TECHNICAL EVALUATION REPORT

Pump and Valve Inservice Testing Program
McGuire Nuclear Station, Units 1 & 2
Duke Power Company

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ABSTRACT

This report presents the results of Brookhaven National Laboratory's evaluation of McGuire Nuclear Station's, Units 1 and 2, ASME Section XI Pump and Valve Inservice Testing Program relief requests.

TABLE OF CONTENTS

ABSTRACT iii

1.0 INTRODUCTION 1

2.0 PUMP IST PROGRAM RELIEF REQUESTS 3
- 2.1 Generic Pump Relief Requests 3
- 2.2 Auxiliary Feedwater System 5
- 2.3 Emergency Diesel Generator Fuel Oil Transfer System 6
- 2.4 Component Cooling Water System 8
- 2.5 Residual Heat Removal System 9
- 2.6 Safety Injection System 12
- 2.7 Chemical and Volume Control System 15
- 2.8 Nuclear Service Water System 17

3.0 VALVE IST PROGRAM RELIEF REQUESTS 19
- 3.1 Containment Spray System 19
- 3.2 Nuclear Service Water System 21
- 3.3 Diesel Generator Starting Air System 22
- 3.4 Diesel Generator Room Sump System 24

4.0 DEFERRED TESTING JUSTIFICATIONS 25

5.0 IST PROGRAM RECOMMENDED ACTION ITEMS 102

6.0 REFERENCES 107

APPENDIX A: McGuire Nuclear Station Unit 1 and 2 Flow Diagrams A-1

Technical Evaluation Report
Pump and Valve Inservice Testing Program
McGuire Nuclear Station

1.0 INTRODUCTION

Contained herein is a technical evaluation of the ASME Section XI pump and valve inservice testing (IST) program relief requests submitted by Duke Power Company for its McGuire Nuclear Station, Units 1 and 2. The McGuire Nuclear Station Units are Westinghouse Pressurized Water Reactors (PWR) with Ice Condenser containments. Unit 1 began commercial operation in December 1981, and Unit 2 began commercial operation in March 1984.

Duke Power Company submitted Revision 20 for Unit 1 and Revision 15 for Unit 2 of the Inservice Testing Program, Second Ten Year Interval on January 6, 1994 (Ref. 1). The second ten year interval extends from December 1, 1992 to December 1, 2002 for Unit 1 and from March 1, 1994 to March 1, 2004 for Unit 2. In a letter dated January 6, 1994 Duke Power Company has informed the NRC that it is revising the IST programs for both Unit 1 and Unit 2 in accordance with 10CFR50.55a(f)(4) (Ref. 2). The licensee states that this program complies with the 1989 Edition of the ASME Section XI Code (Ref. 3, 4), except where specific relief is requested. The program revisions supersede all previous submittals. The licensee also submitted a response to the October 12, 1993 Safety Evaluation for Unit 1 regarding Revision 19 of the Inservice Testing Program, on February 24, 1994. This response discusses modifications made to the diesel generator sump pumps, and, licensee action taken on pump and valve relief requests with the adoption of OMa-1988 Parts 6 and 10. For Unit 2, a revised relief request reflecting the revised schedule for completing modifications to the diesel generator control air valves was submitted to the NRC on August 24, 1993.

Title 10 of the Code of Federal Regulations, §50.55a ¶(f) requires that inservice testing of ASME Code Class 1, 2, and 3 pumps and valves be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable addenda (Ref. 5, 6), except where specific relief has been requested by the licensee and granted by the commission pursuant to §50.55a ¶(a)(3)(i), (a)(3)(ii), or (f)(6)(i). Section 50.55a ¶(f)(4)(iv) provides that inservice testing of pumps and valves may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in paragraph (b) of §50.55a, subject to the limitations and modifications listed, and subject to Commission approval.

Duke Power has requested relief from certain ASME Section XI testing requirements. A review of the relief requests was performed utilizing the Standard Review Plan, Section 3.9.6; Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs;" and the Minutes of the Public Meeting on GL 89-04, dated October 25, 1989; and Draft NUREG-1482 (Ref. 7, 8, 9, 10, 11). The IST Program requirements apply only to component (i.e., pump and valve) testing and are not intended to provide a basis to change the licensee's current Technical Specifications for system test requirements.

Section 2 of this report presents the eight pump relief requests and Brookhaven National Laboratory's (BNL) evaluation. Similar information is presented in Section 3 for the four relief requests for the valve testing program. A review of the ninety-five valve cold shutdown and refueling outage

justifications for deferral testing was performed and details of this review are contained in Section 4. Relief requests that are authorized by GL 89-04 are not specifically evaluated in this Technical Evaluation Report. However, any anomalies associated with these relief requests are addressed in Section 5 of this report.

Section 5 also summarizes the recommended actions for the licensee resulting from the relief request review and deferred testing evaluations. BNL recommends that the licensee resolve these items in accordance with the evaluations, conclusions, and guidelines presented in this report.

2.0 PUMP IST PROGRAM RELIEF REQUESTS

In accordance with §50.55a, Duke Power Company has submitted eight relief requests for pumps at the McGuire Station which are subject to inservice testing under the requirements of OMa-1988 Part 6. These relief requests have been reviewed to verify their technical basis and determine their acceptability. The relief requests, along with the technical evaluation by BNL, are summarized below.

2.1 Generic Pump Relief Requests

2.1.1 Pump Relief Request 1.3.1

Relief Request: The licensee requests relief from the pump vibration acceptance criteria requirements of OMa-1988 Part 6, ¶6.1 and the vibration accuracy requirements of ¶4.6.1 for all pumps in the IST program.

Proposed Alternate Testing: The licensee's proposed alternate testing is as follows:

1) In lieu of the vibration acceptance criteria specified in OMa-1988 Part 6, ¶6.1, Table 3a, the following ranges shall be used. These ranges are based on current vibration standards (vibration severity charts):

	Acceptable Range	Alert Range	Required Action Range
For all pumps when Vr≤0.075 in/sec	0 to 0.19 in/sec	>0.19 to 0.45 in/sec	>0.45 in/sec
For centrifugal pumps, when Vr>0.075 in/sec	≤2.5 Vr	>2.5 Vr to 6 Vr or >0.325 to 0.70 in/sec	>6 Vr or >0.70 in/sec
For reciprocating pumps, when Vr>0.075 in/sec	≤2.5 Vr	>2.5 Vr to 6 Vr	>6 Vr
For internal gear positive displacement pumps, Vr>0.075 in/sec	≤2.5 Vr	>2.5 Vr to 6 Vr	<6 Vr

2) In lieu of the vibration instrument accuracy requirements of OMa-1988 Part 6, ¶4.6.1, Table 1, the loop accuracy of vibration measurements will be ±6.56% of reading. This accuracy is based on the Root Sum of Squares method and includes the accuracy of the vibration probe (±5.0%) and the accuracy of the calibration instrument (±4.25%). This accuracy is the best that can be reasonably obtained from the state of the art instrumentation used.

Licensee's Basis for Relief: The licensee states that:

1) "Experience has shown that smooth operating pumps (Vr ≤ 0.075 in/sec) often fall in the alert range of vibration measurement when compared to the acceptance criteria given in Part 6, Table 3a. The Table included with this relief request allows for acceptable ranges of vibration measurement for this classification of pumps. This proposal provides an acceptable level of quality and safety given the minimum limits."

2) "Vibration measurement instrumentation currently in use is digital instrumentation. Using our present instrumentation and accounting for all instrumentation uncertainties in the calibration process, the requirement of ±5% instrument accuracy cannot be achieved."

Evaluation:

1) As stated in the Basis, the licensee has requested generic relief for all pumps in the IST Program from the vibration limits specified in OMa-1988 Part 6, ¶5.2(d) for smooth operating pumps (Vr ≤ .075 in./sec.). The Code does not prescribe limits for smooth-operating pumps, and as stated by the licensee, these pumps often fall within the alert and required action ranges when compared to the current Code requirements. This may result in unnecessary additional testing and maintenance.

Although the licensee's proposed absolute limits for smooth-operating pumps may be less conservative than the Code required relative acceptance criteria (i.e., based on multiples of a reference vibration), the licensee's proposed limits for the alert and required action levels for smooth-operating pumps are more restrictive than the present Code absolute requirements for centrifugal pumps, and provide for reasonable assurance as to the pumps ability to operate as required, while not unnecessarily entering the alert and required action ranges. Based on the alternative providing an acceptable level of quality and safety, it is recommended that the alternative be authorized in accordance with §50.55a ¶(a)(3)(i).

The licensee has specified acceptance criteria for internal gear positive displacement pumps. The currently does not specify vibration acceptance criteria for this pump type. The 1994 Addenda of the OM Code, however, clarifies in a note to Table 3 that the acceptance criteria for centrifugal and vertical line shaft pumps should also apply to positive displacement pumps except reciprocating. The licensee should consider revising their program to comply with the intent of the Code.

2) OMa-1988 Part 6, Section 4.6.1.1, Table 1 requires a vibration instrument accuracy of ±5% of full-scale. As stated by the licensee, the currently installed instrumentation meets the Code specified accuracy of ±5%; however, when the accuracy of the calibration instrument is accounted for, the resulting accuracy is ±6.56%.

The licensee has not addressed, as identified in the October 12, 1993 Safety Evaluation (SE) (Ref. 12), the possibility of using outside calibration laboratories to obtain instrumentation accuracies that would meet the Code requirements. Digital vibration instrumentation is available that can meet the accuracy range of ±5% over the calibrated range. Such instrumentation is being used at other nuclear power plants such as the Seabrook Station (letter from Richard Wessman, NRR to Ted Feigenbaum, New Hampshire Yankee, June 28, 1991; subject: "Seabrook Station Relief from IST Range Requirement for Digital Vibration Instruments").

Although the installation of instrumentation is generally not considered burdensome by the NRC, the accuracy obtainable with the existing instrumentation would not seriously impact the level of safety provided by the tests. To require the licensee to replace the existing instrumentation to comply with the ±5% accuracy requirements would result in a hardship without a compensating increase in the level of quality and safety. However, the instrument accuracy should be addressed in the analysis and evaluation of pump test data, with the acceptance criteria adjusted to account for inaccuracies, if necessary. The licensee should consider the repeatability of the measurements. If the measurements are not sufficiently repeatable to justify the use of the Code allowable ranges to permit detection of degradation, the alert and required action values of Table 1 should be reduced by 1.56%. The licensee also should investigate the possibility of using other calibration techniques to meet the accuracy requirements of the Code.

Based upon the fact that the installed instrumentation will provide an acceptable level of safety, and that requiring the licensee to change all the vibration instruments to comply with the Code would present a hardship without a compensating increase in the level of quality or safety, it is recommended that the proposed alternate be authorized in accordance with §50.55a (a)(3)(ii) for one year or until the next refueling outage, whichever is longer. In the interim period, the licensee should investigate the availability of vibration instruments which satisfy the Code accuracy requirements, or the availability of other calibration laboratories as previously recommended in the October 12, 1993 SE (Ref. 12) which the licensee has not addressed to date.

2.2 Auxiliary Feedwater (AFW) System

2.2.1 Pump Relief Request 1.4.1, A and B AFW Pumps, Unit Turbine Driven AFW Pump (Note: CA is designator for Auxiliary Feedwater)

Relief Request: The licensee requests relief from OMa-1988, Part 6, ¶4.6.1.2(a) which requires that the full scale range of the instrument shall be three times the reference value or less for AFW pump suction gauge.

Proposed Alternate Testing: The currently installed process instrumentation will be used to measure the auxiliary feedwater pumps suction pressure for the two motor operated and single turbine driven pumps which have a range of 5 times the reference value.

Licensee's Basis for Relief: The licensee states that: "The installed process instrumentation for the CA pump suction gauge is a 0-100 psig, 0.5% accuracy. Typical values for the CA suction pressure during the CA pump testing is 20-25 psig; therefore, the process gauge does not meet the three times criteria. The accuracy of the process gauge (0.5%) is well below the requirements specified in Table 1 for pressure instrument accuracy (2%). The actual reading error at test pressure due to the process instrument accuracy is 2.5% (0.5 X 100/20). If a 0-60 psig test instrument is used (which meets the three times criteria) and it has an accuracy of 2%, then the reading error would be 6% (2 X 60/20). When the requirements of ¶4.6.1.2(a) and Table 1 are combined, the actual instrument error introduced into the test is less than the Code allowable (2.5% versus 6%). Using the process instrument for suction pressure data does not degrade the quality of the test and meets the intent of the instrumentation requirements of the Code; just not the specific range requirements of ¶4.6.1.2(a)."

Evaluation: The licensee has requested relief from the full scale range requirements for the analog gauge used to measure suction pressure for the AFW pump. OMa-1988, Part 6, ¶4.6.1.2 requires that the range for this instrument be three times the reference value or less.

As discussed in Draft NUREG-1482 (Ref. 11), Section 5.5.1, relief may be granted when the combination of the range and the accuracy yields a reading at least equivalent to the reading achieved from instruments that meet the Code requirements. As stated by the licensee, the accuracy of the pressure instrument is 0.5%, which is greater than the Code specified accuracy of ±2% (OM Part 6, ¶4.6.1.1 Table 1). The combination of the expanded instrument range and reading accuracy for the installed instrumentation provides a higher reading accuracy (±2.5%) than the Code allowable ±6%.

Based upon the use of the installed pressure instruments providing an acceptable level of quality and safety, it is recommended that the proposed alternate be authorized pursuant to §50.55a ¶(a)(3)(i). In the event these instruments are replaced the new instruments should comply with the Code range and accuracy requirements.

2.3 Emergency Diesel Generator (EDG) Fuel Oil Transfer System

2.3.1 Pump Relief Request 1.4.2, A and B EDG Fuel Oil Transfer Pumps

Relief Request: The licensee requests relief from measuring the EDG fuel oil transfer pump discharge pressure in accordance with OMa-1988 Part 6, ¶5.2(d). Relief is also requested from the acceptance criteria requirements specified in ¶6.1, Table 3b for flow measurement.

Proposed Alternate Testing: Pumps will be tested by measuring level rise in the Fuel Oil Day Tank over time and converting the results to a flow in gallons per minute. This method provides a flow rate that meets the instrument accuracy requirements of 2% (Table 1). "The test flow rate (Q) will be compared to acceptance criteria established in accordance with Table 3b except the acceptable range has been widened on the high side and the High Alert Value has been increased. As a result, the High Required Action Range has also been increased. The increased acceptance criteria band is to allow for instrument fluctuations." The new limits are:

Acceptable Range:	0.94 Qr to 1.07 Qr
Low Alert Range:	0.90 Qr to 0.94 Qr
High Alert Range:	1.07 Qr to 1.10 Qr
Low Required Action Range:	< 0.90 Qr
High Required Action Range:	> 1.10 Qr

In addition, monthly Diesel Generator starting and loading (as required by McGuire Technical Specifications) will assess the hydraulic condition of the subject auxiliary pumps and demonstrate the capability of the individual components to perform their design function. Discharge pressure will not be measured.

Licensee's Basis for Relief: The licensee states that: "The characteristics of these pumps and system configuration are such that the comparison of discharge pressure to the acceptance criteria in the Code places the pumps in constant alert range. Additionally, the flow rate evaluation is based on pump performance and derived such that the pump is not constantly in the alert range.

The D/G Fuel Oil Transfer Pumps are internal gear positive displacement pumps. The performance curve for these pumps is relatively flat. Capacity of these pumps is independent of discharge pressure when operating properly and below the cracking pressure of the pump internal relief valve. Since discharge pressure can be affected by the differential pressure of the filters downstream of the pumps and other normal operating conditions associated with these pumps, discharge pressure will be monitored for information purposes, but it will not compared to any acceptance criteria. If the discharge pressure were to be compared to the acceptance criteria, due to previously stated reasons, these pumps would be constantly in the alert range.

These pumps are designed to produce a flow rate of 22 gpm. The requirements of the Diesel Generator are approximately 6 gpm. Five vibration points are monitored and trended on the Fuel Oil Transfer Pumps. Acceptance criteria for the vibration points is calculated based on Relief Request 1.3.1. Vibration data is trended on a quarterly basis similar to the flow test results. Any degradation in the performance of the Fuel Oil Transfer pumps will first appear in the vibration data. Also, the Fuel Oil Transfer pumps are conservatively designed in the discharge pressure that can be obtained. The capabilities of the pump are not challenged during the quarterly test with respect to discharge pressure. System limitations restrict the discharge pressure to less than or equal to 55 psig; however, the Fuel Oil Transfer pumps could easily pump against 150 psig.

Since the pumps are installed with considerable safety margin with respect to flow and discharge pressure, the most prudent data to use for trending for pump degradation would be the velocity vibration data. By trending the five velocity vibration data points, the acceptability of the widened High Alert and Required Action ranges for flow are justified. The flow ensures system operability is met and the pump internal relief valve is not lifting prematurely while the vibration test ensures an adequate trending program is in place to ensure continued operability during testing intervals.

The D/G Fuel Oil Storage Tank is the suction for the Fuel Oil Transfer pumps and is monitored to maintain level as required by McGuire Technical Specifications. This level ensures adequate NPSH; therefore, a suction pressure reading is not required."

Evaluation: The fuel oil transfer pumps are small pumps with one horsepower driver motors as identified in the FSAR (Ref. 13). OMa-1988, Part 6, ¶5.2(d) requires that the (discharge) pressure of positive displacement pumps be determined and compared to the reference values given in ¶6.1, Table 3b. The licensee intends to monitor the EDG fuel oil transfer pumps discharge pressure for information purposes only, and not compare it to any Code reference values. The licensee's rationale is that system limitations restrict the discharge pressure to less than or equal to 55 psig, but that the pumps could easily pump against 150 psig. Since the transfer pumps are positive displacement type pumps, for a given speed, the pump flow rate is essentially constant and independent of pump discharge pressure. Fluctuations in the discharge pressure could be indicative of degradation or an impending safety concern. The licensee has not suggested any alternatives such as using multiple reference values depending on system conditions, e.g., reference values as a function of downstream pressure differential. The licensee has not demonstrated the hardship or

impracticality in meeting the Code requirements, and therefore, pending such demonstration by the licensee, it is recommended that this relief request relating to the discharge pressure be denied.

OMa-1988 Part 6, ¶5.2(d) also requires that the flow rate of positive displacement pumps be determined and be compared to the reference values given in ¶6.1, Table 3b. However, ¶4.6.5 requires the use of a flow rate or quantity meter to be installed in the pump test circuit. The licensee intends to measure flow rate by measuring the level rise in the Fuel Oil Day Tank over time (i.e., during test) and converting the results to a flow in gallons per minute. The accuracy of this method, according to the licensee, meets the ±2% requirement of ¶4.6.1.1, Table 1 for flow rate. The licensee should have specifically requested relief for measuring flow rate in this manner because it does not literally meet ¶4.6.5. However, the method meets the intent of ¶4.6.5. Based upon this alternative providing an acceptable level of quality and safety for measuring flow rate it is recommended that it be authorized pursuant to §50.55a ¶(a)(3)(i). The licensee should ensure that this method is described in a procedure and meets the quality assurance requirements.

The licensee seeks to compare the measured flow rate to acceptance criteria other than that specified in Table 3b. The Low Required Action Range has been widened from < .93 to < .90 while the High Required Action Range is the same. In addition, a High Alert Range which is no longer required in Table 3b, and, a different Low Alert Range is specified. As discussed in Draft NUREG-1482 (Ref. 11), Section 5.6, OMa-1988 Part 6 does not allow the expansion of ranges for pump acceptance criteria. There are provisions for the licensee to review the test results and, if justified, establish new reference values as discussed in ¶4.5. Although the pumps may be over-sized for the application (and an internal gear positive displacement pump (pdp) may have different characteristics than other pdp's) it is not clear from the licensee's description what the basis is for the expanded range and why such an expanded range will not exclude pump degrading conditions. The basis for acceptable pump performance would pertain to the pump and not the system. Therefore, pending such demonstration by the licensee, it is recommended that this relief request relating to flow rate acceptance criteria be denied.

Although the licensee plans to measure pump flow rate, the primary means of detecting pump degradation will be to monitor and trend five vibration velocity points on the pumps. Acceptance criteria for the vibration points is calculated based on Relief Request 1.3.1. The vibration data are trended on a quarterly basis. Section 2.1.1 of this TER evaluates the acceptability of this relief request.

2.4 Component Cooling Water (CCW) System

2.4.1 Pump Relief Request 1.4.3, Component Cooling Water Pumps A1, A2, B1, and B2

Licensee's Relief Request: The licensee requests relief from OMa-1988, Part 6, ¶4.6.1.2(a) which requires that the full scale range of the instrument shall be three times the reference value or less for the component cooling water pump suction gauge.

Proposed Alternate Testing: The currently installed process instrumentation will be used to measure CCW pump suction pressure for the A1, A2, B1 and B2 CCW pumps which have an installed range of 4 times the reference value.

Licensee's Basis for Relief: The licensee states that: "The installed process instrumentation for the component cooling water pump suction gauge is a 0-60 PSIG, 0.5% accuracy. Typical values for the component cooling water suction pressure during the CCW pump testing is 15-20 psig; therefore, the process gauge does not meet the three times criteria. The accuracy of the process gauge (0.5%) is well below the requirements specified in Table 1 for pressure instrument accuracy (2%). The actual reading error at test pressure due to the process instrument accuracy is 2% (0.5 X 60/15). If a 0-45 PSIG test instrument is used (which meets the three times criteria) and it has an accuracy of 2%, then the reading error would be 6% (2 X 45/15). When the requirements of Section 4.6.1.2(a) and Table 1 are combined, the actual instrument error introduced into the test is less than the Code allowable (2% versus 6%). Using the process instrument for suction pressure data does not degrade the quality of the test and meets the intent of the instrumentation requirements of the Code; just not the specific range requirements of Section 4.6.1.2(a)."

Evaluation: The licensee has requested relief from the full scale range requirements for the analog gauge used to measure suction pressure for the component cooling water pump. OMa-1988, Part 6, ¶4.6.1.2 requires that the range for this instrument be three times the reference value or less. As stated by the licensee, the instrument currently used has a range of four times the reference value. The four component cooling water pumps per Unit are low pressure and large flow (150 psig, 3500 gpm) horizontal centrifugal pumps, driven by 200 hp induction motors.

As discussed in Draft NUREG-1482 (Ref. 11), Section 5.5.1, "when the range of a permanently installed analog instrument is greater than 3 times the reference value but the accuracy of the instrument is more conservative than the Code, relief may be granted when the combination of the range and the accuracy yields a reading at least equivalent to the reading achieved from instruments that meet the Code requirements." As stated by the licensee, the accuracy of the pressure instrument is 0.5%, which is better than the Code specified accuracy of ±2% (OM Part 6, ¶4.6.1.1 Table 1). The combination of the expanded instrument range and reading accuracy for the installed instrumentation provides a higher reading accuracy (±2%) than the Code allowable ±6%.

Based upon the use of the installed pressure instruments providing an acceptable level of quality and safety, it is recommended that the alternative be authorized pursuant to §50.55a ¶(a)(3)(i). In the event these instruments are replaced, the new instruments should have ranges in compliance with the Code.

2.5 <u>Residual Heat Removal System</u>

2.5.1 Pump Relief Request 1.4.4, Residual Heat Removal Pumps A and B

Licensee's Relief Request: The licensee requests relief from the quarterly testing requirements using reference values as specified in OMa-1988, Part 6, ¶5.2(b) for the RHR pumps. In addition the licensee is also seeking relief for the instrument range requirements per OMa-1988, Part 6, ¶4.6.1.

Proposed Alternate Testing: The Residual Heat Removal pumps will be tested according to the following program:

Quarterly

The Residual Heat Removal pumps will be tested quarterly to verify Technical Specifications are met. The test measures differential pressure and velocity vibration data. The differential pressure and velocity vibration data will be trended. The instrumentation range requirements of Section 4.6.1.2(a) will be waived. The instrumentation used to measure suction and discharge pressure will meet applicable accuracy requirements for the determination of operability per Technical Specifications. The instrument used to measure vibrations will meet the requirements specified in Relief Request 1.3.1. The test loop used in the test has a flow measuring orifice installed; however, the system resistance cannot be adjusted with the associated throttling valve without invalidating the Residual Heat Removal system flow balance (a Tech Spec balance of flow to all four cold legs.) Therefore, flow through this loop will be recorded for information only.

Refueling Outage

During each refueling outage, a Code pump test - including velocity vibration measurements - will be performed at a test point in the stable region of the performance curve.

As an alternative to repeat testing at a single test point in the stable region, a reference curve may be obtained with applicable acceptance curves plotted. Using this technique, the full flow test point (also in the stable region of the pump curve) will be bound by flow points obtained in the development of the reference curve. The data obtained is then evaluated against acceptance criteria and Chapter 15 basis acceptance curves to verify pump operability. When baseline vibration data varies significantly over the pump head curve, vibration acceptance criteria will be developed for flow regions of the head curve.

The test method selected will depend on plant refueling conditions, maintenance performed on the pump, and the quantity of pump data required. Either method selected will ensure that the pump is tested in the full flow region of the head curve and that system operability is verified. Each test methodology is consistent with the intent of Code requirements and GL 89-04.

Licensee' Basis for Relief: The licensee states that:

1) "When testing these pumps on line, the only flow path available is through the miniflow control valve in the line, which yields a test point back on the head curve. As stated in GL 89-04, minimum flow lines are not designed for pump testing purposes. The test point for monitoring pump performance for degradation should be in a more stable region on the pump performance curve. Also, the amount of time the pump is run at miniflow should be minimized.

2) Also, range requirements will be waived for the quarterly test. The purpose of the quarterly test is to verify Tech Spec requirements are met and to obtain vibration data for trending. The instrumentation used for the quarterly Residual Heat Removal Pump test will meet accuracy requirements for assuring Residual Heat Removal Pump operability per Technical Specifications."

Evaluation: The licensee has requested relief from the quarterly testing requirements which require measurement of flow rate and the pressure instrument range requirements for the RHR pumps A and B. The two RHR pumps per Unit are vertical line shaft centrifugal pumps, low pressure and large flow (600 psig, 3000 gpm), driven by 400 hp induction motors.

In lieu of the quarterly flow test at the reference value, as specified in OMa-1988, Part 6, ¶5.2(b), the licensee is proposing to demonstrate pump operability through a quarterly minimum flow test, measuring pump differential pressure and vibration, and a full flow test during refueling outages. Due to difficulty in throttling flow during the quarterly minimum flow test, the licensee is proposing to monitor flow for information only.

The RHR is used to remove residual and sensible heat from the reactor core and reduce RCS temperature during cold shutdowns and refueling outages. A review of the RHR system flow diagram, MC-1561-1.0, shows that there is a 2 inch bypass loop installed around the pumps. The licensee states it would be difficult to throttle the flow in this minimum recirculation line without upsetting the RHR flow balance. As discussed in Question 48 of the Public Meetings held on GL 89-04 (Ref. 9), the NRC considers minimum flow tests to produce data of marginal value in providing assurance of a pump's operability. A full flow test, during refueling outages or cold shutdowns, is more desirable. Deferring tests to cold shutdowns or refuelings is permissible per staff Position 9 of GL 89-04 provided pump differential pressure, flow rate, and bearing vibration the measurements are taken during this testing and that quarterly testing is continued that measures at least pump differential pressure and vibration. It is impractical to perform a full flow test on these pumps quarterly during normal plant operation since this system is in standby and the RHR pump pressure cannot overcome the RCS pressure.

The licensee has also requested relief from the instrument full range requirement, as specified in OMa-1988, Part 6, ¶4.6.1 for the differential pressure and vibration measurements during the quarterly test. The licensee states in the Basis that the instrumentation used during the Tech. Spec. testing will meet the accuracy requirements for assuring RHR pump operability per the Tech. Specs., but has provided no specific information regarding the range or accuracy. In the previous safety evaluation (Ref. 12) of this request, relief was not recommended, and the licensee was requested to provide further information. This information has still not been provided. Therefore, relief cannot be recommended. The purpose of the IST tests is to ensure the operability of the component to perform as required. Without further specific information, there is no assurance that the accuracy of the specific attributes monitored will be adequate to detect degradation, as required by the Code.

Although not specifically requested, the licensee appears to be requesting permission to use alternative testing to be able to perform the refueling tests using reference values or pump curves, depending on plant refueling conditions, maintenance performed, and the quantity of data required. As discussed in both Draft NUREG-1482 (Ref. 11), Section 5.2, and the previous SE (Ref. 12), the use of pump curves for reference values of flow rate and differential pressure is acceptable if the licensee clearly demonstrates the impracticality of establishing a fixed set of reference values. The licensee has not provided sufficient information to demonstrate the impracticality of establishing a fixed set of reference values during cold shutdowns or refueling outages for the RHR pumps. However, the primary choice of performing a Code pump test - including velocity vibration measurements - at a test point in the stable region of the performance curve is acceptable. Additionally, the seven elements discussed in Draft NUREG-1482 (Ref. 11), Section 5.2 must also be included in the relief request.

In conclusion, the licensee's request to defer the quarterly flow testing for the RHR pumps is in accordance with Position 9 of GL 89-04, and relief is granted pursuant to §50.55a ¶(f)(6)(i) based on the impracticality of performing testing in accordance with Code requirements, and in consideration of the burden on the licensee if the Code requirements were imposed on the facility. It is

recommended that the licensee consider the practicality of performing the full flow test during cold shutdowns as well as refuelings as a means of gaining more performance data.

The licensee has not provided sufficient information regarding the range and accuracy of the instruments which will be used during these tests. An assessment as to the acceptability of these instruments cannot be made, nor can any assurance be provided that they are sensitive enough to detect pump degradation and ensure operability. Therefore, relief cannot be recommended. The licensee should perform the full flow test using reference values, during refueling outages (and also consider testing at cold shutdowns), and compare these values to the limits contained in OMa-1988 Part 6. Pump differential pressure and vibration should continue to be monitored quarterly during pump minimum recirculation flow testing, and action taken as per the requirements of the Code as well as the Technical Specifications. The licensee should revise the relief request in accordance with Section 5.2 of Draft NUREG-1482 (Ref. 11) if the use of pump curves is desired.

2.6 Safety Injection System

2.6.1 Pump Relief Request 1.4.5, Safety Injection Pumps A and B

Licensee's Relief Request: The licensee requests relief from the quarterly testing requirements using reference values as specified in OMa-1988, Part 6, ¶5.2(b) for the Safety Injection Pumps. In addition the licensee is also seeking relief for the instrument range requirements per OMa-1988, Part 6, ¶4.6.1.

Proposed Alternate Testing: The Safety Injection Pumps will be tested according to the following program:

Quarterly

The Safety Injection pumps will be tested quarterly to verify Technical Specifications are met. The test measures differential pressure and velocity vibration data. The differential pressure and velocity vibration data will be trended. The instrumentation range requirements of Section 4.6.1.2(a) will be waived. The instrumentation used to measure suction and discharge pressure will meet applicable accuracy requirements for the determination of operability per Technical Specifications. The instrument used to measure vibrations will meet the requirements specified in Relief Request 1.3.1. The test loop has a flow measuring orifice installed; however, there is no means provided to vary the system resistance to set either the flow or differential pressure. Therefore, flow through this loop will be recorded for information only.

Refueling Outage

During each refueling outage, a Code pump test - including velocity vibration measurements - will be performed at a test point in the stable region of the performance curve.

As an alternative to repeat testing at a single point in the stable region, a reference curve may be obtained with applicable acceptance curves plotted. Using this technique, the full flow test point (also in the stable region of the pump curve) will be bound by flow points obtained in the development of the reference curve. The data obtained is then evaluated against acceptance criteria and Chapter 15 basis acceptance curves to verify pump operability. When baseline vibration data

varies significantly over the pump head curve, vibration acceptance criteria will be developed for flow regions of the head curve.

The test method selected will depend on plant refueling conditions, maintenance performed on the pump, and the quantity of pump data required. Each method selected will ensure that the pump is tested in the full flow region of the head curve and that system operability is verified. Each test methodology is consistent with the intent of Code requirements and GL 89-04.

Licensee' Basis for Relief: The licensee states that:

1) "When testing these pumps on line, the only flow path available is through the miniflow line which has a flow restricting orifice. The orifice yields a test point back on the head curve. As stated in GL 89-04, minimum flow lines are not designed for pump testing purposes. The test point for monitoring pump performance for degradation should be in a more stable region on the pump performance curve. Also, the amount of time the pump is run at miniflow should be minimized.

2) Also, range requirements will be waived for the quarterly test. The purpose of the quarterly test is to verify Tech Spec requirements are met and to obtain vibration data for trending. The instrumentation used for the quarterly Safety Injection Pump test will meet accuracy requirements for assuring Safety Injection Pump operability per Technical Specifications."

Evaluation: The licensee has requested relief from the quarterly testing requirements which require measurement of flow rate and the pressure instrument range requirements for the Safety Injection Pumps A and B. The two SI pumps per Unit are multistage centrifugal pumps, intermediate pressure and flow (1700 psig, 425 gpm), driven by 400 hp induction motors.

In lieu of the quarterly flow test at the reference value, as specified in OMa-1988, Part 6, ¶5.2(b), the licensee is proposing to demonstrate pump operability through a minimum flow test quarterly, measuring pump differential pressure and vibration, and a full flow test during refueling outages. Despite the presence of a fixed orifice the recirculation line does not have a means of throttling flow and, consequently, the licensee is proposing to monitor flow for information only.

The Safety Injection System is utilized as the intermediate pressure, intermediate volume of the emergency core cooling system and during normal operation is aligned to take suction from the refueling water storage tank (in the event of an intermediate or large break LOCA). A review of the SI system flow diagram, MC-1562-3.0, shows that there is a 1 1/2 inch bypass loop installed around the pumps to the refueling water storage tank. As discussed in Question 48 of the Public Meetings held on GL 89-04 (Ref. 9), the NRC considers minimum flow tests to produce data of marginal value in providing assurance of a pump's operability. A full flow test, during refueling outages or cold shutdowns, is more desirable. Deferring tests to cold shutdowns or refuelings is permissible per staff Position 9 of GL 89-04 provided pump differential pressure, flow rate, and bearing vibration measurements are taken during this testing and that quarterly testing also measuring at least pump differential pressure and vibration is continued. It is impractical to perform a full flow test on these pumps quarterly during normal plant operation since this system is in standby with the RCS pressure greater than the SI pump capability.

The licensee has also requested relief from the instrument full range requirement as specified in OMa-1988, Part 6, ¶4.6.1 for the differential pressure and vibration measurements during the quarterly test. The licensee states in the Basis that the instrumentation used during the Tech. Spec. testing will meet the accuracy requirements for assuring SI pump operability per the Tech. Specs., but has provided no specific information regarding the range or accuracy. In the previous safety evaluation (Ref. 12) of this request, relief was not recommended, and the licensee was requested to provide further information. This information has still not been provided and until it is, relief cannot be recommended. The purpose of the IST tests is to ensure the operability of the component to perform as required. Without further specific information, there is no assurance that the accuracy of the specific attributes monitored will be adequate to detect degradation.

Although not specifically requested, the licensee appears to be requesting permission to use alternative testing to be able to perform the refueling tests using reference values or pump curves, depending on plant refueling conditions, maintenance performed, and the quantity of data required. As discussed in both Draft NUREG-1482 (Ref. 11), Section 5.2, and the previous SE (Ref. 12), the use of pump curves for reference values of flow rate and differential pressure is acceptable if the licensee clearly demonstrates the impracticality of establishing a fixed set of reference values. The licensee has provided no information on the impracticality of establishing a fixed set of reference values during cold shutdowns or refueling outages for the Safety Injection Pumps. However, the primary choice of performing a Code pump test - including velocity vibration measurements - at a test point in the stable region of the performance curve is acceptable. Additionally, the seven elements discussed in Section 5.2 of Draft NUREG-1482 (Ref. 11) must be included in the relief request.

In conclusion, the licensee's request to defer the quarterly flow testing for the SI pumps is in accordance with Position 9 of GL 89-04, and relief is granted pursuant to §50.55a ¶(f)(6)(i) based on the impracticality of performing testing in accordance with Code requirements, and in consideration of the burden on the licensee if the Code requirements were imposed on the facility. It is recommended that the licensee consider the practicality of performing the full flow test during cold shutdowns as well as refuelings as a means of gaining more performance data.

The licensee has not provided sufficient information regarding the range and accuracy of the instruments which will be used during these tests. Therefore, an assessment as to the acceptability of these instruments cannot be made, nor can any assurance be provided that they are sensitive enough to detect pump degradation and ensure operability. Therefore, relief cannot be recommended. The licensee should perform the full flow test using reference values, during refueling outages (and as recommended at cold shutdowns), and compare these values to the limits contained in OMa-1988 Part 6, Pump differential pressure and vibration should continue to be monitored quarterly during pump minimum recirculation flow testing, and action taken as per the requirements of the Code as well as the Technical Specifications. The licensee should revise this relief request in accordance with Section 5.2 of Draft NUREG-1482 (Ref. 11) if the use of pump curves is desired.

2.7 Chemical and Volume Control System

2.7.1 Pump Relief Request 1.4.6, Centrifugal Charging Pumps A and B

Licensee's Relief Request: The licensee requests relief from the quarterly testing requirements using reference values as specified in OMa-1988, Part 6, ¶5.2(b) for the Centrifugal Charging Pumps. In addition the licensee is also seeking relief for the instrument range requirements per OMa-1988, Part 6, ¶4.6.1.

Proposed Alternate Testing: The Centrifugal Charging Pumps will be tested according to the following program:

Quarterly

The Centrifugal Charging pumps will be tested quarterly to verify Technical Specifications are met. The test measures differential pressure and velocity vibration data. The differential pressure and velocity vibration data will be trended. The instrumentation range requirements of Section 4.6.1.2(a) will be waived. The instrumentation used to measure suction and discharge pressure will meet applicable accuracy requirements for the determination of operability per Technical Specifications. The instrument used to measure vibrations will meet the requirements specified in Relief Request 1.3.1. The flow through the miniflow line to the Volume Control Tank will be assumed to be constant at the orifice design conditions (60 gpm).

Refueling Outage

During each refueling outage, a Code pump test - including velocity vibration measurements - will be performed at a test point in the stable region of the performance curve.

As an alternative to repeat testing at a single point in the stable region, a reference curve may be obtained with applicable acceptance curves plotted. Using this technique, the full flow test point (also in the stable region of the pump curve) will be bound by flow points obtained in the development of the reference curve. The data obtained is then evaluated against acceptance criteria and Chapter 15 basis acceptance curves to verify pump operability. When baseline vibration data varies significantly over the pump head curve, vibration acceptance criteria will be developed for flow regions of the head curve.

The test method selected will depend on plant refueling conditions, maintenance performed on the pump, and the quantity of pump data required. Each method however will ensure that the pump is tested in the full flow region of the head curve and that system operability is verified. Each test methodology is consistent with the intent of Code requirements and GL 89-04.

Licensee' Basis for Relief: The licensee states that:

1) "When testing these pumps on line, the only flow path available is through a combination of the normal charging line and the miniflow line to the Volume Control Tank. This test yields a test point back on the head curve. As stated in Generic Letter 89-04, minimum flow lines are not designed for pump testing purposes. The test point for monitoring pump performance for degradation should be

in a more stable region on the pump performance curve. Also, the miniflow is not instrumented for flow. The flow through the line is assumed to be at the flow rate corresponding to the orifice design conditions.

2) Also, range requirements will be waived for the quarterly test. The purpose of the quarterly test is to verify Tech Spec requirements are met and to obtain vibration data for trending. The instrumentation used for the quarterly Centrifugal Charging Pump test will meet accuracy requirements for assuring Centrifugal Charging Pump operability per Technical Specifications."

Evaluation: The licensee has requested relief from the quarterly testing requirements which require the measurement of flow rate and the pressure instrument range requirements for the Centrifugal Charging Pumps A and B. The two centrifugal charging pumps per Unit are horizontal centrifugal pumps, high pressure and low flow (2800 psig, 150 gpm), driven by 600 hp induction motors.

In lieu of the quarterly flow test at the reference value as specified in OMa-1988, Part 6, ¶5.2(b), the licensee is proposing to demonstrate pump operability through a minimum flow test quarterly, measuring pump differential pressure and vibration, and a full flow test during refueling outages. There is no means to measure the minimum flow to obtain the total flow rate during the quarterly test. The licensee has determined that installation of a flow element on the minimum flow line is not cost effective at this time (Ref. 14).

The Centrifugal Charging Pumps of the CVCS are used in the high head safety injection system of the emergency core cooling system providing high pressure, low volume refueling water from the refueling water storage tank. During normal operation one of these two pumps, or the reciprocating charging pump, will provide charging flow to the reactor coolant system. A review of the CVCS flow diagram, MC-1554-2.0, shows that there is a 2 inch recirculation loop leading from the common discharge of the pumps which then passes through the Seal Water Heat Exchanger and ultimately returns to the Volume Control Tank. As discussed in Question 48 of the Public Meetings held on GL 89-04 (Ref. 9), the NRC considers minimum flow tests to produce data of marginal value in providing assurance of a pump's operability. A full flow test, during refueling outages or cold shutdowns, is more desirable. Deferring tests to cold shutdowns or refuelings is permissible per staff Position 9 of GL 89-04 provided pump differential pressure, flow rate, and bearing vibration measurements are taken during this testing and that quarterly testing also measuring at least pump differential pressure and vibration is continued. For its Zion Nuclear Generating Station, Commonwealth Edison (Ref. 15) performs the quarterly test during normal operation by taking manual control of normal makeup and maintaining the pressurizer level constant. This flow rate becomes the reference value but may be 60% of the high head design value. Although the licensee has chosen to perform the Code pump test at refueling outages, this other scheme may be beneficial.

The licensee has also requested relief from the instrument full range requirement as specified in OMa-1988, Part 6, ¶4.6.1 for the differential pressure and vibration measurements during the quarterly test. The licensee states in the Basis that the instrumentation used during the Tech. Spec. testing will meet the accuracy requirements for assuring Centrifugal Charging Pump operability per the Tech. Specs., but has provided no specific information regarding the range or accuracy. In the previous safety evaluation (Ref. 12) of this request, relief was not recommended, and the licensee was requested to provide further information. This information has still not been provided and until it is, relief cannot be recommended. The purpose of the IST tests is to ensure the operability of the

component to perform as required. Without further specific information, there is no assurance that the accuracy of the specific attributes monitored will be adequate to detect degradation.

Although not specifically requested, the licensee appears to be requesting permission to use alternative testing to be able to perform the refueling tests using reference values or pump curves, depending on plant refueling conditions, maintenance performed, and the quantity of data required. As discussed in both Draft NUREG-1482 (Ref. 11), Section 5.2, and the previous SE (Ref. 12), the use of pump curves for reference values of flow rate and differential pressure is acceptable if the licensee clearly demonstrates the impracticality of establishing a fixed set of reference values. The licensee has provided no information on the impracticality of establishing a fixed set of reference values during normal operation, cold shutdowns, or refueling outages for the Centrifugal Charging Pumps. However, the primary choice of performing a Code pump test - including velocity vibration measurements - at a test point in the stable region of the performance curve is acceptable. Additionally, the seven elements discussed in Section 5.2 of Draft NUREG-1482 (Ref. 11) must be included in the relief request.

In conclusion, the licensee's request to defer the quarterly flow testing for the Centrifugal Charging Pumps is in accordance with Position 9 of GL 89-04, and relief is granted pursuant to §50.55a ¶(f)(6)(i) based on the impracticality of performing testing in accordance with Code requirements, and in consideration of the burden on the licensee if the Code requirements were imposed on the facility. It is recommended that the licensee consider the practicality of performing the full flow test during cold shutdowns as well as refuelings as a means of gaining more performance data.

The licensee has not provided sufficient information regarding the range and accuracy of the instruments which will be used during these tests. An assessment as to the acceptability of these instruments cannot be made, nor can any assurance be provided that they are sensitive enough to detect pump degradation and ensure operability. Therefore, relief cannot be recommended. The licensee should perform the full flow test using reference values, during refueling outages (and as recommended at cold shutdowns), and compare these values to the limits contained in OMa-1988 Part 6. Pump differential pressure and vibration should continue to be monitored quarterly during pump minimum recirculation flow testing, and action taken as per the requirements of the Code as well as the Technical Specifications. The licensee should revise this relief request in accordance with Section 5.2 of Draft NUREG-1482 (Ref. 11) if the use of pump curves is desired.

2.8 Nuclear Service Water System

2.8.1 Pump Relief Request 1.4.7, Nuclear Service Water Pumps A and B

Relief Request: The licensee requests relief from Section 4.6.1.6 which requires the frequency response range of the vibration measuring transducers to be from one-third minimum pump shaft rotational speed to at least 1000 Hz.

Proposed Alternate Testing: In lieu of Section 4.6.1.6, the vibration instrumentation will be calibrated over a range of 10 to 1000 Hz. Accuracy of measurement within this range is addressed in Relief Request 1.3.1.

Licensee's Basis for Relief: The licensee states that: "The Nuclear Service Water pumps are designed to operate at 1185 rpm. This speed yields a frequency of 19.75 Hz (1185/60). The

vibration instrumentation used cannot be calibrated to the required one-third minimum shaft speed of 6.58 Hz (19.75/3). This calibration range (i.e., 10 to 10,000 Hz.) encompasses most of the noise contributors, and repeatability within this range is very good."

Evaluation: The two Nuclear Service Water pumps per Unit are horizontal centrifugal pumps, low head and very large flow (17,500 gpm at 130 ft.), driven by 1000 hp induction motors of medium speed. Nominal synchronous speed (no load speed) of the motor is 1200 rpm for a six pole, 3 phase, induction motor with a full load speed of 1185 rpm. The lower frequency of 1/3 shaft rotational speed is 6.58 Hz. The lower frequency at 1/2 shaft rotational speed is 9.88 Hz. The full speed frequency is 20 Hz (i.e., 1200/60 at no load). Under the previous requirement, i.e., Section XI, ¶IWP-4520(b), the frequency range of 9.88 to 20 Hz could be met with the vibration instruments identified with only a very small chance of missing a lower range frequency. Under OMa-1988, Part 6, Section 4.6, however, the requirement lowers the low frequency end and significantly extends the high frequency end. As discussed in Mr. J. Zudan's paper describing the differences between OM-Part 6 and Section XI in NUREG/CP-0111 (Ref. 16), the basis for this change is that "this range of frequencies will more accurately envelope all potential noise contributors." The lower limit of the range is to allow detection of problems such as bearing oil whirl and looseness of bearings. The licensee should evaluate whether the Service Water pumps are susceptible to degradation mechanisms that result in increased vibration levels at frequencies below 10 Hz.

The licensee's Catawba Nuclear Station also requested relief for its Nuclear Service Water pumps, which had a slower full load speed of 710 rpm, which corresponds to a low end frequency of 3.94 Hz (at 1/3 rotational shaft speed). At the Catawba plant, the Licensee's CSI model 2110 instrument used for vibration monitoring was equipped with analog integration circuits and other upgrades to lessen instrument susceptibility to field problems with low frequency measurements. It provided the capability of obtaining repeatability of results at frequencies as low as 3 Hz. The licensee cautioned however, that the equipment available for calibration at Duke Power's standards lab would not support calibration of instruments at frequencies less than 10 Hz. The licensee stated that instrumentation for vibration measurements were in place and well established but believes a disruption in the program would be expensive and the ascertainment or improvement of accuracy would have negligible impact on the effectiveness of the pump vibration monitoring.

Instrumentation and calibration services do exist that can detect pump vibrations at very low speeds with a 1/3 minimum pump shaft rotational speed corresponding to 2 Hz. In the licensee's case the question becomes one of being able to calibrate the instrument with the existing calibration equipment and standards that have been developed at some cost. Instruments such as those used at the Catawba Station are acceptable to the NRC. Catawba Nuclear station was granted relief pursuant to §50.55a ¶(a)(3)(i) and (ii). (Catawba Safety Evaluation dated January 16, 1992) (Ref. 17).

If the licensee commits to using similar instruments at McGuire Nuclear Station as it did at Catawba Nuclear Station, then this alternative would provide an acceptable level of quality and safety and imposition of compliance would result in an undue burden on the licensee without a compensating increase in the level of quality and safety. It would be recommended that relief be granted pursuant to §50.55a ¶(a)(3)(i) and (ii) provided, as discussed in the October 12, 1993 SE (Ref. 12), the licensee revises the relief request to discuss the accuracy and repeatability of the instruments. Additionally, the licensee should evaluate whether the pumps are susceptible to degradation mechanisms which result in increased frequencies less than 10 Hz. and provide this information in the relief request.

3.0 VALVE IST PROGRAM RELIEF REQUESTS

In accordance with §50.55a, Duke Power Company has submitted four relief requests for specific valves at the McGuire Station that are subject to inservice testing under the requirements of ASME Section XI. These relief requests have been reviewed to verify their technical basis and determine their acceptability. Each relief request that is not authorized by Generic Letter 89-04 is summarized below, along with the technical evaluation by BNL.

3.1 Containment Spray System

3.1.1 Valve Relief Request RR-NS1, Containment Spray (NS) Pump Check Valves

Relief Request: The licensee has requested relief from full-stroke open exercising of the Containment Spray Pump Check Valves, NS-13, 16, 30, 33, 41, and 46, quarterly as required by OMa-1988, Part 10, ¶4.3.2.1.

Proposed Alternate Testing: In lieu of quarterly exercising the licensee proposes to disassemble/inspect all six valves on a frequency of once every four refueling outages (i.e., once every 6 years at present). A partial stroke test using air flow will be performed after reassembly. Subsequent partial stroke tests will be performed within the four refueling outage interval but not every refueling outage.

Licensee's Basis for Relief: The licensee states: "This valve population is verified to full stroke open by sample disassembly (refer to Justification of Deferrals 1-MC-NS2 and 2-MC-NS2). There are currently two separate subgroups within this population of valves. Group 1 contains the 2 valves associated with RHR discharge flow and group 2 contains the 4 valves associated with NS pump discharge flow. The present disassembly schedule inspects one valve from each group every refueling outage. During the four year history of disassembly, there have been no indications of wear, corrosion or degradation to the internal components. This is attributed to the fact that this population of valves is not subjected to flow, unless containment spray is initiated through the spray nozzles. Except for the spray nozzles there is no flow loop downstream of these check valves.

Due to the restricted access of this valve population, disassembly of any valve requires scaffolding to be erected on top of the polar crane. Tools, equipment, parts, electrical power and air lines must also be transported to the work location. Requirements of 29CFR 1910.28, 29CFR 1926.452, ANSI A10.8-1977 and Duke Power's scaffolding program place workers at risk during the erection of scaffolding, and to a lesser degree, during the disassembly/reassembly execution. This concern for personnel safety is also coupled with the fact that these check valves are cover hung, swing check valves. This type of valve does not allow the technician to visually or physically verify exact seat realignment during reassembly. It is therefore possible, though unlikely, to degrade the condition of these valves by excessive disassembles.

The partial stroke test will not be performed each outage as scaffolding and polar crane use time is required for it also. This schedule of disassembly is to begin during EOC9 for both Units. All six valves will be disassembled and inspected. A partial stroke will be performed after reassembly. The valves will not be disassembled again until EOC13 (for both Units)."

Evaluation: Containment Spray pump discharge check valves NS-13, 16, 30, 33, 41, and 46 are eight inch, Category C, normally closed check valves. These valves open upon initiation of flow from the containment spray pumps through the spray headers. OMa-1988, Part 10, ¶4.3.2.1 specifies that check valves will be exercised quarterly to their safety positions. This testing may be deferred to cold shutdowns or refueling outages if quarterly testing is not practical.

As stated by licensee in the Basis, and confirmed through a review of flow diagram, MC-1563-1.0, testing these valves with flow would require initiation of containment spray, which is not practical. As described in Section 6.5.4 of the McGuire UFSAR (Ref. 13), air is used to test the containment spray header valves. Generic Letter 89-04, Position 2 allows for check valve grouping and disassembly and inspection as an alternative to full-flow testing. Specific requirements are provided limiting the size of the sample group, sampling frequency, and corrective action should valve degradation be found.

The licensee is proposing to perform a one time disassembly and visual inspection for these six check valves, then perform no additional tests for a six year period, when each valve would be disassembled and inspected again. The licensee, in the Basis, states that this proposed schedule is primarily based upon the personnel and logistic hardships encountered during the inspection process. In the response to Questions 12 and 19 contained in the Minutes of the Public Meetings held on GL 89-04 (Ref. 9), the NRC recognized that the provisions of Position 2 may have a significant impact upon outage time. The existence of "extreme hardship" that would allow an extension of the disassembly schedule is dependant upon particular plant circumstances. Examples cited include the need to off-load the reactor core, or the need to operate at mid-level of the reactor coolant loops. It does not appear that erection of scaffolding solely would be considered an extreme hardship given these examples.

The basic concern with the licensee's approach relates to confidence in ensuring continued operability of the valves. The staff considers the sampling aspect of a staggered sequence to provide assurance of the continued operability of the valves that are not inspected during any given refueling outage provided that at least one valve in the grouping is disassembled and inspected. The licensee has not provided information on the required review of industry experience regarding the same type of valves used in similar service. As stated in Position 2, extension of the valve disassembly/inspection interval to one valve every other refueling outage or expansion of the group size above four valves should only be considered in cases of <u>extreme</u> hardship where the extension is supported by actual results from previous testing, and industry experience. The licensee's testing experience for the past 4 years has shown no indications of wear, corrosion, or degradation to the internal components.

Another concern that should be addressed relates to the common cause failure rate and the basic event (i.e., failure to open) failure rate. The common cause failure rate may be greater for a grouping of six check valves of 6 years duration between disassembly versus the staggered sequence. It may turn out that the common cause failure rate is quite small and can be neglected. However, the licensee is obligated under Position 2 to review industry experience regarding the same type of valve used in similar service. Additionally, the significance of the loss of benefits of sampling should be addressed. One method for assessing this significance could be to identify the basic event failure rate and the common cause failure rate for the two schemes, and the corresponding difference in unavailability of the containment spray system and Level II containment failure frequency. If the common cause failure rate proves to be high the licensee should reevaluate the relief request. Partial

stroke testing in the succeeding four refueling outage interval could help alleviate concerns about common cause failures. The licensee should also address the partial stroke testing schedule in its evaluation.

The primary intent of disassembling and inspecting one valve each outage is to provide some degree of assurance that the valve has not degraded and will perform as required. The licensee's proposal to perform no inspections for a six year period does not provide similar assurance. Proper operation of these check valves is essential in ensuring the proper operation of the containment spray system in order to mitigate the consequences of an accident. The difficulties described by the licensee do not meet the examples of extreme hardship as provided by the NRC. The licensee should evaluate the burden of inspecting the valves versus the benefit from performing the inspections. Without an evaluation of the effect upon plant safety, industry experience, and a more detailed explanation of the burden, authorization of the licensee's alternate inspection schedule cannot be recommended. Numerous other PWR licensees perform inspections of the containment spray valves in accordance with GL 89-04. The licensee should continue to perform the inspections in accordance with GL 89-04 Position 2.

As an alternative, the licensee may consider the use of non-intrusive techniques for these valves. As discussed in Draft NUREG-1482 (Ref. 11), Section 4.1.2, such techniques are permissible per the Code and provide indirect indications of proper check valve functioning. As discussed, these techniques, when used in conjunction with flow tests, may be used on a sampling basis to verify full-stroke opening, and as such, provide an alternative to disassembly and inspection. Such techniques, in conjunction with the testing performed on these valves with air, could provide indication of valve operability, while minimizing the difficulty encountered during visual inspections and reassembly.

3.2 <u>Nuclear Service Water System</u>

3.2.1 Valve Relief Request RR-RN1, Nuclear Service Water to Containment Spray Heat Exchanger Check Valves

Relief Request: The licensee has requested relief from full-stroke close exercising of the Nuclear Service Water to Containment Spray Check Valves, RN-994 and RN-1006, in accordance with OMa-1988, Part 10, ¶4.3.2.1 and ¶4.3.2.2.

Proposed Alternate Testing: These check valves will be exercised closed on a yearly frequency during the nuclear service water system (RN) flow balance.

Licensee's Basis for Relief: The licensee states: "Testing these valves for closure requires passing the design flow through the containment spray heat exchanger. These heat exchangers are placed in wet-layup to maintain the heat exchanger integrity. Nuclear service water cools these heat exchangers and they have experienced corrosion from this raw water. Under wet lay-up conditions, the chemistry of the water on the raw water side of the heat exchanger is controlled and maintained for longer life of the heat exchangers. Testing these check valves would severely change the chemistry in the wet lay-up state which would result in higher corrosion risk and major cost impact."

Evaluation: Check valves RN-994 and RN-1006 are 1 inch, Category C, check valves that are normally open when the wet layup recirculation pump is in operation. As shown in nuclear service water flow diagrams, MC-1574-3.1 and MC-1574-2.1, these check valves provide a safety function

in the closed direction for the nuclear service water (RN) system integrity during a seismic event in the event the non-Code piping fails.

It is impractical to test these check valves on a quarterly basis because of the potential for heat exchanger corrosion by having the chemical protection swept away during the test. OMa-1988, Part 10, ¶4.3.2.2(e) states that if exercising is not practicable during power operation or cold shutdowns, it may be limited to full-stroke exercising during refueling outages. The licensee's proposal to exercise these valves closed on a yearly frequency, during the nuclear service water system flow balance, exceeds this requirement. Based upon the fact that the annual testing of these valves providing an acceptable level of quality and safety, it is recommended that the alternative be authorized pursuant to §50.55a ¶(a)(3)(i).

3.3 Diesel Generator Starting Air System

3.3.1 Valve Relief Request RR-VG1, Diesel Generator Control Air Solenoid Valves

Relief Request: The licensee has requested relief from stroke time exercising the control air to the diesel generator valves (VGSV5160, 5161, 5162, 5163, 5170, 5171, 5172, 5173), in accordance with OMa-1988, Part 10, ¶4.2.

Proposed Alternate Testing: Design Bases Document MCS-1609.VG-00-0001 paragraph 20.4.3.1 states that these valves shall be tested by the diesel start tests. These tests are performed monthly, and a failure of any one of these valves would result in a failure of the diesel start test. The monthly diesel start test will continue to be performed, and during the refueling outages mentioned below, the function of these class B valves will be changed such that they are no longer subject to OMa-1988, Part 10, ¶4.2 requirements.

Licensee's Basis for Relief: The licensee states: "Direct observation of these valves is impossible. These valves are automatically opened when the diesel generator is started. Similar valves (the starting air solenoid valves) are tested with acoustic emission monitoring. Limitations on available acoustic equipment prevents its use on these valves. Additionally, these valves are scheduled to be modified in function during refueling outages 1EOC9 Unit 1, and, 2EOC9 Unit 2 (i.e., August 1994 and November 1994, respectively). Their new function will not be within the scope of the IST program. To comply with the requirements of Section 4.2 would impose a cost burden of additional acoustic monitoring equipment for the quarterly timing. Due to the short time before these valves are modified, no adverse trends could be developed from the quarterly testing."

Evaluation: The purpose of these solenoid operated valves is to supply control air to the Diesel Generator air/oil booster cylinder, the intercooler temperature controller, and the run/shutdown cylinder. Section XI and OMa-1988 Part 10 require the measurement of valve stroke times as a means of monitoring valve degradation. The diesel control air header solenoid valves are enclosed and have no position indication. There are no design provisions that allow for measuring the stroke times of these valves by conventional methods. The licensee has stated that "Limitations on available acoustic equipment prevents its use on these valves" and that it would be burdensome to obtain additional acoustic monitoring equipment. The licensee's position is that another means of indirect indication of valve disk movement can be obtained from the monthly diesel start test.

If any one of these valves fails to perform its intended function, it would result in a failure of the diesel to start. Conversely, a successful start of the diesel would indirectly indicate that the valve disk properly moved. As such, the proper movement of the valve disk is indirectly verified on at least a monthly basis. However, there is no measurement of degradation or trending over time. A successful start is a yes-no test but does not provide time information to give an indication of degradation. If the diesel start times can be correlated to these valves' stroke times, there would be better information on degradation.

As discussed in the initial relief request that was submitted by a Duke Power letter dated July 8, 1992, the valves in question were not initially included within the scope of the IST program. This oversight was identified as a result of the Design Basis Document upgrade program. During the upcoming refueling outages (EOC-9 for both Units), the valves in question will be modified. The modification would result in deleting the valves from the scope of the IST program, apparently under 10 CFR 50.59. The licensee has not provided information that would explain the basis for removing these valves from the IST program. This basis should be available for review by the NRC during subsequent inspections. For Unit 2, a revised relief request reflecting the revised schedule for completing the modification (EOC-9 refueling outage) was provided by a Duke Power letter dated August 24, 1993. The October 12, 1992 submittal provided the revised relief request which updated the Unit 1 revised schedule for completing the modification (from EOC-8 to EOC-9 refueling outage). The reason for the delay in completing the modification is attributed to less diesel down time during the outage due to the increased concern with shutdown risk management. This revision will allow the modifications to be planned within allowable outage windows.

As noted, NRC approval of this relief request was originally provided by a letter dated September 25, 1992, in which the NRC advised that a relief request be submitted in the event the modifications were not completed during the 1993 refueling outages for the two Units. The October 12, 1992 IST program submittal for Unit 1 provided the request for relief for the Unit 1 valves, while for Unit 2 a relief request was submitted by an August 24, 1993 Duke letter. (Ref. 14 briefly summarizes the history of this relief request).

The previous SE (Ref. 12) stated that "The licensee has revised the request by rescheduling the modification to the next refueling outage, however, the licensee has not provided an explanation of the burden of utilizing acoustic equipment as requested in the previous SE. Therefore, without an expanded explanation of the burden of complying with the Code, relief cannot be recommended." In its letter to the Staff of February 24, 1994 (Ref. 14), the licensee went into more detail as to why the diesel start test was an acceptable alternative but is apparently reluctant to discuss any further the burden imposed by utilizing acoustic equipment. However, given the limited length of time that relief is required, and the level of safety afforded by the monthly diesel test, interim relief is recommended until EOC-9. If the licensee does not delete these valves from the program in EOC-9, and relief is still required, the licensee must provide a means for detecting valve degradation (e.g., trending diesel start times as discussed above) and resubmit this relief request.

3.4 Diesel Generator Room Sump System

3.4.1 Valve Relief Request RR-WN1, Diesel Generator Room Sump Pump Discharge Valves

Relief Request: The licensee has requested relief from full-stroke exercising the diesel generator room sump pump discharge valves (WN-3, 5, 7, 11, 13, and 15) open and closed, quarterly in accordance with OMa-1988, Part 10, ¶4.3.2.1.

Proposed Alternate Testing: These valves will be verified to fully cycle with the pump tests every two years.

Licensee's Basis for Relief: The licensee states: "These valves are tested with pump operation. The pumps are considered to be dry sump pumps (reference OMa-1988, Part 6, ¶5.5) and are tested on a two year frequency."

Evaluation: These diesel generator sump pump discharge valves are 2 in. or 6 in. simple swing check valves. These valves isolate parallel pump flow losses. WN-3, 5, 11, and 13, open to allow pump flow and close to isolate opposite pump flow losses. WN-7 and 15 close to isolate non-safety-related pumps from safety-related pumps. There are no test connections that would allow stroke exercising the valves open or closed quarterly. The only method available to test these valves is to run the sump pumps. The licensee requested relief to test these discharge valves every two years, which is consistent with Part 6 for the sump pump test frequency.

OMa-1988, Part 10, ¶4.3.2.2(e) states that if exercising is not practicable during power operation or cold shutdowns, it may be limited to full-stroke exercising during refueling outages. Some utilities have gone to a two year refueling outage cycle.

The licensee would have to fill the sump and run the pumps quarterly, solely to exercise these valves in accordance with the Code. Based on the required test setup, it would be a hardship, considering OMa-1988, Part 6, ¶5.5 only requires the licensee to run the pumps once every two years.

Based upon the impracticability of testing these valves quarterly in accordance with the Code, the licensee's proposal to test these valves every two years in conjunction with sump pump tests provides a reasonable alternative. It is recommended that relief be granted pursuant to §50.55a ¶(f)(6)(i).

4.0 DEFERRED TESTING JUSTIFICATIONS

Duke Power has submitted ninety-five deferral justifications that document the impracticality of testing valves quarterly, during operation, as required by Section XI. These justifications were reviewed to verify their technical basis. The results of this review are documented in Table 4.1. In general, the licensee should provide more information and discuss why the testing itself is impractical, by assessing the problems associated with performing the test. Generally, those tests involving a plant trip, damage to a system or component, or excessive personnel hazards are not considered practical. Removing one train for testing or entering a limiting condition of operation is not sufficient basis for not performing the required tests, unless the testing renders systems inoperable for extended periods of time. As discussed in GL 91-18 (Ref. 19), it is not the intent of IST to cause unwarranted plant shutdowns or to unnecessarily challenge other safety systems. Other factors, such as the effect on plant safety and the difficulty of the test may be considered.

The licensee states in numerous justifications that the testing cannot be performed because of consequences if the valve failed during testing. The licensee should not base the justification simply on an assumed failure, unless the failure could cause a loss of a safety system function or the probability and risk associated with a test induced failure warrants it. For example, the NRC staff has concluded that quarterly testing of PORVs is impractical because PORVs have shown a high probability of causing a small LOCA by sticking open. Typical valves, whose failure in a non-conservative position during exercising would cause a loss of system function, include all non-redundant valves in lines such as a single line from the RWST or accumulator discharge, or the RHR pump discharge crossover valves for plants whose licensing bases assumes that all four cold legs are being supplied by water from at least one pump (Reference NRC Information Notice 87-01). Other valves may fall into this category under certain system configurations or plant operating modes, e.g., when one train of a redundant ECCS system is inoperable, non-redundant valves in the remaining train should not be cycled because their failure would cause a total loss of system function. However, when assessing the practicality of testing a valve, the licensee should not consider both a design basis accident and a single failure in the other train, as described in LER 90-22, Revision 1 (Docket 50-369).

The ninety-five deferral justifications have been tabulated. Twenty-six of these were reviewed in the previous safety evaluation and additional information was requested but has not been received as of this date. Six of the deferrals should have been relief requests.

Table 4.1 McGuire Justification of Deferrals, Unit 1 (and 2)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
AUXILIARY FEEDWATER SYSTEM (CA)				
1(2)-MC-CA1	1(2)CA-37, 1(2)CA-41, 1(2)CA-45, 1(2)CA-49, 1(2)CA-53, 1(2)CA-57, 1(2)CA-61, 1(2)CA-65, 4" check valves, Cat. C, Auxiliary Feedwater Supply to Steam Generators, normally closed	MC-1592-1.0, Rev. 19, (MC-2592-1.0, Rev. 0) "Flow Diagram of Auxiliary Feedwater System (CA)"	"Full stroke testing these valves would unnecessarily thermal shock the steam generators and feedwater piping."	Valves will be full stroke exercised at cold shutdown. Closure will be verified quarterly.
Evaluation: These check valves are located in the supply lines to the steam generators. It is impractical to part-stroke or full-stroke exercise these valves open quarterly because this would result in the flow of cold Auxiliary Feedwater flow into the steam generators, possibly resulting in thermal stress and shock on the nozzle connections. The alternative provides full-stroke exercising open at cold shutdowns in accordance with OMa-1988 Part 10, ¶4.3.2.2(c).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-CA2	1(2)CA-165, 1(2)CA-166, 8" check valves, Cat. C, Nuclear Service Water to Auxiliary Feedwater	MC-1592-1.1, Rev. 14, (MC-2592-1.1, Rev. 1), "Flow Diagram of Auxiliary Feedwater (CA)"	"Neither full nor partial flow can be put through these valves without contaminating the Auxiliary Feedwater System with raw water. No means exist for alternate testing techniques using air or any other medium. No means exist to test for proper closure without contaminating the Auxiliary Feedwater System with raw water. These valves will not be tested during cold shutdown because sample disassembly is required."	At least one of these two valves will be disassembled and full stroked during each refueling outage, and both valves will have been disassembled and full stroked after two consecutive refueling outages. Failure of one valve to properly full stroke during a refueling outage will result in the remaining valves being disassembled and full stroked during that outage. Sample disassembly will also be used to verify proper closure of valves.

Evaluation: These valves are in the Nuclear Service Water (RN) supply to the steam generators. The RN system is only used if there is low suction pressure from the normally aligned sources of feedwater to the auxiliary-feedwater (CA) pumps. Hence, the RN supply is a backup supply. If, during CA operation, the suction pressure drops below a preset pressure for three seconds the downstream motor operated valves open allowing RN flow through the check valves (which must open).

It is impractical to part-stroke or full-stroke exercise these valves open quarterly or during cold shutdowns because this would result in contaminating the Auxiliary Feedwater System with raw service water. To verify closure of these valves by leak testing during power operation or cold shutdowns also would require that the EMOs immediately downstream be open, thereby contaminating the Auxiliary Feedwater System with raw service water. A review of P&ID MC-1592-1.1 verifies that there is no means to either full or partial stroke these valves with flow without service water flow to the Auxiliary Feedwater pumps.

The licensee's proposed alternative testing is to sample disassemble at least one of these two valves and verify full stroke open and closed (manually) during refueling outages. The licensee's proposed alternative testing by sample disassembly is in accordance with Generic Letter 89-04, Position 2.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-CA3	1(2)CA-8, 1(2)CA-10, 1(2)CA-12, 8" check valves, Cat. C, Auxiliary Feedwater Pump Suction check valves, normally closed	MC-1592-1.1, Rev. 14, (MC-2592-1.1, Rev. 1), "Flow Diagram of Auxiliary Feedwater (CA)"	"These valves cannot be tested to close without contaminating the Auxiliary Feedwater System with raw water. These valves will not be tested during cold shutdown because sample disassembly is required."	Valves will be sample disassem'led during refueling outages tc verify valve closure capability. 1(2)CA-8 is disassembled every refueling outage, 1(2)CA-10 and 1(2)CA-12 every other refueling outage on a staggered basis.
Evaluation: These valves open to allow the normal auxiliary feedwater supply to the Auxiliary Feedwater (CA) pumps and close when the alternate Nuclear Service Water (RN) source is the supply to the pumps. This deferral and the previous deferral go together. The licensee's proposed alternative testing is to sample disassemble at least one of these two valves and verify full stroke open and verify closure during refueling outages. The licensee has classified this alternative testing and frequency as a deferral when in fact it should be a relief request. The licensee should revise the IST program and include this as a relief request. However, the licensee's proposed alternative testing by sample disassembly is in accordance with Generic Letter 89-04, Position 2 and a relief request should be submitted.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
FEEDWATER SYSTEM (CF)				
1(2)-MC-CF1	1(2)CF-26AB, 1(2)CF-28AB, 1(2)CF-30AB, 1(2)CF-35AB, 12" electric-hydraulic actuated gate valves, Cat. B, Main Feedwater Isolation valves, normally open	MC-1591-1.1, Rev. 14, (MC-2591-1.1, Rev. 0) "Flow Diagram of Feedwater System (CF)"	"Closure of these valves would isolate the Steam Generator feedwater which could result in a severe transient in the Steam Generator, resulting in a Unit trip."	Valves will be cycled and timed during cold shutdown.
Evaluation: These valves are normally open and provide Main Feedwater to the steam generators main feedwater nozzles, and, close to (1) provide main feedwater isolation to prevent over pressurization of containment following a feedwater or main steam line break, (2) preclude blowdown of all steam generators following a feedwater or main steam line break, and (3) provide containment isolation following a LOCA or similar accident. It is impractical to part-stroke or full-stroke exercise these valves closed quarterly because closure of these valves would result in a loss of steam generator level control and a possibly result in a plant trip. These valves also provide a containment isolation function and the licensee has not addressed the test requirements which in this case would be a seat leak rate test in accordance with 10CFR50, Appendix J. The alternative provides full-stroke exercising to the open and closed positions at cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c). However, the licensee has not addressed containment isolation testing. The licensee should revise and resubmit this deferral.				
1(2)-MC-CF2	1(2)CF-17AB, 1(2)CF-20AB, 1(2)CF-23AB, 1(2)CF-32AB, 18" air operated globe valves, Cat. B, Main Feedwater Control Valves to Steam Generators, normally open	MC-1591-1.1, Rev. 14, (MC-2591-1.1, Rev. 0) "Flow Diagram of Feedwater System (CF)"	"Closure of these valves would isolate the Steam Generator feedwater which could result in a severe transient in the Steam Generator, resulting in a Unit trip."	Valves will be cycled and timed during cold shutdown.
Evaluation: These valves control the flow of Feedwater to the Steam Generators. It is impractical to either part-stroke or full-stroke exercise these valves closed quarterly because closure of these valves would result in a loss feedwater flow to the steam generator which would result in water level control problems and a possible plant trip. The alternative provides full-stroke exercising to the closed position and stroke timing during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-CF3	1(2)CF-126B, 1(2)CF-127B, 1(2)CF-128B, 1(2)CF-129B, Main Feedwater Startup Isolation Valves, 6 in. normally closed motor-operated gate valves, Cat. B	1.1MC-1591-1.1, Rev. 14, (MC-2591-1.1, Rev. 0) "Flow Diagram of Feedwater System (CF)"	"Cycling valves during power operation could induce unwanted transients in the steam generators. This would result in an increase in flow to the main feedwater nozzles causing vibrations in the preheater section of the steam generators."	Valves will be cycled and timed during cold shutdown.

Evaluation: These valves open in a preheater bypass line to supply startup feedwater to the steam generators through the Auxiliary Feedwater nozzles. Upon reaching about 17% flow at low load the flow is directed to the main feedwater nozzle via the preheater. With the electric-hydraulic valves closed these valves must provide the same safety functions of (1) provide main feedwater isolation to prevent over pressurization of containment following a feedwater or main steam line break, (2) preclude blowdown of all steam generators following a feedwater or main steam line break, and (3) provide containment isolation following a LOCA or similar accident.

It is impractical to exercise these valves open during power operation because this could induce transient conditions in the steam generators resulting in an increased flow of feedwater to the Feedwater nozzles and in vibrations in the preheater section of the steam generators. These valves also provide a containment isolation function and the licensee has not addressed the test requirements which in this case would be a seat leak rate test in accordance with 10CFR50, Appendix J.

The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c). However, the licensee has not addressed containment isolation testing. The licensee should revise and resubmit this deferral.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-CF4	1(2)CF-104AB, 1(2)CF-105AB, 1(2)CF-106AB, 1(2)CF-107AB, 6" air operated valves, Cat. B, Main Feedwater Flow Tempering Control Valves to Steam Generators	MC-1591-1.1, Rev. 14 (MC-2591-1.1, Rev. 0) "Flow Diagram of Feedwater System (CF)"	"Closing this valve during operation could result in loss of Steam Generator level control and result in a Unit trip."	Valves will be cycled and timed during cold shutdown.
Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.1). The Steam Generator Tempering Flow Valves are in a 6 in. bypass line around an 18 in. line containing the main feedwater control valves, with one 18 in. line leading to each steam generator. The licensee is implying that quarterly testing would be performed when the valves are open. According to the McGuire FSAR, Section 7.7.1.7 on steam generator water level control, a secondary automatic control system is provided for operation at low power which uses the steam generator water level and nuclear power signals to position the bypass valve, which is the same as the tempering valve. Switchover from the bypass feedwater control system, which is operating at low power, to the main feedwater control system is initiated by the operator at approximately 17% power. While the flow diagram, MC-1591-1.1, Rev. 14, (MC-2591-1.1, Rev. 0), "Flow Diagram of Feedwater System (CF)," shows the tempering valves to be normally open, it is not likely that the valves would be open above 17% power. Even if the valves are open, it does not seem likely that isolating the flow from the 6 in. bypass line would cause a feedwater transient. The licensee should clarify the operation of these tempering valves and the conditions under which quarterly testing is assumed to be performed.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-CF5	1(2)CF-152, 1(2)CF-154, 1(2)CF-156, 1(2)CF-158, 2" check valves, Cat. C, tempering circuits to auxiliary feedwater nozzles, normally open	MC-1591-1.1, Rev. 14 (MC-2591-1.1, Rev. 0) "Flow Diagram of Feedwater System (CF)"	"During normal operation, there is constant flow through these valves to keep the auxiliary feedwater nozzles tempered. Testing these valves would require supplying the Steam Generators with cold water and thus thermally shocking these nozzles."	Valves will be full stroke exercised at cold shutdown.

Evaluation: These normally open check valves provide safety functions in both open and closed positions. When open tempering flow is provided to the steam generator Auxiliary Feedwater nozzles. The valves close to form a pressure boundary when the Auxiliary Feedwater System is in operation.

It is impractical to full-stroke exercise these valves closed quarterly during plant operation because this would require operation of the Auxiliary Feedwater System and thereby supply the steam generators with cold water and imposing thermal stresses on the Auxiliary Feedwater nozzles.

The alternative proposed by the licensee to full-stroke exercise these check valves at cold shutdowns is in accordance with OMa-1988 Part 10, ¶4.3.2.2(c). The licensee should ensure that this full-stroke exercising is for both the open and closed positions.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
REFUELING WATER SYSTEM (FW)				
1(2)-MC-FW1	1(2)FW-27A, 14" motor operated gate valve, Cat. B, Refueling Water Storage Tank (RWST) supply isolation valve to Residual Heat Removal (RHR) pumps suction header, normally open with power removed	MC-1571-1.0, Rev. 16, (MC-2571-1.0, Rev. 10), "Flow Diagram of Refueling Water System (FW)"	"Closure of this valve during normal power operation would render all low pressure injection inoperable. This valve is opened and power removed above Mode 4 per Tech Spec. 4.5.2."	Valve will be cycled and timed during cold shutdown.
Evaluation: This valve isolates the supply of water from the RWST to the suction of the Low Pressure Injection(LPI)/RHR pumps. It is impractical to full-stroke exercise this valve closed during power operation because this would isolate both trains of LPI, rendering it unavailable if needed. In addition, the reactor coolant system pressure would prevent full flow testing of these valves because it is higher than the RHR pump pressure. The alternative provides full-stroke exercising to the open and closed positions during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c). The licensee should ensure that this full-stroke testing is for both the open and closed directions.				
1(2)-MC-FW2	1(2)FW-28, 10" check valve, Cat. C, Refueling Water Storage Tank (RWST) supply check valve to Residual Heat Removal (RHR) pumps suction header, normally closed	MC-1571-1.0, Rev. 16, (MC-2571-1.0, Rev. 10), "Flow Diagram of Refueling Water System (FW)"	"Valve cannot be full stroked during power operation since the only full flow path is into the RCS by the Residual Heat Removal pumps. These pumps cannot overcome RCS system pressure."	Valve will be full stroke exercised at cold shutdown.
Evaluation: This valve opens to allow LPI flow to the RHR pumps and closes to prevent reverse flow to the RWST. It is in line and just downstream of isolation valve 1(2)FW-27A. It is impractical to full stroke exercise this valve open and closed quarterly during power operation because the only full flow path through this valve is into the Reactor Coolant System (RCS) by the RHR pumps. The RHR pumps cannot overcome the RCS pressure. The alternative provides full-stroke exercising during cold shutdowns in accordance with OMa-1988 Part 10 ¶4.3.2.2(c). This check valve is also in the RHR (ND) test line and must partially open for the RHR pump quarterly testing. It appears that this valve can be part-stroke exercised to the open position quarterly in conjunction with the RHR pump testing.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
INSTRUMENT AIR SYSTEM (IA)				
1(2)-MC-IA1	1(2)IA-5260, 1(2)IA-5270, 1(2)IA-5280, 1(2)IA-5290, 1(2)IA-5300, 1(2)IA-5310, 1(2)IA-5320, 1(2)IA-5330, 1(2)IA-5340, 1(2)IA-5350, 1(2)IA-5360, 1(2)IA-5370, 1(2)IA-5380, 1(2)IA-5390, 1" Instrument air check valves, Cat. A&C	MC-1499-IA1, Rev. 0, (MC-2499-IA1, Rev. 0), "Instrument Detail, Upper/Lower Personnel Air Locks, Inflatable Seals Control Air System (IA)"	"These valves cannot be practically tested during operation due to the design of the system."	Valves will be verified closed by leak test performed in accordance with 10 CFR 50 Appendix J at a six month frequency per Tech Spec 4.6.1.3.d.
Evaluation: Valves 1(2)IA-5260, 5270, 5280, 5290, 5300, 5310, 5320 and 5330 prevent loss of instrument air from the receiver tank on each personnel airlock door in the event of loss of instrument air supply to the door seals. These check valves form a pressure boundary for the inflatable seals. Valves 1(2)IA-5340 and 5350 provide the inside containment isolation barrier in the event of a break on the flexible hose connection on the air supply to the door seals. The outside solenoid isolation valves are 1(2)IA-5080 and 5160. The check valves are on the auxiliary building side of the airlocks. Valves 1(2)IA-5360, 5370, 5380 and 5390 provide double isolation on the reactor building side of the airlocks for the pressure relief line. A review of Drawing No. MC-1499-IA1 confirms that there are no test connections which could be used to verify valve operability. The licensee's frequency of testing of 6 months is dictated by technical specifications if quarterly testing cannot be met. OMa-1988 Part 10, ¶4.3.2.2 allows full-stroke exercising that is not practical during operation to be deferred to cold shutdowns or refueling outages. In this case, full-stroke exercising to the closed position is verified by seat leak testing in accordance with Tech Spec 4.6.1.3.d. The licensee should additionally implement all related requirements of ¶4.3.2.2, which includes Part 10, ¶4.2.2.3(e) and (f).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
COMPONENT COOLING SYSTEM (KC)				
1(2)-MC-KC1	1(2)KC-424B, 1(2)KC-425A, 8" motor operated butterfly valves, Cat. A, Component Cooling Water return isolation valves from RCP motor coolers thru Penetration M-320, normally open	MC-1573-3.1, Rev. 7, (MC-2573-3.1, Rev. 5) "Flow Diagram of Component Cooling System (KC)"	"Failure of either of these valves in the closed position during testing would inhibit the normal flow path from the reactor coolant pump motor coolers. This action could result in damage to the pumps."	Valves will be cycled and stroke timed during cold shutdown.
Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.15). As shown on flow diagram MC-1573-3.1, Rev. 7, (MC-2573-3.1, Rev. 5) "Flow Diagram of Component Cooling System (KC)," 1(2)KC-424B and 1(2)KC-425A are installed in series in a line returning Component Cooling Water flow from inside the containment to the CCW return header outside and, as a result, isolate containment penetration M-320. The licensee states that "Failure of either of these valves in the closed position during testing would inhibit the normal flow path from the reactor coolant pump motor coolers. This action could result in damage to the pumps." The valves appear also to isolate the flow from the reactor vessel support coolers, and by referring to MC-1573-3.0, Rev. 10, (MC-2573-3.0, Rev. 7) From a review of the flow diagrams, it appears that the valves close also to isolate the reactor coolant pump thermal barrier heat exchangers. The licensee has not provided any information concerning the time available before such consequences would result following failure of the valves in the closed position. Testing should not be performed if the RCP or RCP seals could be damaged, resulting in an unisolatable LOCA. However, the licensee should provide further information in the CSJ basis to justify why the plant could not achieve a normal shutdown in the event that the valves fail closed during testing and clarify the function of these valves. The licensee should revise and resubmit this justification.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-KC2	1(2)KC-338B, 8" motor operated butterfly valve, Cat. A, Component Cooling Water supply to RCP motor coolers outboard isolation valve off Containment Penetration M-327, normally open	MC-1573-3.1, Rev. 7, (MC-2573-3.1, Rev. 5) "Flow Diagram of Component Cooling System (KC)"	"Failure of this valve in the closed position during testing would inhibit flow to the reactor vessel support coolers. This action could result in damage to the reactor vessel."	Valves will be cycled and stroke timed during cold shutdown.
Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.16). As shown on flow diagram MC-1573-3.1, Rev. 7, (MC-2573-3.1, Rev. 5) "Flow Diagram of Component Cooling Water System (KC)," this valve is located outside containment in a line supplying Component Cooling Water to the reactor vessel support coolers and, as a result, provides isolation for containment penetration M-327. The licensee states that failure of this valve in the closed position during testing would inhibit flow to the reactor vessel support coolers, and that this action could result in damage to the reactor vessel. The licensee has not provided any information concerning the time available before such consequences would result following failure of the valve in the closed position. The licensee should provide additional information in the basis to justify why the plant could not achieve a normal shutdown in the event that 1(2)KC-338B failed closed during testing. The licensee should revise and resubmit this justification.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-KC3	1(2)KC-332B, 1(2)KC-333A, 3" air operated diaphragm valves, Cat. A, Component Cooling Water discharge isolation valves from Reactor Coolant Drain Tank Heat Exchanger thru Containment Penetration M-355, normally open	MC-1573-3.1, Rev. 7, (MC-2573-3.1, Rev. 5) "Flow Diagram of Component Cooling System (KC)"	"Failure of one of these valves in the closed position during testing would inhibit flow through the reactor coolant drain tank heat exchanger. No alternate flow path for cooling water to the heat exchanger exists. Without flow to the heat exchanger, the drain tank would become over pressurized and steam would be released."	Valve will be cycled and stroke timed during cold shutdown.
Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.17). (Joint evaluation with 1(2)-MC-KC4 below). As shown on flow diagram MC-1573-3.1, Rev. 7, (MC-2573-3.1, Rev. 5) "Flow Diagram of Component Cooling Water System (KC)," valves 1(2)KC-332B and 1(2)KC-333A are air-operated valves located in the Component Cooling Water outlet line from the Reactor Coolant Drain Tank Heat Exchanger (RCDTHX) and, as a result, provide isolation for containment penetration M-355. Also as shown on MC-1573-3.1 (MC-2573-3.1), AOV 1(2)KC-320A is located on the CCW supply line to the RCDTHX and provides isolation for containment penetration M-376. The licensee states that failure of one of these valves in the closed position during testing would inhibit flow through the RCDTHX, and that no alternate flow path for cooling water to the RCDTHX exists. Without flow to the RCDTHX, the Reactor Coolant Drain Tank would become overpressurized and steam would be released. The licensee has not provided any information concerning the time available before such consequences would result following failure of one of the valves in the closed position. The licensee should provide additional information in the basis to justify why the plant could not achieve a normal shutdown in the event that one of these valves failed closed during testing.				
1(2)2-MC-KC4	1(2)KC-320A, 3" air operated diaphragm valve, Cat. A, Component Cooling Water supply to Reactor Coolant Drain Tank Heat Exchanger outboard isolation valve off Containment Penetration M-376, normally open	MC-1573-3.1, Rev. 7, (MC-2573-3.1, Rev. 5) "Flow Diagram of Component Cooling System (KC)"	"Failure of this valve in the closed position during testing would inhibit flow through the reactor coolant drain tank heat exchanger. No alternate flow path for cooling water to the heat exchanger exists. Without flow to the heat exchanger, the drain tank would become over pressurized and steam would be released."	Valve will be cycled and stroke timed during cold shutdown.
Evaluation: See evaluation for KC3 above.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-KC5	1(2)KC-280, 1" stop check valve, Cat. A&C, Containment Penetration M-355 stop check valve, normally closed	MC-1573-3.1, Rev. 7, (MC-2573-3.1, Rev. 5) "Flow Diagram of Component Cooling System (KC)"	"This valve cannot be practically tested during operation due to the design of the system."	Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: This stop check valve provides containment isolation and thermal overpressurization protection of the line between 1(2)KC-333A on penetration M-355. This valve is normally closed but would be required to open to provide the thermal overpressurization protection function. The licensee states that the valve cannot be practically tested during operation due to the design of the system and the valve will be verified closed by leak testing under Appendix J.

It is impractical to test this valve quarterly or during cold shutdowns because the valve and test connections are located inside containment. Access for testing presents a personnel hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full-stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. Full-stroke exercising to the closed position is verified by seat leak testing in accordance with 10CFR50 Appendix J provided the licensee implements all related requirements which includes Part 10, ¶4.2.2.3(e) and (f).

However, although the licensee has described a safety function in the open position for these valves of providing thermal overpressurization protection for the containment penetration, the deferral does not specify any full-stroke or part-stroke exercise open test for these valves. The licensee should full-stroke exercise these valves open during cold shutdowns or revise the deferral to provide justification accordingly.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-KC6	1(2)KC-322, 4" stop check valve, Cat. A&C, Containment Penetration M-376 Isolation stop check valve, normally open	MC-1573-3.1, Rev. 7, (MC-2573-3.1, Rev. 5) "Flow Diagram of Component Cooling System (KC)"	"This valve cannot be practically tested during operation due to the design of the system."	Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: This valve is the inboard CIV upstream of the RCDTHX located inside containment.

It is impractical to test this valve quarterly or during cold shutdowns because the valve and test connections are located inside containment. Access to testing presents a personnel hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. Full-stroke exercising to the closed position is verified by seat leak testing in accordance with 10CFR50 Appendix J provided the licensee implements all related requirements which includes Part 10, ¶4.2.2.3(e) and (f).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-KC7	1(2)KC-279, 1" check valve, Cat. A&C, Containment Penetration M-320 Isolation check valve, normally closed	MC-1573-3.1, Rev. 7, (MC-2573-3.1, Rev. 5) "Flow Diagram of Component Cooling System (KC)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified by leak test performance in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: This valve provides containment isolation and thermal overpressurization protection of the line between 1(2)KC-424B and 1(2)KC-425A on penetration M-320. This valve is normally closed but would be required to open to provide the thermal overpressurization protection function. The licensee states that the system design does not provide a means of verifying valve closure upon flow reversal, and the valve will be verified closed by leak testing under Appendix J.

It is impractical to test this valve quarterly or during cold shutdowns because the valve and test connections are located inside containment. Access to testing presents a personnel hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. Full-stroke exercising to the closed position is verified by seat leak testing in accordance with 10CFR50 Appendix J provided the licensee implements all related requirements which includes Part 10, ¶4.2.2.3(e) and (f).

However, although the licensee has described a safety function in the open position for these valves of providing thermal overpressurization protection for the containment penetration, the deferral does not specify any full-stroke or part-stroke exercise open test for these valves. The licensee should full-stroke exercise these valves open during cold shutdowns or revise the deferral to provide justification accordingly.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-KC8	1(2)KC-340, 1" check valve, Cat. A&C, Containment Penetration M-327 Isolation check valve, normally open	MC-1573-3.1, Rev. 7, (MC-2573-3.1, Rev. 5) "Flow Diagram of Component Cooling System (KC)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: This valve is the inboard CIV for the CC flow to the RCP motor coolers and the Reactor Vessel Support Coolers and is normally open. The licensee states that the system design does not provide a means of verifying valve closure upon flow reversal, and the valve will be verified closed by leak testing under Appendix J.

It is impractical to test this valve quarterly or during cold shutdowns because the valve and test connections are located inside containment. Access to testing presents a personnel hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the need for containment entry and an extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdown.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. Full-stroke exercising to the closed position is verified by seat leak testing in accordance with 10CFR50 Appendix J provided the licensee implements all related requirements which includes Part 10, ¶4.2.2.3(e) and (f).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-KC9	1(2)KC-47, 3/4" check valve, Cat. A&C, Containment Penetration M-322 Isolation check valve, normally closed	MC-1573-4.0, Rev. 10, (MC-2573-4.0, Rev. 6) "Flow Diagram of Component Cooling System (KC)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified closed by leak test performance in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: This valve is normally closed. The licensee states that this valve provides containment isolation on penetration M-322. From a review of the flow diagram, it appears that this valve also provides thermal overpressurization for the penetration for the CC header to the CC drain tank. This valve is normally closed. The licensee states that the system design does not provide a means of verifying valve closure upon flow reversal, and the valve will be verified closed by leak testing under Appendix J. This valve is located inside containment. Therefore, it is impractical to full-stroke exercise this valve closed quarterly.

It is impractical to test this valve quarterly or during cold shutdowns because the valve and test connections are located inside containment. Access to testing presents a personnel hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2 2(e) allows full stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. Full-stroke exercising to the closed position is verified by seat leak testing in accordance with 10CFR50 Appendix J provided the licensee implements all related requirements which includes Part 10, ¶4.2.2.3(e) and (f).

However, the licensee should verify whether this valve performs a safety function in the open position by providing thermal overpressurization protection for the containment penetration. The deferral does not specify any full-stroke or part-stroke exercise open test for these valves. Pending such verification, the licensee should full-stroke exercise these valves open during cold shutdowns or revise the deferral to provide justification accordingly.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
BORON RECYCLE SYSTEM (NB)				
1(2)-MC-NB1	1(2)NB-262, 1" stop check valve, Cat. A&C, Containment Penetration M-259 stop check valve, normally closed	MC-1556-3.0, Rev. 15, (MC-2556-3.0, Rev. 10) "Flow Diagram of Boron Recycle System (NB)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified closed by leak test performance in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: This valve closes to prevent reverse flow on the line from the Reactor Makeup Water Storage Tank to the Excess Letdown Heat Exchanger. This valve is located inside containment and the licensee states that the system design does not provide a means of verifying valve closure upon flow reversal, and the valve will be verified closed by leak testing under Appendix J at refueling outages. This valve is normally closed since the line is isolated upstream and would only have flow when required for the Excess Letdown Heat Exchanger.

It is impractical to test this valve quarterly or during cold shutdowns because the valve and test connections are located inside containment. Access to testing presents a personnel safety hazard due to higher radiation levels and proximity to high systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full-stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. Full-stroke exercising to the closed position is verified by seat leak testing in accordance with 10CFR50 Appendix J provided the licensee implements all related requirements which includes Part 10, ¶4.2.2.3(e) and (f).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
REACTOR COOLANT SYSTEM (NC)				
1(2)-MC-NC1	1(2)NC-32B, 1(2)NC-34A, 1(2)NC-36B, 3" air operated control valves, Cat. B, Reactor Coolant System (RCS) Pressurizer Power Operated Relief Valves (PORVs), normally closed	MC-1553-2.0, Rev. 19, (MC-2553-2.0, Rev. 15) "Flow Diagram of Reactor Coolant System (NC)"	"PORVs do not serve a safety function when unit is at operating temperature and pressure. PORVs protect the Reactor Coolant System from over pressurization during LTOP conditions."	Stroke time testing will be performed at cold shutdown and in all cases prior to entering LTOP conditions in accordance with Generic Letter 90-06. Testing will not be required more often than once per quarter as defined in OMa-1988 Part 10, 4.2.1.1.

Evaluation: The RCS PORVs open to relieve pressure for the primary (RCS) system.

In Generic Letter 90-06, the NRC staff included PORVs, valves in PORV control air systems, and block valves within the scope of a program covered by the ASME Section XI, Subsection IWV. Stroke testing of PORVs should only be performed during Mode 3 (HOT STANDBY) or Mode 4 (HOT SHUTDOWN) and in all cases prior to establishing conditions where PORVs are used for low-temperature overpressure protection (LTOP). Stroke testing of the PORVs should not be performed during power operation.

The alternative provides full-stroke exercising to the open and closed positions during cold shutdowns in accordance with OMa-1988, Part 10, ¶4.2.1.1(c), and in all cases prior to entering LTOP conditions in accordance with Generic Letter 90-06.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NC2	1(2)NC-272AC, 1(2)NC-273AC, 1(2)NC-274B, 1(2)NC-275B, 1" solenoid operated globe valves, Cat. B, Reactor Vessel Head Vent Valves, normally closed	MC-1553-2.1, Rev. 0, (MC-2553-2.1, Rev. incorrect/M-2553-2.O, Rev. 15) "Flow Diagram of Reactor Coolant System (NC)"	"Opening these valves at full pressure could cause damage to the valve seating surfaces. A reactor coolant leak could be caused."	Valve will be cycled and stroke timed during cold shutdown.

Evaluation: These are the Reactor Vessel Head Vent valves, which are normally closed.

It is impractical to exercise these valves to the open position quarterly because testing of these valves during power operation could jeopardize the integrity of the RCS pressure boundary.

The alternative provides full-stroke exercising open and closed during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c).

However, the licensee has categorized these valves as Category B, and they are not listed in Table 3.4-1 of the Technical Specifications as Pressure Isolation Valves. The licensee should ensure that the categorization of these valves complies with the requirements of Generic Letter 89-04, Position 4, regarding Pressure Isolation Valves, and the additional guidance regarding Position 4 in Draft NUREG-1482 (Ref. 11).

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NC3	1(2)NC-259, 1(2)NC-261, 3/4" check valves, Cat. A&C, Containment Penetration M-361 and M-326 check valves, normally closed	MC-1553-4.0, Rev. 10, (MC-2553-4.0, Rev. 13) "Flow Diagram of Reactor Coolant System (NC)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valves will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: These valves provide containment isolation and thermal overpressurization protection of the line between 1(2)NC-195B and 1(2)NC-196A on penetration M-361, and the line between 1(2)NC-141 and 1(2)NC-142 on penetration M-326 respectively. These valves are located inside containment and the licensee states that the system design does not provide a means of verifying valve closure upon flow reversal, and the valves will be verified closed by leak testing under Appendix J at refueling outages.

It is impractical to test this valve quarterly or during cold shutdowns because the valve and test connections are located inside containment. Access to testing presents a personnel safety hazard due to higher radiation levels and proximity to high systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the need for containment entry and an extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. Full-stroke exercising to the closed position is verified by seat leak testing in accordance with 10CFR50 Appendix J provided the licensee implements all related requirements which includes Part 10, ¶4.2.2.3(e) and (f).

However, although the licensee has described a safety function in the open position for these valves of providing thermal overpressurization protection for the containment penetration, the deferral does not specify any full-stroke or part-stroke exercise open test for these valves. The licensee should full-stroke exercise these valves open during cold shutdowns or revise the deferral to provide justification accordingly.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
RESIDUAL HEAT REMOVAL SYSTEM (ND)				
1(2)-MC-ND1	1(2)ND-1B, 1(2)ND-2AC, 14" motor operated gate valves, Cat. A RHR Pumps suction isolation valves, 14 in. motor-operated gate valves, normally closed	MC-1561-1.0, Rev. 19, (MC-2561-1.0, Rev. 0) "Flow Diagram of Residual Heat Removal System (ND)"	"These valves have an interlock which prevents their opening when the Reactor Coolant System pressure is greater than 385 psig."	Valve will be cycled and stroke timed during cold shutdown. Valve will be leak tested in accordance with Tech Spec 4.4.6.2.2.
Evaluation: These valves open to provide suction for the Residual Heat Removal pumps during normal cool down, and must remain closed during normal power operation to provide pressure boundary isolation for the Reactor Coolant System. It is impractical to part-stroke or full-stroke exercise these valves during power operation. Tech Spec 4.4.6.2.2 specifies the circumstances and frequencies for leak testing these valves. The alternative provides full-stroke exercising during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c) and leak testing in accordance with ¶4.2.2.3.				
1(2)-MC-ND2	1(2)ND-58A, 8" motor operated gate valve, Cat. B, RHR Pumps Discharge to Centrifugal Charging Pumps and Safety Injection Pumps Suction, normally closed	MC-1561-1.0, Rev. 19, (MC-2561-1.0, Rev. 0) "Flow Diagram of Residual Heat Removal System (ND)"	"Opening this valve during operation would render both trains of Residual Heat Removal inoperable."	Valve will be cycled and stroke timed during cold shutdown.
Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.2). Motor- operated valve, 1ND-58A (2ND-58A), is in an 8 in. line leading from the discharge of RHR Heat Exchanger 1A (2A) to the suction of the Safety Injection and Centrifugal Charging Pumps. The licensee states that opening this valve during operation would render both trains of RHR inoperable. A review of the P&ID indicates that there is an air-operated valve, 1ND29 (2ND29), downstream of the take-off point which could be used to ensure that flow from RHR Pump 1B (2B) could supply all four legs of the Reactor Coolant System. The licensee should consider the practicality of using this valve. The licensee should stroke time test these valves quarterly in accordance with OMa-1988, Part 10, ¶4.2.1.1, or provide additional information in the basis to justify why opening 1(2)ND-58A renders both trains of RHR inoperable.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-ND3	1(2)ND-15B, 1(2)ND-30A, 8" motor operated gate valves, Cat. B, RHR Heat Exchanger Outlet Crossover Block Valves, normally open	MC-1561-1.0, Rev. 19, (MC-2561-1.0, Rev. 0) "Flow Diagram of Residual Heat Removal System (ND)"	"One of the ECCS safety analysis assumptions is that each train of ND can supply flow to all four cold legs. If either of these valves failed closed during testing then only two cold legs could be supplied by each train of ND. This would make both trains of ND inoperable."	Valve will be cycled and stroke timed during cold shutdown.
Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.5). The licensee is proposing to forego quarterly testing of these valves because "One of the ECCS safety analysis assumptions is that each train of ND (RHR) can supply flow to all four cold legs. If either of these valves failed closed during testing, then only two cold legs could be supplied by each train of ND. This would make both trains of ND inoperable." IE Information Notice 87-01, "RHR Valve Misalignment Causes Degradation of ECCS in PWRs," addresses inservice testing of crossover valves in RHR system. It appears that inadvertent closure of either one of these valves would violate the single failure criterion. However, these valves are not among the valves listed in the FSAR, Section 6.3.2.16, "Motor-Operated Valves and Controls," as having the power disconnected at motor control centers, nor are they identified in Technical Specification 4.5.2 as having the power removed. The licensee should provide additional information regarding the FSAR requirement that each train of RHR be able to supply flow to all four cold legs, or provide further explanation as to the basis for that statement.				
1(2)-MC-ND4	1(2)ND-70, 8" check valve, Cat. C, RHR Pumps Discharge check valve to Centrifugal Charging & SI Pumps suction, normally closed	MC-1561-1.0, Rev. 19, (MC-2561-1.0, Rev. 0) "Flow Diagram of Residual Heat Removal System (ND)"	"Valve cannot be full stroked during power operation since 1(2)ND-58A would have to be opened, rendering both trains of ND inoperable. Additionally, the flow requirements to full stroke this valve cannot be achieved with the Reactor Coolant System pressurized."	Valve will be full stroke exercised at cold shutdown.
Evaluation: See ND5 below.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-ND5	1(2)ND-71, 8" check valve, Cat. C, RHR pumps discharge check valve to SI pumps suction, normally closed	MC-1561-1.0, Rev. 19, (MC-2561-1.0, Rev. 0) "Flow Diagram of Residual Heat Removal System (ND)"	"Valve cannot be full stroked during power operation since 1(2)NI-136B would have to be opened, rendering both trains of ND inoperable. Additionally, the flow requirements to full stroke this valve cannot be achieved with the Reactor Coolant System pressurized."	Valve will be full stroke exercised at cold shutdown.

Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.3). Check valve 1(2)ND-71 is in an 8 in. line leading from RHR Heat Exchanger 1B(2B) to the suction of the Safety Injection and Centrifugal Charging Pumps. The licensee is proposing to forego quarterly testing of this valve because the "Valve cannot be full stroked during power operation since 1(2)NI-136B would have to be opened, rendering both trains of ND inoperable. Additionally, the flow requirements to full stroke this valve cannot be achieved with the Reactor Coolant System pressurized."

In LER 369/90-22, Revision 01, the licensee stated that cycling of valves 1NI-136B and 2NI-136B, RHR (ND) Heat Exchanger 1B and 2B to Safety Injection (NI) pump 1B and 2B, to the open position while at power operation could degrade RHR system operation in the event of a Large Break Loss of Coolant Accident (LBLOCA). It appears that the licensee's logic was based on assuming a design basis event during the stroke test combined with a worst case single failure. On this basis, testing of any given train of Emergency Core Cooling System (ECCS) components would rend the entire system inoperable when combined with a design basis event and a single failure of the opposite train. Such logic is not acceptable as a basis for foregoing quarterly testing, as discussed above.

In addition, there is an air-operated valve, 1ND14, on the outlet of RHR Heat Exchanger 1B which is downstream of the take-off connection leading to the SI and charging pumps which could be used to ensure that flow from RHR Pump 1A could supply all four legs of the Reactor Coolant System. It appears that the valve could at least be partially stroked on a quarterly basis. The licensee should full-stroke exercise this valve open quarterly in accordance with OMa-1988, Part 10, ¶4.3.2.1, or provide additional information in the basis to justify why opening valve 1NI-136B would render both trains of RHR inoperable.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-ND6	1(2)ND-8, 1(2)ND-23, 8" check valves, Cat. C, RHR Pumps Discharge line check valves, normally closed	MC-1561-1.0, Rev. 19, (MC-2561-1.0, Rev. 0) "Flow Diagram of Residual Heat Removal System (ND)"	"Valves cannot be full stroke exercised during power operation since the only full flow path is into the Reactor Coolant System and the ND pumps cannot overcome RCS pressure."	Valve will be full stroke exercised at cold shutdown. Valves will be partially stroked quarterly. The opposite train valves will be tested closed quarterly except when the opposite train of ND is in service.

Evaluation: These are the RHR pumps' discharge line check valves.

It is impractical to full-stroke exercise these valves open or closed quarterly because the RHR pumps shutoff head cannot overcome the RCS pressure. These valves will be part-stroke exercised open quarterly during the RHR pump testing.

The alternative provides part-stroke exercising open during plant operation and full-stroke exercising to the open and closed positions during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.3.2.2(b).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
ICE CONDENSER REFRIGERATION SYSTEM (NF)				
1(2)-MC-NF1	1(2)NF-229, 1" check valve, Cat. A&C, Containment Penetration M-373 Isolation check valve, normally open	M-1558-4.0, Rev. 14, (MC-2558-4.0, Rev. 9), "Flow Diagram of Ice Condenser Refrigeration Syst^m (NF)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	1) Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency. 2) Leak Rate testing of the valve will be performed per Tech Spec 4.6.1.2.d.4.

Evaluation: This valve closes to provide containment isolation for penetration M-373 on the line from the glycol chiller packages. This valve is located inside containment and the licensee states that the system design does not provide a means of verifying valve closure upon flow reversal, and the valve will be verified closed by leak testing under Appendix J at refueling outages. Tech Spec 4.6.1.2.d specifies the conditions for leakage testing of this valve.

It is impractical to test this valve quarterly or during cold shutdowns because the valve and test connections are located inside containment. Access to testing presents a personnel safety hazard due to higher radiation levels and proximity to high systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. Full-stroke exercising to the closed position is verified by seat leak testing in accordance with 10CFR50 Appendix J provided the licensee implements all related requirements which includes Part 10, ¶4.2.2.3(e) and (f).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
SAFETY INJECTION SYSTEM (NI)				
1(2)-MC-NI1	1(2)NI-9A, 1(2)NI-10B, 4" motor operated gate valves, Cat. B, Centrifugal Charging Pumps flow path to RCS cold legs, normally closed	MC-1562-1.0, Rev. 18, (MC-2562-1.0, Rev. 15) "Flow Diagram of Safety Injection System (NI)	"Opening either of these valves during operation would increase the charging flow into the Reactor Coolant System resulting in an increase of pressure and a rapid change in the primary system boron concentration. This could create a transient and possible unit shutdown."	Valve will be cycled and stroke timed during cold shutdown.
Evaluation: These valves isolate the flow path from the CCPs to the RCS cold legs. Upon receipt of a safety signal these valves open allowing flow to the cold legs and will remain open (if necessary) after transfer of the water source from the refueling water storage tank to the discharge of the RHR (ND) heat exchangers for high pressure recirculation. It is impractical to part-stroke or full-stroke open either of these valves during power operation because this would increase the charging flow to the RCS, resulting in an increase in RCS pressure and boron concentration, which could cause a plant transient and unit shutdown. The alternative provides full-stroke exercising during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c).				
1(2)-MC-NI2	1(2)NI-100B, 8" motor operated gate valve, Cat. B, RWST to SI pumps suction isolation, normally open	MC-1562-3.0, Rev. 12, (MC-2562-3.0, Rev. 10) "Flow Diagram of Safety Injection System (NI)"	"Closing this valve during operation would render both trains of Safety Injection inoperable. This valve is opened and power removed above Mode 4 per Tech Spec 4.5.2."	Valve will be cycled and timed during cold shutdown.
Evaluation: This valve closes to isolate the flow path from the RWST to the SI pumps' common suction header. This valve is normally open with power removed at the breaker for Modes 1, 2, and 3. When switching over to recirculation in the course of a LOCA the power must be restored to close the valve. Therefore, it is impractical to exercise this valve during power operation since closure of this valve would disable both trains of Safety Injection. The alternative provides full-stroke exercising during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NI3	1(2)NI-147A, 1(2)NI-115B, 2" motor operated globe valve, Cat. B, miniflow line to RWST, and 1 1/2" motor operated globe valve, Cat. B, from SI pump 1A to 1(2)NI-147A, normally open	MC-1562-3.0, Rev. 12, (MC-2562-3.0, Rev. 10) "Flow Diagram of Safety Injection System (NI)"	"Closing either of these valve during power operation renders both trains of Safety Injection inoperable. 2NI-147A is open with power removed above mode 4 per Tech Spec 4.5.2."	Valve will be cycled and timed during cold shutdown.
Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.6). The licensee is proposing to forego quarterly testing of these valves because "Closing either of these valves during power operation renders both trains of Safety Injection inoperable. Valve, 1(2)NI-147A, is open with the power removed above Mode 4 per Tech Spec 4.5.2." While it is definitely true that closing valve 1(2)NI-147A renders both trains of Safety Injection inoperable, it is not immediately apparent from the flow diagram why closing valve 1(2)NI-115B would do so. In LER 369/90-22, Revision 01, the licensee states that when valve 1NI-115B is cycled to the closed position, a loss of Train B power would render Train A of the Safety Injection system inoperable. This is because when a Safety Injection signal has occurred, and the Reactor Coolant System pressure is above the shutoff head for the Safety Injection pump, the Safety Injection pump would not have a flow path for the miniflow protection of the Train A Safety Injection pump. On this basis, testing of any given train of Emergency Core Cooling System (ECCS) components would render the entire system inoperable when combined with a design basis event and a single failure of the opposite train. Such logic is not acceptable as a basis for foregoing quarterly testing. With respect to valve 1(2)NI-147A, the alternative provides full-stroke exercising to the closed position during cold shutdowns in accordance with OMa-1988, Part 10, ¶4.2.1.2(c). However, the licensee should stroke time test valve 1(2)NI-115B quarterly or provide additional information in the basis to justify why closing this valve renders both trains of SI inoperable.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NI4	1(2)NI-121A, 1(2)NI-152B, 4" motor operated gate valves, Cat. B, Safety Injection System Pump Discharge Isolation valves, normally closed	MC-1562-3.0, Rev. 12, (MC-2562-3.0, Rev. 10) "Flow Diagram of Safety Injection System (NI)"	"These valves are closed with power removed above Mode 4 per Tech Spec 4.5.2."	Valve will be cycled and timed during cold shutdown.
Evaluation: These valves isolate SI flow to the RCS hot legs during injection phase and open during recirculation phase. During Modes 1, 2 and 3, these valves are closed with power removed at the breaker as per Tech Spec 4.5.2. Therefore, it is impractical to full-stroke exercise these valves during power operation. The alternative provides full-stroke exercising during cold shutdowns in accordance with OM Part 10, ¶4.2.1.2(c).				
1(2)-MC-NI5	1(2)NI-162A, 4" motor operated gate valve, Cat. B, Safety Injection Header to RCS Cold Legs, normally open	MC-1562-3.1, Rev. 6, (MC-2562-3.1, Rev. 4) "Flow Diagram of Safety Injection System (NI)"	"This valve is opened and power removed above Mode 4 per Tech Spec 4.5.2."	Valve will be cycled and timed during cold shutdown.
Evaluation: This normally open valve isolates SI flow to the RCS cold legs. This valve is required to be in the open position by Tech Spec 4.5.2 with power removed for Modes 1, 2 and 3 operation. Therefore, it is impractical to exercise this valve during power operation. The alternative provides full-stroke exercising during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NI6	1(2)NI-103A, 6" motor operated gate valve, Cat. B, Safety Injection System Pumps' suction header isolation valve, normally open	MC-1562-3.0, Rev. 12, (MC-2562-3.0, Rev. 10) "Flow Diagram of Safety Injection System (NI)"	"Closing this valve during power operations degrades both trains of Chemical and Volume Control."	Valves will be cycled and timed during cold shutdown.
Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.7). Valve 1(2)NI-103A is an MOV which isolates flow from the Refueling Water Storage Tank to the suction of Safety Injection Pump 1A (2A). The licensee is proposing to forego quarterly testing of this valve because "Closing this valve during power operations degrades both trains of Chemical and Volume Control." From a review of flow diagram MC-1562-3.0, Rev. 12, (MC-2562-3.0, Rev. 10), "Flow Diagram of Safety Injection System (NI)," there is no apparent reason why closure of this valve would degrade the CVCS. In addition, the licensee is quarterly testing the Safety Injection Pump Train B miniflow valve, 1(2)NI-144A. In LER 369/90-22, Revision 01, the licensee states that when valve 1(2)NI-103A is cycled to the closed position, a loss of Train A power would render Train B of the CVCS inoperable. During the Recirculation Phase of Safety Injection, the flow path of the Residual Heat Removal system Train B to the CVCS pump suction is through valve 1(2)NI-103A. On this basis, testing of any given train of Emergency Core Cooling System (ECCS) components would render the entire system inoperable when combined with a design basis event and a single failure of the opposite train. Such logic is not acceptable as a basis for foregoing quarterly testing. The licensee should stroke time test valve 1(2)NI-103A quarterly in accordance with OMa-1988, Part 10, ¶4.2.1.1, or provide additional information in the basis to justify why closure of this valve would degrade the CVCS.				
1(2)-MC-NI7	1(2)NI-173A, 1(2)NI-178B, 8" motor operated gate valves, Cat. B, RHR system discharge isolation valves to Safety Injection System, normally open	MC-1562-3.1, Rev. 6, (MC-2562-3.1, Rev. 4) "Flow Diagram of Safety Injection System (NI) "	"These valves are opened and power removed above Mode 4 per Tech Spec 4.5.2."	Valve will be cycled and timed during cold shutdown.
Evaluation: These valves provide the flow path for the Residual Heat Removal to the RCS cold legs. As per Technical Specification 4.5.2, these valves are required to be in the open position with power removed during Modes 1, 2 and 3 operation. Therefore, it is impractical to exercise these valves during power operation. The alternative provides full-stroke exercising during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NI8	1(2)NI-334B, 6" motor operated gate valve, Cat. B, Isolation valve for RHR recirc. flow to Safety Injection System, normally open	MC-1562-3.0, Rev. 12, (MC-2562-3.0, Rev. 10) "Flow Diagram of Safety Injection System (NI)"	"Closing this valve during power operation degrades both trains of Safety Injection."	Valve will be cycled and timed during cold shutdown.

Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.8). As shown on flow diagram MC-1562-3.0, Rev.12, "Flow Diagram of Safety Injection System (NI)," valve 1NI-334B is in an 8 in. line leading either from the outlet of RHR Heat Exchanger Train B to the suction of Centrifugal Charging Pump Train B or, if flow is in the opposite direction, from RHR Heat Exchanger Train A to the suction of Safety Injection Pump Train B. The licensee states that closing this valve during power operation degrades both trains of Safety Injection. This valve is not on the list of valves in Section 4.5.2 of the Technical Specifications for which power to the valve operators has been removed. This seeming discrepancy should be clarified.

In LER 369/90-22, Revision 01, the licensee states that when valve 1NI-334B is cycled to the closed position, a loss of Train B power would render Train A of Safety Injection inoperable. During the Recirculation Phase of a Safety Injection, the flow path of Train A of RHR to the Safety Injection pump suction is through valve 1NI-334B. On this basis, testing of any given train of Emergency Core Cooling System (ECCS) components would render the entire system inoperable when combined with a design basis event and a single failure of the opposite train. Such logic is not acceptable as a basis for foregoing quarterly testing. In the same line as this valve are two normally closed MOVs, 1NI-332A and 1NI-333B, which are in parallel. The licensee states that opening these valves during power operations requires 1NI-334B to be closed to prevent aligning the Refueling Water Storage Tank to the suction of the Centrifugal Charging pumps. Injecting RWST boron concentrated water in the Reactor Coolant System would induce a transient. Furthermore, the licensee states again that closing 1NI-334B degrades both trains of Safety Injection.

The McGuire FSAR, Table 6.3.2-3A, "Sequence of Operations: Injection to Cold Leg Recirculation," indicates in Step 12 that 1NI-332A or 1NI-333B must be opened to achieve Cold Leg Recirculation. Section 3.5.2 of the Technical Specifications requires that two independent Emergency Core Cooling System (ECCS) subsystems shall be operable with each subsystem comprised of one each operable centrifugal charging pump, Safety Injection pump, RHR heat exchanger, RHR pump and flow path capable of taking suction from the Refueling Water Storage Tank on a Safety Injection signal and automatically transferring suction to the containment sump during the recirculation phase of operation. It appears that only the automatic transfer capability must be available at all times, and not the actual alignment.

Therefore, the licensee should stroke time test valves 1NI-334B, 1NI-332A and 1NI-333B quarterly in accordance with OMa-1988, Part 10, ¶4.2.1.1, or provide additional information in the basis to justify why valve 1NI-334B cannot be closed for periodic testing. .

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NI9	1(2)NI-183B, 12" motor operated gate valve, Cat. B, RHR discharge to Safety Injection System hot legs isolation valve, normally closed	MC-1562-3.0, Rev. 12, (MC-2562-3.0, Rev. 10) "Flow Diagram of Safety Injection System (NI)"	"This valve is closed and power removed above Mode 4 per tech Spec 4.5.2."	Valve will be cycled and timed during cold shutdown.
Evaluation: This valve isolates Residual Heat Removal flow to the RCS hot legs. As per Tech Spec 4.5.2, this valve is required to be in the closed position with power removed during Modes 1, 2 and 3 operation. Therefore, it is impractical to exercise this valve during power operation. The alternative provides full-stroke exercising during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c).				
1(2)-MC-NI10	1(2)NI-184B, 1(2)NI-185A, 18" motor operated gate valve, Cat. B, Containment sump to RHR and containment spray pump suction isolation valves, normally closed	MC-1562-3.1, Rev. 6, (MC-2562-3.1, Rev. 4) "Flow Diagram of Safety Injection System (NI)"	"Opening these valves during power operation would allow water to enter lower containment. To prevent this, 1FW-27A would have to be closed, rendering both trains of Residual Heat Removal inoperable. Voids in suction piping would be created requiring fill and vent operations to prevent ECCS pump damage."	Valve will be cycled and timed during cold shutdown.
Evaluation: These valves provide flow paths from the Containment Sump to the Residual Heat Removal Pump and the Containment Spray Pump suction. Opening either of these valves during power operation would allow water to enter the lower containment from the Refueling Water Storage Tank through the RHR pumps' common suction line. To prevent this, Refueling Water valve 1(2)FW-27A, which isolates the outlet line of the RWST, would have to be closed, thereby rendering both trains of RHR inoperable. Closure of 1(2)FW-27A would create voids in the suction piping for all of the ECCS pumps, which are supplied by the RWST. Fill and vent operations would be required to prevent ECCS pump damage. Therefore, it is impractical to exercise 1(2)NI-184B or 1(2)NI-185A during power operation. The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NI11	1(2)NI-332A, 1(2)NI-333B, 6" motor operated gate valves, Cat. B, RHR recirc. isolation valves to Safety Injection System, normally open	MC-1562-3.0, Rev. 12, (MC-2562-3.0, Rev. 10) "Flow Diagram of Safety Injection System (NI)"	"Opening these valves during power operations requires 1(2)NI-334B to be closed to prevent aligning FWST to the suction of the Centrifugal Charging Pumps. Injecting FWST boron concentrated water into the Reactor Coolant System would induce a transient. Closing 1(2)NI-334B degrades both trains of Safety Injection."	Valve will be cycled and timed during cold shutdown.
Evaluation: These valves provide flow paths to the Centrifugal Charging Pumps and Safety Injection Pumps from Residual Heat Removal Pumps during the recirculation phase following a LOCA. **See Evaluation for 1(2)MC-NI8.** The licensee should stroke time test valves 1(2)NI-334B, 1(2)NI-332A, and 1(2)NI-333B quarterly in accordance with OMa-1988, Part 10, ¶4.2.1.1, or provide additional information in the basis to justify why valve 1(2)NI-334B cannot be closed for periodic testing.				
1(2)-MC-NI12	1(2)NI-15, 1(2)NI-17, 1(2)NI-19, 1(2)NI-21, 1(2)NI-347, 1(2)NI-348, 1(2)NI-349, 1(2)NI-354, 1½ " check valves, Cat. C, Centrifugal Charging Pumps flowpath to RCS cold legs, normally closed	MC-1562-1.0, Rev. 18, (MC-2562-1.0, Rev. 15) "Flow Diagram of Safety Injection System (NI)"	"Injection flow through these valves from the Centrifugal Charging Pumps during power operations could result in unnecessary thermal shock to the injection nozzles."	Valve will be full stroke exercised at cold shutdown.
Evaluation: These check valves open to allow flow to the RCS cold legs from the Centrifugal Charging Pumps during the injection and high pressure recirculation phases of a LOCA. It is impractical to part-stroke or full-stroke exercise these check valves during power operation because flow through these check valves is isolated by normally closed valves MOVs 1(2)NI9A and 1(2)NI10B to prevent flow from the Charging pumps from entering the RCS cold legs. Injecting flow through these check valves during power operation could result in unnecessary thermal shock to the RCS cold leg injection nozzles. The alternative provides full-stroke exercising during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.3.2.2(c).				

Table 4.1 (Cont'd)

<table>
<tr><th>Item No.</th><th>Valve Identification</th><th>Drawing No.</th><th>Licensee's Justification For Deferred Testing</th><th>Proposed Alternate Testing</th></tr>
<tr><td>1(2)-MC-NI13</td><td>1(2)NI-12, 3" check valve, Cat. C, CCPs to RCS cold legs</td><td>MC-1562-1.0, Rev. 18, (MC-2562-1.0, Rev. 15, "Flow Diagram of Safety Injection System (NI)"</td><td>"Injecting flow through this valve from the Centrifugal Charging Pumps during power operations could result in unnecessary thermal shock to the injection nozzles."</td><td>Valve will be full stroke exercised at cold shutdown.</td></tr>
<tr><td colspan="5">Evaluation: This check valve provides a flow path for the Centrifugal Charging Pumps to the RCS cold legs and is open during the injection and high pressure recirculation phases of a LOCA.

It is impractical to part-stroke or full-stroke exercise this check valve during power operation because flow through this valve is isolated by normally closed valves MOVs 1(2)NI9A and 1(2)NI10B to prevent flow from the Charging pumps from entering the RCS cold legs. Injecting flow through these check valves during power operation could result in unnecessary thermal shock to the RCS cold leg injection nozzles.

The alternative provides full-stroke exercising during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.3.2.2(c).</td></tr>
<tr><td>1(2)-MC-NI14</td><td>1(2)NI-101, 8" check valve, Cat. C, RWST discharge check valve to Safety Injection System pump suction, normally closed</td><td>MC-1562-3.0, Rev. 12, (MC-2562-3.0, Rev. 10) "Flow Diagram of Safety Injection System (NI)"</td><td>"Valve cannot be full stroke tested during power operation since the Safety Injection Pumps cannot overcome Reactor Coolant System pressure. Closure cannot be verified quarterly since both trains of Residual Heat Removal would be rendered inoperable."</td><td>Valve will be full stroke exercised at cold shutdown. Valve will be partial stroked quarterly.</td></tr>
<tr><td colspan="5">Evaluation: This check valve opens to allow flow from the Refueling Water Storage Tank to the Safety Injection Pumps. The valve closes to provide suction pressure boundary for these pumps from the Residual Heat Removal Pump discharge.

It is impractical to full-stroke exercise this valve to the closed position during power operation because this valve is immediately downstream of normally open MOV 1(2)NI100B which is on the single supply line from the Refueling Water Storage Tank to the SI pumps, so that closure of 1(2)NI101 would also isolate both trains of SI pumps {see 1(2)-MC-NI2 for 1(2)NI100B}. Although the licensee states that closure of this val[illegible]ates both trains of RHR, it appears that both trains of SI would be rendered inoperable. It is impractical to full-stroke exercise this valve to the open position quarterly because the SI pump discharge pressure cannot overcome the RCS pressure.

The alternative provides full-stroke exercising to the open and closed positions during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.3.2.2(c). The licensee should clearly indicate that the full-stroke exercising during cold shutdowns includes full-stroke exercising to the open position as well.</td></tr>
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Table 4.1 (Cont'd)

<table>
<tr><th>Item No.</th><th>Valve Identification</th><th>Drawing No.</th><th>Licensee's Justification For Deferred Testing</th><th>Proposed Alternate Testing</th></tr>
<tr><td>1(2)-MC-NI15</td><td>1(2)NI-116, 1(2)NI-148, 4" check valves, Cat. C, Safety Injection System pump discharge check valves, normally closed</td><td>MC-1562-3.0, Rev. 12, (MC-2562-3.0, Rev. 10) "Flow Diagram of Safety Injection System (NI)"</td><td>"Valve cannot be full or partial stroke tested during power operation since the Safety Injection Pumps cannot overcome Reactor Coolant System pressure."</td><td>Valves will be full stroke exercised at cold shutdown. Valves will be verified closed quarterly.</td></tr>
<tr><td colspan="5">Evaluation: The normally closed SI Pump discharge check valve opens to allow Safety Injection flow and closes to prevent opposite train flow losses.

It is impractical to full-stroke exercise these valves open quarterly because the SI pumps cannot overcome RCS pressure. A review of the flow diagram indicates that the valves cannot be part-stroke exercised quarterly during the SI pump test because the valves are located downstream of the SI pumps' minimum flow recirculation line return to the RWST.

The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.3.2.2(c).</td></tr>
<tr><td>1(2)-MC-NI16</td><td>1(2)NI-124, 1(2)NI-128, 1(2)NI-156, 1(2)NI-157, 1(2)NI-159, 1(2)NI-160, 2" check valves, Cat. A&C, Safety Injection System hot leg check valves, normally closed</td><td>MC-1562-3.0, Rev. 12, (MC-2562-3.0, Rev. 10) - "Flow Diagram of Safety Injection System (NI)"</td><td>"Valve cannot be full or partial stroke tested during power operation since the Safety Injection Pumps cannot overcome Reactor Coolant System pressure."</td><td>Valves will be full stroke exercised at cold shutdown. Leak test in accordance with Tech Spec 4.4.6.2.2.</td></tr>
<tr><td colspan="5">Evaluation: These valves are part of the Reactor Coolant System pressure boundary and open on flow from the Safety Injection Pumps to the RCS hot legs.

These valves are pressure isolation valves for the RCS. It is impractical to full-stroke exercise these valves open quarterly because the SI pumps cannot overcome RCS pressure. The valves cannot be part-stroke exercised quarterly during the SI pump test because the valves are located downstream of the SI pumps' minimum flow recirculation line return to the RWST.

The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.3.2.2(c) and ¶4.2.2.3. It is impractical to verify closure during operation or cold shutdowns because these valves are located inside containment. Verifying valve closure would necessitate containment entry which could result in radiation exposure to plant personnel and delay plant startup due to test setup and performance. The licensees proposal to perform leak testing during refuelings in accordance with Technical Specification 4.4.6.2.2 is in accordance with OMa-1988 Part 10, ¶4.2.2.3(a)</td></tr>
</table>

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NI17	1(2)NI-165, 1(2)NI-167, 1(2)NI-169, 1(2)NI-171, 2" check valves, Cat. A&C, Safety Injection System cold leg injection check valves, normally closed	MC-1562-3.1, Rev. 6, (MC-2562-3.1, Rev. 4) "Flow Diagram of Safety Injection System (NI)"	"Valves cannot be full or partial stroke tested during power operations since the Safety Injection Pumps cannot overcome Reactor Coolant System pressure."	Valve will be full stroke exercised at cold shutdown. Leak test in accordance with Tech Spec 4.4.6.2.2.
Evaluation: These valves are part of the Reactor Coolant System pressure boundary and open on flow from the Safety Injection Pumps to the RCS cold legs. These valves are pressure isolation valves for the RCS. It is impractical to full-stroke exercise these valves open quarterly because the SI pumps cannot overcome RCS pressure. The valves cannot be part-stroke exercised quarterly during the SI pump test because the valves are located downstream of the SI pumps' minimum flow recirculation line return to the RWST. The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.3.2.2(c) and ¶4.2.2.3. It is impractical to verify closure during operation or cold shutdowns because these valves are located inside containment. Verifying valve closure would necessitate containment entry which could result in radiation exposure to plant personnel and delay plant startup due to test setup and performance. The licensees proposal to perform leak testing during refuelings in accordance with Technical Specification 4.4.6.2.2 is in accordance with OMa-1988 Part 10, ¶4.2.2.3(a).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NI18	1(2)NI-175, 1(2)NI-176, 1(2)NI-180, 1(2)NI-181, 2" check valves, Cat. A&C, RHR discharge to Safety Injection cold leg check valves, normally closed	MC-1562-3.1, Rev. 6, (MC-2562-3.1, Rev. 4) "Flow Diagram of Safety Injection System (NI)"	"Valves cannot be full or partial stroke tested during power operation since the Residual Heat Removal pumps cannot overcome Reactor Coolant System pressure."	Valve will be full stroke exercised at cold shutdown. Leak test in accordance with Tech Spec 4.4.6.2.2.

Evaluation: These valves are part of the Reactor Coolant System pressure boundary and open on flow from the Residual Heat Removal Pumps to the RCS cold legs.

These valves are pressure isolation valves for the RCS. It is impractical to full-stroke exercise these valves open quarterly because the RHR pumps cannot overcome RCS pressure. The valves cannot be part-stroke exercised quarterly during the RHR pump test because the valves are located downstream of the RHR pumps' minimum flow recirculation line return to the RWST.

The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.3.2.2(c) and ¶4.2.2.3. It is impractical to verify closure during operation or cold shutdowns because these valves are located inside containment. Verifying valve closure would necessitate containment entry which could result in radiation exposure to plant personnel and delay plant startup due to test setup and performance. The licensees proposal to perform leak testing during refuelings in accordance with Technical Specification 4.4.6.2.2 is in accordance with OMa-1988 Part 10, ¶4.2.2.3(a).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NI19	1(2)NI-125, 1(2)NI-126, 1(2)NI-129, 1(2)NI-134, 6, 8, 12, inch check valves, Cat. A&C, Safety Injection System low head hot leg check valves, normally closed	MC-1562-3.0, Rev. 12, (MC-2562-3.0, Rev. 10) "Flow Diagram of Safety Injection System (NI)"	"Valve cannot be full or partial stroke tested during power operation since the Residual Heat Removal pumps cannot overcome Reactor Coolant System pressure."	Valve will be full stroke exercised at cold shutdown. Leak test in accordance with Tech Spec 4.4.6.2.2.

Evaluation: These valves open on flow from the Residual Heat Removal Pumps to the RCS hot legs. These valves are part of the Reactor Coolant System pressure boundary.

These valves are pressure isolation valves for the RCS. It is impractical to full-stroke exercise these valves open quarterly because the RHR pumps cannot overcome RCS pressure. The valves cannot be part-stroke exercised quarterly during the RHR pump test because the valves are located downstream of the RHR pumps' minimum flow recirculation line return to the RWST.

The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.3.2.2(c) and ¶4.2.2.3. It is impractical to verify closure during operation or cold shutdowns because these valves are located inside containment. Verifying valve closure would necessitate containment entry which could result in radiation exposure to plant personnel and delay plant startup due to test setup and performance. The licensees proposal to perform leak testing during refuelings in accordance with Technical Specification 4.4.6.2.2 is in accordance with OMa-1988 Part 10, ¶4.2.2.3(a).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NI20	1(2)NI-136B, 8" motor operated gate valve, Cat. B, RHR discharge to Safety Injection Pumps, normally closed	MC-1562-3.0, Rev. 12 (MC-2562-3.0, Rev. 10) "Flow Diagram of Safety Injection System (NI)"	"Opening this valve during power operation renders both trains of Residual Heat Removal inoperable."	Valve will be cycled and timed during cold shutdown.

Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.9). As shown on flow diagram MC-1562-3.0, Rev.12, (MC-2562-3.0, Rev. 10), "Flow Diagram of Safety Injection System (NI)," valve 1NI-136B is in an 8 in. line leading to the suction header of both Safety Injection pumps, which in turn leads to the suction header of the Centrifugal Charging pumps. The licensee states that opening this valve renders both trains of RHR inoperable.

In LER 369/90-22, Revision 01, the licensee stated that cycling of valves 1NI-136B and 2NI-136B, RHR (ND) Heat Exchanger 1B and 2B to Safety Injection (NI) pump 1B and 2B, to the open position while at power operation could degrade RHR system operation in the event of a Large Break Loss of Coolant Accident (LBLOCA).

It appears that the licensee's logic was based on assuming a design basis event during the stroke test combined with a worst case single failure. On this basis, testing of any given train of Emergency Core Cooling System (ECCS) components would render the entire system inoperable when combined with a design basis event and a single failure of the opposite train. Such logic is not acceptable as a basis for foregoing quarterly testing.

In addition, the 8 in. line containing valve 1(2)NI-136B branches off from the outlet of RHR Heat Exchanger B upstream of an air-operated valve 1(2)ND14 which could be closed to ensure that flow from RHR Pump Train A can be provided to all four loops of the Reactor Coolant System. The licensee should stroke time test valve 1(2)NI-136B quarterly in accordance with OMa-1988, Part 10, ¶4.2.1.1, or provide additional information in the basis to justify why opening MOV 1(2)NI-136B would render both trains of RHR inoperable.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NI21	1(2)NI-48, 1" check valve, Cat. A&C, Safety Injection System containment penetration isolation check valve, normally closed	MC-1562-2.0, Rev. 14, (MC-2562-2.0, Rev. 10) "Flow Diagram of Safety Injection System (SI)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: This valve provides containment isolation on penetration M-330. It provides the inboard containment isolation for the nitrogen bulk storage line to the SI Accumulators. This valve is located inside containment and the licensee states that the system design does not provide a means of verifying valve closure upon flow reversal, and the valve will be verified closed by leak testing under Appendix J at refueling outages. According to the flow diagram, this valve is normally closed since the line is isolated upstream and would only have flow when required for supplying nitrogen to the SI Accumulators.

Although the licensee has provided an inadequate basis, it is impractical to test this valve quarterly or during cold shutdowns because the valve and test connections are located inside containment. Access to testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full-stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. Full-stroke exercising to the closed position is verified by seat leakage testing in accordance with 10CFR50 Appendix J.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NI22	1(2)NI-59, 1(2)NI-70, 1(2)NI-81, 1(2)NI-93, 10" check valves, Cat. A&C, Safety Injection System Accumulator injection check valves, normally closed	MC-1562-2.0, Rev. 14, (MC-2562-2.0, Rev. 10), MC-1562-2.1, Rev. 12, (MC-2562-2.1, Rev. 8) "Flow Diagram of Safety Injection System (SI)"	"Valves cannot be full or partial stroked during power operation since the accumulator pressure is ~600 psig and cannot overcome RCS pressure. Valves will not be tested during cold shutdown since disassembly is required. Disassembly would render one train of RHR inoperable for an extended period of time."	Valves will be full stroked at refueling by disassembly on a sample basis. All valves will be partial stroked at refueling. Partial stroke will not be performed at cold shutdown since Tech Spec 4.4.6.2.2 requires leak testing after initiating flow through these valves and does not require leak testing more often than once per nine months. Valves will be verified closed by leak test performed in accordance with Tech Spec 4.4.6.2.2.

Evaluation: These valves form part of the Reactor Coolant pressure boundary and open on flow from the NI (Safety Injection) cold leg accumulator to the Reactor Coolant System. These valves are located inside containment.

These valves are pressure isolation valves for the RCS. It is impractical to part-stroke or full-stroke exercise these valves open quarterly because the SI accumulator pressure cannot overcome RCS pressure. It is also impractical to full or partial-stroke exercise these valves every cold shutdown, as Tech Spec 4.4.6.2.2 requires leak testing after initiating flow through these valves and does not require leak testing more often than once per nine months. As discussed in Draft NUREG-1482 (Ref. 11), Section 4.1.3, the NRC has determined that implementation of an extension of the test frequency for those valves requiring a leak test is acceptable. The licensee's proposed alternative testing is to sample disassemble at least one of these valves and verify part stroke open and verify closure during refueling outages. The licensee has classified this alternative testing and frequency as a deferral when in fact it should be a relief request.

The licensee should convert this deferral into a relief request which meets all of the requirements for sample disassembly under Generic Letter 89-04, Position 2. In addition, the licensee should investigate the practicality of using non-intrusive testing techniques in lieu of valve disassembly and inspection.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NI23	1(2)NI-436, 1" check valve, Cat. A&C, Safety Injection System containment penetration isolation check valve, normally closed	MC-1562-2.1, Rev. 12, (MC-2562-2.1, Rev. 8) "Flow Diagram of Safety Injection System (SI)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: This valve provides containment isolation and thermal overpressurization protection for penetration M-321. This valve provides one of the flow paths to fill SI Accumulators C & D. This valve is located inside containment.

Although the licensee has provided an inadequate basis, it is impractical to test this valve quarterly or during cold shutdowns because the valve and test connections are located inside containment. Access to testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full-stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. Full-stroke exercising to the closed position is verified by seat leakage testing in accordance with 10CFR50 Appendix J.

However, although the licensee has described a safety function in the open position for these valves of providing thermal overpressurization protection for the containment penetration, the deferral does not specify any full-stroke or part-stroke exercise open test for these valves. The licensee should full-stroke exercise these valves open quarterly, or revise the deferral to provide justification accordingly.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NI24	1(2)NI-60, 1(2)NI-71, 1(2)NI-82, 1(2)NI-94, 10" check valves, Cat. A&C, Safety Injection System Accumulator outlet check valves, normally closed	MC-1562-2.0, Rev. 14, (MC-2562-2.0, Rev. 10), MC-1562-2.1, Rev. 12, (MC-2562-2.1, Rev. 8) "Flow Diagram of Safety Injection System (SI)"	"Valves cannot be full or partial stroked during power operation since a driving head which can overcome RCS pressure does not exist. Instrumentation is not present to measure the flow through the individual valves. Valves will not be tested during cold shutdown since disassembly is required. Disassembly would render one train of RHR inoperable for an extended period of time."	Valves will be full stroked at refueling by disassembly on a sample basis. All valves will be partial stroked at refueling. Partial stroke will not be performed at cold shutdown since Tech Spec 4.4.6.2.2 requires leak testing after initiating flow through these valves and does not require leak testing more often than once per nine months. Valves will be verified closed by leak test performed in accordance with Tech Spec 4.4.6.2.2.

Evaluation: These valves form part of the Reactor Coolant pressure boundary and open on flow from the NI (Safety Injection) cold leg accumulator to the Reactor Coolant System. These valves are located inside containment.

These valves are pressure isolation valves for the RCS. It is impractical to part-stroke or full-stroke exercise these valves open quarterly because the SI accumulator pressure cannot overcome RCS pressure. It is also impractical to full or partial-stroke exercise these valves every cold shutdown, as Tech Spec 4.4.6.2.2 requires leak testing after initiating flow through these valves and does not require leak testing more often than once per nine months. As discussed in Draft NUREG-1482 (Ref. 11), Section 4.1.3, the NRC has determined that implementation of an extension of the test frequency for those valves requiring a leak test is acceptable. The licensee's proposed alternative testing is to sample disassemble at least one of these valves and verify part stroke open and verify closure during refueling outages. The licensee has classified this alternative testing and frequency as a deferral when in fact it should be a relief request.

The licensee should convert this deferral into a relief request which meets all of the requirements for sample disassembly under Generic Letter 89-04, Position 2. In addition, the licensee should investigate the practicality of using non-intrusive testing techniques in lieu of valve disassembly and inspection.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
NUCLEAR SAMPLING SYSTEM (NM)				
1(2)-MC-NM1	1(2)NM-420, 1(2)NM-421, 3/4" check valves, Cat. A&C, normally open	MC-1572-1.0, Rev.14, (MC-2572-1.0, Rev.15), "Flow diagram of Nuclear Sampling System (NM)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: These check valves provide containment isolation and thermal overpressurization protection for penetrations M-235 and M-309 respectively. These valves are located inside containment and the licensee states that the "system design does not provide a means of verifying valve closure upon flow reversal", and the valves will be verified closed by leak testing under Appendix J at refueling outages.

Although the licensee has provided an inadequate basis, it is impractical to test these valves quarterly or during cold shutdowns because the valve and test connections are located inside containment. Access to testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. Leak testing these valves during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full-stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. Full-stroke exercising to the closed position is verified by seat leak testing in accordance with 10CFR50 Appendix J.

However, although the licensee has described a safety function in the open position for these valves of providing thermal overpressurization protection for the containment penetration, the deferral does not specify any full-stroke or part-stroke exercise open test for these valves. The licensee should full-stroke exercise these valves open quarterly, or revise the deferral to provide justification accordingly.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
CONTAINMENT SPRAY SYSTEM (NS)				
1(2)-MC-NS1	1(2)NS-38B, 1(2)NS-43A, 8" motor operated gate valves, Cat. B, RHR heat exchanger discharge to auxiliary spray header isolation valves, normally closed	MC-1563-1.0, Rev.18, (MC-2563-1.0, Rev.15), "Flow diagram of Containment Spray System (NS)"	"Opening either of these valves during power operation renders both trains on Residual Heat Removal inoperable."	Valve will be cycled and timed during cold shutdown.
Evaluation: Auxiliary Spray Nozzle header isolation. (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.4). The licensee is proposing to forego quarterly testing of these valves. As shown on flow diagram MC-1563-1.0, Rev. 18, (MC-2563-1.0, Rev. 15) "Flow Diagram of Containment Spray System (NS)," valves 1(2)NS-38B and 1(2)NS-43A are each on 8 in. lines leading from the outlets of RHR Heat Exchanger Train B and RHR Heat Exchanger Train A, respectively. The licensee states that opening either of these valves during power operation renders both trains of RHR inoperable. Valves 1(2)NS-38B and 1(2)NS-43A were cited in LER 369/90-22, Revision 1, as valves which, if cycled opened during testing, could render both trains of RHR inoperable when combined with a design basis event and a worst case single failure of the opposite train. On this basis, testing of any given train of Emergency Core Cooling System (ECCS) components would render the entire system inoperable when combined with a design basis event and a single failure of the opposite train. Such logic is not acceptable as a basis for foregoing quarterly testing. The licensee should revise this deferral to provide additional information in the basis to justify why opening either valve 1(2)NS-38B or 1(2)NS-43A renders both trains of RHR inoperable.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NS2	1(2)NS-13, 1(2)NS-16, 1(2)NS-30, 1(2)NS-33, 1(2)NS-41, 1(2)NS-46, 8" check valves, Cat. C, primary and auxiliary spray headers check valves, normally closed	MC-1563-1.0, Rev.18, (MC-2563-1.0, Rev.15), "Flow diagram of Containment Spray System (NS)"	"Full stroke exercising of these check valves is not practical since there is no external indication of disk movement. Full stroke exercising would require for the pumps and spray nozzles to be activated which would require a large scale cleanup effort. Valves will not be tested during cold shutdown since sample disassembly is required."	These valves will be verified to fully cycle by sample disassembly at refueling outage. Relief is being requested on these valves (Relief Request 1(2)-MC-RR-NS1). When relief is granted, this Justification of Deferral will be deleted.
Evaluation: As stated in Section 3.1.1 of this TER, these check valves open upon initiation of flow from containment spray pumps to provide flow to the spray headers. In Relief Request RR-NS1, the licensee indicates that sample disassembly of these check valves has been performed the past four years. The Safety Evaluation of June 21, 1993 granted relief in accordance with Generic Letter 89-04, Position 2 for grouping of 4 valves, NS-13, NS-16, NS-30, and NS-33 to the primary header and 2 valves, NS-41 and NS-43 to the auxiliary header, in which one valve in each group is disassembled each refueling outage. The most recent relief request, RR-NS1, seeks to increase the grouping to all 6 valves but disassemble all valves every four refueling outages. This is not in accordance with Generic Letter 89-04, Position 2. Disassembly and inspection in lieu of flow testing is acceptable if all of the provisions of Generic Letter 89-04, Position 2, are met. The licensee should disassemble and inspect one valve at each refueling outage. The licensee also should investigate the practicality of using non-intrusive testing techniques.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NS3	1(2)NS-4, 1(2)NS-21, 12" check valves, Cat. C, RWST discharge check valves to containment spray pump suction, normally closed	MC-1563-1.0, Rev.18, (MC-2563-1.0, Rev.15), "Flow diagram of Containment Spray System (NS)"	"Full stroke exercising with flow would require for the pumps and spray nozzles to be activated which would require a large scale cleanup effort. The system design does not provide any indication for verifying closure upon flow reversal."	Full stroke testing will be achieved by sample disassembly. At least one of these valves will be disassembled during each refueling outage, and both valves will have been disassembled and full stroked after two consecutive outages. Sample disassembly will also verify closure. Failure of one valve to properly full stroke during a refueling outage will result in the remaining valve being disassembled and full stroked during that outage. Valves will be partial stroked quarterly.
Evaluation: Open to allow flow from the Refueling Water Storage Tank to the Containment Spray Pump suction. Close to prevent flow from the Containment Recirculation Sump to the Refueling Water Storage Tank during post-LOCA recirculation. The licensee's proposed alternative test method of sample disassembly for each valve every other refueling outage, including fully stroking the valve, and partial stroking of the valves quarterly is in accordance with Generic Letter 89-04, Position 2. It should be noted that the licensee has classified this alternative testing and frequency as a deferral when it should be a relief request. The licensee should resubmit this deferral as a relief request with the next revision of the program.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NS4	1(2)NS-140, 1(2)NS-141, 10" check valves, Cat. A & C, Containment Spray discharge check valves to primary spray header, normally closed	MC-1563-1.0, Rev.18, (MC-2563-1.0, Rev.15), "Flow diagram of Containment Spray System (NS)"	"Full stroke exercising of these check valves is not practical since there is no external indication of disk movement. Full stroke exercising would require for the pumps and spray nozzles to be activated which would require a large scale cleanup effort. Valves will not be tested during cold shutdown since sample disassembly is required."	Valves will be verified to full stroke open using sample disassembly every other refueling outage on a staggered basis. Valves will be partial stroked quarterly. Valves will be leak tested at refueling outages. Leak testing will also verify closure of these valves.
Evaluation: These valves open to allow Containment Spray to the spray ring headers and close to prevent column separation of water in the header after initial building spraydown and pump shutdown. During this time, the column of water in the vertical piping up to the spray rings could separate, creating a void in the system at sub-atmospheric pressure. Upon pump restart, the collapse of this void would damage the piping system. The licensee's proposed alternative test method of sample disassembly for each valve every other refueling outage, including fully stroking the valve, and partial stroking of the valves quarterly is in accordance with Generic Letter 89-04, Position 2. In addition the licensee will be leak testing the valves in accordance with OM-10 each refueling outage. The licensee has classified this alternative testing as a deferral when it should be a relief request. The licensee should resubmit this deferral as a relief request with the next revision of the program. The licensee should note also that these valves are <u>not</u> shown on the flow diagrams for either unit. Check valves 83, 84, 85, 86, 87, 88 are still shown for Unit 1, and check valves 110, 111, 112, 113, 114, 115 are still shown for Unit 2. The licensee should ensure that the flow diagrams are updated to include the NS-140 and 141 valves and verify that the other valves are properly shown as required.				

Table 4.1 (Cont'd)

<table>
<tr><th>Item No.</th><th>Valve Identification</th><th>Drawing No.</th><th>Licensee's Justification For Deferred Testing</th><th>Proposed Alternate Testing</th></tr>
<tr><td colspan="5">CHEMICAL AND VOLUME CONTROL SYSTEM (NV)</td></tr>
<tr><td>1(2)-MC-NV1</td><td>1(2)NV-94AC, 1(2)NV-95B, 4" motor operated gate valves, Cat. B, RCP seal water return flow isolation valves, normally open</td><td>MC-1554-1.1, Rev.9, (MC-2554-1.1, Rev.5), "Flow diagram of Chemical & Volume Control System (NV)"</td><td>"Closure of one of these valves during power operation would inhibit normal seal water flow across the reactor coolant pump number 1 seal. This action could result in damage to the reactor coolant pump seals or the pump itself."</td><td>Valve will be cycled and timed during cold shutdown.</td></tr>
<tr><td colspan="5">Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.10). As shown on flow diagram MC-1554-1.1, Rev. 9, "Flow Diagram of Chemical & Volume Control System (NV)," valves 1NV-94A and 95B are in series in a single line conducting the seal water discharge from all four reactor coolant pumps to the seal water filter. These valves provide containment isolation for penetration M-256. The licensee states that "closure of one of these valves during power operation would inhibit normal seal water flow across the reactor coolant pump number 1 seal. This action could result in damage to the reactor coolant pump seals or the pump itself."

Testing should not be performed if the RCP seals could be damaged, resulting in an unisolatable LOCA. However, the licensee should evaluate the amount of time the valve could be closed before seal damage would occur and provide additional information in the basis to justify why the plant could not achieve a normal shutdown in the event that the valves fail closed during testing.</td></tr>
<tr><td>1(2)-MC-NV2</td><td>1(2)NV-7B, 3" motor operated globe valve, Cat. B, normal letdown flow outboard isolation valve, normally open</td><td>MC-1554-1.2, Rev.17, (MC-2554-1.2, Rev.14), "Flow diagram of Chemical & Volume Control System (NV)"</td><td>"Failure of this valve in a closed position could result in loss of pressurizer level control and result in unit shutdown."</td><td>Valve will be cycled and timed during cold shutdown.</td></tr>
<tr><td colspan="5">Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.11). As shown on flow diagram MC-1554-1.2, Rev. 17, (MC-2554-1.2, Rev. 14) "Flow Diagram of Chemical & Volume Control System (NV)," MOV 1(2)NV-7B is in the flow path for the normal CVCS letdown and provides containment isolation for penetration M-347. The licensee states that failure of this valve closed could result in loss of pressurizer level control and result in unit shutdown. The licensee has not provided sufficient information concerning the time available before such consequences would result following failure of the valve in the closed position. The licensee should provide additional information in the basis to justify why the plant could not achieve a normal shutdown in the event that 1(2)NV-7B failed closed during testing.</td></tr>
</table>

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NV3	1(2)NV-21A, 2" air operated control valve, Cat. B, pressurizer auxiliary spray control valve, normally closed	MC-1554-1.2, Rev.17, (MC-2554-1.2, Rev.14), "Flow diagram of Chemical & Volume Control System (NV)"	"Opening this valve during power operations could result in a reactor low pressure trip."	Valve will be cycled and timed during cold shutdown.
Evaluation: 1(2)NV-21A is an air operated control valve off the regenerative heat exchanger return which is normally closed during operation. It is impractical to part-stroke or full stroke exercise this valve to the open position quarterly because this would cause a pressure transient in the reactor coolant system from the spray of cold water into the pressurizer, which in turn might cause a plant trip and impose thermal stresses on the pressurizer spray piping. The alternative provides full stroke exercising to the open position at cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c).				
1(2)-MC-NV4	1(2)NV-141A, 1(2)NV-142B, 4" motor operated gate valves, Cat. B, volume control tank discharge isolation valves, normally open	MC-1554-2.0, Rev.17, (MC-2554-2.0, Rev.14), "Flow diagram of Chemical & Volume Control System (NV)"	"Closure of one of these valves during power operation would isolate the suction for the Centrifugal Charging Pumps. This action could result in damage to the pumps. Seal water to the Reactor Coolant pumps would be interrupted causing damage to the seals."	Valve will be cycled and timed during cold shutdown.
Evaluation: Provides isolation for Charging Pump suction from Volume Control Tank upon receipt of a safety injection signal. It is impractical to part-stroke or full stroke exercise either of these two valves to the closed position quarterly because this would likely result in damage to the charging pumps and reactor coolant pump seals, and undesirable pressurizer level transients and possible plant trip. The alternative provides full stroke exercising at cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NV5	1(2)NV-244A, 1(2)NV-245B, 3" motor operated gate valves, Cat. B, normal charging line isolation valves, normally open	MC-1554-3.0, Rev.16, (MC-2554-3.0, Rev.12), "Flow diagram of Chemical & Volume Control System (NV)"	"If one of these valves were to fail in the closed position while testing during power operation, normal and alternate charging would be lost. This could result in a loss of pressurizer level control and result in unit shutdown."	Valve will be cycled and timed during cold shutdown.
Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.12). As shown on flow diagram MC-1554-3.0, Rev. 16, (MC-2554-3.0, Rev. 12), "Flow Diagram of Chemical & Volume Control System," 1(2)NV-244A and 1(2)NV-245B are in series in the CVCS charging flow path to the Regenerative Heat Exchanger. The valves isolate charging flow to the Reactor Coolant System upon a Safety Injection signal. The licensee states that if one of these valves were to fail in the closed position during power operation, normal and alternate charging would be lost and that this could result in a loss of pressurizer level control and unit shutdown. The licensee has not provided any information concerning the time available before such consequences would result following failure of the valves in the closed position. Also, the licensee has not discussed the reduced charging flow available through the Reactor Coolant Pump seal injection lines. The licensee should provide additional information in the basis to justify why the plant could not achieve a normal shutdown in the event that 1(2)NV-244A or 1(2)NV-245B failed closed during testing.				
1(2)-MC-NV6	1(2)NV-221A, 1(2)NV-222B, 8" motor operated gate valves, Cat. B, in parallel lines from RWST to centrifugal charging pump suction, normally closed	MC-1554-3.1, Rev.13, (MC-2554-3.1, Rev.10), "Flow diagram of Chemical & Volume Control System (NV)"	"Opening these valves during power operation allows the Charging Pumps to inject highly borated water into the Reactor Coolant System which could result in a unit shutdown."	Valve will be cycled and timed during cold shutdown.
Evaluation: These valves open automatically upon receipt of a safety injection signal or low-low volume control tank level signal to allow the centrifugal charging pumps to take suction from the RWST. There are no means of isolating these MOV gate valves during normal operation for performing any quarterly testing. Hence cycling either of these valves open during normal operation will inject a high concentration of borated water into the reactor coolant system causing a rapid shutdown. The alternative provides full stroke exercising to the open position during cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c). (See deferrals 1(2)-MC-NV10, 1(2)-MC-NV11, and 1(2)-MC-NV15).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NV7	1(2)NV-264, 2" check valve, Cat. C, in line from boric acid tank to charging pump suction, normally closed	MC-1554-3.1, Rev.13, (MC-2554-3.1, Rev.10), "Flow diagram of Chemical & Volume Control System (NV)"	"To full stroke exercise this valve during power operations would inject more than 30 gpm of boric acid into the Reactor Coolant System creating a transient. To verify closure, residual boric acid would be injected causing a transient."	Valve will be full stroke exercised at cold shutdown.
Evaluation: This check valve is in the emergency borate loop and is required to open after the emergency borate isolation valve (NV-265B) opens and the boric acid pumps start to provide a flow path from the Boric Acid Tank to the centrifugal charging pump suction. The valve closes to provide pump suction pressure boundary. It is impractical to full stroke exercise to the open position quarterly because exercising the valve open and closed will create a reactivity decrease and subsequent plant transient to recover. The alternative provides full stroke exercising to the open and closed positions at cold shutdowns in accordance with OMa-1988 Part 10, ¶4.3.2.2(c).				
1(2)-MC-NV8	1(2)NV-150B, 1(2)NV-151A, 2" motor operated kerotest (globe) valves, Cat. B, miniflow line isolation valves, normally open	MC-1554-2.0, Rev.17, (MC-2554-2.0, Rev.14), "Flow diagram of Chemical & Volume Control System (NV)"	"If either valve were to fail closed while testing, the Charging Pump miniflow protection line is isolated possibly causing damage to the pump."	Valve will be cycled and timed during cold shutdown.
Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.13). As shown on flow diagram MC-1554-2.0, Rev. 17, "Flow Diagram of Chemical & Volume Control System (NV)," 1NV-150B and 1NV-151A are in series in the common miniflow line from both centrifugal charging pumps to the Volume Control Tank. The valves provide isolation of the miniflow line to the Volume Control Tank. The licensee states that if either valve were to fail closed during testing, the Charging Pump miniflow line is isolated which could possibly damage the pumps. The licensee has not provided any information concerning the time available before such consequences would result following failure of the valves in the closed position, considering that the charging pumps are normally in full flow operation during plant operation. The licensee should provide additional provide additional information in the basis.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NV9	1(2)NV-265B, 2" motor operated globe valve, Cat. B, isolation valve in line from boric acid tank to charging pumps, normally closed	MC-1554-3.1, Rev.13, (MC-2554-3.1, Rev.10), "Flow diagram of Chemical & Volume Control System (NV)"	"If valve is opened during power operations, boric acid could be injected into the Reactor Coolant System causing a transient."	Valve will be cycled and timed during cold shutdown.
Evaluation: Since this valve is the isolation valve for emergency boration, it provides a flow path from the boric acid transfer pumps to the centrifugal charging pumps via check valve NV-264 (see 1(2)-MC-NV7 above). With the boric acid pumps in operation or with the CVCS in automatic mode it is impractical to full stroke exercise to the open position quarterly because exercising the valve open and closed may cause plant transients. The alternative provides full-stroke exercising to the open and closed positions at cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(c).				
1(2)-MC-NV10	1(2)NV-225, 1(2)NV-231, 4" check valves, Cat. C, centrifugal pumps discharge check valves, normally open	MC-1554-3.1, Rev.13, (MC-2554-3.1, Rev.10), "Flow diagram of Chemical & Volume Control System (NV)"	"Valve cannot be full stroke exercised during power operation since this would require an increase in Reactor Coolant System boron concentration which could result in unit shutdown. Normal letdown is not sufficient to verify full stroke, this must be done when aligned to the RWST for suction."	Valve will be full stroke exercised during cold shutdown, partial stroked with normal use.
Evaluation: This check valve opens to provide a discharge flow path for the centrifugal charging pump, and closes to prevent opposite train flow losses. During power operation, the RCS pressure prevents the charging pump from reaching full injection flow conditions, and also suction would have to be drawn from the RWST (via check valve NV-223), which in turn would result in an increase in boron concentration in the RCS and a power transient. The alternative provides part-stroke exercising open during plant operation and full-stroke exercising to the open and closed positions at cold shutdowns in accordance with OMa-1988 Part 10, ¶4.3.2.2(b).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NV11	1(2)NV-223, 8" check valve, Cat. C, in flow line from RWST to centrifugal charging pumps, normally closed	MC-1554-3.1, Rev.13, (MC-2554-3.1, Rev.10), "Flow diagram of Chemical & Volume Control System (NV)"	"Testing this valve during power operations would require opening of either 2NV-221A or 2NV-222B. Opening these valves during power operation could result in a unit trip. See Justification #MC-NV6."	Valve will be full stroke exercised at cold shutdown.
Evaluation: This check valve opens to provide a flow path from the RWST to the centrifugal charging pumps, and closes upon cessation of pump operation. The same considerations as for discharge check valves NV-225 and NV-231 are to be considered for this suction check valve. During power operation, the RCS pressure prevents the charging pump from reaching full injection flow conditions, and also suction would have to be drawn from the RWST (via check valve NV-223), which in turn would result in an increase in boron concentration in the RCS and a power transient. The alternative provides full-stroke exercising to the open and closed positions at cold shutdowns in accordance with OMa-1988 Part 10, ¶4.3.2.2(c).				
1(2)-MC-NV12	1(2)NV-1046, 2" check valve, Cat. C, in recirc loop around positive displacement pump, normally closed	MC-1554-3.0, Rev.16, (MC-2554-3.0, Rev.12), "Flow diagram of Chemical & Volume Control System (NV)"	"Testing this valve during power operation would result in the addition of highly borated water into the Reactor Coolant System causing a transient."	Valve will be full stroke exercised at cold shutdown.
Evaluation: Valve 1(2)NV-1046 is part of the recirculation line around the positive displacement pump. This valve closes to provide a pump suction pressure boundary for the centrifugal charging pumps, and opens to protect the positive displacement pump from over-pressurization. Because suction is being drawn from the Volume Control Tank it is not clear where the source of highly borated water is coming from. It appears that a portion of the loop is in use during the RCS hydrostatic test. The licensee, however, has not provided sufficient information on the functions of the other valves in the loop to evaluate this deferral request. The licensee should resubmit this deferral with a system description that describes the source and pathway for the highly borated water.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NV13	1(2)NV-261, 1(2)NV-263, 1" and 2" check valves, respectively, Cat. C, for pressure isolation off the chemical mixing tank and reactor makeup water storage tank, normally closed	MC-1554-3.1, Rev.13, (MC-2554-3.1, Rev.10), "Flow diagram of Chemical & Volume Control System (NV)"	"Testing these valves requires 2NI-121A to be opened. This valve is closed with power removed above mode 4 per Tech Spec 4.5.2."	Valve will be full stroke exercised at cold shutdown.
Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.14). As shown on flow diagram MC-1554-3.1, Rev. 13, (MC-2554-3.1, Rev. 10), "Flow Diagram of Chemical & Volume Control System (NV)," 1(2)NV-261 and 1(2)NV-263 are check valves which prevent back flow to the Chemical Mixing Tank and the Reactor Makeup Water Storage Tank (RMWST) from the boric acid tank, respectively. The valves close to provide pump suction pressure isolation for the Centrifugal Charging pumps from the Chemical Mixing Tank and the RMWST. The licensee states that "Testing these valves requires 1(2)NI-121A to be opened. This valve is closed with power removed above Mode 4 per Tech Spec 4.5.2. Valve 1(2)NI-121A appears on flow diagram MC-1562-3.0, Rev. 12, (MC-2562-3.0, Rev. 10) and is an isolation MOV for Reactor Coolant System Loops 2 and 3 Hot Legs from the discharge of Safety Injection Pump 1A (2A). It is unclear what opening this valve has to do with testing 1(2)NV-261 or 1(2)NV-263. The licensee should clarify the basis.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-NV14	1(2)NV-1002, 2" check valve, Cat. A & C, inside containment in standby makeup line, normally open	MC-1554-1.3, Rev.4, (MC-2554-1.3, Rev.5), "Flow diagram of Chemical & Volume Control System (NV)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.
Evaluation: Provides containment isolation on penetration M-342. These valves are located inside containment and the licensee states that the system design does not provide a means of verifying valve closure upon flow reversal, and the valves will be verified closed by leak testing under Appendix J at refueling outages. Although the licensee has provided an inadequate basis, it is impractical to test these valves quarterly or during cold shutdowns because the valve and test connections are located inside containment. Access to testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. Leak testing these valves during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns. OMa-1988 Part 10, ¶4.3.2.2(e) allows full-stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. Full-stroke exercising to the closed position is provided by seat leak testing in accordance with 10CFR50 Appendix J.				
1(2)-MC-NV15	1(2)NV-143, 4" check valve, Cat. C, volume control tank discharge check valve, normally open	MC-1554-2.0, Rev. 17, (MC-2554-2.0, Rev.14), "Flow diagram of Chemical & Volume Control System (NV)"	"This valve is in the flow path from the Volume Control Tank to the Charging pumps. During normal system operation, this valve is open. To verify this valve closes properly requires the alignment from the RHR pumps, and would interrupt normal charging activities."	Valve will be full stroke exercised at cold shutdown.
Evaluation: This valve closes to provide Centrifugal Charging Pump suction pressure boundary during Recirculation alignment from RHR Pump discharge. During power operation suction would have to be drawn from the RWST, which in turn would result in an increase in boron concentration in the RCS and a power transient. The alternative provides full-stroke exercising to the closed position at cold shutdowns in accordance with OMa-1988 Part 10, ¶4.3.2.2(c).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
FIRE PROTECTION SYSTEM (RF)				
1-MC-RF1	1RF-823, 4" check valve, Cat. A&C, Fire Protection System Supply Header check valve, normally closed	MC-1599-2.2, Rev. 8, "Flow diagram of Fire Protection System (RF) Units 1 & 2"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: This valve provides containment isolation on penetration M-353 for the Unit 1 Fire Protection supply header. This valve is located inside containment and the licensee states that the system design does not provide a means of verifying valve closure upon flow reversal, and the valve will be verified closed by leak testing under Appendix J at refueling outages.

Although the licensee has provided an inadequate basis, it is impractical to test this valve quarterly or during cold shutdowns because the valve and test connections are located inside containment. Access to testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

The alternative provides full-stroke exercising at refueling outages in accordance with OMa-1988 Part 10, ¶4.3.2.2(e).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
2-MC-RF1	1RF-834, 4" check valve, Cat. A&C, Fire Protection System Supply Header check valve, normally closed	MC-1599-2.2, Rev. 8, "Flow diagram of Fire Protection System (RF) Units 1 & 2"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: This valve provides containment isolation on penetration M-353. Although this valve is designated as **Unit 1** piping, it is located inside the **Unit 2** containment and provides isolation for the Unit 2 Fire Protection supply header. This valve is located inside containment and the licensee states that the system design does not provide a means of verifying valve closure upon flow reversal, and the valve will be verified closed by leak testing under Appendix J at refueling outages.

Although the licensee has provided an inadequate basis, it is impractical to test this valve quarterly or during cold shutdowns because the valve and test connections are located inside containment. Access to testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

The alternative provides full-stroke exercising at refueling outages in accordance with OMa-1988 Part 10, ¶4.3.2.2(e).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
NUCLEAR SERVICE WATER SYSTEM (RN)				
1(2)-MC-RN1	1(2)RN-252B, 6" air operated diaphragm valve, Cat. A (outboard), 1(2)RN-253A 6" motor operated diaphragm valve, Cat A (inboard), Non-essential header supply to RCP coolers isolation valves, normally open	MC-1574-4.0, Rev. 16, (MC-2574-4.0, Rev. 9), "Flow Diagram of Nuclear Service Water System (RN)"	"If one of these valves were to fail closed during testing, isolation of cooling water to the motor coolers could result in damage to the pumps."	Valve will be cycled and stroke timed during cold shutdown.
Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.18). As shown on flow diagram MC-1574-4.0, Rev. 16 (MC-2574-4.0, Rev. 9) "Flow Diagram of Nuclear Service Water System (RN)," valves 1(2)RN-252B and 1(2)RN-253A are in series in a line providing cooling water from the Nuclear Service Water non-essential header to all four reactor coolant pump motor air coolers. Valves 1(2)RN-276A and 1(2)RN-277B are in series in a line discharging cooling water flow from the same four reactor coolant pump motor air coolers. The former two valves provide containment isolation for penetration M-307, while the latter two valves provide containment isolation for penetration M-315. The licensee states that if one of these valves were to fail closed during testing, isolation of cooling water to the motor coolers could result in damage to the pumps. The licensee has not provided any information concerning the time available before such consequences would result following failure of the valve in the closed position. The licensee should provide additional information in the basis to justify why the plant could not achieve a normal shutdown in the event that any of these valves failed closed during testing.				
1(2)-MC-RN2	1(2)RN-276A, 6" motor operated diaphragm valve, Cat. A (inboard), 1(2)RN-277B, 6" air-operated diaphragm valve, Cat A (outboard), Non-essential header return from RCP coolers isolation valves, normally open	MC-1574-4.0, Rev. 16, (MC-2574-4.0, Rev. 9), "Flow Diagram of Nuclear Service Water System (RN)"	"If one of these valves were to fail closed during testing, isolation of cooling water to the motor coolers could result in damage to the pumps."	Valve will be cycled and stroke timed during cold shutdown.
Evaluation: See evaluation for RN1 above.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-RN3	1(2)RN-42A, 10" motor operated butterfly valve, Cat. B, Non-essential header isolation valve, normally open	MC-1574-4.0, Rev. 16, (MC-2574-4.0, Rev. 9), "Flow diagram of Nuclear Service Water System (RN)"	"Closing this valve during power operation isolates cooling water flow to the Steam Generator Blowdown Heat Exchanger. Failure in the closed position could result in damage to the heat exchanger."	Valve will be cycled and stroke timed during cold shutdown.
Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.19). As shown on flow diagram MC-1574-4.0, Rev. 16, (MC-2574-4.0, Rev. 9) "Flow Diagram of Nuclear Service Water System (RN)," 1(2)RN-42A is an MOV which isolates the Nuclear Service Water Train A non-essential header to the Steam Generator Blowdown Heat Exchanger and the Reciprocating Charging Pump oil coolers. Flow diagram MC-1574-1.0, Rev. 21, (MC-2574-4.0, Rev. 9) "Flow Diagram of Nuclear Service Water System (RN)," shows valves 1(2)RN-63B and 1(2)RN-64A to be in series in a line discharging cooling water flow from the Steam Generator Blowdown Heat Exchanger and the Reciprocating Charging Pump oil coolers. The licensee states that closing any of these valves during power operation isolates cooling water flow to the Steam Generator Blowdown Heat Exchanger, and that failure in the closed position could result in damage to the heat exchanger. The licensee has not provided any information concerning the time available before such consequences would result following failure of the valve in the closed position. The licensee should provide additional information in the basis to justify why the plant could not achieve a normal shutdown in the event that any of these valves failed closed during testing.				
1(2)-MC-RN4	1(2)RN-63B, 1(2)RN-64A, 10" motor operated butterfly valves, Cat. B, Non-essential Header Supply isolation valves, normally open	MC-1574-1.0, Rev. 21, (MC-2574-1.0, Rev. 9), "Flow diagram of Nuclear Service Water System (RN)"	"Closing either of these valves during power operation isolates cooling water flow to the Steam Generator Blowdown Heat Exchanger. Failure in the closed position could result in damage to the heat exchanger."	Valve will be cycled and stroke timed during cold shutdown.
Evaluation: See Evaluation for RN3.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-RN5	1(2)RN-214, 4" check valve, Cat. C, Nuclear Service Water Supply to Spent fuel Pool check valve, normally closed	MC-1574-3.0, Rev. 33, (MC-2574-3.0, Rev. 22), "Flow Diagram of Nuclear Service Water System (RN)"	"Valves cannot be full stroked at any time without putting raw water into the Spent Fuel Pool."	This valve will be disassembled and full stroked during each refueling outage until it is deleted from the system. The valve will be partial stroked quarterly.

Evaluation: This valve must open to allow assured makeup supply from the Nuclear Service Water System to the Spent Fuel Pool. The closed function of this valve was eliminated by modification MGMM-3676 (MGMM-3776). This valve is scheduled to be deleted from the system during 1(2)EOC9 refueling outage. Until it is deleted, it will be included in the test program and tested as described above. 1EOC9 (2EOC9) is scheduled for 19-Aug-94 (17-Nov-94).

The licensee states that this valve is partial stroked open quarterly. There are 1 in. connections upstream and downstream of this valve which it appears are used by the licensee to perform the partial stroke test. From a review of MC-1574-1.0, Rev. 21, (MC-2570-1.0, Rev. 11), "Flow Diagram of Spent Fuel Cooling System (KF)", it is correct that this valve cannot be full-stroke exercised without flushing raw service water into the Spent Fuel Pool, which is impractical.

The proposed alternative of partial stroke exercising this valve open quarterly and disassembly and inspection at each refueling outage until the valve has been removed from the system is in accordance with Generic Letter 89-04, Position 2.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-RN6	1(2)RN-891, 1(2)RN-892, 2" check valves, Cat. C, Return line check valve from diesel generator cooling to Essential Header, normally closed	MC-1574-2.0, Rev. 33, (MC-2574-2.0, Rev. 21), "Flow Diagram of Nuclear Service Water System (RN)", MC-1574-3.0, Rev. 33 , (MC-2574-3.0, Rev. 22), "Flow Diagram of Nuclear Service Water System (RN)"	"The system does not permit reverse flow testing as there is not sufficient pressure down stream of these check valves to verify closure. These check valves discharge into the main RN (Nuclear Service Water) discharge header, and piping that large has little back pressure."	These valves will be tested for closure via sample disassembly at a refueling outage frequency (as specified per GL 89-04). The open function will be verified with proper Diesel Generator operation as "Valves in Regular Use" and done on a monthly frequency.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing

Evaluation: These valves check flow from the Nuclear Service Water (RN) return line (from the Diesel Generator Cooling Water (KD) heat exchanger to the RN essential header) to maintain RN system integrity, during a seismic event. These valves open to allow Nuclear Service Water return from the Diesel Generator Starting Air (VG) coolers.

The licensee states that the open function will be verified with proper Diesel Generator operation as "Valves in Regular Use" and done on a monthly frequency. However, OM Part 10, ¶4.3.2.3 to which the licensee is referring states that "Check valves which operate in the course of plant operation at a frequency which would satisfy the exercising requirements of this Part need not be additionally tested provided that the observations otherwise required for testing are made and analyzed during such operation and are recorded on the plant records at intervals no greater than specified in para. 4.3.2.1." The licensee should specify whether the flow rate passing through the valve during the monthly diesel generator testing is sufficient to full-stroke or part-stroke exercise these valves.

The licensee states that the system does not permit reverse flow testing as there is not sufficient pressure downstream of these valves to verify closure, since these valves discharge into the main Nuclear Service Water header and piping "that large", i.e. through an 8 in. diameter and on to the 36 in. diameter RN header, "has little back pressure." There are no valves on the 8 in. line which could be used to isolate the 2 in. check valves to perform reverse flow testing to verify closure. It would be necessary to isolate flow on the 36 in. main RN header. However, the licensee has not explained why testing of the 2 in. check valves could not be performed simultaneously with the quarterly stroke time test of 1(2)RN-197B which would isolate flow on the corresponding portion of the main RN header.

The licensee's proposed alternative testing is to sample disassemble at least one of these two valves (for each unit) to verify closure during refueling outages. The licensee has classified this alternative testing and frequency as a deferral when in fact it should be a relief request.

Therefore, the licensee should revise this deferral to specify whether the part-stroke or full-stroke exercising of this valve is achieved by the monthly diesel generator testing and to describe the impracticality of verifying closure concurrently with stroke time testing of 1(2)RN-197B and any equivalent test for the "A" main RN header. If sample disassembly is still required to verify closure, the licensee should convert this deferral to a relief request.
Relief would be granted in accordance with GL 89-04, Position 2.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
CONTAINMENT VENTILATION COOLING WATER SYSTEM (RV)				
1(2)-MC-RV1	1(2)RV-32A, 1(2)RV-33B, 1(2)RV-76A, 1(2)RV-77B, 12" motor operated butterfly valves, Cat. A, Containment Ventilation Cooling Water supply and return isolation valves, normally open	MC-1604-3.0, Rev. 18, (MC-2604-3.0, Rev. 15), "Flow Diagram of Containment Ventilation Cooling Water System (RV)"	"Failure of one of these valves in the closed position during testing would isolate cooling flow to the Lower Containment Ventilation Units causing an increase in lower containment temperature which could exceed Tech Spec limits."	Valve will be cycled and stroke timed during cold shutdown.
Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.20). As shown in flow diagram MC-1604-3.0, Rev. 18, (MC-2604-3.0, Rev. 15) "Flow Diagram of Containment Ventilation Cooling Water System (RV)," valves 1(2)RV-32A and 1(2)RV-33B are MOVs which isolate the Containment Ventilation Cooling Water to the Lower Containment Ventilation Units 1A, 1B, 1C and 1D, (2A, 2B, 2C and 2D) and also isolate Penetration M-240 while valves 1(2)RV-76A and 1(2)RV-77B are MOVs which isolate the cooling water flow from the ventilation units, and also isolate Penetration M-279. The licensee states that failure of one of these valves in the closed position during testing would isolate cooling flow to the Lower Containment Ventilation Units causing an increase in lower containment temperature which could exceed the Technical Specification limits. The licensee has not provided any information concerning the time available before such consequences would result following failure of the valve in the closed position. The licensee should provide additional information in the basis to justify why the plant could not achieve a normal shutdown in the event that any of these valves failed closed during testing.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
MAIN STEAM TO AUXILIARY EQUIPMENT (SA)				
1(2)-MC-SA1	1(2)SA-5, 1(2)SA-6, 6" check valves, Cat. C, steam generators 1B and 1C check valves to turbine driven auxiliary feedwater pump, normally closed	MC-1593-1.2, Rev.13, (MC-2593-1.2, Rev.11), "Flow diagram of Main Steam Supply to Aux. Equipment System (SA)"	"System configuration and design do not provide a suitable means to prove the valve prevents reversal of flow. To test the close function of this valve on line would risk personnel safety since high energy steam would be involved."	At least one of these two valves will be disassembled and full stroked during each refueling outage, and both valves will have been disassembled and full stroked after two consecutive outages. Sample disassembly will verify closure. Failure of one valve to properly full stroke during a refueling outage will result in the remaining valve being disassembled and full stroked during that outage. Valves will be full stroked open quarterly.

Evaluation: These valves open to allow steam supply to the turbine driven Auxiliary Feedwater Pump and close to prevent cross connecting steam generators 1B and 1C.

Testing the close function of these valves would risk personnel safety due to high steam conditions during operation. The licensee's alternative is a disassembly/inspection plan during refueling outages which is in accordance with Generic Letter 89-04, Position 2. The licensee has classified this alternative testing and frequency as a deferral, when in fact it should be a relief request.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
MAIN STEAM SYSTEM (SM)				
1(2)-MC-SM1	1(2)SM-1AB, 1(2)SM-3AB, 1(2)SM-5AB, 1(2)SM-7AB, 34" air operated globe valves, Cat. B, Main Steam Isolation Valves, normally open	MC-1593-1.0, Rev.20, MC-1593-1.3, Rev.20, (MC-2593-1.0, Rev. 20, MC-2593-1.3, Rev.12)," Flow diagram of Main Steam System (SM)"	"These valves cannot be fully cycled closed during power operation since a unit shutdown would result."	These valves will be partially cycled closed while in Modes 1, 2 and 3. These valves will be cycled and timed during cold shutdown.
Evaluation: These are the Main Steam Isolation Valves. It is impractical to full-stroke exercise these valves closed quarterly because this would cause a transient and reactor shutdown. The alternative provides part-stroke exercising to the closed position in modes 1, 2, and 3 and full-stroke cycling to closed position and timing at cold shutdowns in accordance with OMa-1988 Part 10, ¶4.2.1.2(b).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
BREATHING AIR SYSTEM (VB)				
1(2)-MC-VB1	1(2)VB-50, 2" check valve, Cat. A&C, breathing air supply inside containment, normally closed	MC-1605-3.1, Rev.11, (MC-2605-3.1, Rev.7)," Flow diagram of Breathing Air System (VB)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: Provides containment isolation on penetration M-215. These valves are located inside containment and the licensee states that the system design does not provide a means of verifying valve closure upon flow reversal, and the valves will be verified closed by leak testing under Appendix J at refueling outages.

Although the licensee has provided an inadequate basis, it is impractical to test these valves quarterly or during cold shutdowns because the valves and test connections are located inside containment. Access to testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full-stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. This deferral is acceptable for using leak testing in accordance with 10CFR50 Appendix J.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
DIESEL GENERATOR STARTING AIR SYSTEM (VG)				
1(2)-MC-VG1	1(2)VG-17, 1(2)VG-18, 1(2)VG-19, 1(2)VG-20, 3/4" check valves, Cat. C, in lines to air banks, normally closed	MC-1609-4.0, Rev.18, (MC-2609-4.0, Rev.0), "Flow diagram of Diesel Generator Starting Air System (VG)"	"Valve will be full stroke exercised with the diesel generator start on a single bank of control air and performed at refueling outage frequency."	A separate relief requested has been submitted for these valves. This relief request was submitted on August 24, 1993 as Docket No. 50-370. Relief Request 92-01.
Evaluation: (This deferral was previously evaluated in the October 22, 1993 Safety Evaluation, Section 4.21). As shown on flow diagram MC-1609-4.0, Rev. 18, (MC-2609-4.0, Rev. 0) "Flow Diagram of Diesel Generator Starting Air System (VG)," valve 1(2)VG-17 is a 3/4 in. check valve which prevents back flow to Starting Air Tank 1(2)A1, valve 1(2)VG-18 to Tank 1(2)A2, valve 1(2)VG-19 to Tank 1(2)B1, and valve 1(2)VG-20 to Tank 1(2)B2. When open, valves 1(2)VG-17 and 1(2)VG-18 provide a flow path for control air to Volume Tank 1A (2A) and valves 1(2)VG-19 and 1(2)VG-20 to Volume Tank 1B (2B). The licensee states that "Testing these valves requires the Diesel Generator to be started on a single bank of control air which is considered a degraded condition. This is not justified for quarterly starts." The licensee has not pointed to any violation of the Technical Specifications nor to any impracticality in performing the tests. Testing the diesel generators with one bank of control air isolated is the only method available to assure that the valves perform their safety function. In fact, in a letter dated March 28, 1992, the Arizona Public Service Company submitted to the NRC Special Report 3-SR-92-001 for Palo Verde Nuclear Generating Station Unit 3, Docket No. 50-530, which described the failure of a check valve in the diesel generator starting air system that was detected by isolating and depressurizing one bank of starting air for test purposes. After 15 seconds from the start signal, the diesel generator tripped on low lube oil pressure and never attained rated voltage and frequency. A 3/8 in. check valve in the opposite bank pneumatic controls was fouled with oil believed to be carryover from the starting air compressor and restricted flow in the forward direction, causing other components to perform unsatisfactorily. Based on the safety significance of these valves, the licensee should test the valves quarterly or provide further information.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
INSTRUMENT AIR SYSTEM (VI)				
1(2)-MC-VI1	1(2)VI-368, 1(2)VI-372, 1(2)VI-373, 1(2)VI-374, 2" check valves, Cat. C, nitrogen supply lines check valves to PORVs, normally closed	MC-1605-1.3, Rev.9, (MC-2605-1.3, Rev.7), "Flow Diagram of Instrument Air System (VI)"	"All four valves are tested with PORV stroke timing. PORV's are tested on a cold shutdown frequency. Refer to Justification 1(2)-MC2-NC1."	Valve will be full stroke exercised at cold shutdown.

Evaluation: VI-368 and VI-373 must open to allow nitrogen to the PORV actuator. VI-372 and VI-374 must close to prevent loss of Nitrogen pressure if instrument air is lost.

Generic Letter 90-06 states, "Stroke testing of the PORVs should not be performed during power operation, due to the risk associated with challenging these valves in this condition." That statement is also applicable to the backup nitrogen supply to the instrument air supply. It is impractical to exercise these valves to the open and closed positions respectively because the primary supply must be defeated, and the PORVs would have to then be exercised open and timed and fail safe tested while the Unit was at power.

The alternative provides for testing the these backup nitrogen supply valves in conjunction with the PORVs at cold shutdowns in accordance with OMa-1988 Part 10, ¶4.3.2.2(e). The licensee should ensure that the full-stroke exercising includes verification of both full-stroke open and full-stroke close capability of these valves.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-VI2	1(2)VI-124, 1(2)VI-149, 2" check valves, Cat. A&C, inside containment supply check valves, normally open	MC-1605-1.2, Rev.7C, (MC-2605-1.2, Rev.14), "Flow diagram of Instrument Air System (VI)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: These valves are located inside containment and provide containment isolation on penetrations M-317 and M-386 respectively. These valves are located inside containment and the licensee states the system does not provide a means of verifying closure upon flow reversal, and the valves will be verified closed by leak testing under Appendix J at refueling outages.

Although the licensee has provided an inadequate basis, it is impractical to test these valves quarterly or during cold shutdowns because the valves and test connections are located inside containment. Access to testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full-stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. This deferral is acceptable for using leak testing in accordance with 10CFR50 Appendix J.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-VI3	1(2;VI-40, 1(2)VI-161, 2" check valves, Cat. A&C, inside containment isolation valves, normally open	MC-1605-1.3, Rev.9, (MC-2605-1.3, Rev.7), "Flow diagram of Instrument Air System (VI)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified closed by lead test performance in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: Provides containment isolation on penetrations M-220 and M-359 respectively. These valves are located inside containment and the licensee states the system does not provide a means of verifying closure upon flow reversal, and the valves will be verified closed by leak testing under Appendix J at refueling outages.

Although the licensee has provided an inadequate basis, it is impractical to test these valves quarterly or during cold shutdowns because the valves and test connections are located inside containment. Access to testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full-stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. This deferral is acceptable for using leak testing in accordance with 10CFR50 Appendix J.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
STATION AIR SYSTEM (VS)				
1(2)-MC-VS1	1(2)VS-13, 2" check valve, Cat. A&C, station air to various supplies isolation check valve, normally open	MC-1605-2.2, Rev.5, (MC-2605-2.2, Rev.2), "Flow diagram of Station Air System (NS)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.
Evaluation: These valves are located inside containment and provides containment isolation on penetration M-219, and the licensee states the system does not provide a means of verifying closure upon flow reversal, and the valves will be verified closed by leak testing under Appendix J at refueling outages. Although the licensee has provided an inadequate basis, it is impractical to test these valves quarterly or during cold shutdowns because the valves and test connections are located inside containment. Access to testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns. OMa-1988 Part 10, ¶4.3.2.2(e) allows full-stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. This deferral is acceptable for using leak testing in accordance with 10CFR50 Appendix J.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
CONTAINMENT AIR RETURN & HYDROGEN SKIMMER SYSTEM (VX)				
1(2)-MC-VX1	1(2)VX-30, 2" check valve, inside containment, Cat. A&C, normally closed	MC-1557-1, Rev.22, (MC-2557-1, Rev.17), "Flow diagram of Containment Air Return Exchange & Hydrogen Skimmer System (VX)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: Provides containment isolation on penetration M-325. These valves are located inside containment and the licensee states the system does not provide a means of verifying closure upon flow reversal, and the valves will be verified closed by leak testing under Appendix J at refueling outages.

Although the licensee has provided an inadequate basis, it is impractical to test these valves quarterly or during cold shutdowns because the valves and test connections are located inside containment. Access to testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full-stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. This deferral is acceptable for using leak testing in accordance with 10CFR50 Appendix J.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
LIQUID WASTE RECYCLE SYSTEM (WL)				
1(2)-MC-WL1	1(2)WL-24, 1/2" check valve, Cat. A&C, inside containment check valve off reactor coolant drain tank, normally closed	MC-1565-1.1, Rev.12, (MC-2565-1.1, Rev.8), "Flow diagram of Liquid Waste Recycle System (WL)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: Provides containment isolation and thermal over pressurization protection of line between WL-1B and WL-2A on penetration M-375. These valves are located inside containment and the licensee states the system does not provide a means of verifying closure upon flow reversal, and the valves will be verified closed by leak testing under Appendix J at refueling outages.

Although the licensee has provided an inadequate basis, it is impractical to test these valves quarterly or during cold shutdowns because the valves and test connections are located inside containment. Access to testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full-stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. This deferral is acceptable for using leak testing in accordance with 10CFR50 Appendix J.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
1(2)-MC-WL2	1(2)WL-385, 1" check valve, Cat. A&C,inside containment off ventilation unit drain tank, normally closed	MC-1565-7.0, Rev.19, (MC-2565-7.0, Rev.17), "Flow diagram of Liquid Waste Rrcycle System (WL)"	"The system design does not provide a means of verifying valve closure upon flow reversal."	Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: Provides containment isolation and thermal over pressurization protection of line between WL-322B and WL-321A on penetration M-221. These valves are located inside containment and the licensee states the system does not provide a means of verifying closure upon flow reversal, and the valves will be verified closed by leak testing under Appendix J at refueling outages.

Although the licensee has provided an inadequate basis, it is impractical to test these valves quarterly or during cold shutdowns because the valves and test connections are located inside c tainment. Access to testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full-stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. This deferral is acceptable for using leak testing in accordance with 10CFR50 Appendix J.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification For Deferred Testing	Proposed Alternate Testing
MAKEUP DEMINERALIZED WATER SYSTEM (YM)				
1(2)-MC-YM1	1(2)YM-116, 2" check valve, Cat. A&C, makeup water check valve inside containment, normally open	MC-1601-2.4, Rev.16, (MC-2601-2.4, Rev.17), "Flow diagram of Makeup Demineralized Water System (YM)"	The system design does not provide a means of verifying valve closure upon flow reversal.	Valve will be verified closed by leak test performed in accordance with 10CFR50 Appendix J at refueling outage frequency.

Evaluation: This valve is located inside containment and provides containment isolation on penetration M-337, and the licensee states the system design does not provide a means of verifying valve closure upon flow reversal, and the valve will be verified closed by leak testing under Appendix J at refueling outages.

Although the licensee has provided an inadequate basis, it is impractical to test these valves quarterly or during cold shutdowns because the valves and test connections are located inside containment. Access to testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. Leak testing this valve during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and radiation exposure to test personnel, and the potential for extending the shutdowns.

OMa-1988 Part 10, ¶4.3.2.2(e) allows full-stroke exercising that is not practical during operation or cold shutdowns to be deferred to refueling outages. This deferral is acceptable for using leak testing in accordance with 10CFR50 Appendix J.

5.0 IST PROGRAM RECOMMENDED ACTION ITEMS

Inconsistencies, omissions, and required licensee actions identified during the review of the licensee's Inservice Testing Program, Revision 20 and 15 (Unit 1 and 2, respectively) of the second ten-year interval, are summarized below. The licensee should resolve these items in accordance with the evaluations presented in this report.

5.1 The IST Program does not include a description of: (a) how the components were selected, (b) how testing requirements were identified for each component, and, (c) the safety function of the valves. Additionally, the IST program tables do not specify the position indication verification required by the Code. The program should be revised to provide this information.

The review performed for this technical evaluation report (TER) did not include verification that all pumps and valves within the scope of 10 CFR 50.55a and Section XI are contained in the IST Program, and did not ensure that all applicable testing requirements have been identified. The results of a limited review of six systems is given in 5.13 below. The program should describe the development process, such as a listing of the documents used, the method of the basis for categorizing valves, and the method or process used for maintaining the program current with design modifications or other activities performed under 10 CFR 50.59.

5.2 In pump Relief Request 1.3.1 the licensee wants to continue to use the present vibration measurement instrumentation which cannot meet the ±5% instrument accuracy because of instrumentation uncertainties in the calibration process. It is recommended that interim relief be granted in accordance with §50.55a ¶(a)(3)(ii) for one year or until the next refueling outage, whichever is longer. In the interim period, the licensee should investigate the availability of vibration instruments which satisfy the Code accuracy requirements, or the availability of other calibration laboratories as previously recommended in the October 12, 1993 SE (Ref. 12), which the licensee has not addressed to date. (TER Section 2.1.1)

5.3 In pump Relief Request 1.4.2 the licensee neglected to specifically request relief from Part 6 ¶4.6.5 for measuring the EDG fuel oil transfer pump flow rate by measuring the level rise in the Fuel Oil Day Tank. Based upon this alternative providing an acceptable level of quality and safety for measuring flow rate it is recommended that it be authorized pursuant to §50.55a ¶(a)(3)(i). The licensee, however, did not provide sufficient technical information on why the fuel oil transfer pumps should have a wider acceptance range than that given in ¶6.1 Table 3b for internal gear positive displacement pumps. In addition the licensee did not demonstrate any hardship or impracticality in measuring the fuel oil transfer pumps discharge pressure. (TER Section 2.3.1)

5.4 In pump Relief Requests 1.4.4, 1.4.5, and 1.4.6, for the Residual Heat Removal, Safety Injection, and Centrifugal Charging pumps the licensee appears to be requesting the option of alternative testing using reference values or pump curves depending on plant refueling conditions, maintenance performed, and quantity of data required in lieu of performing the test at specified reference values. As discussed in Draft NUREG-1482 (Ref. 11), Section 5.2, the use of pump curves is acceptable if the licensee clearly demonstrates the impracticality of establishing a fixed set of reference values. The licensee should revise the request the request to discuss this impracticality and ensure that the IST program includes the seven elements discussed in Section 5.2. Additionally, without specific information on the test instrument range and accuracy, relief from the Code's range

requirements is not recommended. The licensee should revise the request and provide this information as requested in the previous SE. (TER Sections 2.5.1, 2.6.1, 2.7.1)

5.5 In pump relief request 1.4.7 for the Nuclear Service Water pumps the licensee requested relief from measuring vibrational frequencies as low as 6.58 Hz because the vibration instrumentation currently in-place cannot be calibrated to that low a frequency. It is pointed out to the licensee that the Catawba Nuclear Station was granted relief when the licensee agreed to modify the CSI model 2110 vibration instrument with analog integration circuits and other upgrades to lessen instrument susceptibility to field problems with low frequency measurements. If the licensee commits to using similar instruments at McGuire Nuclear Station as it did at Catawba Nuclear Station, then this alternative would provide an acceptable level of quality and safety. The licensee would still need to revise the relief request to discuss the accuracy and repeatability of the instruments. Additionally the licensee should evaluate whether the pumps are susceptible to degradation mechanisms which result in increased frequencies less than 10 Hz. and provide this information in the relief request. (TER Section 2.8.1)

5.6 In valve relief request RR-NS1 the licensee proposes to regroup the 6 containment spray check valves to the primary and auxiliary spray headers as one group of 6 and disassemble/inspect all the values every 4 refueling outages (which currently amounts to 6 years) instead of disassembling/inspecting the 4 check valves to the primary header on a staggered basis over the 4 refueling outages and the 2 check valves to the auxiliary header every other refueling outage because of extreme hardship. The primary intent of disassembling and inspecting one valve each outage is to provide some degree of assurance that the valve has not degraded and will perform as required. The licensee's proposal to perform no inspections for a six year period does not provide similar assurance. Proper operation of these check valves is essential in ensuring the proper operation of the containment spray system in order to mitigate the consequences of an accident. The difficulties described by the licensee do not meet the examples of extreme hardship as provided by the NRC. The licensee should evaluate the burden of inspecting the valves versus the benefit from performing the inspections. Without an evaluation of the effect upon plant safety, industry experience, and a more detailed explanation of the burden, authorization of the licensee's alternate inspection schedule cannot be recommended. Numerous other PWR licensees perform inspections of containment spray valves in accordance with GL 89-04. The licensee should continue to perform inspections in accordance with GL 89-04 Position 2. (TER Section 3.1.1)

5.7 In valve relief request RR-VG1 the licensee is seeking relief from stroke time exercising the control air solenoid valves to the diesel generators because of limitations on available acoustic equipment and a forthcoming modification that will remove these valves from IST requirements. The NRC previously approved this request on an interim basis until the modification was installed at the EOC8 outage. The modification was not installed and the licensee was asked to provide further explanation of the burden for not installing acoustic equipment in the previous Safety Evaluation (Ref. 12). In its letter to the Staff of February 24, 1994, the licensee went into more detail as to why the diesel start test should be an acceptable alternative but did not discuss any further the burden imposed by utilizing acoustic equipment. However, given the limited length of time that relief is required, and the level of safety afforded by the monthly diesel test, interim relief is recommended until EOC-9. If the licensee does not delete these valves from the program in EOC-9, and relief is still required, the licensee must provide a means for detecting valve degradation (e.g., trending diesel start times) and resubmit this relief request. (TER Section 3.3.1)

5.8 Ten of the ninety-five justification of deferrals for valves identify disassembly/inspection at refueling outages as the alternative testing. These deferrals should be resubmitted as valve relief requests under Position 2 of GL 89-04. Specifically, the following deferrals are involved:

1(2)-MC-CA2	1(2)-MC-NS2	1(2)-MC-RN5
1(2)-MC-CA3	1(2)-MC-NS3	1(2)-MC-RN6
1(2)-MC-NI22	1(2)-MC-NS4	1(2)-MC-SA1
1(2)-MC-NI24		

Deferral 1(2)-MC-RN6 is an open item pending submittal of additional information.

5.9 Twenty-six of the ninety-five justification of deferrals that were previously reviewed and documented in the October 12, 1993 safety evaluation report requested additional information from the licensee. No additional information has been received to date and the status of those deferrals remain the same. The deferrals needing further information are :

1(2)-MC-CF4	1(2)-MC-NI20	1(2)-MC-NV8
1(2)-MC-KC1	1(2)-MC-ND2	1(2)-MC-NV13
1(2)-MC-KC2	1(2)-MC-ND3	1(2)-MC-RN1
1(2)-MC-KC3	1(2)-MC-ND4	1(2)-MC-RN2
1(2)-MC-KC4	1(2)-MC-ND5	1(2)-MC-RN3
1(2)-MC-NI3	1(2)-MC-NS1	1(2)-MC-RN4
1(2)-MC-NI6	1(2)-MC-NV1	1(2)-MC-RV1
1(2)-MC-NI8	1(2)-MC-NV2	1(2)-MC-VG1
1(2)-MC-NI11	1(2)-MC-NV5	

5.10 Additional information is also requested for the following deferrals:

1(2)-MC-CF1: Containment isolation testing is not addressed.
1(2)-MC-CF3: Containment isolation testing is not addressed.

1(2)-MC-KC5: Open testing is not discussed.
1(2)-MC-KC7: Open testing is not discussed.
1(2)-MC-KC9: Open testing is not discussed.
1(2)-MC-NC3: Open testing is not discussed.
1(2)-MC-NI23: Open testing is not discussed.
1(2)-MC-NM1: Open testing is not discussed.

1(2)-MC-FW2: Clarify partial opening during quarterly RHR pump testing.

1(2)-MC-NV12: Because suction during normal operation is coming from the Volume Control Tank it is not clear where the source of highly borated water is coming from. This deferral needs clarification.

5.11 Alternative is acceptable but an inadequate technical basis was presented for the following deferrals:

1(2)-MC-KC5	1-MC-RF1
1(2)-MC-KC6	2-MC-RF1
1(2)-MC-KC7	1(2)-MC-VB1
1(2)-MC-KC7	1(2)-MC-VI2
1(2)-MC-KC8	1(2)-MC-VI3
1(2)-MC-NB1	1(2)-MC-VS1
1(2)-MC-NC3	1(2)-MC-VX1
1(2)-MC-NF1	1(2)-MC-WL1
1(2)-MC-NI23	1(2)-MC-WL2
1(2)-MC-NM1	1(2)-MC-YM1
1(2)-MC-NV14	

5.12 The IST Program's scope was reviewed for six systems: (1) Chemical and Volume Control [NV], (2) Refueling Water [FW], (3) Residual Heat Removal [ND], (4) Safety Injection [NI], (5) Containment Spray [NS], (6) Nuclear Service Water [RN]. References used in the review included the FSAR, PRA, and the respective flow diagrams.

- Chemical and Volume Control System (NV):

  (1) On a safety injection signal the seal water return isolation valves close. The thermal over-pressurization check valve 1(2)NV96 surrounding the inboard MOV isolation valve 1(2)NV94A,C, shown on flow diagrams MC-1554-1.1 and MC-2554-1.1, should close and isolate penetration M256. Hence, check valve 1(2)NV96 should be added to the program as a Cat A&C check valve.

  (2) Pressure Relief Valve, 1(2)NV220, off the reciprocating charging pump discharge, and shown in flow diagrams, MC-1554-3.0 and MC-2554-3.0, should be in the program (Ref. 13, page 9.3-28).

- Safety Injection System (NI): The Cold Leg Accumulators (CLAs) discharge isolation valves, 10 inch MOVs: 1(2)NI54A, 1(2)NI65B, 1(2)NI76A, and 1(2)NI88B, shown in flow diagrams MC-1562-2.0, MC-1562-2.1, MC-2562-2.0, and MC-2562-2.1, which may be used to isolate the Accumulators from the rest of the system, should be in the program for position indication verification only.

- Residual Heat Removal System (ND): Air operated valves 1(2)ND14 and 1(2)ND29 fail open upon loss of instrument air. A stroke time test quarterly is shown in the valve table. A fail safe test should be added to the valve table.

- Nuclear Service Water System (RN): In general all AOVs in this system requiring support from the Instrument Air (VI) System fail to a safe position upon loss of instrument air. The corresponding safe positions for these valves should be identified and added to the valve table.

- No findings were found for the Refueling Water System and Containment Spray System.

From this sampling the licensee should review its program to ensure that all safety-related valves, fail-safe testing, and position indication verification requirements are adequately identified in the valve table.

5.13 In Draft NUREG-1482 (Ref. 11), page 3-19, an example is given for a refueling outage justification for the high head and intermediate head safety injection flow path check valves. For comparative purposes the applicable check valves for McGuire Nuclear Station are given in deferrals 1(2)-MC-NV10, 1(2)-MC-NV11, 1(2)-MC-NV15, 1(2)-MC-NI12, 1(2)-MC-NI13, 1(2)-MC-NI14, 1(2)-MC-NI15, 1(2)-MC-16, and 1(2)-MC-NI17. The licensee has requested deferrals to cold shutdowns for these check valves. Full flow testing at cold shutdown may require alignment to the RWST (FWST). If this is necessary it is recommended that the licensee evaluate the practical difficulties of dealing with substantial increases in boron concentration from the RWST and the potential for over- pressurization when in cold shutdowns relative to refueling outages (with the RV head removed). The licensee upon further review and evaluation of the burden in dealing with higher boron concentrations and/or over-pressurization during cold shutdowns may wish to consider a deferral request under OMa-1988 Part 10, ¶4.3.2.2(e).

6.0 REFERENCES

1. "Inservice Testing Plan (IST), Second Interval Plans for Units 1 and 2, Relief Request 94-01", T.C. McMeekin, Duke Power, to USNRC, January 6, 1994.

2. Title 10, Code of Federal Regulations, Section 55a, Codes and Standards.

3. NRC Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1", Revision 9, April 1992.

4. ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection.

5. ASME/ANSI OMa-1988, Part 6, "Inservice Testing of Pumps in Light-Water Reactor Power Plants".

6. ASME/ANSI OMa-1988, Part 10, "Inservice Testing of Valves in Light-Water Reactor Power Plants".

7. Standard Review Plan, NUREG-0800, Section 3.9.6, Inservice Testing of Pumps and Valves, Rev. 2, July 1992.

8. NRC Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs", April 3, 1989.

9. Minutes of the Public Meetings on Generic Letter 89-04, October 25, 1989.

10. Supplement to the Minutes of the Public Meetings on Generic Letter 89-04, September 26, 1991.

11. Draft NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants", P. Campbell, November 1993.

12. NRC Safety Evaluation, McGuire Nuclear Station Unit 1, IST Program Plan, October 12, 1993.

13. 1988 Final Safety Analysis Report (FSAR) updated for McGuire Nuclear Station, June 22, 1989.

14. "Inservice Testing Plan (IST), Second Interval Plans for Unit 1, Response to NRC Safety Evaluation (SE), Relief Request 92-04", T. C. McMeekin, Duke Power, to USNRC, dated February 24, 1994.

15. Technical Evaluation Report, Zion Nuclear Generating Station IST Program, March 16, 1994.

16. NUREG/CP-0111, "Proceedings of the Symposium on Inservice Testing of Pumps and Valves, held August 1-3 1989, Washington, D.C.

17. "Safety Evaluation (SE) of the Inservice Testing (IST) Program for a General Pump Relief Request, Catawba Nuclear Station, Units 1 and 2", James A. Norberg, NRC, to Robert E. Martin, NRC, dated January 16, 1992.

18. McGuire Nuclear Station Probabilistic Risk Assessment, 3 volumes, August 30, 1991.

19. NRC Generic Letter 91-18 "Information to Licensee's Regarding Two NRC Inspection Manual Sections on Resolution of Degraded and Non-conforming Conditions on Operability," November 7, 1991.

Appendix A: McGuire Nuclear Station
Units 1 and 2 Flow Diagrams

Flow diagram Dwg. No	System	Revision
MC-1554-1.0	Chemical & Volume Control	14
MC-1554-1.1	Chemical & Volume Control	9
MC-1554-1.2	Chemical & Volume Control	17
MC-1554-1.3	Chemical & Volume Control	4
MC-1554-2.0	Chemical & Volume Control	17
MC-1554-3.0	Chemical & Volume Control	16
MC-1554-3.1	Chemical & Volume Control	13
MC-1554-5.0	Chemical & Volume Control	15
MC-1554-5.0	Chemical & Volume Control	15
MC-1554-5.0	Chemical & Volume Control	13B
MC-2554-1.0	Chemical & Volume Control	8
MC-2554-1.1	Chemical & Volume Control	5
MC-2554-1.2	Chemical & Volume Control	14
MC-2554-1.8	Chemical & Volume Control	5
MC-2554-2.0	Chemical & Volume Control	14
MC-2554-3.0	Chemical & Volume Control	12
MC-2554-3.1	Chemical & Volume Control	10
MC-2554-5.0	Chemical & Volume Control	7
MC-1553-2.0	Reactor Coolant System	19
MC-15553-2.1	Reactor Coolant System	0
MC-1553-4.0	Reactor Coolant System	10
MC-1556-1.1	Boron Recycle System	14
MC-1556-3.0	Boron Recycle System	15
MC-1557-1	Containment Air Return Ex.	22
MC-1558-4.0	Ice Condenser Refrigeration	14
MC-1561-1.0	Residual Heat Removal	19

Appendix A: (Cont'd)

Flow diagram Dwg. No.	System	Revision
MC-1562-1.0	Safety Injection	18
MC-1562-2.0	Safety Injection	14
MC-1562-2.1	Safety Injection	12
MC-1562-3.0	Safety Injection	12
MC-1562-3.1	Safety Injection	6
MC-1563-1.0	Containment Spray	18
MC-1564-1	Annulus Ventilation	26
MC-1565-1.0	Liquid Waste Recycle	20
MC-1565-1.1	Liquid Waste Recycle	12
MC-1565-7.0	Liquid Waste Recycle	19
MC-1567-2.0	Waste Gas	10
MC-1567-2.1	Waste Gas	8
MC-1568-1.0	Equipment Decontamination	10
MC-1570-1.0	Spent Fuel Cooling	13B
MC-1570-1.0	Spent Fuel Cooling	13
MC-1571-1.0	Refueling Water System	16
MC-1572-1.0	Nuclear Sampling	14
MC-1572-1.1	Nuclear Sampling	4
MC-1572-3.0	Nuclear Sampling	14
MC-1573-1.0	Component Cooling	24
MC-1573-1.1	Component Cooling	14
MC-1573-2.0	Component Cooling	11
MC-1573-2.1	Component Cooling	4
MC-1573-2.2	Component Cooling	6
MC-1573-3.0	Component Cooling	10
MC-1573-3.1	Component Cooling	7
MC-1573-1.0	Component Cooling	10

Appendix A: (Cont'd)

Flow diagram Dwg. No.	System	Revision
MC-1574-1.0	Nuclear Service Water	21
MC-1574-1.1	Nuclear Service Water	17
MC-1574-2.0	Nuclear Service Water	33
MC-1574-2.1	Nuclear Service Water	16
MC-1574-3.0	Nuclear Service Water	33
MC-1574-3.1	Nuclear Service Water	14
MC-1574-4.0	Nuclear Service Water	16
MC-1576-1	Containment Purge Ventilation	18
MC-1578-1.0	Control Area Ventilation	27
MC-1580-1.0	Steam Generator Blowdown Recycle	20
MC-1585-1.0	Containment Air Release & Addition	0
MC-1591-1.1	Feedwater	14
MC-1592-1.0	Auxiliary Feedwater	19
MC-15292-1.1	Auxiliary Feedwater	14
MC-1593-1.0	Main Steam System	20
MC-15393-1.2	Main Steam Supply to Aux. Equipment	13
MC-1593-1.3	Main Steam	11
MC-1599-2.2	Station Air	8
MC-1601-2.4	Makeup Demineralized Water	16
MC-1601-2.4	Makeup Demineralized Water	11B
MC-1604-3.0	Containment Ventilation Cooling	18
MC-1605-1.2	Instrument Air System	14
MC-1605-1.2	Instrument Air System	7
MC-1605-1.3	Instrument Air System	09
MC-1605-1.13	Instrument Air System	04
MC-1605-1.14	Instrument Air System	03

Appendix A: (Cont'd)

Flow diagram Dwg. No.	System	Revision
MC-1605-1.17	Instrument Air System	02
MC-1605-2.2	Station Air System	5
MC-1605-3.1	Breathing Air System	11
MC-1609-1.0	Diesel Generator Engine Cooling Water	18
MC-1609-1.0	Diesel Generator Engine Cooling Water	15A
MC-1609-1.1	Diesel Generator Engine Cooling	11
MC-1609-1.1	Diesel Generator Engine Cooling	9A
MC-1609-2.0	Diesel Generator Engine Lube Oil	15
MC-1609-2.0	Diesel Generator Engine Lube Oil	14A
MC-1609-2.1	Diesel Generator Engine Lube Oil	11
MC-1609-2.1	Diesel Generator Engine Lube Oil	8A
MC-1609-3.0	Diesel Generator Engine Lube Oil	21
MC-1609-3.0	Diesel Generator Engine Lube Oil	16A
MC-1609-3.1	Diesel Generator Engine 1B Fuel Oil	12
MC-1609-3.1	Diesel Generator Engine 1B Fuel Oil	7A
MC-1609-4.0	Diesel Generator Starting Air	11A
MC-1609-4.0	Diesel Generator Starting Air	18
MC-1609-7.0	Diesel Generator Room Sump Pump	10
MC-1609-7.0	Diesel Generator Room Sump Pump	10F
MC-1618-1	Control Area Chilled Water	27
MC-1618-2	Control Area Chilled Water	11
MC-1618-4	Control Area Chilled Water	8
MC-1499-VG3	D.G. Pneumatic/Hydraulic Control	6
MC-1499-M17	Radiation Monitor	8
MCIC-1499-IA.01-01	Upper/Lower Personnel Air Locks	0
MCID-1499-IA.01-01	Upper/Lower Personnel Air Locks	0

Appendix A: (Cont'd)

Flow diagram Dwg. No.	System	Revision
MC-1499-NS.08	Containment Pressure Narrow Range	5
MC-1574-1.0	Nuclear Service Water	21
MC-1601-2.4	Makeup Demineralized Water	17
MCID-2499-VG.03	D.G. Pneumatic/Hydraulic Control	0
MCID-2499-VG.03.01	D.G. Pneumatic/Hydraulic Control	0
MCID-2499-NS.08	Containment Pressure Narrow Range	1
MC-2499-M17	Radiation Monitor 2E MF38	11
MCID-2499-IA.01-02	Upper/Lower Personnel Air Locks Inflatable Seals Control Air	0
MCID-2499-IA.01-01	Upper/Lower Personnel Air Locks Inflatable Seals Control Air	0
MC-2553-2.0	Reactor Coolant	5
MC-2556-3.0	Boron Recycle	10
MC-2557-1	Containment Air Return Exchange	19
MC-2558-4.0	Ice Condenser Refrigeration	9
MCFD-2561-01.00	Residual Heat Removal	0
MC-2562-1.0	Safety Injection	15
MC-2562-2.0	Safety Injection	10
MC-2562-2.1	Safety Injection	8
MC-2562-3.0	Safety Injection	10
MC-2562-3.0	Safety Injection	4
MC-2563-1.0	Containment Spray	16
MC-2564-1	Annular Ventilation System	20
MC-2565-1.0	Liquid Waste Recycle	19
MC-2565-1.1	Liquid Waste Recycle	8
MC-2565-7.0	Liquid Waste Recycle	13
MC-2570-1.0	Spent Fuel Cooling	11
MC-2571-1.0	Refueling Water	10

Appendix A: (Cont'd)

Flow diagram Dwg. No.	System	Revision
MC-2572-1.0	Nuclear Sampling	13
MC-2572-1.1	Nuclear Sampling	4
MC-2572-1.1	Nuclear Sampling	4
MC-2572-3.0	Nuclear Sampling	13
MC-2573-1.0	Component Cooling	14
MC-2573-1.1	Component Cooling	5
MC-2573-2.0	Component Cooling	8
MC-2573-2.1	Component Cooling	3
MC-2573-3.0	Component Cooling	7
MC-2573-3.1	Component Cooling	5
MC-2573-4.0	Component Cooling	6
MC-2574-1.1	Nuclear Service Water	13
MC-2574-2.0	Nuclear Service Water	21
MC-2574-2.1	Nuclear Service Water	13
MC-2574-3.0	Nuclear Service Water	22
MC-2574-3.1	Nuclear Service Water	13
MC-2574-4.0	Nuclear Service Water	9
MC-2576-1	Containment Purge Ventilation	12
MC-2580-1.0	Steam Generator Blowdown Recycle	16
MC-2585-1.0	Containment Air Release and Addition	6
MCFD-2591-01.01	Feedwater	0
MCFD-2592-01.01	Auxiliary Feedwater	1
MC-2593-1.0	Main Steam	20
MC-2593-1.2	Main Steam	11
MC-2593-1.3	Main Steam	12
MC-2604-3.0	Containment Ventilation Cooling Water	15

Appendix A: (Cont'd)

Flow diagram Dwg. No.	System	Revision
MC-2650-1.13	Instrument Air System	01
MC-2605-1.2	Instrument Air System	14
MC-2605-1.3	Instrument Air System	7
MC-2605-2.2	Station Air	2
MC-2605-3.1	Breathing Air	7
MCFD-2609-01.00	Diesel Generator Engine	0
MCFD-2609-01.01	Diesel Generator Engine	0
MCFD-2609-02.00	Diesel Generator Engine	0
MCFD-2609-02.01	Diesel Generator Engine	0
MCFD-2609-03.00	Diesel Generator Engine	0
MCFD-2609-03.01	Diesel Generator Engine	0
MCFD-2609-04.00	Diesel Generator Engine	0
MCFD-2609-07.00	Diesel Generator Engine	0
MCFD-2592-01.00	Auxiliary Feedwater	0
MCID-2499-IA.01-01	Upper/Lower Personnel Air Locks Inflatable Seals Control Air	0