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10 CFR Part 50
Section 50.55a

US Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

MONTICELLO NUCLEAR GENERATING PLANT
Docket No. 50-263 License No. DPR-22

Response to Issues Identified in the NRC
Safety Evaluation for the Third Ten-Year Inservice Testing Program

By letter of July 6, 1993, the NRC provided approval of the Monticello Third Ten-Year Inservice Testing Program with qualification that relief request PR-5 was denied and that further approval of the remainder of the program is contingent upon timely response to items summarized in Section 7 of the NRC safety evaluation. The July 6, 1993 letter requested a response, within one year of the July 6, 1993 date, describing the actions taken to address the 10 action items identified in the NRC Safety Evaluation. Attachment A provides our response to each of the identified action items.

Revised Relief Requests PR-6 and SC-1 are provided as Attachments B and C for NRC review. The revised relief requests incorporate comments contained in section 7.2, 7.8 and 7.9 of the NRC safety evaluation as discussed in our response provided in Attachment A. Resolution of the remaining NRC safety evaluation action items will necessitate program changes as specified in Attachment A which are administrative in nature. We feel that revision of our program as specified in Attachment A will address all of your comments and allow closure of your review of the Monticello IST Program. We will formally incorporate these changes via a program revision on receipt of notification that our response has been reviewed and found acceptable.

The Monticello IST program is governed by our report entitled, "Inservice Testing Program, Third Ten Year Inspection Interval, May 31, 1992 - May 31, 2002." This program conforms to Section XI, Subsection IWV, of the 1986 Edition of the ASME Code, ASME Operations and Maintenance Standards Part 6 (OM-6), and portions of ASME Operations and Maintenance Standards Part 10 (OM-10) pursuant to 10 CFR 50.55a(f)(4)(iv). The Program governs the conduct of the Section XI Inservice Testing Program over the third ten year interval of operation of the Monticello Nuclear Generating Plant.

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This letter contains the following new NRC commitments pending issuance of Revision 2 of the Monticello IST Program:

Monticello will implement the IST Program documented in Revision 1 of our report entitled "Inservice Testing Program, Third Ten Year Inspection Interval, May 31, 1992 - May 31, 2002" with the following exceptions:

Relief Request PR-5 is denied.

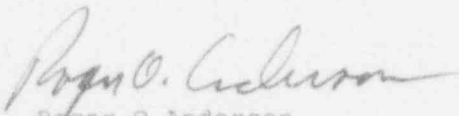
Relief Request PR-6 will be implemented only for the HPCI pump in the horizontal plane of pump vibration measurement.

Relief Request PR-7 will not be implemented.

Relief Request HPCI-4, HPCI-5, RCIC-4 and RCIC-5 will not be implemented. The subject check valves are to be disassembled and inspected on a refueling outage frequency in accordance with the applicable portions of OM-10 pursuant to 10 CFR 50.55a(f)(4)(iv).

The valve groupings of Relief Request SC-1 are to be implemented as specified in our response to Action Item 7.9.

Please contact Marv Engen, Sr Licensing Engineer, at (612) 295-1291 if you require further information.



Roger O Anderson
Director
Licensing and Management Issues

c: Regional Administrator - III, NRC
NRR Project Manager, NRC
Sr Resident Inspector, NRC
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Attachments: (A) Responses to Action Items in July 6, 1993 Safety Evaluation
(B) Relief Request PR-6
(C) Relief Request SC-1

RESPONSES TO ACTION ITEMS IN JULY 6, 1993 SAFETY EVALUATION

Action Item:

- 7.1 *"The licensee requested relief in PR-1 from the Code flow rate measurement and test duration requirements of OM-6, Sections 4.6.5 and 5.6, respectively, for the standby liquid control (SBLC) pumps P-203A and P-203B. The licensee proposed to use the test tank to measure flow rate over a 2 minute pump test duration. Relief was granted with the provision that the test tank level is measured in accordance with the accuracy requirements of OM-6, Table 1, that tank level is approximately the same at the beginning of each test to ensure repeatability, and that test procedures include the calculational method and test conditions."*

NSP Response:

The test procedure for the standby liquid control pumps does specify the calculational method used to reduce the test data taken (test tank level change over time) to determine the pump flow rate. The test procedure contains specific steps which contain the equation for calculating the pump flow rate from the measured quantities.

OM-6, Table 1 specifies an acceptable instrument accuracy of $\pm 2\%$ of the analog instrument full scale for flow rate measurement. The standby liquid control pumps have an established reference value for flow rate of 30 gpm. Per section 4.6.1.2 of OM-6, the acceptable full scale range of analog instrumentation would be three times the reference value or 90 gpm. Thus the acceptable accuracy for flow rate measurement is 1.8 gpm. The tank level is measured at the beginning and end of the pump flow rate portion of the test to an accuracy of 0.25 inches using a ruler and the test duration is measured with a stop watch to an accuracy of 0.1 seconds. The accuracy of the measured quantities results in the calculated pump flow rate having an accuracy of ± 0.6 gpm, which is well within the OM-6, Table 1 accuracy requirements. The test methodology specifies the required conditions of test duration and level measurement precision to achieve this accuracy.

The standby liquid control pumps are positive displacement pumps. During the quarterly pump flow rate test, pump suction is from the demineralized water system and the pump discharge enters at the top of the test tank. As such the pump flow is independent of the test tank level, and test repeatability is not affected by the initial test tank level.

RESPONSES TO ACTION ITEMS IN JULY 6, 1993 SAFETY EVALUATION

Action Item:

- 7.2 *"The licensee requested relief in PR-6 from the vibration alert requirements of OM-6, Table 3a, for the high pressure coolant injection (HPCI) and the reactor core isolation cooling (RCIC) pumps M-124 and M-126, respectively. The licensee proposed to set the vibration alert limit at 2.5 times the reference value or 0.500 inches/second, whichever is less. The licensee has not completed their assessment of the pump vibration levels for the HPCI and RCIC pumps. Interim relief was granted for a period of one year to not test at the increased frequency for "alert." The vibration alert levels for the HPCI and RCIC pumps may be adjusted to 0.500 inches/second during the interim period until the evaluation is completed. At the end of the interim period, the licensee should resubmit the relief request, if necessary. The relief request should contain summaries of evaluations from the pump and turbine manufacturers' and the contractor's evaluation of the pump bearing vibration levels."*

NSP Response:

We have completed our evaluation of the RCIC and HPCI pump vibration levels and have concluded that relief is still required for the HPCI pump, but we have limited the scope. The revised relief request identifies the specific vibration measurement points for which relief from the code requirement is required and an evaluation demonstrating that HPCI pump operation above the vibration alert limit of OM-6 is acceptable. Satisfying the OM-6 vibration alert limit for all HPCI pump vibration measurement locations is a burden in that it results in a increased frequency of pump testing, and increased pump wear, or significant modifications to the pump installation. Based on historical data which shows acceptable pump performance at the present vibration levels and an independent evaluation which found that pump operation above the code allowed alert limit is acceptable, actions necessary to comply with the code vibration alert limit would not provide any compensating increase in quality or safety. The proposed alternative vibration limit provides assurance that a significant change in vibration level, which may be indicative of degrading pump performance, is promptly identified with appropriate action.

Relief Request PR-6 has been revised to reflect the information provided above and is provided as Attachment B for review.

RESPONSES TO ACTION ITEMS IN JULY 6, 1993 SAFETY EVALUATION

Action Item:

- 7.3 "The licensee requested relief in PR-7 from the Code vibration frequency response range requirements of OM-6, Paragraph 4.6.1.6, for the standby liquid control (SBLC) pumps P-203A and P-203B. The licensee proposed to use the existing vibration instrumentation. The vibration instrumentation currently in use by the licensee is not certified to one times (1X) pump running speed. Interim relief was granted for a period of one year. During the interim period, the licensee should either certify the existing vibration measurement instrumentation to 1X pump running speed or procure new instrumentation that meets the Code requirements. In addition, when the licensee submits a revised relief request, a more detailed explanation should be provided as to why these pumps have no sub-synchronous failure modes."

NSP Response:

We have reviewed Relief Request PR-7 and determined that the alternative testing proposed in the relief request would provide an acceptable level of quality and safety. However, we have evaluated the use of improved vibration monitoring equipment and we have procured new instrumentation for the standby liquid control pumps vibration measurement. The new vibration measurement instrumentation meets the frequency response requirements of section 4.6.1.6 of OM-6. Relief Request PR-7 is to be withdrawn with revision 2 to the Monticello IST Program.

Action Item:

- 7.4 "In Revision 1 to the licensee's third ten-year IST Program, Section 10 is titled "Excess Flow Check Valves Tested During Vessel Hydrostatic/Leak Test Each Refueling Outage," but in fact the excess flow check valves are not listed in this section. The licensee should modify this section to include a list of the excess flow check valves."

NSP Response:

Section 10 of the IST Program and Relief Request GR-6 will be deleted with revision 2 of the program. Unique equipment identification numbers have been assigned to each of the excess flow check valves. The valves will be included in the valve program tables provided in Section 7, Valve Inservice Test Program, with appropriate information regarding the

RESPONSES TO ACTION ITEMS IN JULY 6, 1993 SAFETY EVALUATION

applicable testing. Refuel frequency testing of the excess flow check valves is allowed per OM-10, Section 4.3.2.2(e) as noted in Section 3.6 of the NRC SER. The justification for performing stroke testing at a refueling outage frequency, currently contained in Relief Request GR-6, is to be administratively transferred to Section 9.0 of the Monticello IST Program, Deferred Testing.

Action Item:

7.5 *"The licensee requested relief in PR-3 from the Code full-scale range requirements of OM-6, Section 4.6.1.2(a), for the residual heat removal (RHR) and the residual heat removal service water (RHRSW) pump flow transmitters FT-10-111A, FT-10-111B, FT-10-97A, and FT-10-97B. The licensee has proposed to continue to use these instruments for IST. The alternative was authorized provided the licensee compares the actual variance of the analog flow instrumentation with the variance derived using the accuracy requirement given in OM-6, Table 1, of $\pm 2\%$ and the range requirement given in Section 4.6.1.2(a) of 3 times the reference value. The relief does not apply if the instruments are digital."*

NSP Response:

The instrumentation identified in relief request PR-3 are analog flow transmitters. OM-6, Table 1 specifies an acceptable instrument accuracy of $\pm 2\%$ of the analog instrument full scale for flow rate measurement. The residual heat removal pumps have an established reference value for pump flow rate of 3870 gpm. Per section 4.6.1.2 of OM-6, the acceptable full scale range of analog instrumentation would be three times the reference value or 11,610 gpm. Thus the acceptable accuracy for flow rate measurement is ± 232 gpm. In accordance with the alternative testing specified in Relief Request PR-3, the Monticello calibration program currently specifies the instrument loops for residual heat removal pump flow rate measurement to be calibrated to achieve an accuracy of ± 90 gpm which satisfies the OM-6 code requirements.

The residual heat removal service water pumps have an established reference value for pump flow rate of 3660 gpm for pumps P-109A and P-109C, and 3700 gpm for pumps P-109B and P-109D. The code required accuracy of $\pm 2\%$ of three times the pump reference values equates to a instrument loop accuracy of ± 220 gpm and ± 222 gpm respectively. In accordance with the alternative testing specified in Relief Request PR-

RESPONSES TO ACTION ITEMS IN JULY 6, 1993 SAFETY EVALUATION

3, the Monticello calibration program currently specifies the instrument loops for residual heat removal service water pump flow rate measurement to be calibrated to achieve an accuracy of ± 100 gpm for pumps P-109A and P-109C, and ± 80 gpm for pumps P-109B and P-109D. These instrument loop accuracies satisfy the OM-6 code requirements.

Action Item:

7.6 "The licensee requested relief in PR-5 from the Code reference value requirements of OM-6, Paragraph 4.3, for the residual heat removal (RHR) pumps P-202A, P-202B, P-202C, and P-202D. The licensee proposed to use a reference value for pump differential pressure which is interpolated between 2 data points. The method of establishing the pump reference value was not in accordance with Code. In addition, the licensee's proposed alternate testing did not provide adequate justification for not establishing reference values in accordance with the Code. Therefore, relief is denied. Testing must conform with Code requirements within 6 months of the date of this SE.

The licensee should set the pump reference value in accordance with the Code requirements. If the variation in the recorded reference value is within $\pm 2\%$ of the reference value, relief is not required but the variance and the method for establishing the variance must be documented in the IST program. If the variance cannot be held within a tolerance of $\pm 2\%$ of the reference value, the licensee may consider constructing a pump reference curve for each RHR pump. Finally, if the licensee maintains the position that their method is an acceptable alternative, additional information should be provided to the NRC which includes justification which shows that proposed alternate testing is an acceptable alternative to the Code requirements."

NSP Response:

We have reviewed Relief Request PR-5 and determined that the alternative testing proposed in the relief request would provide an improved method of detecting pump degradation, however; to be in compliance with the code, Relief request PR-5 will be withdrawn with revision 2 to the Monticello IST program. Test procedures were revised such that Residual Heat Removal pump testing conformed to Code requirements as of August 1992.

RESPONSES TO ACTION ITEMS IN JULY 6, 1993 SAFETY EVALUATION

Action Item:

- 7.7 *"In the licensee's response to action item 5.16 from the NRC SE dated September 24, 1992, valve relief requests HPCI-4, HPCI-5, RCIC-4, and RCIC-5 did not demonstrate that extreme difficulty in disassembling and inspecting the valves listed in these relief requests every refueling outage constitutes an extreme hardship. Therefore, the licensee should disassemble and inspect the valves listed in the referenced relief requests every refueling outage, unless an extreme hardship exists."*

NSP Response:

Relief requests RCIC-4, RCIC-5, HPCI-4, and HPCI-5 will be withdrawn with revision 2 of the Monticello IST Program. The IST program will be revised to specify disassembly and inspection of the respective check valves (RCIC-31, RCIC-37, HPCI-31, and HPCI-42) during each refueling outage in accordance with paragraph 4.3.2.4(c) of OM-10 pursuant to 10 CFR 50.55a(f)(4)(iv).

Action Item:

- 7.8 *"In the licensee's response to action item 5.16 from the NRC SE dated September 24, 1992 relief request SC-1 groups a 1-inch check valve, CST-189, with 2-inch check valves in a sample disassembly and inspection program. Valve size is a key factor in assessment of valve failures and no valves of different sizes should be in the same inspection group. Therefore, the licensee should place CST-189 in a separate inspection group."*

NSP Response:

Relief Request SC-1 has been revised to remove valve CST-189 from the list of applicable valves. The IST program will be revised to specify disassembly and inspection of CST-189 during each refueling cycle in accordance with paragraph 4.3.2.4(c) of OM-10 pursuant to 10 CFR 50.55a(f)(4)(iv).

RESPONSES TO ACTION ITEMS IN JULY 6, 1993 SAFETY EVALUATION

Action Item:

- 7.9 *"In the licensee's response to action item 5.16 from the NRC SE dated September 24, 1992, relief request SC-1 contains valve groups which could potentially see different service conditions. The interfacing systems may operate at different frequencies, thereby creating different service conditions for valves in the same inspection group. The licensee's relief request and action item response do not address this issue. The licensee should reassess the valve service conditions and revise the relief request and the valve groups accordingly."*

NSP Response:

Relief Request SC-1 has been revised to reflect revised valve groupings in compliance with position 2 of Generic Letter 89-04 and is provided as Attachment C for review. The IST program will be revised to specify disassembly and inspection of CST-96 and CST-90 during each refueling cycle in accordance with paragraph 4.3.2.4(c) of OM-10 pursuant to 10 CFR 50.55a(f)(4)(iv).

The revised valve grouping of Relief Request SC-1 is a single group consisting of valves CST-88, CST-92, CST-94, and CST-98.

Action Item:

- 7.10 *"The licensee's responses to action items 5.19, 5.22, and 5.28, from the NRC SE dated September 24, 1992 did not adequately address the inability to enter LCOs to conduct IST for the valves referenced in the action items. The licensee should review the testing of the valves referenced in these three responses and either test these valves in accordance with the Code requirements or provide justification why testing of these valves cannot be conducted at the Code frequency."*

NSP Response:

In our response to action item 5.28 in our letter dated December 7, 1992, we described how we re-evaluated the design basis of the subject valves and removed them entirely from the IST program or changed the test frequency to quarterly. This results in no Core Spray or RHR valves with deferred testing justifications that cite entry into an LCO as the reason for Cold Shutdown frequency. Therefore, action item 5.28

RESPONSES TO ACTION ITEMS IN JULY 6, 1993 SAFETY EVALUATION

should not be included in the latest SE Report's action item 7.10.

Regarding action items 5.19 and 5.22, we have evaluated the NRC guidance on entering LCO's per paragraph 5.4 in your SE Report dated July 6, 1993; evaluated the NRC guidance on deferring tests to cold shutdowns and refueling outages in the draft NUREG 1482, GUIDELINES FOR INSERVICE TESTING AT NUCLEAR POWER PLANTS; evaluated the guidance in the EPRI document TR-102240, EVALUATION OF THE SAFETY BENEFITS AND COSTS OF PROPOSED REVISIONS TO INSERVICE TESTING REQUIREMENTS FOR PUMPS AND VALVES and re-evaluated our previous response. As a result, we have confirmed that testing the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) turbine exhaust check valves on a Cold Shutdown frequency, as allowed by Subsection IWV, is appropriate and justified. The following discussion is provided for your concurrence on this determination.

The HPCI and RCIC systems are inservice tested each quarter as required by the code. These quarterly tests verify the open safety position of the subject valves: HPCI-9, HPCI-10, RCIC-9, and RCIC-10. Since these valves are also containment isolation valves their closed position is considered safety related. The closed position is not tested as a part of the quarterly functional test. As is typical of many containment isolation check valves, the backflow test has traditionally been deferred to be performed in conjunction with the refuel frequency Appendix J test. To meet the highest test frequency practical, we changed the test frequency of these valves to Cold Shutdown in our current third ten year interval program.

This deferred frequency, which is allowed by the code, is deemed necessary because a backflow test requires the downstream manual block valve to be closed and an upstream vent to be opened. A test connection to an air supply also needs to be hooked up between the manual block valve and the check valves. Since the systems can not operate in this line-up and an automatic initiation while testing at power would result in major equipment damage and be a personnel hazard, further isolations would be required such as defeating automatic start logic, having the steam isolation valves tagged closed with their valve operator power supply breakers open, and placing the HPCI auxiliary oil pump in pull-to-lock. This completely removes the systems from service and would require extensive operator action to return the system to normal if it was needed. Performing these activities on a quarterly basis would place an added burden on plant resources of approximately 440 person-hours and 200 mRem per year.

RESPONSES TO ACTION ITEMS IN JULY 6, 1993 SAFETY EVALUATION

These systems are our only high pressure safety related sources of coolant injection. They do not have a redundant loop or redundant set of components associated with them. Therefore, when the systems are isolated, the only backup is the low pressure injection systems and a manual blowdown of the reactor. We do not consider this to be an equivalent or acceptable backup for routine isolation purposes such as inservice testing.

We have conducted PRA analysis which show an increase in core damage frequency of 139% and 125% when the HPCI and RCIC systems, respectively, are unavailable during power operation. Since these systems are not designed to operate while the reactor is shutdown and they have a relatively large impact on core damage frequency during power operation, deferring these tests to cold shutdown frequency is prudent.

To clarify our deferred testing justifications for the HPCI and RCIC check valve closed position tests that require system isolation, we will administratively revise their justifications in the IST Program to read as follows:

"The closed position of these valves will be tested on a Cold Shutdown frequency. Testing them at power requires isolating and venting the system which includes manual valve realignments, opening motor operated valve breakers and defeating auto start logic; a significant burden on plant resources. This total loss of system function dramatically reduces the level of safety during power operation."

RESPONSES TO ACTION ITEMS IN JULY 6, 1993 SAFETY EVALUATION

RELIEF REQUEST NUMBER PR-6

System: High Pressure Coolant Injection (HPCI)

P&ID: M-124

Pump: P-209

Class: 2

Function: Injects coolant into the reactor vessel independent of AC power.

Code Test Requirement:

OM-6 Table 3a and paragraph 6.1; Vibration Alert limit of 0.325 in/sec for the horizontal vibration data points and the resulting increased pump test frequency.

Basis for Relief:

10 CFR Part 50, Section 50.55a(a)(3), states (in part):

"Proposed alternatives to the requirements of paragraphs (c), (d), (e), (f), and (h) of this section or portions thereof may be used when...
(ii) Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety."

The HPCI pump consists of a centrifugal main pump, a separate centrifugal booster pump, a speed reducing gear for the booster pump, and a Terry turbine steam driver. All these components are mounted horizontally along the same drive train. Therefore, there are four independently balanced and aligned rotating assemblies that are coupled together. This configuration is significantly different than the typical single pump and electric motor that the OM-6 limits are based on. As a result, the normal (baseline) vibration readings in the horizontal direction on both the booster pump and main pump are approximately 0.325 in/sec.

Application of a 0.325 in/sec alert limit would require us to enter accelerated test frequency each time the pump was tested because one or more of these points measured would exceed this limit. Prior to the third ten year interval, the alert limit of 0.325 in/sec was not a code requirement at

RESPONSES TO ACTION ITEMS IN JULY 6, 1993 SAFETY EVALUATION

Monticello. We have many years of inservice test data showing that baseline vibrations at 0.325 in/sec represent acceptable pump operation and that vibration levels have not trended up. We have also had these vibration levels analyzed by an engineering Consultant that specializes in vibration analysis. Their analysis shows that this pump can operate at vibration levels up to 0.700 in/sec.

NPRDS component history was reviewed for this type of pump. No failures attributed to extended hours of pump operation at vibration levels exceeding 0.325 in/sec were found. The pump manufacturer, Byron-Jackson, also stated that these vibration levels did not require corrective action.

Implementing the alert limit of 0.325 in/sec would require us to constantly have the HPCI pump on accelerated test frequency. This would result in a monthly pump inservice test instead of quarterly. The intent of increased test frequency is to closely monitor a pump that is deteriorating from its baseline values. In this case, the pump would be operating at its normal vibration range and no change would be seen. The additional 8 tests a year would require a significant amount of time and resources and only create additional maintenance due to normal wear of the system. Modifications to try and reduce the vibration levels, such as installing new shafts and impellers, are extremely expensive and may not reduce the vibration levels. Therefore, requiring an alert limit of 0.325 in/sec on the HPCI pump is an extreme hardship without a compensating increase in public safety.

An appropriate alert limit for these vibration data points is 0.500 in/sec. This is based on previous test history, a review of industry data, the vibration analysis performed, and discussions held with the pump's manufacturer.

Alternative Testing:

A vibration alert limit of 0.500 in/sec will be used for the pump horizontal vibration data points. The OM-6 Code's required action limit of 0.700 in/sec will be adhered to.

Approval:

Relief granted with the incorporation of NRC comments in their SE Report dated July 6, 1993.

RELIEF REQUEST SC-1

System: Condensate Storage Transfer (a.k.a. Service Condensate)

Valves: CST-88, CST-92, CST-94, CST-98

Category: C-1

Class: 2

Function: These are the boundary valves between the safety related RHR pumps discharge piping and the non-safety related service condensate keep fill system.

Code Test Requirement: IWV-3520; Full stroke exercise, frequency and method.

Basis for Relief:

10 CFR 50, Section 50.55a(f)(5) & (6). states, (in part):

(5)(iii) If the licensee has determined that conformance with certain code requirements is impractical for its facility, the licensee shall notify the commission....

(6)(i) ... The commission may grant relief and may impose alternative requirements...giving due consideration to the burden upon the licensee....

These valves have a closed safety position since they prevent diversion of RHR flow into the service condensate system. There are no test taps or instrumentation installed that would allow testing that proves by positive means that the disc moves to the seat on cessation or reversal of flow. Installation of test taps and isolation valves to reverse flow test these valves is a burden.

Generic Letter 89-04 position 2 allows grouping identical valves and testing them by disassembly and inspection on a refuel frequency.

Alternative Testing:

These valves will be grouped and tested in accordance with Generic Letter 89-04 position 2 as follows:

Group: CST-88, CST-92, CST-94, CST-98

All these check valves are the same size, type, and manufacturer. They all perform identical functions and have the same fluid through them. CST-92 and CST-94 interface with the A loop RHR discharge piping while CST-88 and CST-98

interface with B loop RHR discharge piping. Over the course of a refuel cycle, the valves experience the service conditions through the same number of RHR system inservice tests and roughly the same RHR loop operating time in shutdown cooling. The valves are all in the same orientation. Therefore, they meet the design and service condition grouping criteria of Generic Letter 89-04, position 2.

Approval:

Relief granted with the incorporation of NRC comments in their SE Report dated July 6, 1993.