the stroke times for these valves may not be meaningful since test-personnel response times and variations in system parameters may change the measured stroke times and could mask changes in valve condition. However, the basis provided by the licensee does not show that these valves are adequately monitored for degradation.

The licensee should develop a method to obtain repeatable stroke times for these valves or propose some other method to adequately monitor for valve degradation. It may be possible to demonstrate that stroke-time testing during the periodic set pressure testing of these valves provides adequate assurance that the valves are not degraded. If stroke-time measurements are used to monitor for valve degradation, the licensee should assign a maximum stroke-time limit to these valves that is based on test data and verify that they stroke within that limit during testing. The measured stroke times need not be trended or compared to previous values, but if the maximum limit is exceeded, the valve should be declared inoperable and corrective action taken that is consistent with OM-10, Paragraph 4.2.1.8. An interim period of 1 year would allow the licensee time to develop a method to adequately monitor for valve degradation. The licensee's proposed exercise test and testing to the requirements of OM-1, Section 3.3.1.1 should provide an acceptable level of quality and safety during this interim period.

11.4 Conclusion

Based on the determination that the proposed exercise test and testing to the requirements of OM-1, Section 3.3.1.1 should provide an acceptable level of quality and safety during the interim period, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for 1 year to allow the licensee time to develop a method to adequately monitor for valve degradation.

12.0 RELIEF REQUEST RV-10

The licensee's proposal to closure test the instrument line excess flow check valves by means of a leak test performed on a refueling outage frequency is not a deviation from the Code requirements. No relief request from IST requirements for this closure testing is required since OM-10, Paragraph 4.3.2, specifies full-stroke exercising at each refueling outage if exercising is impracticable quarterly during power operation and during cold shutdowns. The licensee's basis for impracticality of closure testing quarterly and during cold shutdowns is documented in the IST program as required by OM-10, Paragraph 6.2. The basis for deferral of testing is subject to review during NRC inspections.

13.0 RELIEF REQUEST RV-11

For valves RCIC-CV-18CV and RCIC-CV-19CV, RV-11 requests relief from OM-10, Paragraph 4.3.2.1, which requires check valves to be individually exercised nominally every 3 months, except as provided by Paragraphs 4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5.

13.1 Licensee's Basis For Request

The licensee provided the following basis for the relief request:

> The valves in question are reactor core isolation cooling (RCIC) pressure maintenance check valves. These valves open to maintain the RCIC system water-filled and close to prevent diversion of RCIC injection flow.

These valves are normally closed check valves (in series). They open as necessary to keep the RCIC system in a water-filled standby condition, which is not a safety function. When the RCIC pumps start, these valves close to ensure maximum flow to the reactor. The current system design does not allow testing to ensure that both valves have closed.

Only one valve is required to close to prevent diversion of flow. However, the valves cannot be tested individually. Thus both valves will be tested together. When a RCIC pump is started, should both valves fail to close, a relief valve would lift or a pressure sensor would alarm on the condensate supply side of the valves.

13.2 Proposed Alternate Testing

The check valves will be tested closed simultaneously to assess the operational readiness of the pair of valves.

13.3 Evaluation

These normally closed valves (two in series) have a safety function to prevent diversion of RCIC injection flow. The open function is not safety related. The Code requires valves performing safety functions to be stroked to the position(s) required for the valves to perform those functions; however, the licensee states that the current system design does not allow testing to ensure both valves have closed.

The guidance in NUREG-1482, Section 4.1.1, addresses testing series check valve pairs as a unit. Group testing should not be used if it permits a required redundant capability to be compromised. Therefore, as indicated in NUREG-1482, the licensee should review the plant safety analysis to determine if group testing would permit a capability for which credit is taken to go untested. If only one of the redundant series valves is credited in the safety analysis (that is, the other could be removed without creating an unreviewed safety question or creating a conflict with regulatory or license requirements), then verification that the group of valves is capable of performing the required function should be acceptable for inservice testing. On this basis, all group check valves must be included in the IST program and be subject to equivalent quality assurance criteria. Testing is required during each quarter or at an extended interval in accordance with the Code. If the licensee finds indication that the closure capability of the group of valves is questionable, all valves in the group must be declared inoperable and corrective actions taken for all valves, as necessary, before being returned to service.

There are several restrictions and limitations for inservice testing of series valves as a pair. Both valves in a series pair must be verified to function if the plant safety analysis credits or otherwise requires both valves. Inservice testing of series valves as a pair cannot be used as an alternate means of verifying leak-tightness (Category A/C valves). Inservice testing to verify the closure of series check valves as a pair does not enable the

licensee to verify the operational readiness of each component as intended in the Code, because this testing method would not detect if one valve of the pair failed open.

The following should be considered when developing relief requests for these cases:

(1) Indicate in the request that a safety analysis review was performed to determine that only one of the valves is necessary to perform the safety function.

(2) Indicate in the request that neither valve performs a function that requires leakage to be limited to a specific amount.

(3) Indicate in the request that both valves are subject to equivalent quality assurance criteria.

(4) Demonstrate that the acceptance criteria are appropriate for the safety function performed.

(5) Indicate that both valves will be declared inoperable until they are repaired or replaced if an acceptance criterion is exceeded.

Requests that meet the items listed above can be approved. Where all of the above items are not met, a request for relief may still be found to be acceptable. However, in these cases the licensee must clearly demonstrate that the proposed alternative provides an adequate assessment of valve operational readiness. Alternative such as non-intrusive testing or Position 2 of GL 89-04 for sample disassembly and inspection can be acceptable to the NRC.

The basis provided by the licensee is not in sufficient detail to justify the relief request. The licensee should expand the basis to satisfy items (1) through (5), identified above, or propose an alternative that provides an adequate assessment of valve operational readiness. The relief request should be revised appropriately and resubmitted.

13.4 Conclusion

If the licensee determines that a single valve would meet the plant safety analysis, the relief request should be revised to satisfy the items in Section 13.3, above. However, if both valves are required for meeting the safety analysis, the licensee should propose an alternative that provides an adequate assessment of valve operational readiness. If the guidance of Position 2 is followed, GL 89-04 indicates that the alternative is acceptable and no further NRC approval is necessary. If the licensee later proposes to follow Position 2 in part, as if for example extending the interval for

inspecting all of the valves, NRC approval will be required. The relief request is therefore denied and should be revised based upon further review by the licensee and resubmitted within 120 days from the date of this SE.

14.0 RELIEF REQUEST RV-12

For valves RHR-CV-18CV, RHR-CV-19CV, RHR-CV-24CV, and RHR-CV-25CV, RV-12 requests relief from OM-10, Paragraph 4.3.2.1, which requires check valves to be individually exercised nominally every 3 months, except as provided by Paragraphs 4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5.

14.1 Licensee's Basis For Request

The licensee provided the following basis for the relief request:

> The valves in question are residual heat removal (RHR) loop A and loop B pressure maintenance check valves. These valves open to maintain the RHR system water-filled and close to prevent diversion of LPCI injection flow.
>
> These valves are normally closed check valves (two in series). They open as necessary to keep the RHR system in a water-filled standby condition, which is not a safety function. When the RHR pumps start, these valves close to ensure maximum flow to the reactor. The current system design does not allow testing to ensure both valves have closed.
>
> Only one valve is required to close to prevent diversion of flow. However, the valves cannot be tested individually. Thus, both valves will be tested together. When a RHR pump is started, should both valves fail to close, a relief valve would lift or a pressure sensor would alarm on the condensate supply side of the valves.

14.2 Proposed Alternate Testing

The check valves in each loop will be tested closed simultaneously to assess the operational readiness of each pair of valves.

14.3 Evaluation

These normally closed valves (two in series) have a safety function to prevent diversion of LPCI system flow. The open function is not safety related. The Code requires valves performing safety functions to be stroked to the position(s) required for the valves to perform those functions; however, the licensee states that the current system design does not allow testing to ensure both valves have closed.

The guidance in NUREG-1482, Section 4.1.1, addresses testing series check valve pairs as a unit. Group testing should not be used if it permits a required redundant capability to be compromised. Therefore, as indicated in NUREG-1482, the licensee should review the plant safety analysis to determine

if group testing would permit a capability for which credit is taken to go untested. If only one of the redundant series valves is credited in the safety analysis (that is, the other could be removed without creating an unreviewed safety question or creating a conflict with regulatory or license requirements), then verification that the group of valves is capable of performing the required function should be acceptable for inservice testing. On this basis, all group check valves must be included in the IST program and be subject to equivalent quality assurance criteria. Testing is required during each quarter or at an extended interval in accordance with the Code.

If the licensee finds indication that the closure capability of the group of valves is questionable, all valves in the group must be declared inoperable and corrective actions taken for all valves, as necessary, before being returned to service.

There are several restrictions and limitations for inservice testing of series valves as a pair. Both valves in a series pair must be verified to function if the plant safety analysis credits or otherwise requires both valves. Inservice testing of series valves as a pair cannot be used as an alternate means of verifying leak-tightness (Category A/C valves). Inservice testing to verify the closure of series check valves as a pair does not enable the licensee to verify the operational readiness of each component as intended in the Code, because this testing method would not detect if one valve of the pair failed open.

The following should be considered when developing relief requests for these cases:

(1) Indicate in the request that a safety analysis review was performed to determine that only one of the valves is necessary to perform the safety function.

(2) Indicate in the request that neither valve performs a function that requires leakage to be limited to a specific amount.

(3) Indicate in the request that both valves are subject to equivalent quality assurance criteria.

(4) Demonstrate that the acceptance criteria are appropriate for the safety function performed.

(5) Indicate that both valves will be declared inoperable until they are repaired or replaced if an acceptance criterion is exceeded.

Requests that meet the items listed above can be approved. Where all of the above items are not met, a request for relief may still be found to be acceptable. However, in these cases the licensee must clearly demonstrate that the proposed alternative provides an adequate assessment of valve operational readiness. Alternative such as non-intrusive testing or Position 2 of GL 89-04 for sample disassembly and inspection can be acceptable to the NRC.

The basis provided by the licensee is not in sufficient detail to justify the relief request. The licensee should expand the basis to satisfy items (1) through (5), identified above, or propose an alternative that provides an adequate assessment of valve operational readiness. The relief request should be revised appropriately and resubmitted.

14.4 Conclusion

If the licensee determines that a single valve would meet the plant safety analysis, the relief request should be revised to satisfy the items in Section 14.3, above. However, if both valves are required for meeting the safety analysis, the licensee should propose an alternative that provides an adequate assessment of valve operational readiness. If the guidance of Position 2 is followed, GL 89-04 indicates that the alternative is acceptable and no further NRC approval is necessary. If the licensee later proposes to follow Position 2 in part, as if for example extending the interval for inspecting all of the valves, NRC approval will be required. The relief request is therefore denied and should be revised based upon further review by the licensee and resubmitted within 120 days from the date of this SE.

15.0 RELIEF REQUEST RV-13

Relief is requested from OM-10, Paragraph 4.2.1.1, which requires Category A and B power-operated valves to be individually full-stroke exercised and stroked timed nominally every 3 months, except as provided by Paragraphs 4.2.1.2, 4.2.1.5, and 4.2.1.7. This relief request pertains to valves SW-MOV-M089A and SW-MOV-M089B.

15.1 Licensee's Basis For Request

The licensee provided the following basis for the relief request:

> These loop A and loop B outlet valves are normally closed to provide isolation for the service water booster pump cooling water to the RHR heat exchangers. These normally closed valves have an active safety function in the throttled position to provide a flow path for cooling water flow through the RHR heat exchangers during transient and accident conditions.
>
> These valves are exercised during quarterly service water booster pump flow testing to a throttled position required to satisfy TS flow requirements. Valve stroke-timing to the fully-opened position is impracticable. Full opening will cause RHR service water booster pump run-out. These valves cannot be accurately stroke-timed because they are controlled with a thumb-wheel-type controller. After a pump associated with either valve has started, valve movement is subject to considerable variation. This type of controller provides an output signal that is dependent upon the speed with which the controller is operated. Stroke-time measurements of these valves would be very difficult to repeat because of the absence of normal valve control switches and would not contribute meaningful data to utilize in monitoring valve degradation.

15.2 Proposed Alternate Testing

These valves will be exercised to their safety-related throttled position every 3 months, but stroke times will not be measured.

15.3 Evaluation

These normally closed motor-operated valves have an active safety function in the throttled position to provide a flow path for cooling water flow through the RHR heat exchangers during transient and accident conditions. The licensee states that these valves, which lack normal valve control switches, are controlled with a thumb-wheel-type controller. Stroke-time measurement would be difficult to repeat using this type of controller. However, simply verifying that the valves function by meeting the system requirements in the TS is not an acceptable alternative when stroke-time measurement by the conventional method is impractical.

The licensee may consider investigating alternatives to verify the stroke times of the valves that include (1) enhanced maintenance with a periodic stroking which may not be timed and (2) stroke-timing with acoustic or other nonintrusive methods that involves bypassing control signals and measures to prevent pump run-out. The motor-operated valve testing program established in accordance with GLs 89-10 and 96-05 might be an acceptable alternative, because it would yield more information on valve condition including stroke-time, although the information would be obtained less frequently. The alternative method should be described in detail in order for the staff to determine its acceptability.

The licensee should develop a method to obtain repeatable stroke-timing for these valves or propose some other method to adequately monitor for valve degradation. Immediate compliance with the Code requirements would be a hardship without a commensurate increase in the level of quality and safety. An interim period would allow the licensee time to develop a method to monitor for valve degradation. The proposed exercise test should provide reasonable assurance of operational readiness during the interim period.

15.4 Conclusion

Based on the determination that the proposed exercise test of these valves should provide an acceptable level of quality and safety during the interim period, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for 1 year to allow the licensee time to evaluate alternatives. The licensee should develop a method to adequately monitor for valve degradation in accordance with the Code requirements.

16.0 RELIEF REQUEST RV-14

Relief is requested from OM-10, Paragraph 4.3.1, which states that safety and relief valves shall meet the IST requirements of OM-1. The subject of this request is Paragraph 3.3.2.3(a) of OM-1, which requires vacuum relief valves

to be individually actuated to verify the open and close capability, the set pressure, and the performance of any pressure and position sensing accessories. This relief request pertains to HPCI-CV-24CV, HPCI-CV-25CV, HPCI-CV-26CV, HPCI-CV-27CV, RCIC-CV-22CV, RCIC-CV-23CV, RCIC-CV-24CV, and RCIC-CV-25CV.

16.1 Licensee's Basis For Request

The licensee provided the following basis for the relief request:

> The HPCI and RCIC turbine exhaust line vacuum breakers open to prevent siphoning suppression pool water into the exhaust line. These valves are normally closed check valves in a parallel-series configuration. In the closed position, they prevent steam from the exhaust line entering the free space of the suppression chamber. Two valves in series provides added assurance that steam will not enter the suppression chamber.
>
> The valves open to prevent siphoning suppression pool water into the exhaust line because of steam condensing when the associated HPCI or RCIC systems are isolated. Each pair of valves is cross connected so that a single failure will not prevent the vacuum relief function. Because of the configuration, neither a closure test nor a set pressure test of the inboard valves can be performed.

16.2 Proposed Alternate Testing

Each valve will be disassembled, inspected, and manually exercised open and closed during each refueling outage. In addition, the outboard vacuum relief valves will be setpoint tested in place.

16.3 Evaluation

These check valves function to relieve vacuum to prevent siphoning suppression pool water into the HPCI and RCIC turbine exhaust line. In the closed position, they prevent steam from the exhaust line entering the free space of the suppression chamber.

As indicated in Section 4.3.8 of NUREG-1482, these check valves are required to be full-stroke exercised in accordance with Paragraph 4.3.2 of OM-10 at the specified frequency and are required to be tested in accordance with OM-1 to verify the capability to open and close, the set pressure, and the performance of any accessories for sensing pressure and position. The setpoint would be the pressure (vacuum) at which the valve is required to open to relieve vacuum. If the check valve has no leak tight criteria, leak testing is not required. The staff recommends that licensees test Class 2 and 3 vacuum breakers, which are within the scope of OM-1, at the frequency specified in Paragraph 1.3.4.1, "Pressure Relief Valves," of OM-1. The frequency would, therefore, be at least once in each ten-year interval, except for any additional testing of check valves required in OM-10.

The licensee states that, because of the configuration, neither a closure test nor a set pressure test of the inboard valves can be performed. The basis provided by the licensee, however, is not in sufficient detail to justify the relief request. The request should be described in such a way that it is evident that meeting the Code requirements is impracticable. The basis should specifically address technical concerns such as damage to equipment, hazards to plant personnel, or the possibility of a plant trip. Personnel radiation exposure concerns should contain information about the general area radiation field, local hot spots, plant radiation limits and stay times, and the amount of exposure personnel performing the testing would receive. Analysis may be based on historical data from the manufacturer, onsite, or other plants.

The basis does not address the OM-10 requirements, open capability test, performance of any accessories for sensing pressure and position, or leak tight criteria. It appears, however, that the licensee's proposal to disassemble the valves during refueling outages can meet the Code requirements for the open/close capability test since Paragraph 4.3.2.4(c) of OM-10 allows for disassembly and inspection as an alternative to test. Also, it is not clear whether the licensee is aware of the NRC guidelines in Section 4.3.8 of NUREG-1482, which specifies a test interval of up to 10 years relative to OM-1 testing for these valves. In areas where the Code requirements cannot be met, additional details as described above should be submitted.

16.4 Conclusion

RV-14 requests relief from the test requirements of OM-10 and OM-1 for HPCI and RCIC turbine exhaust line vacuum breakers. The licensee states that, because of the configuration, neither a closure test nor a set pressure test of the inboard valves can be performed. The basis provided by the licensee, however, is not in sufficient detail to justify the proposed testing. Relief request is denied. Where the Code requirements cannot be met, the licensee should expand the basis so that it is evident that testing is impracticable. If the valves in question cannot be tested in accordance with all related requirements of OM-10 and OM-1, this relief request should be resubmitted with additional bases within 120 days from the date of this SE.

17.0 CONCLUSION

Relief requests RP-1, RP-2, RP-3, and RP-4 are authorized pursuant to 10 CFR 50.55a, paragraph (a)(3)(ii). Relief request RV-1, which proposes to base the scope of the IST program on "safe" shutdown rather than cold shutdown, is not required; however, the IST program document submitted to the NRC must state the special condition for the plant in an introductory section (see Section 2.2 of NUREG-1482). For relief requests RV-8, RV-9, and RV-13, interim relief is authorized pursuant to 10 CFR 50.55a, paragraph (a)(3)(i), for 1 year from the date of this SE to allow the licensee time to develop a method to adequately monitor for valve degradation. Relief requests RV-2, RV-3, RV-4, and RV-5 are approved pursuant to GL 89-04; however, implementation of the alternative in accordance with GL 89-04, Position 7 is subject to NRC inspection. For denied relief requests RV-6, RV-7, RV-11,

RV-12, and RV-14, the licensee must take actions within 120 days from the date of this SE to comply with the Code requirements or to seek review and approval of revised relief requests. RV-10 is considered acceptable under provisions in OM-10 and, therefore, relief is not required; however, the request is effectively a refueling outage justification.

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