ENCLOSURE 2

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TECHNICAL EVALUATION REPORT
PUMP AND VALVE INSERVICE TESTING PROGRAM
BEAVER VALLEY POWER STATION, UNIT 1

Docket Number 50-334

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ABSTRACT

This EG&G Idaho, Inc., report presents the results of our evaluation of the Beaver Valley Power Station, Unit 1, Inservice Testing Program for safety-related pumps and valves.

PREFACE

This report is supplied as part of the "Review of Pump and Valve Inservice Testing Programs for Operating License Reactors (III)" being conducted for the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Mechanical Engineering Branch, by EG&G Idaho, Inc., Regulatory and Technical Assistance Unit.

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TECHNICAL EVALUATION REPORT

PUMP AND VALVE INSERVICE TESTING PROGRAM

BEAVER VALLEY POWER STATION, UNIT 1

1. INTRODUCTION

Contained herein is a technical evaluation of the pump and valve inservice testing (IST) program submitted by the Duquesne Light Company for its Beaver Valley Power Station, Unit 1.

By a letter dated December 16, 1986, Duquesne Light Company submitted an IST program for the Beaver Valley Power Station, Unit 1. The working session with Duquesne and Beaver Valley, Unit 1, representatives was conducted on October 27 and 28, 1987. The licensee's revised program, dated March 21, 1988, as further revised by letters dated April 27, 1989, (Revision 4), October 3, 1989, (Revision 5), and July 27, 1990, (Revision 6), were received and compared to the previous submittal to identify any changes. The licensee's IST Program was reviewed to verify compliance of proposed tests of safety-related pumps and valves with the requirements of the ASME Boiler and Pressure Vessel Code (the Code), 1983 Edition, through the Summer of 1983 Addenda.

Any IST program revisions subsequent to those noted above are not addressed in this technical evaluation report (TER). Any IST program revisions should follow the guidance presented in Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Programs."

In their submittal, Duquesne Light Company has requested relief from the ASME Code testing requirements for specific pumps and valves and these requests have been evaluated individually to determine if the criteria in 10 CFR 50.55a for granting relief are met for the specified pumps and valves. This review was performed using the acceptance criteria of the Standard Review Plan, NUREG-0800, Section 3.9.6, and the Draft Regulatory Guide and Value/Impact Statement titled "Identification of Valves for Inclusion in Inservice Testing Programs", and Generic Letter 89-04, "Guidance on Developing

Acceptable Inservice Programs." These IST program testing requirements apply only to component testing (i.e., pumps and valves) and are not intended to provide the basis to change the licensee's current Technical Specifications for system test requirements.

Section 2 of this report presents the Duquesne Light Company bases for requesting relief from the Section XI requirements for the Beaver Valley, Unit 1, pump testing program and the reviewer's evaluations and conclusions regarding these requests. Similar information is presented in Section 3 for the valve testing program.

A listing of P&IDs used for this review is contained in Appendix A.

Inconsistencies and omissions in the licensee's IST program noted during the course of this review are listed in Appendix B. The licensee should resolve these items in accordance with the evaluations, conclusions, and guidelines presented in this report.

2. PUMP TESTING PROGRAM

The Beaver Valley Power Station, Unit 1, IST program submitted by Duquesne Light Company was examined to verify that all pumps that are included in the program are subjected to the periodic tests required by the ASME Code, Section XI, except where specific relief from testing has been requested and as identified below. Each Duquesne Light Company basis for requesting relief from the pump testing requirements and the EG&G reviewer's evaluation of that request are summarized below.

2.1 All Pumps Except Residual Heat Removal and Low Head Safety Injection

2.1.1 Bearing Temperature Measurements

2.1.1.1 Relief Request. The licensee has requested relief from measuring pump bearing temperature annually on all pumps in the IST program except the residual heat removal and low head safety injection pumps, in accordance with the requirements of Section XI, Paragraph IWP-3300, and has proposed to use vibration velocity measurements as described in ANSI/ASME OM-6, Draft 8, to monitor pump condition.

2.1.1.1.1 Licensee's Basis for Requesting Relief--The mechanical characteristics of a pump can be better determined by taking vibration readings in velocity units than by taking the vibration readings in displacement units and by bearing temperature readings taken annually.

Vibration severity is a function of both displacement and frequency. Therefore, vibration in velocity units is the more accurate description of the vibration. In addition, velocity measurements are more sensitive to small changes that are indicative of developing mechanical problems and hence more meaningful than displacement measurements. Velocity measurements detect not only high amplitude vibrations that indicate a major mechanical problem, but also the equally harmful low amplitude high frequency vibrations due to misalignment, imbalance, or bearing wear that usually go undetected by simple displacement measurements.

Also, a bearing will be seriously degraded prior to the detection of increased heat at the bearing housing. Therefore, quarterly vibration velocity readings should achieve a much higher probability of detecting developing problems than the once a year reading of bearing temperatures.

Alternate Test: Pump vibration measurements will be taken in vibration velocity units (in/sec), using the ranges listed in OM-6, Revision 8, as acceptance criteria. (See table). Annual pump bearing temperature measurements will not be taken.

TABLE

RANGES OF TEST PARAMETERS (1)

PUMP TYPE	TEST PARAMETER	ACCEPTABLE RANGE	ALERT RANGE	REQUIRED ACTION RANGE
Centrifugal (2) and Vertical Line Shaft (3)	Vv	≤2.5 Vr	>2.5 Vr to 6Vr but not >0.325 in/sec	>6 Vr but not >0.70 in/sec
Reciprocating (4)	Vv	≤2.5 Vr	>2.5 Vr to 6Vr	>6Vr

NOTES: (1) Vv represents the peak vibration velocity. Vr is vibration reference value in the selected units.

(2) On centrifugal pumps, measurements shall be taken in a plane approximately perpendicular to the rotating shaft in two orthogonal directions on each accessible pump bearing housing. Measurement also shall be taken in the axial direction on each accessible pump thrust bearing housing.

(3) On vertical line shaft pumps, measurements shall be taken on the upper motor bearing housing in three orthogonal directions, one of which is the axial direction.

(4) On reciprocating pumps, the location shall be on the bearing housing of the crankshaft, approximately perpendicular to both the crankshaft and the line of plunger travel.

2.1.1.1.2 Evaluation--The annual bearing temperature measurement is an unreliable method of detecting bearing failure because a temperature rise in a failing bearing usually occurs only just prior to the failure. This failure characteristic makes detecting an impending bearing failure by the use of a single annual bearing temperature measurement very unlikely. Bearing

temperatures taken at one year intervals provide little statistical basis for determining the incremental degradation of a bearing or meaningful trending information. Temperature detectors are not installed in the bearings of these pumps and temperature measurements taken on the bearing housing are affected by other factors which may mask changes in bearing condition, short of catastrophic failure. Additionally, many of the bearings of the centrifugal pumps included in the Beaver Valley, Unit 1, IST Program are water cooled, thus, bearing temperature measurements may be significantly influenced by the temperature of the cooling medium and may not necessarily be indicative of bearing condition. Quarterly pump vibration velocity measurements will provide better information to monitor bearing condition and detect degradation than yearly bearing temperature measurements.

The advantages of using vibration velocity instead of displacement for monitoring the mechanical condition of pumps, except for reciprocating pumps, are widely acknowledged in the industry. The use of pump vibration velocity measurements can provide a great deal of information about pump mechanical condition that could not be obtained by using vibration displacement readings. Therefore, the licensee's proposed alternate test method should give adequate assurance of pump operational readiness and provide a reasonable alternative to the Code requirements. OM-6 provides vibration velocity test methods and acceptance criteria. The licensee's proposed alternative uses the OM-6 acceptance criteria, however, it is not clear if they comply with all of the OM-6 vibration test methods, such as locations for vibration measurement.

Based on the determination that the quarterly pump vibration velocity measurements will provide equivalent or better indication of pump mechanical condition and detection of pump bearing degradation than the Code required testing, relief may be granted from the Section XI requirements provided that the licensee complies with all of the vibration measurement requirements of ANSI/ASME OM-6, Draft 8 or later version.

2.2 Charging Pumps

2.2.1 Inlet Pressure Measurements

2.2.1.1 Relief Request. The licensee has requested relief from measuring inlet pressure on the charging pumps, CH-P-1A, -1B, and -1C, in accordance with the requirements of Section XI, Paragraph IWP-3100, and has proposed to calculate inlet pressure based on the level in the volume control tank or the refueling water storage tank as appropriate.

2.2.1.1.1 Licensee's Basis for Requesting Relief--No installed instrumentation exists to measure suction pressure, therefore, relief is requested from this requirement.

Alternate Test: The static head from tanks or the Ohio River will be used to calculate suction pressure once per test.

2.2.1.1.2 Evaluation--The P&IDs provided with the IST program indicate that there are test connections located on the suction piping of each charging pump, therefore, it appears that provisions exist to permit pump inlet pressure measurements. The licensee should investigate either a permanent installation or using temporary instruments at the existing test connections to measure pump inlet pressure during quarterly pump tests. If the licensee finds that it is impractical to install permanent or temporary instruments, pump suction pressure may be calculated from the height of fluid above the pump's suction provided the calculations are within the accuracy that would result from instruments meeting the Code accuracy requirements.

An interim period is necessary to give the licensee time to complete their investigation, revise procedures, and procure instruments, as required, to measure the inlet pressure of these pumps. Immediate compliance could be a burden to the licensee due to the lead time involved with obtaining pressure gauges that meet the requirements of Section XI or performing engineering evaluations to ensure calculations meet the Code required accuracy. The licensee's proposed alternative should provide reasonable assurance of operational readiness in the interim since the calculated inlet pressure

values should give reasonably reliable information concerning hydraulic conditions at the pump suction.

Based on the impracticality of immediate compliance with the Code requirements, and considering the burden on the licensee if the Code requirements were immediately imposed, interim relief may be granted for one year or until the next refueling outage, whichever is greater. In the interim, the licensee may calculate inlet pressure during the quarterly tests of these pumps provided the calculations are within the accuracy that would result from instruments meeting the Code accuracy requirements. If the licensee installs instrumentation in these lines meeting the Section XI requirements, this relief request should be withdrawn.

2.3 Boric Acid Transfer Pumps

2.3.1 Inlet Pressure Measurements

2.3.1.1 Relief Request. The licensee has requested relief from measuring inlet pressure on the boric acid transfer pumps, CH-P-2A and -2B, in accordance with the requirements of Section XI, Paragraph IWP-3100, and has proposed to calculate inlet pressure based on the level in the boric acid storage tank.

2.3.1.1.1 Licensee's Basis for Requesting Relief--No installed instrumentation exists to measure suction pressure, therefore, relief is requested from this requirement.

Alternate Test: The static head from tanks or the Ohio River will be used to calculate suction pressure once per test.

2.3.1.1.2 Evaluation--Inlet pressure for the boric acid transfer pumps cannot be measured directly because of the lack of installed instrumentation. Measuring the height of fluid above the pump suction and calculating the inlet pressure would provide a value that could be used to determine differential pressure to evaluate pump hydraulic condition. This test method is a reasonable alternative to directly measuring pump inlet

pressure provided the calculations are within the accuracy that would result from instruments meeting the Code accuracy requirements. Inlet pressure could be measured directly only after system modifications to install instrumentation. Requiring the licensee to install instrumentation, would be a hardship without a compensating increase in the level of quality and safety since their ability to monitor pump condition and degradation would not be increased significantly.

The licensee's proposed alternative should provide reasonable assurance of operational readiness since the calculated inlet pressure values should give reasonably reliable information concerning hydraulic conditions at the pump suction.

Based on the determination that imposing the Code requirements would be a hardship without a compensating increase in the level of quality and safety, and considering the licensee's proposed alternative, relief may be granted as requested provided the inlet pressure calculations are within the accuracy that would result from instruments meeting the Code accuracy requirements.

2.3.2 Flow Rate Measurements

2.3.2.1 Relief Request. The licensee has requested relief from measuring flow rate in accordance with the requirements of Section XI, Paragraph IWP-3100, on the boric acid transfer pumps, CH-P-2A and -2B, and has proposed to calculate flow rate on a refueling outage frequency.

2.3.2.1.1 Licensee's Basis for Requesting Relief--These pumps are tested in fixed resistance recirculation lines. Therefore, either the measured flow rate or the measured differential pressure can be considered constant and at its reference value. The other test quantities may then be measured or observed and recorded.

Alternate Test: Test quarterly through recirculation lines while measuring pump differential pressure per OST 1.7.1 & 2. Test at refueling by measuring pump differential pressure and calculating flow by transferring water between

boric acid tanks and measuring the change in tank level over time, when Technical Specifications require only one of two boric acid sources and flow paths to be operable. Testing in this manner will require partially draining one tank to make room for the transfer.

2.3.2.1.2 Evaluation--It is impractical to measure flow rate for the boric acid transfer pumps quarterly during recirculation to the boric acid storage tank due to the lack of installed instrumentation. The recirculation path is the only practical flow path to use when testing these pumps quarterly because the only other flow path is into the suction of the charging pumps and from there into the reactor coolant system. It would be impractical to pump boric acid to the charging pump suction for quarterly testing because it could result in a reactor shutdown. Flow rate cannot be calculated while at power or cold shutdown by pumping from one boric acid tank to the other because this would require taking the boric acid transfer system out of service when the system is required to be operable by the plant Technical Specifications. The licensee's proposal in the body of the IST program to determine pump differential pressure and measure vibration velocity quarterly and to calculate flow during refueling outages, when the system can be taken out of service, is an acceptable alternative to the Code requirement of quarterly flow measurements and provides a reasonable assurance of operational readiness. However, the flow calculations must be within the accuracy that would result from instruments meeting the Code accuracy requirements.

In order to detect both mechanical and hydraulic degradation, the licensee has indicated that vibration velocity measurements will be taken during both the quarterly and refueling outage testing. Since pump flow rates may vary substantially due to the different test configurations, the licensee should establish vibration reference values for both test configurations because pump vibration is a variable pump parameter under variable pump test conditions.

Based on the impracticality of measuring flow quarterly and the burden on the licensee if this Code requirement were imposed, relief may be granted from the Section XI quarterly flow measurement requirement as requested provided that the licensee evaluates the vibration measurements as discussed

above and the flow calculations are within the accuracy that would result from instruments meeting the Code accuracy requirements.

2.4 Residual Heat Removal Pumps

2.4.1 Test Frequency

2.4.1.1 Relief Request. The licensee has requested relief from testing the residual heat removal pumps, RH-P-1A and -1B, quarterly in accordance with the requirements of Section XI, Paragraph IWP-3400(a), and has proposed to test them during cold shutdowns and refueling outages.

2.4.1.1.1 Licensee's Basis for Requesting Relief--Testing the RHR pumps quarterly would require making an entry into the subatmospheric containment. In addition, any testing done at power would be limited to the pump recirculation flow path due to pressure and temperature interlocks between the RHR and RC systems which prevent lining up the two systems at power. The pump recirculation flow path lacks the necessary instrumentation to measure pump flow rate.

Alternate Test: These pumps will be tested during cold shutdowns per OST 1.10.1.

2.4.1.1.2 Evaluation--The design of this system is such that no external suction source, other than the reactor coolant system, can be aligned to the pumps to ensure adequate net positive suction head during quarterly tests. Any testing performed during power operation, when interlocks prevent aligning the pump suction to the reactor coolant system, must be done using the 2 inch recirculation line which, in effect, becomes the pump suction line. Due to the relative size of the recirculation line and the absence of a suction source to provide the necessary net positive suction head, it is impractical to test these pumps quarterly because severe pump cavitation with resultant pump damage is likely. Also, flow induced vibrations may mask or influence mechanical vibration characteristics thereby providing false information on the mechanical condition of the pumps.

These pumps are located inside the subatmospheric containment and are normally inaccessible during power operation due to personnel safety and radiation exposure concerns. It would be burdensome to require the licensee to test these pumps quarterly due to the expense involved because that would require quarterly reactor shutdown to permit containment entry and reactor cooldown to allow system realignment. Considering the design of this system, the licensee's proposal to perform pump tests during cold shutdowns and refueling outages when the system can be realigned to prevent pump cavitation appears to be the only practical alternate testing interval and should provide reasonable assurance of pump operational readiness.

Based on the impracticality of complying with the Code requirements, the burden on the licensee if the Code requirements were imposed, and considering that the pump tests performed during cold shutdowns and refueling outages should provide reasonable assurance of operational readiness, relief may be granted from the test frequency requirements of Section XI as requested.

2.5 Low Head Safety Injection Pumps

2.5.1 Inlet Pressure Measurements

2.5.1.1 Relief Request. The licensee has requested relief from measuring inlet pressure on the low head safety injection pumps, SI-P-1A and -1B, in accordance with the requirements of Section XI, Paragraph IWP-3100, and has proposed to calculate inlet pressure based on the level in the refueling water storage tank.

2.5.1.1.1 Licensee's Basis for Requesting Relief--No installed instrumentation exists to measure suction pressure, therefore, relief is requested from this requirement.

Alternate Test: The static head from tanks or the Ohio River will be used to calculate suction pressure once per test.

2.5.1.1.2 Evaluation--Inlet pressure for the low head safety injection pumps cannot be measured directly because of the lack of installed instrumentation. Measuring the height of fluid above the pump suction and calculating the inlet pressure would provide a value that could be used to determine differential pressure to evaluate pump hydraulic condition. This test method is a reasonable alternative to directly measuring pump inlet pressure provided the calculations are within the accuracy that would result from instruments meeting the Code accuracy requirements. Inlet pressure could be measured directly only after system modifications to install instrumentation. Requiring the licensee to install instrumentation, would be a hardship without a compensating increase in the level of quality and safety since their ability to monitor pump condition and degradation would not be increased significantly.

The licensee's proposed alternative should provide reasonable assurance of operational readiness since the calculated inlet pressure values should give reasonably reliable information concerning hydraulic conditions at the pump suction.

Based on the determination that imposing the Code requirements would be a hardship without a compensating increase in the level of quality and safety, and considering the licensee's proposed alternative, relief may be granted as requested provided the inlet pressure calculations are within the accuracy that would result from instruments meeting the Code accuracy requirements.

2.6 Quench Spray Pumps

2.6.1 Inlet Pressure Measurements

2.6.1.1 Relief Request. The licensee has requested relief from measuring inlet pressure on the quench spray pumps, QS-P-1A and -1B, in accordance with the requirements of Section XI, Paragraph IWP-3100, and has proposed to calculate inlet pressure based on the level in the refueling water storage tank.

2.6.1.1.1 Licensee's Basis for Requesting Relief--No installed instrumentation exists to measure suction pressure, therefore, relief is requested from this requirement.

Alternate Test: The static head from tanks or the Ohio River will be used to calculate suction pressure once per test.

2.6.1.1.2 Evaluation--The P&IDs provided with the IST program indicate that there are test connections located on the suction piping of each quench spray pump, therefore, it appears that provisions exist to permit pump inlet pressure measurements. The licensee should investigate either a permanent installation or using temporary instruments at the existing test connections to measure pump inlet pressure during quarterly pump tests. If the licensee finds that it is impractical to install permanent or temporary instruments, pump suction pressure may be calculated from the height of fluid above the pump's suction provided the calculations are within the accuracy that would result from instruments meeting the Code accuracy requirements.

An interim period is necessary to give the licensee time to complete their investigation, revise procedures, and procure instruments, as required, to measure the inlet pressure of these pumps. Immediate compliance could be a burden to the licensee due to the lead time involved with obtaining pressure gauges that meet the requirements of Section XI or performing engineering evaluations and rewriting procedures. The licensee's proposed alternative should provide reasonable assurance of operational readiness in the interim since the calculated inlet pressure values should give reasonably reliable information concerning hydraulic conditions at the pump suction.

Based on the impracticality of immediate compliance with the Code requirements, and considering the burden on the licensee if the Code requirements were immediately imposed, interim relief may be granted for one year or until the next refueling outage, whichever is greater. In the interim, the licensee may calculate inlet pressure during the quarterly tests of these pumps provided the calculations are within the accuracy that would result from instruments meeting the Code accuracy requirements. If the

licensee installs instrumentation in these lines meeting the Section XI requirements, this relief request should be withdrawn.

2.7 Chemical Injection Pumps

2.7.1 Inlet Pressure Measurements

2.7.1.1 Relief Request. The licensee has requested relief from measuring inlet pressure on the quench spray chemical injection pumps, QS-P-4A, -4B, -4C, and -4D, in accordance with the requirements of Section XI, Paragraph IWP-3100.

2.7.1.1.1 Licensee's Basis for Requesting Relief--The function of these pumps is to provide 32 gpm of NaOH water to the suction of the quench spray pumps during an accident. Since these pumps are positive displacement, flow rate and differential pressure are independent variables. Unlike centrifugal style pumps, it is not necessary to measure both parameters to assess the hydraulic performance of these pumps.

Alternate Test: Pump discharge pressure and flow rate will be utilized for evaluating pump performance.

2.7.1.1.2 Evaluation--Since these are positive displacement pumps, changes in inlet pressure have no effect on the flow rate or the discharge pressure as long as an adequate pump suction source is available. For this reason, calculating or measuring inlet or differential pressure would not contribute meaningful data to use in monitoring pump degradation.

The licensee's proposed alternative should provide an acceptable level of quality and safety, therefore, relief may be granted from the requirements of Section XI as requested.

2.8 Inside Recirculation Spray Pumps

2.8.1 Inlet Pressure Measurements

2.8.1.1 Relief Request. The licensee has requested relief from measuring inlet pressure on the inside recirculation spray pumps, RS-P-1A and -1B, in accordance with the requirements of Section XI, Paragraph IWP-3100, and has propcsed to calculate inlet pressure based on the level in the containment sump.

2.8.1.1.1 Licensee's Basis for Requesting Relief--No installed instrumentation exists to measure suction pressure, therefore, relief is requested from this requirement.

Alternate Test: The static head from tanks or the Ohio River will be used to calculate suction pressure once per test.

2.8.1.1.2 Evaluation--It is impractical to measure inlet pressure for the inside recirculation spray pumps because the pumps are mounted in the containment sump. The sump is essentially an open tank in this installation, therefore, measuring the height of fluid above the pump suction and calculating the inlet pressure is a reasonable alternative to directly measuring pump inlet pressure provided the calculations are within the accuracy that would result from installed instrumentation meeting the Code accuracy requirements. It would be burdensome to require the licensee to perform system modifications in order to measure inlet pressure on these pumps in accordance with the Code requirements because the expense involved would not be justified by the limited amount of additional information provided.

Based on the impracticality of measuring inlet pressure on these pumps, the burden on the licensee if these Code requirements were imposed, and considering that the licensee's proposed alternative should provide reasonable assurance of operational readiness, relief may be granted from the requirements of Section XI as requested provided the calculations are within the accuracy that would result from installed instrumentation meeting the Code accuracy requirements.

2.8.2 Test Frequency

2.8.2.1 Relief Request. The licensee has requested relief from testing the inside recirculation spray pumps, RS-P-1A and -1B, in accordance with the requirements of Section XI, Paragraph IWP-3400(a), and has proposed to test them quarterly with a 60 second dry pump run and during refueling outages with flow.

2.8.2.1.1 Licensee's Basis for Requesting Relief--The function of these pumps is to take suction on the containment sump and discharge to the spray rings on the containment ceiling during a DBA. In order to test these pumps, a temporary dike must be installed in the containment around the safeguards sump to ensure adequate NPSH for each pump. Quarterly testing at power in this manner is a safety concern since it would block off the sump from the containment in the event of an accident. Pump testing during cold shutdowns, while not involving the same safety concern, would increase personnel radiation exposure, create over 2,000 gallons of additional radioactive waste, divert maintenance from higher priority items, and could extend the length of a plant shutdown due to the extensive preparatory work required to properly install the dike.

Alternate Test: Dry run quarterly per OST 1.13.3 and 1.13.4 for not more than 60 seconds and stopped when they reach 100 rpm. Also, run on recirculation per 1BVT 1.13.5 during refueling outages.

2.8.2.1.2 Evaluation--These pumps are located inside containment and take their suction from the safeguards sump. To test them with flow requires entering containment and building a temporary dike around the sump and filling the sump with water to provide the pump a suction source. Since testing these pumps necessitates that containment be accessible, testing during power operation is impractical because containment entry is not allowed due to personnel safety and radiation exposure concerns. It is impractical to test these pumps with flow during cold shutdowns since startup from cold shutdown could be delayed due to the extensive testing preparations and system restoration that would be involved.

This system would have to be significantly redesigned to allow pump testing in accordance with the Code requirements. It would be burdensome to require the licensee to perform these system modifications due to the expense involved and possible reduction in system reliability. Considering the design of this system, the licensee's proposal to test these pumps quarterly with dry pump runs of 60 seconds or less and with flow during refueling outages appears to be the only practical method of testing and should provide reasonable assurance of operational readiness.

Based on the impracticality of complying with the Code requirements, the burden on the licensee if these Code requirements were imposed, and considering that the proposed alternate testing should provide reasonable assurance of operational readiness, relief may be granted from the requirements of Section XI as requested.

2.9 Outside Recirculation Spray Pumps

2.9.1 Inlet Pressure Measurements

2.9.1.1 Relief Request. The licensee has requested relief from measuring inlet pressure on the outside recirculation spray pumps, RS-P-2A and -2B, in accordance with the requirements of Section XI, Paragraph IWP-3100, and has proposed to calculate inlet pressure based on the level in the pump casing.

2.9.1.1.1 Licensee's Basis for Requesting Relief--No installed instrumentation exists to measure suction pressure, therefore, relief is requested from this requirement.

Alternate Test: The static head from tanks or the Ohio River will be used to calculate suction pressure once per test.

2.9.1.1.2 Evaluation--It is impractical to directly measure inlet pressure for the outside recirculation spray pumps because the pumps are not equipped with inlet instrumentation. These pumps are run dry during the quarterly tests, therefore, any attempt to measure inlet pressure would be meaningless. During refueling outages, these pumps are tested in the recirculation mode when containment entry is possible and the safeguards sump can be pumped down (See Item 2.9.2.1). The design of the system is such that no other test alignment is possible. The licensee's proposal to calculate inlet pressure is the only practical alternative available due to the design of these pumps (similar to deep draft pump design). The licensee's proposal to calculate inlet suction pressure from the height of fluid above the pump suction provides an acceptable alternative to the Code requirements as long as the calculations are within the accuracy that would result from installed instrumentation meeting the Code requirements. It would be burdensome to require the licensee to perform system modifications in order to measure inlet pressure in accordance with the Code requirements because the expense involved would not be justified by the limited amount of additional information provided.

Based on the impracticality of measuring inlet pressure on these pumps, the burden on the licensee if these Code requirements were imposed, and considering that the licensee's proposed alternative should provide reasonable assurance of operational readiness, relief may be granted from the requirements of Section XI as requested provided the calculations are within the accuracy that would result from installed instrumentation meeting the Code accuracy requirements.

2.9.2 Test Frequency

2.9.2.1 Relief Request. The licensee has requested relief from testing the outside recirculation spray pumps, RS-P-2A and -2B, in accordance with the requirements of Section XI, Paragraph IWP-3400(a), and has proposed to test them quarterly with a 60 second dry pump run and during refueling outages with recirculation flow.

2.9.2.1.1 Licensee's Basis for Requesting Relief--The function of these pumps is to take suction on the containment sump and discharge to the spray rings inside containment. The pumps are designed with a recirculation flow path for testing; however, the piping arrangement and required valve lineup for post-test system restoration prevents draining the pump casing and suction lines without returning some water to the safeguards sump in the containment building. As a result, a containment entry is required to pump the sump down. Performing this test also creates radioactive waste, increases personnel radiation exposure, and could increase the maintenance required on the pump suction and discharge MOVs which must cycled closed to perform this test placing a differential pressure across these valves not normally seen under either normal or accident conditions.

Alternate Test: Run dry quarterly per OST 1.13.5 & 6 for not more than 60 seconds and stopped after visually observing pump shaft rotation. Also, run on recirculation per OST 1.13.7 during refueling outages.

2.9.2.1.2 Evaluation--It is impractical to test these pumps with flow quarterly during power operation because water drains from the suction piping and pump casing into the containment sump when the system is returned to its operational alignment. Containment entry is necessary to pump out the safeguards sump because the sump level indication is a required element of the reactor coolant leakage detection system. Water drained out of the outside recirculation spray pump casings and suction piping could mask reactor coolant system leakage that collects in the sump and the leakage could go undetected. Testing these pumps with flow during cold shutdowns could delay reactor startup due to the extensive test preparations and the requirement to restore the system to operational status prior to startup.

This system would have to be significantly redesigned to allow pump testing in accordance with the Code requirements. It would be burdensome to require the licensee to perform these system modifications due to the expense involved and possible reduction in system reliability. Considering the design of this system, the licensee's proposal to test these pumps with quarterly dry pump runs of 60 seconds or less and with recirculation flow during refueling

outages appears to be the only practical method of testing and should provide reasonable assurance of pump operational readiness.

Based on the impracticality of complying with the Code requirements, the burden on the licensee if these Code requirements were imposed, and considering that the proposed alternate testing should provide reasonable assurance of operational readiness, relief may be granted from the requirements of Section XI as requested.

2.10 Auxiliary Feedwater Pumps

2.10.1 Flow Rate Measurements

2.10.1.1 Relief Request. The licensee has requested relief from measuring flow rate on the auxiliary feedwater pumps, FW-P-2, -3A, and -3B, in accordance with the requirements of Section XI, Paragraph IWP-3100, and has proposed to measure flow rate on a refueling outage frequency.

2.10.1.1.1 Licensee's Basis for Requesting Relief--These pumps are tested in fixed resistance recirculation lines. Therefore, either the measured flow rate or the measured differential pressure can be considered constant and at its reference value. The other test quantities may then be measured or observed and recorded.

Alternate Test: Test quarterly through their recirculation lines while measuring pump differential pressure only per OSTs 1.24.2, 3, & 4. Test at refueling when plant conditions permit directing flow to the steam generators and measure pump differential pressure and flow rate using the flow instrumentation in the S/G supply headers per OSTs 1.24.8 & 9.

2.10.1.1.2 Evaluation--The only flow path for these pumps that is instrumented for flow rate discharges into the steam generators. It is impractical to establish auxiliary feedwater flow into the steam generators during power operation because injecting cold water into the steam generators could result in thermal shock and subsequent fatigue failure of the steam

generator feed nozzles. The only flow path through these pumps that can be practically used for quarterly testing is the recirculation path. It is impractical to measure flow rate in this path since there is no installed flow instrumentation. System modifications would be necessary in order to install flow instrumentation in the recirculation flow path. It would be burdensome to require the licensee to make these modifications because of the costs involved. Position 9 of Generic Letter 89-04 states in part that where flow can only be established through a non-instrumented minimum flow path during quarterly pump testing and a path exists at cold shutdowns or refueling outages to perform a test of the pump under full or substantial flow conditions, the increased interval is an acceptable alternative to the Code requirements provided that pump differential pressure, flow rate and bearing vibration measurements are taken during this testing and that quarterly testing measures at least pump differential pressure and vibration. Data from both of these tests should be trended as required by IWP-6000.

The licensee proposed to test these pumps quarterly by measuring differential pressure when they are running in the recirculation path and to measure pump differential pressure and flow rate when the pump discharge is directed into the steam generators during refueling outages. However, the licensee has not demonstrated the impracticality of testing these pumps during cold shutdowns using the instrumented flow path into the steam generators. Additionally, the licensee stated in Cold Shutdown Justification 25 that the discharge check valves associated with these pumps will be full-stroke exercised during cold shutdowns. Therefore, a substantial flow test of these pumps should be performed during cold shutdowns measuring all pump test parameters per Generic Letter 89-04, Attachment 1, Position 9. In order to detect mechanical degradation, the licensee indicated that vibration velocity measurements will be taken during both recirculation and substantial flow testing. Since flow may vary substantially in the different test configurations, the licensee should establish vibration reference values for both configurations.

Based on the impracticality of complying with the Code requirements, the burden on the licensee if the Code requirements were imposed, and considering that testing in accordance with Position 9 of Generic Letter 89-04

should provide reasonable assurance of pump operational readiness, relief may be granted from quarterly flow rate measurements, however, the licensee should measure differential pressure and vibration quarterly and all pump parameters during cold shutdowns.

2.11 River Water Pumps

2.11.1 Inlet Pressure Measurements

2.11.1.1 Relief Request. The licensee has requested relief from measuring inlet pressure on the river water pumps, WR-P-1A, -1B, and -1C, in accordance with the requirements of Section XI, Paragraph IWP-3100, and has proposed to calculate inlet pressure based on the river level in the intake bay.

2.11.1.1.1 Licensee's Basis for Requesting Relief--No installed instrumentation exists to measure suction pressure, therefore, relief is requested from this requirement.

Alternate Test: The static head from tanks or the Ohio River will be used to calculate suction pressure once per test.

2.11.1.1.2 Evaluation--It is impractical to measure inlet pressure for the river water pumps because the pumps are submerged in the river water intake bays. Measuring the height of fluid above the pump suction and calculating the inlet pressure is a reasonable alternative to directly measuring pump inlet pressure provided the calculations are within the accuracy that would result from installed instrumentation meeting the Code accuracy requirements. It would be burdensome to require the licensee to perform system modifications in order to measure inlet pressure on these pumps in accordance with the Code requirements because the expense involved would not be justified by the limited amount of additional information provided.

Based on the impracticality of measuring inlet pressure on these pumps, the burden on the licensee if these Code requirements were imposed, and considering that the licensee's proposed alternative should provide reasonable assurance of operational readiness, relief may be granted from the

requirements of Section XI as requested provided the inlet pressure calculations are within the accuracy that would result from installed instrumentation meeting the Code accuracy requirements.

2.12 Fuel Transfer Pumps

2.12.1 Inlet Pressure Measurements

2.12.1.1 Relief Request. The licensee has requested relief from measuring inlet pressure and differential pressure on the diesel fuel oil transfer pumps, EE-P-1A, -1B, -1C, and -1D, in accordance with the requirements of Section XI, Paragraph IWP-3100, and has proposed to measure and trend discharge pressure.

2.12.1.1.1 Licensee's Basis for Requesting Relief--Relief is requested from measuring suction pressure and differential pressure due to a lack of installed instrumentation. Also, these are positive displacement pumps and the flow rate is more indicative of pump degradation than the pressures are.

Alternate Test: Discharge pressure is recorded and trended as a further indication of pump performance.

2.12.1.1.2 Evaluation--Since these are positive displacement pumps, changes in their inlet pressure have no effect on the flow rate or the discharge pressure as long as pump suction requirements are met. For this reason, calculating or measuring inlet or differential pressure would not contribute meaningful data to use in monitoring pump degradation.

The licensee's proposed alternative should provide an acceptable level of quality and safety, therefore, relief may be granted from the requirements of Section XI as requested.

2.12.2 Flow Rate Measurements

2.12.2.1 Relief Request. The licensee has requested relief from measuring flow rate on the diesel fuel oil transfer pumps, EE-P-1A, -1B, -1C, and -1D, in accordance with the requirements of Section XI, Paragraph IWP-4600, and has proposed to calculate flow rate by measuring day tank level rate of change.

2.12.2.1.1 Licensee's Basis for Requesting Relief--There is no installed instrumentation.

Alternate Test: The level change over time in the floor mounted day tank will be measured and converted to the flowrate.

2.12.2.1.2 Evaluation--Due to system design, it is impractical to measure flow on these pumps because there are no instruments installed to measure pump flow directly. However, the flow rate can be readily obtained by measuring the level change in the diesel generator day tank over a period of time while the diesel generator is secured. This is an acceptable alternate test method if the information obtained is within the accuracy that would result from installed instrumentation meeting the Code accuracy requirements. A system modification would be required to allow direct measurement of pump flow rate. It would be burdensome to require the licensee to perform system modifications because the expense involved would not be justified by the limited amount of additional information provided.

Based on the impracticality of measuring pump flow directly, the burden on the licensee if these Code requirements were imposed, and considering that calculating pump flow rate from the rate of level change in the day tank during pump tests should provide an acceptable alternative to the Code requirements, relief may be granted to calculate the fuel oil transfer pump flow rate as requested provided the calculations are within the accuracy that would result from installed instrumentation meeting the Code accuracy requirements.

3. VALVE TESTING PROGRAM

The Beaver Valley Power Station, Unit 1, IST program submitted by Duquesne Light Company was examined to verify that all valves that are included in the program are subjected to the periodic tests required by the ASME Code, Section XI, and the NRC positions and guidelines. The reviewers found that, except as noted in Appendix B or where specific relief from testing has been requested, these valves are tested to the Code requirements and established NRC positions. Each Duquesne Light Company basis for requesting relief from the valve testing requirements and the reviewer's evaluation of that request is summarized below and grouped according to system and valve category.

3.1 <u>Containment Building</u>

3.1.1 <u>Containment Isolation Valves</u>.

3.1.1.1 <u>Relief Request</u>. The licensee has requested relief from leak testing all Category A and A/C primary containment isolation valves in accordance with the requirements of Section XI, Paragraphs IWV-3420, and has proposed to leak test these valves in accordance with the requirements of 10 CFR 50, Appendix J, and Section XI, Paragraphs IWV-3426 and -3427(a).

3.1.1.1.1 <u>Licensee's Basis for Requesting Relief</u>--These containment isolation valves are leak tested in accordance with 10 CFR 50, Appendix J, Type C. Since the acceptance criteria for Appendix J, Type C, is more limiting than the ASME Section XI, additional leak testing in accordance with ASME Section XI would be redundant.

<u>Alternate Test:</u> Leak tested during refueling outages in accordance with 10 CFR 50, Appendix J, IWV-3426, and IWV-3427(a) per 1BVT 1.47.5. The additional requirements of IWV-3427(b) for valves six inches or larger will not be followed. The usefulness of IWV-3472(b) does not justify the burden of complying with this requirement. Unnecessary repair or replacement of a valve or additional leak testing, if attempted at cold shutdown, could delay plant

startup. Per 10 CFR 50.55(a)(3)(ii), compliance with the specified requirements of IWV-3427(b) would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety. For the valves listed in the relief request, an asterisk to the left of the valve mark number indicates its size as six inches or larger. As a special test after maintenance has been performed on any Type C relief valve, 1BVT 2.47.2 may also be performed to leak test the valve in lieu of 1BVT 1.47.5.

3.1.1.1.2 Evaluation--The leak test procedures and requirements for containment isolation valves identified by 10 CFR 50, Appendix J, are essentially equivalent to the requirements of Paragraphs IWV-3421 through -3425. Appendix J, Type C, leak rate testing adequately determines the leak-tight integrity of these valves. Since the 10 CFR 50, Appendix J, leak rate testing does not trend or provide for corrective actions based on individual valve leakage rates, the licensee has stated that the Analysis of Leakage Rates and Corrective Action requirements of Section XI, Paragraphs IWV-3426 and 3427(a), will be followed. Therefore, the licensee's proposed testing should provide reasonable assurance of the ability of these valves to perform their containment isolation function. Position 10 of Generic Letter 89-04 states in part that IWV-3427(b) specifies additional requirements on increased test frequencies for valve sizes of six inches and larger and repairs or replacement over the requirements of IWV-3427(a). Based on input from many utilities and staff review of testing data at some plants, the usefulness of IWV-3427(b) does not justify the burden of complying with this requirement.

The licensee's proposal to leak test containment isolation valves in accordance with the requirements of 10 CFR 50, Appendix J, and Section XI, Paragraphs IWV-3426 and -3427(a), is in accordance with the guidance presented in Generic Letter 89-04, Attachment 1, Item 10, and should provide an acceptable level of quality and safety, therefore, relief may be granted as requested.

3.1.1.2 Relief Request. The licensee has requested relief from leak testing primary containment isolation valves, 1VS-183 and 1VS-184, in

accordance with the requirements of Section XI, Paragraphs IWV-3420, and has proposed to leak test these valves, as a group, in accordance with the requirements of 10 CFR 50, Appendix J, and Section XI, Paragraphs IWV-3426 and -3427(a). Furthermore, the licensee is assigning a maximum permissible leakage rate to the Emergency airlock as a whole, instead of each individual valve, and using that limit as the criteria for initiating corrective action in accordance with IWV-3427(a).

3.1.1.2.1 Licensee's Basis for Requesting Relief--These containment isolation valves are leak tested in accordance with 10 CFR 50, Appendix J, Type B. Since the acceptance criteria for Appendix J, Type B testing is more limiting than ASME Section XI, additional leak testing in accordance with ASME Section XI would be redundant. In addition, as shown on the attached figure for the Emergency Airlock, the configuration of this containment penetration (i.e. a single test connection located in the emergency airlock between two airlock equalization valves) is such that individual leakage rates for each specific valve cannot be determined using the test method of 10 CFR 50, Appendix J. In this case, assigning maximum permissible leakage rates for each valve would not be practical.

Alternate Testing: Leak test semi-annually in accordance with Technical Specification 4.6.1.3.b.1, 10 CFR 50, Appendix J and IWV-3426 per 1BVT 1.47.10. In addition, assign a maximum permissible leakage rate for the entire airlock to then be used as the criteria for initiating corrective action in accordance with IWV-3427(a).

3.1.1.2.2 Evaluation--Valves, 1VS-183 & -184, are equalizing valves for the emergency airlock that also serve as containment isolation valves. These valves are located inside the emergency airlock and operate in conjunction with the opening of the outer and inner doors to equalize the pressure differential across the doors to ease opening and prevent a potential safety hazard. According to the figure of the emergency airlock, there is only one test connection for these valves which is located inside the emergency airlock where the valves are located. Because of the system design, the only practical method to leak rate test these valves appears to be as a group with a maximum permissible leakage assigned rate to the group/airlock as

a whole. System modifications would be required to permit 10 CFR 50, Appendix J, Type C, testing and to meet the requirements of Section XI, Paragraphs IWV-3426 and -3427(a). Requiring the licensee to perform plant modifications would result in hardship without a compensating increase in the level of quality and safety at the plant. The licensee's proposed alternative of leak rate testing these valves as a group and assigning a maximum permissible leakage rate for the entire airlock to be used as the criteria for initiating corrective action in accordance with IWV-3427(a), should provide reasonable assurance of valve leak tight integrity.

Based on the determination that compliance with Code requirements would result in hardship without a compensating increase in the level of quality and safety and considering that the licensee's proposed testing provides an acceptable alternative to the Code requirements, relief may be granted as requested from the Section XI requirements.

3.2 Reactor Coolant System

3.2.1 Category A/C Valves.

3.2.1.1 Relief Request. The licensee has requested relief from exercising valve RC-68, pressurizer relief tank nitrogen supply check, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to verify closure, its safety position, during refueling outages.

3.2.1.1.1 Licensee's Basis for Requesting Relief--This valve is normally closed and is opened only during nitrogen makeup to the pressurizer relief tank. Its safety position is closed for containment isolation. The only means for verifying closure is during the 10 CFR 50, Appendix J, leak rate test performed at refueling.

Alternate Test: Valve closure is verified by a leak test during refueling outages per 1BVT 1.47.5.

3.2.1.1.2 Evaluation--This valve is a simple check valve that is located inside containment and is not equipped with position indication. The only practical method available to verify closure of this valve is to perform a leak test. The test connections are inside containment and it would require a containment entry in order to verify valve closure. Routine containment entries are not made during power operations because of high radiation levels and a potentially harsh environment. Performing this testing during cold shutdowns would subject plant personnel to increased radiation doses due to the extensive set up required to perform valve leak tests. The time required to set up and perform the leak test could result in a delay in plant start up which would be burdensome to the licensee. It would be impractical to require the licensee to make containment entry quarterly during power operation or during cold shutdown in order to verify closure of this valve. The licensee's proposal to Appendix J, Type C, leak rate test this valve during refueling outages provides a reasonable assurance of its ability to perform its safety function in the closed position.

Based on the impracticality of full-stroke exercising this valve quarterly and during cold shutdowns, the burden on the licensee if these Code requirements were imposed, and considering that the licensee's proposal to verify valve closure by performing leak rate testing at least once every two years is a reasonable alternative to the Code requirements, relief may be granted from the exercising frequency requirements of Section XI as requested.

3.2.1.2 Relief Request. The licensee has requested relief from exercising valve RC-72, pressurizer relief tank primary grade water supply check, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to verify closure, its safety position, during refueling outages.

3.2.1.2.1 Licensee's Basis for Requesting Relief--This valve is normally closed and is opened only during makeup to or while depressurizing the pressurizer relief tank. Its safety position is closed for containment isolation. The only means for verifying closure is during the 10 CFR 50, Appendix J, leak rate test performed at refueling.

Alternate Test: Valve closure is verified by a leak test during refueling outages per 1BVT 1.47.5.

3.2.1.2.2 Evaluation--This valve is a simple check valve that is located inside containment and is not equipped with position indication. The only practical method available to verify closure of this valve is to perform a leak test. The test connections are inside containment and it would require a containment entry in order to verify valve closure. Routine containment entries are not made during power operations because of high radiation levels and a potentially harsh environment. Performing this testing during cold shutdowns would subject plant personnel to increased radiation doses due to the extensive set up required to perform valve leak tests. The time required to set up and perform the leak test could result in a delay in plant start up which would be burdensome to the licensee. It would be impractical to require the licensee to make containment entry quarterly during power operation or during cold shutdown in order to verify closure of this valve. The licensee's proposal to Appendix J, Type C, leak rate test this valve during refueling outages provides a reasonable assurance of its ability to perform its safety function in the closed position.

Based on the impracticality of full-stroke exercising this valve quarterly and during cold shutdowns, the burden on the licensee if these Code requirements were imposed, and considering the licensee's proposal to test this valve according to 10 CFR 50, Appendix J, Type C, leak test criteria provides reasonable assurance of its ability to perform its safety function in the closed position, relief may be granted from the exercising requirements of Section XI as requested.

3.3 Chemical and Volume Control System

3.3.1 Category A Valves.

3.3.1.1 Relief Request. The licensee has requested relief from leak testing valves TV-CH-200A, -200B, and -200C, reactor coolant letdown orifice isolations, in accordance with the requirements of Section XI, Paragraphs

IWV-3426 and -3427, and proposed to assign a maximum permissible leakage rate to the associated penetration.

3.3.1.1.1 Licensee's Basis for Requesting Relief--The configuration of containment penetration #28 (i.e. three inside containment isolation valves in parallel) is such that individual leakage rates for each specific valve cannot be determined using the test method of 10 CFR 50, Appendix J. In this case, assigning maximum permissible leakage rates for each valve would not be practical.

Alternate Test: Assign a maximum permissible leakage rate for the entire barrier to then be used as the criteria for initiating corrective action in accordance with IWV-3427(a).

3.3.1.1.2 Evaluation--It is impractical to leak test these valves individually because they are installed in a parallel piping configuration, without the necessary isolation valves or test connections. With this system design, it is only practical for all three valves to be leak tested simultaneously.

Where it is impractical to leak test containment isolation valves individually due to system design and/or lack of test connections, leak rate testing them as a group, by penetration, should demonstrate the leak tight integrity of the group. The licensee has stated that a maximum leakage limit will be assigned to the penetration and not to an individual valve. This limitation is acceptable provided that the limiting leak rate for the penetration is conservative considering the number and size of the valves in the group and does not allow excessive leakage through any particular valve in the group to go uncorrected.

This system would have to be substantially redesigned to allow leak testing these valves individually. It would be burdensome to require the licensee to perform these system modifications due to the expense involved.

Based on the impracticality of individually leak testing these valves, the burden on the licensee if these Code requirements were imposed, and

considering that the proposed alternative should provide reasonable assurance of operational readiness, relief may be granted as requested, provided that the limiting leak rate for the penetration is conservative and does not allow excessive leakage through any particular valve in the group to go uncorrected.

3.3.1.2 Relief Request. The licensee has requested relief from exercising valves MOV-CH-308A, -308B, and -308C, reactor coolant pump seal water injection isolations, in accordance with the requirements of Section XI, Paragraph IWV-3412, and proposed to full-stroke exercise these valves during cold shutdowns when RCS pressure is less than 100 psig and during refueling outages.

3.3.1.2.1 Licensee's Basis for Requesting Relief--These valves are open during power operation but are required to close to fulfill their safety function. Closing the valves during power operation would secure seal injection water to the reactor coolant pump seals, resulting in seal damage. In addition, seal injection flow is required any time the system is pressurized to greater than 100 psig.

Alternate Test: The MOVs will be full-stroke exercised and timed during cold shutdowns when reactor coolant system pressure has been reduced to below 100 psig and refueling outages per OST 1.1.10.

3.3.1.2.2 Evaluation--The reactor coolant pump seals serve as a pressure boundary for the reactor coolant system and leakage out of a failed seal cannot be isolated, therefore, seal failure could result in unisolable coolant leakage from the reactor coolant system. The pump seals can be damaged by overheating if seal water flow is stopped whenever the pumps are running. Stopping seal flow when the RCS is pressurized to 100 psig or greater, can result in migration of particulate from the RCS into the Seal which could result in seal wear and subsequent failure. It is impractical, even when the pumps are not running, to exercise these valves during any plant condition that could result in abnormal seal wear because it could lead to a seal failure and a small break loss of coolant accident. It is impractical to exercise these valves each cold shutdown because the reactor coolant system is

not normally depressurized each cold shutdown. It would be burdensome to exercise these valves quarterly because this would require quarterly plant shutdown, cooldown, and reactor coolant system depressurization to less than 100 psig. Primary plant depressurization to less than 100 psig to allow testing these valves each cold shutdown would be burdensome because it could delay plant startup. The licensee's proposal to full-stroke exercise these valves during those cold shutdowns when the reactor coolant system pressure is reduced below 100 psig and during refueling outages should provide a reasonable assurance of operational readiness.

Based on the impracticality of exercising these valves quarterly and during those cold shutdowns when the reactor coolant system pressure remains above 100 psig, the burden on the licensee if these Code requirements were imposed, and considering that the licensee's alternate testing provides an acceptable alternative to the Code requirements, relief may be granted from the exercising frequency requirements of Section XI as requested.

3.3.1.3 Relief Request. The licensee has requested relief from exercising valves MOV-CH-378 and -381, reactor coolant pump seal water return isolations, in accordance with the requirements of Section XI, Paragraph IWV-3412, and proposed to full-stroke exercise these valves during cold shutdowns when reactor coolant system pressure is less than 100 psig and during refueling outages.

3.3.1.3.1 Licensee's Basis for Requesting Relief--These valves are open during power operation, but are required to close to fulfill their safety function. Exercising at power would secure reactor coolant pump seal water return causing seal damage. In addition, seal injection flow is required any time the reactor coolant system is pressurized to greater than 100 psig.

Alternate Test: Full-stroke exercised and timed during cold shutdowns when reactor coolant system pressure has been reduced to below 100 psig and refueling outages per OST 1.1.10.

3.3.1.3.2 Evaluation--The reactor coolant pump seals serve as a pressure boundary for the reactor coolant system and leakage out of a failed seal cannot be isolated, therefore, seal failure could result in unisolable coolant leakage from the reactor coolant system. The pump seals can be damaged by excessive seal water injection due to the cooler seal water injection temperature. The cooler seal injection water causes a temperature transient on the seals which could cause minor damage or complete seal failure. It is impractical, even when the pumps are not running, to exercise these valves during any plant condition that could result in abnormal seal wear because it could lead to a seal failure and a small break loss of coolant accident. It is impractical to exercise these valves each cold shutdown because the reactor coolant system is not normally depressurized each cold shutdown. It would be burdensome to exercise these valve quarterly because this would require quarterly plant shutdown, cooldown, and reactor coolant system depressurization to less than 100 psig. Primary plant depressurization to less than 100 psig to allow testing these valves each cold shutdown would be burdensome because it could delay plant startup. The licensee's proposal to full-stroke exercise these valves during those cold shutdowns when the reactor coolant system pressure is reduced below 100 psig and during refueling outages should provide a reasonable assurance of operational readiness.

Based on the impracticality of exercising these valves quarterly and during those cold shutdowns when the reactor coolant system pressure remains above 100 psig, the burden on the licensee if these Code requirements were imposed, and considering that the licensee's alternate testing provides an acceptable alternative to the Code requirements, relief may be granted from the exercising frequency requirements of Section XI as requested.

3.3.1.4 Relief Request. The licensee has requested relief from leak testing valve MOV-CH-378, reactor coolant pump seal water return isolation, in accordance with the requirements of Section XI, Paragraphs IWV-3426 and -3427, and proposed to assign a maximum permissible leakage rate to the penetration associated with it.

3.3.1.4.1 Licensee's Basis for Requesting Relief--The configuration of containment penetration #19 (i.e. two inside containment isolation valves in parallel) is such that individual leakage rates for each specific valve cannot be determined using the test method of 10 CFR 50, Appendix J. In this case, assigning maximum permissible leakage rates for each valve would not be practical.

Alternate Test: Assign a maximum permissible leakage rate for the entire barrier to then be used as the criteria for initiating corrective action in accordance with IWV-3427(a).

3.3.1.4.2 Evaluation--It is impractical to leak test this valve individually because it is installed in a parallel piping configuration without the necessary isolation valves or test connections. With this system design, it is only practical to leak rate test the two parallel valves simultaneously.

Where it is impractical to leak test containment isolation valves individually due to system design and/or lack of test connections, leak rate testing them as a group, by penetration, should demonstrate the leak tight integrity of the group. The licensee has stated that a maximum leakage limit will be assigned to the penetration and not to an individual valve. This limitation is acceptable provided that the limiting leak rate for the penetration is conservative considering the number and size of the valves in the group and does not allow excessive leakage through any particular valve in the group to go uncorrected.

This system would have to be substantially redesigned to allow leak testing this valve individually. It would be burdensome to require the licensee to perform these system modifications due to the expense involved.

Based on the impracticality of individually leak testing this valve, the burden on the licensee if these Code requirements were imposed, and considering that the proposed alternative should provide reasonable assurance of operational readiness, relief may be granted as requested.

3.3.2 Category A/C Valves.

3.3.2.1 Relief Request. The licensee has requested relief from leak testing valve CH-369, reactor coolant pump seal water return thermal relief check, in accordance with the requirements of Section XI, Paragraphs IWV-3426 and -3427, and proposed to assign a maximum permissible leakage rate to the penetration associated with it.

3.3.2.1.1 Licensee's Basis for Requesting Relief--The configuration of containment penetration #19 (i.e. two inside containment isolation valves in parallel) is such that individual leakage rates for each specific valve cannot be determined using the test method of 10 CFR 50, Appendix J. In this case, assigning maximum permissible leakage rates for each valve would not be practical.

Alternate Test: Assign a maximum permissible leakage rate for the entire barrier to then be used as the criteria for initiating corrective action in accordance with IWV-3427(a).

3.3.2.1.2 Evaluation--It is impractical to leak test this valve individually because it is installed in a parallel piping configuration without the necessary isolation valves or test connections. With this system design, it is only impractical to leak rate test the two parallel valves simultaneously.

Where it is impractical to leak test containment isolation valves individually due to system design and/or lack of test connections, leak rate testing them as a group, by penetration, should demonstrate the leak tight integrity of the group. The licensee has stated that a maximum leakage limit will be assigned to the penetration and not to an individual valve. This limitation is acceptable provided that the limiting leak rate for the penetration is conservative considering the number and size of the valves in the group and does not allow excessive leakage through any particular valve in the group to go uncorrected.

This system would have to be substantially redesigned to allow leak testing this valve individually. It would be burdensome to require the licensee to perform these system modifications due to the expense involved.

Based on the impracticality of individually leak testing this valve, the burden on the licensee if these Code requirements were imposed, and considering that the proposed alternative should provide reasonable assurance of operational readiness, relief may be granted as requested.

3.3.2.2 Relief Request. The licensee has requested relief from exercising valve CH-31, charging header containment isolation check, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to verify closure, its safety position, during refueling outages.

3.3.2.2.1 Licensee's Basis for Requesting Relief--This normally open check valve must close to fulfill its safety function. Valve closure can be checked only by a leak test and there is no instrumentation to monitor upstream pressure. Therefore, relief is requested from quarterly and cold shutdown stroke tests.

Alternate Test: Valve closure is verified by a leak test during refueling outages per 1BVT 1.47.11.

3.3.2.2.2 Evaluation--This valve is a simple check valve that is located inside containment and is not equipped with position indication. The only practical method available to verify closure of this valve is to perform a leak test. The test connections are inside containment and it would require a containment entry in order to verify valve closure. Routine containment entries are not made during power operations because of high radiation levels and a potentially harsh environment. Performing this testing during cold shutdowns would subject plant personnel to increased radiation doses due to the extensive set up required to perform valve leak tests. The time required to set up and perform the leak test could result in a delay in plant start up which would be burdensome to the licensee. It would be impractical to require the licensee to make containment entry quarterly during power operation or

during cold shutdown in order to verify closure of this valve. The licensee's proposal to Appendix J, Type C, leak rate test this valve during refueling outages provides a reasonable assurance of its ability to perform its safety function in the closed position.

Based on the impracticality of full-stroke exercising this valve quarterly and during cold shutdowns, the burden on the licensee if these Code requirements were imposed, and considering that the licensee's proposal to verify valve closure by performing leak rate testing at least once every two years is a reasonable alternative to the Code requirements, relief may be granted from the exercising frequency requirements of Section XI as requested.

3.3.2.3 Relief Request. The licensee has requested relief from exercising valves CH-181, -182, and -183, reactor coolant pump seal water injection checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and has proposed verifying closure of these valves, their safety position, during refueling outages.

3.3.2.3.1 Licensee's Basis for Requesting Relief--These valves are open during power operation but are required to close to fulfill their safety function. Closing the valves during power operation, or anytime the system is pressurized to greater than 100 psig, would secure seal injection water to the reactor coolant pump seals, resulting in seal damage. In addition, valve closure can be checked only by leak testing since they have no position indication or weighted arms. Therefore, relief is requested from quarterly and cold shutdown exercising.

Alternate Test: Valve closure is verified by a leak test during refueling outages per 1BVT 1.47.11.

3.3.2.3.2 Evaluation--The reactor coolant pump seals serve as a pressure boundary for the reactor coolant system and leakage out of a failed seal cannot be isolated, therefore, seal failure could result in unisolable coolant leakage from the reactor coolant system. The pump seals can be damaged by overheating if seal water flow is stopped whenever the pumps are

running. Stopping seal flow when the RCS is pressurized to 100 psig or greater, can result in migration of particulate from the RCS into the Seal which could result in seal wear and subsequent failure. It is impractical, even when the pumps are not running, to exercise these valves during any plant condition that could result in abnormal seal wear because it could lead to a seal failure and a small break loss of coolant accident. It is impractical to exercise these valves each cold shutdown because the reactor coolant system is not normally depressurized each cold shutdown. It would be burdensome to exercise these valves quarterly because this would require quarterly plant shutdown, cooldown, and reactor coolant system depressurization to less than 100 psig. Primary plant depressurization to less than 100 psig to allow testing these valves each cold shutdown would be burdensome because it could delay plant startup.

These valves are simple check valves that are located inside containment and are not equipped with position indication. The only practical method available to verify closure of these valves is to perform a leak test. The test connections are inside containment and it would require a containment entry in order to verify valve closure. Routine containment entries are not made during power operations because of high radiation levels and a potentially harsh environment. Performing this testing during cold shutdowns would subject plant personnel to increased radiation doses due to the extensive set up required to perform valve leak tests. The time required to set up and perform the leak test could result in a delay in plant start up which would be burdensome to the licensee. It would be impractical to require the licensee to make containment entry quarterly during power operation or during cold shutdown in order to verify closure of these valves. The licensee's proposal to Appendix J, Type C, leak rate test these valves during refueling outages provides a reasonable assurance of their ability to perform their safety function in the closed position.

Based on the impracticality of full-stroke exercising these valves quarterly and during cold shutdowns, the burden on the licensee if these Code requirements were imposed, and considering that the licensee's proposal to Appendix J, Type C, leak rate test these valves during refueling outages provides a reasonable assurance of their ability to perform their safety

function in the closed position, relief may be granted from the exercising requirements of Section XI as requested.

3.3.2.4 Relief Request. The licensee has requested relief from exercising valve CH-369, reactor coolant pump seal water return thermal relief check, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to verify closure, its safety position, during refueling outages.

3.3.2.4.1 Licensee's Basis for Requesting Relief--This valve is normally closed during power operation and is required to remain closed to fulfill its safety function. Full-stroking can be verified only by the leak test. Therefore, relief is requested from quarterly and cold shutdown stroke tests.

Alternate Test: Valve closure is verified by a leak test during refueling outages per 1BVT 1.47.5.

3.3.2.4.2 Evaluation--This valve is a simple check valve that is located inside containment and is not equipped with position indication. The only practical method available to verify closure of this valve is to perform a leak test. The test connections are inside containment and it would require a containment entry in order to verify valve closure. Routine containment entries are not made during power operations because of high radiation levels and a potentially harsh environment. Performing this testing during cold shutdowns would subject plant personnel to increased radiation doses due to the extensive set up required to perform valve leak tests. The time required to set up and perform the leak test could result in a delay in plant start up which would be burdensome to the licensee. It would be impractical to require the licensee to make containment entry quarterly during power operation or during cold shutdown in order to verify closure of this valve. The licensee's proposal to Appendix J, Type C, leak rate test this valve during refueling outages provides a reasonable assurance of its ability to perform its safety function in the closed position.

Based on the impracticality of full-stroke exercising this valve quarterly and during cold shutdowns, the burden on the licensee if these Code requirements were imposed, and considering that the licensee's proposal to Appendix J, Type C, leak rate test this valve during refueling outages provides a reasonable assurance of its ability to perform its safety function in the closed position, relief may be granted from the exercising requirements of Section XI as requested.

3.3.3 Category B Valves.

3.3.3.1 Relief Request. The licensee has requested relief from exercising valve MOV-CH-370, reactor coolant pump seal water supply, in accordance with the requirements of Section XI, Paragraph IWV-3412, and proposed to full-stroke exercise it during cold shutdowns when reactor coolant system pressure is less than 100 psig and during refueling outages.

3.3.3.1.1 Licensee's Basis for Requesting Relief--This valve is normally open during power operation. Closing it during power operation would secure seal injection water to the reactor coolant pump seals, resulting in seal damage. In addition, seal injection flow is required any time the system is pressurized to greater than 100 psig.

Alternate Test: Full-stroke exercise and time during cold shutdowns when RCS pressure has been reduced to below 100 psig and refueling outages per OST 1.1.10.

3.3.3.1.2 Evaluation--The reactor coolant pump seals serve as a pressure boundary for the reactor coolant system and leakage out of a failed seal cannot be isolated, therefore, seal failure could result in unisolable coolant leakage from the reactor coolant system. The pump seals can be damaged by overheating if seal water flow is stopped whenever the pumps are running. Stopping seal flow when the RCS is pressurized to 100 psig or greater, can result in migration of particulate from the RCS into the Seal which could result in seal wear and subsequent failure. It is impractical, even when the pumps are not running, to exercise this valve during any plant

condition that could result in abnormal seal wear because it could lead to a seal failure and a small break loss of coolant accident. It is impractical to exercise this valve each cold shutdown because the reactor coolant system is not normally depressurized each cold shutdown. It would be burdensome to exercise this valve quarterly because this would require quarterly plant shutdown, cooldown, and reactor coolant system depressurization to less than 100 psig. Primary plant depressurization to less than 100 psig to allow testing this valve each cold shutdown would be burdensome because it could delay plant startup. The licensee's proposal to full-stroke exercise this valve during those cold shutdowns when the reactor coolant system pressure is reduced below 100 psig and during refueling outages should provide a reasonable assurance of operational readiness.

Based on the impracticality of exercising this valve quarterly and during those cold shutdowns when the reactor coolant system pressure is greater than 100 psig, the burden on the licensee if these Code requirements were imposed, and considering the licensee's proposed alternative provides a reasonable alternative to the Code requirements, relief may be granted from the exercising requirements of Section XI as requested.

3.3.4 Category C Valves.

3.3.4.1 Relief Request. The licensee has requested relief from exercising valves CH-22, -23, and -24, charging pump discharge checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to part-stroke exercise them quarterly and full-stroke exercise them during refueling outages.

3.3.4.1.1 Licensee's Basis for Requesting Relief--The design function of these check valves is to prevent reverse flow during pump shutdown and to stroke full open for safety injection flow. A full design flow test is required to ensure full stroke. However, during normal operation, the charging pump will not develop the required flow. Therefore, relief from quarterly full-stroke exercising is requested during normal operation. Relief is also requested from cold shutdown exercising because full flow testing

could result in a low temperature overpressurization of the reactor coolant system.

<u>Alternate Test</u>: Part-stroked open and full-stroked closed quarterly per OST 1.7.4, 5 and 6. Full-stroke open during refueling outages per OST 1.11.14."

3.3.4.1.2 <u>Evaluation</u>--It is impractical to full-stroke exercise these valves during power operation because the only full flow path is into the reactor coolant system and the charging pumps do not develop full design accident flow against reactor pressure. Using this flow path during power operation could also cause a loss of pressurizer level control and a reactor trip. It is impractical to full stroke exercise these valves during cold shutdown because the reactor coolant system does not contain sufficient expansion volume to accommodate the flow required and a low temperature overpressure condition could result. The licensee's proposal to partial-stroke exercise these valves open and full-stroke them closed quarterly and to full-stroke exercise them open during refueling outages when the reactor head is removed, is a reasonable alternative to the exercising requirements of the Code.

These valves could only be full stroked exercised quarterly or during cold shutdown if extensive system modifications were performed, such as installing full flow test loops. Making these system modifications would be costly and burdensome to the licensee.

Based on the impracticality of full-stroke exercising these valves quarterly and during cold shutdowns, the burden on the licensee if these Code requirements were imposed, and considering that the proposed alternate testing should provide reasonable assurance of operational readiness, relief may be granted from the exercising requirements of Section XI as requested.

3.4 Safety Injection System

3.4.1 Category A Valves.

3.4.1.1 Relief Request. The licensee has requested relief from exercising valves MOV-SI-867C and -867D, boron injection tank outlets, in accordance with the requirements of Section XI, Paragraph IWV-3412, and proposed to full-stroke exercise them during refueling outages.

3.4.1.1.1 Licensee's Basis for Requesting Relief--These valves are shut at power but are required to open to fulfill their safety function in the event of a safety injection. Quarterly stroking of these valves to their open safety position could result in some borated, oxygenated water from the BIT entering the piping downstream of these valves. With no means to flush out these lines, valve closure would then cause a stagnant condition to develop. IE Bulletin 79-17 has identified the combination of these three factors as one which promotes intergrannular stress corrosion cracking (IGSCC). The ability to flush out the downstream piping to minimize the probability of IGSCC formation is possible only during refueling outages in conjunction with the SI full flow test, OST 1.11.14. Therefore, relief is requested from quarterly stroke testing.

Alternate Test: Full-stroke exercise and time during refueling outages per OST 1.11.14.

3.4.1.1.2 Evaluation--It is impractical to full-stroke exercise these valves during power operation or cold shutdown because boron migration and solidification in the downstream injection line could result in blockage which could render the boron injection tank inoperable. Flushing this line is practical only during refueling outages because the only flow path available is into the reactor coolant system. This flow path cannot be used during power operation because the highly concentrated boron from the tank would be injected into the reactor coolant system and would result in a plant transient and possible plant shutdown. Flushing this line during cold shutdowns is impractical because it could result in a low temperature overpressure

condition in the reactor coolant system due to the volume of water needed. This system would have to be substantially redesigned to allow exercising these valves in accordance with Section XI. It would be burdensome to require the licensee to perform these modifications due to the expense involved. The licensee's proposed testing should provide a reasonable assurance of operational readiness.

The licensee's proposal is intended to control the migration of borated water in piping systems that cannot readily be flushed using a clean water source and is in accordance with the guidance presented in I&E Bulletin 79-17, "Pipe Cracks in Stagnant Borated Water Systems at PWR Plants", July 25, 1979, and Revision 1, October 26, 1979.

Based on the impracticality of full-stroke exercising these valves quarterly or during cold shutdowns, the burden on the licensee if these Code requirements were imposed, and considering that the licensee's proposal provides an acceptable alternative to the Code requirements, relief may be granted from the exercising requirements of Section XI as requested.

3.4.2 Category A/C Valves.

3.4.2.1 Relief Request. The licensee has requested relief from exercising valves SI-10, -11, and -12, low head safety injection cold leg injection checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke exercise them open and closed during refueling outages.

3.4.2.1.1 Licensee's Basis for Requesting Relief--These check valves are normally shut to prevent reverse flow from the higher pressure reactor coolant system and high head safety injection system to the low pressure low head safety injection system during power operation but are required to open in the event of a safety injection. Due to the lack of installed instrumentation and the relative system pressures, relief from quarterly full- and part-stroke exercising is requested. In addition, relief is requested from full- or part-stroke exercising at cold shutdown because

testing would require full-flow injection to the reactor coolant system where there is insufficient expansion volume to receive the additional inventory.

Alternate Test: Full-stroke exercise open per OST 1.11.14 and reverse flow stroke closed per leak test OST 1.11.16 during refueling outages.

3.4.2.1.2 Evaluation--These check valves perform a safety function in both the open and closed positions. In the closed position, these valves prevent leakage from the high pressure RCS and HHSI systems to the lower pressure LHSI system. However, during a safety injection actuation these valves are required to open to admit fluid from the LHSI system. These valves cannot be practically full- or partial-stroke exercised open during power operation because the only flow path is into the reactor coolant system and the low head safety injection pumps cannot overcome normal operating reactor coolant system pressure. It is impractical to exercise these valves open during cold shutdowns because the reactor coolant system does not contain sufficient expansion volume to accommodate the flow required and a low temperature overpressure condition could occur even if less than design accident flow rates were used. Reverse flow or leak testing these valves at power is impractical because these valves are located inside containment and containment entry is restricted to emergencies only during power operations due to high radiation levels. Leak testing these valves during cold shutdowns is impractical because it could delay reactor startup due to the time required to set up the test equipment and perform the test. The licensee's proposal to full-stroke exercise these valves with flow during refueling outages when the reactor vessel head is removed and to verify reverse closure by leak testing at refueling outages is a reasonable alternative to the full-stroke exercising requirements of the Code.

However, the licensee stated that no flow instrumentation is installed in the injection headers but has stated that these check valves will be full-stroke exercised during refueling outages. These valves are installed in parallel, therefore, it is unclear how a full-stroke exercise will be verified. On this basis, the licensee's proposed testing cannot be considered a full-stroke exercise because the individual valve disk position and flow rate cannot be determined in these parallel flow paths. The Code required

testing could be verified only after installation of flow instrumentation in each injection header or by using non-intrusive flow instruments or valve diagnostics.

The licensee should investigate a method that verifies full and part-stroke exercising of these valves. One of the options the licensee may consider is installing flow instrumentation in each injection header or using portable instrumentation so the flow rate through each valve can be verified.

Another alternative available to the licensee is to verify that each of these valves opens sufficiently to pass the maximum required accident flow rate. One method of accomplishing this verification may be the use of non-intrusive diagnostic testing techniques during flow testing at least once each refueling outage.

Based on the impracticality of complying with the Code frequency requirements, the burden on the licensee if the Code requirements were imposed, and considering that full stroke exercising these valves at refueling outages provides a reasonable alternative to the Code requirements, relief may be granted as requested provided the licensee verifies during the refueling outage testing that these valves are full stroke exercised open in accordance with Generic Letter 89-04, Attachment 1, Position 1.

3.4.2.2 Relief Request. The licensee has requested relief from exercising valves SI-23, -24, and -25, combined high and low head safety injection cold leg injection checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke exercise them open and close during refueling outages.

3.4.2.2.1 Licensee's Basis for Requesting Relief--These check valves are normally shut during power operation to prevent reverse flow from the higher pressure reactor coolant system to the lower pressure low head safety injection system but are required to open in the event of a safety injection. Due to the lack of installed instrumentation, the relative system pressures, and the potential for a premature failure of the injection nozzles caused by the thermal shock from a cold water injection, relief from quarterly

full- or part-stroke testing at power is requested. In addition, relief from cold shutdown stroke testing is requested since this would require a full flow injection to the reactor coolant system where there is insufficient expansion volume to receive the additional inventory.

Alternate Test: Full-stroke exercise open per OST 1.11.14 and reverse flow stroke closed per leak test OST 1.11.16 during refueling outages.

3.4.2.2.2 Evaluation--These check valves perform a safety function in both the open and closed position. In the closed position, these valves prevent leakage from the high pressure RCS to the lower pressure LHSI system. However, during a safety injection actuation these valves are required to open to admit fluid from the LHSI system. These valves cannot be practically full- or partial-stroke exercised open during power operation because the only flow path is into the reactor coolant system and the low head safety injection pumps cannot overcome normal operating reactor coolant system pressure. In addition, the relatively cooler injection water could result in thermal shock considerations to the injection nozzles if testing could be performed at power. It is impractical to exercise these valves open during cold shutdowns because the reactor coolant system does not contain sufficient expansion volume to accommodate the flow required and a low temperature overpressure condition could occur even if less than design accident flow rates were used. Reverse flow or leak testing these valves at power is impractical because these valves are located inside containment and containment entry is restricted to emergencies only during power operations due to high radiation levels. Leak testing these valves during cold shutdowns is impractical because it could delay reactor startup due to the time required to set up the test equipment and perform the test. The licensee's proposal to full-stroke exercise these valves with flow during refueling outages, when the reactor vessel head is removed, and to verify reverse closure by leak testing at refueling outages is a reasonable alternative to the full-stroke exercising requirements of the Code.

However, the licensee stated that no flow instrumentation is installed in the injection headers but has stated that these check valves will be full-stroke exercised during refueling outages. These valves are installed in

parallel, therefore, it is unclear how a full-stroke exercise will be verified. On this basis, the licensee's proposed testing cannot be considered a full-stroke exercise because the individual valve disk position and flow rate cannot be determined in these parallel flow paths. The Code required testing could be verified only after installation of flow instrumentation in each injection header or by using non-intrusive flow instruments or valve diagnostics.

The licensee should investigate a method that verifies full and part-stroke exercising of these valves. One of the options the licensee may consider is installing flow instrumentation in each injection header or using portable instrumentation so the flow rate through each valve can be verified.

Another alternative available to the licensee is to verify that each of these valves opens sufficiently to pass the maximum required accident flow rate. One method of accomplishing this verification may be the use of non-intrusive diagnostic testing techniques during flow testing at least once each refueling outage.

Based on the impracticality of complying with the Code frequency requirements, the burden on the licensee if the Code requirements were imposed, and considering that full stroke exercising these valves at refueling outages provides a reasonable alternative to the Code requirements, relief may be granted as requested provided the licensee verifies during the refueling outage testing that these valves are full stroke exercised open in accordance with Generic Letter 89-04, Attachment 1, Position 1.

3.4.2.3 Relief Request. The licensee has requested relief from exercising valves SI-48, -49, -50, -51, -52, and -53, accumulator discharge checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke exercise them during refueling outages.

3.4.2.3.1 Licensee's Basis for Requesting Relief--These valves are shut during normal power operation but are required to open to fulfill their safety function of allowing the accumulators to discharge for core flooding. Relief from full- or part-stroke exercising at power is requested

due to the high pressure differential between the reactor coolant system and the accumulators. Relief from exercising during cold shutdown is also requested due to a lack of installed instrumentation and an uncontrolled test volume change needed to achieve the flow required by the safety analysis.

Alternate Test: Full-stroke exercise open during refueling outages per 1BVT 1.11.3. As a special test, after maintenance has been performed on any of these valves, OST 1.11.15 may be performed to partial-stroke exercise the applicable valve.

3.4.2.3.2 Evaluation--These check valves perform a safety function in the open position to allow accumulator flow into the RCS during and accident. These valves cannot be practically full- or partial-stroke exercised open during power operation because the only flow path is into the reactor coolant system and the lower pressure of the accumulators cannot overcome normal operating reactor coolant system pressure. In addition, the highly concentrated boric acid from the accumulators would cause power transients and possibly a plant trip or shutdown if injected at power. It is impractical to exercise these valves open during cold shutdowns because the reactor coolant system does not contain sufficient expansion volume to accommodate the flow required and a low temperature overpressure condition could occur even if less than design accident flow rates were used. The licensee's proposal to full-stroke exercise these valves with flow during refueling outages is a reasonable alternative to the full-stroke exercising requirements of the Code.

The licensee stated that these valves will be full stroke exercised during refueling outages but has not indicated how a full stroke as defined in Generic Letter 89-04, Attachment 1, Position 1 will be verified. It does not appear to be practical to establish maximum required accident flow rates through these valves during refueling outages even if the reactor vessel head is removed because the high flow rates could damage reactor vessel internals. On this basis, the licensee's proposed testing cannot be considered a full-stroke exercise because it appears that neither valve disk position or flow rate can be determined during the refueling outage testing. The Code required testing could be verified only after installation of flow

instrumentation in each flow path or by using non-intrusive flow instruments or valve diagnostics.

The licensee should investigate a method that verifies full stroke exercising of these valves. One of the options the licensee may consider is installing flow instrumentation in each flow path or using portable instrumentation so the flow rate through each valve can be verified.

Another alternative available to the licensee is to verify that each of these valves opens sufficiently to pass the maximum required accident flow rate. One method of accomplishing this verification may be the use of non-intrusive diagnostic testing techniques during flow testing at least once each refueling outage.

Based on the impracticality of complying with the Code frequency requirements, the burden on the licensee if the Code requirements were imposed, and considering that full stroke exercising these valves at refueling outages provides a reasonable alternative to the Code requirements, relief may be granted as requested provided the licensee verifies during the refueling outage testing that these valves are full stroke exercised open in accordance with Generic Letter 89-04, Attachment 1, Position 1.

3.4.2.4 <u>Relief Request</u>. The licensee has requested relief from exercising valves SI-83 and -84, high head safety injection hot leg injection checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke exercise them during refueling outages.

3.4.2.4.1 <u>Licensee's Basis for Requesting Relief</u>--These valves are normally shut but are required to open to fulfill their safety function to provide long term recirculation in the event of a safety injection. They cannot be full- or part-stroked open at power due to the potential for a premature failure of injection nozzles caused by the thermal shock from a cold water injection. Cold shutdown full-stroke testing cannot be performed since this could result in a low temperature overpressurization of the RCS.

Alternate Test: Full-stroke exercise open at refueling outages per OST 1.11.14.

3.4.2.4.2 Evaluation--It is impractical to full-stroke exercise these valves open during power operation because that would require injection of relatively cold water into the reactor coolant system which could cause thermal shock to the injection nozzles and possibly result in their premature failure. It is impractical to full-stroke exercise these valves during cold shutdowns because the reactor coolant system has insufficient expansion volume to contain the necessary flow rate and a low temperature overpressure condition could develop. These valves could only be full stoke exercised quarterly or during cold shutdowns if extensive system modifications were performed, such as installing full flow test loops. Making these system modifications would be costly and burdensome to the licensee. The licensee's proposal to full stroke exercise open these valves during refueling outages should provide a reasonable assurance of operational readiness.

However, the licensee has not demonstrated that it is impractical to partial-stroke exercise these valves using less than design accident flow rates during cold shutdowns. The P&IDs (RM-167B, Rev. 9) provided with the IST program indicate that flow transmitters are installed in the individual injection headers downstream of these check valves. Therefore, it appears that these valves can be partial-stroke exercised and the flow rate monitored during cold shutdowns when disturbances to the charging system flow would have the least affect on the primary system and equipment. On this basis, the licensee should investigate a method to partial-stroke exercise these valves during cold shutdowns.

Based on the impracticality of full-stroke exercising these valves quarterly and during cold shutdowns, the burden on the licensee if these Code requirements were imposed, and considering the licensee's proposed alternative of full-stroke exercising these valves during refueling outages, relief may be granted from the full-stroke exercising requirements of Section XI as requested provided that the licensee investigates into partial-stroke exercising these valves during cold shutdowns, and documents their findings.

3.4.2.5 <u>Relief Request</u>. The licensee has requested relief from exercising valves SI-94, boron injection tank outlet check, and SI-95, reactor coolant system fill header check, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke exercise them during refueling outages.

3.4.2.5.1 <u>Licensee's Basis for Requesting Relief</u>--These valves are normally shut during power operation but are required to open to fulfill their safety function in the event of a safety injection. These valves cannot be full- or part-stroked at power at any frequency due to the potential for a premature failure of the injection nozzles caused by the thermal shock from a cold water injection. Relief from stroke testing at cold shutdowns is also required since this could result in a low temperature overpressurization of the RCS.

<u>Alternate Test</u>: Full-stroke exercised open at refueling outages per OST 1.11.14.

3.4.2.5.2 <u>Evaluation</u>--It is impractical to full-stroke exercise these valves during power operation because that would require injection of relatively cold water into the reactor coolant system which could cause thermal shock to the injection nozzles and possibly result in their premature failure. It is impractical to full-stroke exercise these valves during cold shutdowns because the reactor coolant system has insufficient expansion volume to contain the necessary flow rate and a low temperature overpressure condition could develop. These valves could only be full stoke exercised quarterly or during cold shutdowns if extensive system modifications were performed, such as installing full flow test loops. Making these system modifications would be costly and burdensome to the licensee. The licensee's proposal to full stroke exercise open these valves during refueling outages should provide a reasonable assurance of operational readiness.

However, the licensee has not demonstrated that it is impractical to partial-stroke exercise these valves using less than design accident flow rates during cold shutdowns. The P&IDs (RM-167B, Rev. 9) provided with the IST program indicate that flow transmitters are installed in the individual

injection headers downstream of these check valves. Therefore, it appears that these valves can be partial-stroke exercised and the flow rate monitored during cold shutdowns when disturbances to the charging system flow would have the least affect on the primary system and equipment. On this basis, the licensee should investigate a method to partial-stroke exercise these valves during cold shutdowns.

Based on the impracticality of full-stroke exercising these valves quarterly and during cold shutdowns, the burden on the licensee if these Code requirements were imposed, and considering the licensee's proposed alternative of full-stroke exercising these valves during refueling outages, relief may be granted from the full-stroke exercising requirements of Section XI as requested provided that the licensee investigates partial-stroke exercising these valves during cold shutdowns and documents their findings.

3.4.3 Category B Valves.

3.4.3.1 Relief Request. The licensee has requested relief from exercising valves MOV-SI-867A and -867B, boron injection tank inlets, in accordance with the requirements of Section XI, Paragraph IWV-3412, and proposed to full-stroke exercise them during refueling outages.

3.4.3.1.1 Licensee's Basis for Requesting Relief--These valves are shut at power but are required to open to fulfill their safety function in the event of a safety injection. Stroking these valves fully or partially at power has historically caused leakage past the BIT manway flange and the other valves in the system. In addition, stroking these valves would dilute the boron concentration of the BIT, potentially causing entry into a Technical Specification Action Statement.

Alternate Test: Full-stroke exercise and stroke time during refueling outages per OST 1.11.14.

3.4.3.1.2 Evaluation--It is impractical to full-stroke exercise these valves during power operation because the boron injection tank is

normally at a lower pressure than the charging system and the higher pressure charging water could enter the tank and dilute the boron concentration which could render the tank inoperable. This system would have to be substantially redesigned to allow exercising these valves quarterly during power operation. It would be burdensome to require the licensee to perform these modifications due to the time and expense involved.

However, the licensee has not demonstrated that it is impractical to exercise these valves during cold shutdowns when charging pump discharge pressure is significantly lower. It appears that these valves can be exercised during cold shutdowns without encountering the problems discussed above. Therefore, the licensee should full-stroke exercise and stroke time these valves during cold shutdowns.

The licensee has not provided an adequate technical justification for not full stroke exercising these valves at the Code specified frequency, therefore, relief should not be granted to defer exercising these valves until refueling outages. It is impractical to full or partial stroke exercise these valves quarterly during power operations, however, they should be full stroke exercised during cold shutdowns as provided for in IWV-3412.

3.4.4 Category C Valves

3.4.4.1 Relief Request. The licensee has requested relief from exercising valves SI-1 and -2, low head safety injection pump containment sump suction checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to verify valve operability by check valve sample disassembly/inspection during refueling outages.

3.4.4.1.1 Licensee's Basis for Requesting Relief--These valves are normally closed during power operation but must open to fulfill their safety function for long-term core cooling. Any type of stroke testing at power would violate containment integrity. Due to the lack of installed or test instrumentation and the impracticality of simulating actual safety

injection long-term cooling, relief from quarterly and cold shutdown exercising is requested.

Alternate Test: Maintenance to visually inspect one valve per refueling per CMP 1-75-ALOYCO-1M.

3.4.4.1.2 Evaluation--It is impractical to exercise these valves open with flow during power operation because the only water source is from the normally dry containment sump and testing would require filling the sump with water. This test configuration cannot be used during power operation because the containment is not accessible due to personnel safety and radiation exposure concerns. It is impractical to test these valves with flow during cold shutdowns because, since testing requires filling the containment sump with water, drying and cleaning the sump after testing could delay reactor start up. Compliance with the Code required testing would require that this system be substantially redesigned. It would be burdensome to require the licensee to perform system modifications in order to exercise these valves due to the time and expense involved.

Disassembly and inspection on a sampling basis may be an acceptable method to use to assess valve condition when individually exercising valves with system flow cannot be verified. However, the NRC staff considers valve disassembly and inspection to be a maintenance procedure that is not equivalent to the exercising produced by fluid flow. This procedure has risks which make its routine use as a substitute for testing unacceptable when some method of testing is possible. The NRC staff positions regarding valve disassembly and inspection are explained in detail in Generic Letter 89-04, Attachment 1, Item 2. The minutes from the public meetings on Generic Letter 89-04 regarding Item 2 further stipulate that a partial-stroke exercise test using flow is expected to be performed after disassembly and inspection is completed but before the valve is returned to service. The licensee should investigate a method that verifies part-stroke exercising these valves.

Based on the impracticality of complying with the Code requirements, the burden on the licensee if the Code requirements were imposed, and considering that the licensee's proposed alternative should provide reasonable assurance

of valve operational readiness, relief may be granted as requested provided the licensee complies with the Generic Letter 89-04, Position 2 guidelines on disassembly and performs a partial stroke test when reassembly is complete and prior to returning the valve to service.

3.4.4.2 Relief Request. The licensee has requested relief from exercising valve SI-5, low head safety injection pumps refueling water storage tank suction check, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to partial-stroke exercise it quarterly and full-stroke exercise it during refueling outages.

3.4.4.2.1 Licensee's Basis for Requesting Relief--The function of this normally closed valve is to open to permit flow from the RWST to the LHSI pump suctions. Full-stroke capability can be verified only by rated safety injection flow, therefore, relief is requested from quarterly full-stroke exercising. Relief from cold shutdown full-stroke exercising is also requested because testing would require full flow injection to the RCS where there is insufficient volume to receive the additional inventory.

Alternate Test: Part-stroke exercise quarterly in the open direction per OST 1.11.1 and 2. Full-stroke exercise open at refueling outages per OST 1.11.14.

3.4.4.2.2 Evaluation--It is impractical to full-stroke exercise this valve quarterly or during cold shutdown because the only full flow path is into the reactor coolant system and the low head safety injection pumps cannot overcome reactor coolant system pressure during power operation. It is impractical to use this flow path during cold shutdowns because the reactor coolant system does not contain sufficient expansion volume to accommodate the flow required and a low temperature overpressure condition could develop. This valve is full-stroke exercised during refueling outages when the reactor vessel head is removed to provide the necessary expansion volume. This valve could only be full stoke exercised quarterly or during cold shutdowns if extensive system modifications were performed, such as installing full flow test loops. Making these system modifications would be costly and burdensome to the licensee. The licensee's proposal to full stroke exercise open this

valve during refueling outages should provide a reasonable assurance of operational readiness.

Based on the impracticality of full-stroke exercising this valve quarterly and during cold shutdowns, the burden on the licensee if these Code requirements were imposed, and considering that the proposed alternate testing should provide reasonable assurance of operational readines., relief may be granted from the exercising requirements of Section XI as requested.

3.4.4.3 Relief Request. The licensee has requested relief from exercising valves SI-6 and -7, low head safety injection pumps discharge checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to partial-stroke exercise them quarterly and full-stroke exercise them during refueling outages.

3.4.4.3.1 Licensee's Basis for Requesting Relief--These valves close when the opposite LHSI pump is operating to prevent damaging the non-running pump seals and pump suction piping but must be fully open during an accident. These valves are part-stroke exercised open and full-stroke exercised closed during the quarterly pump surveillance tests, however, rated safety injection flow is needed to verify full-stroke capability. Relief from stroking to the full open position at power is requested due to the inability of the LHSI pumps to overcome RCS pressure. Relief from cold shutdown stroking is also requested because testing would require full flow injection to the RCS where there is insufficient volume to receive the additional inventory.

Alternate Test: Part-stroke quarterly in the open direction per OST 1.11.1 or 2. Full-stroke open during full-flow testing during refueling outages per OST 1.11.14.

3.4.4.3.2 Evaluation--The P&IDs provided with the IST program indicate that the low head safety injection pumps minimum flow and test line branch off of the pump discharge line upstream of these check valves, therefore, it is unclear how these valves are partial-stroke exercised during

the quarterly pump tests. The only full flow path through these valves is into the reactor coolant system and, since the low head safety injection pumps do not develop sufficient discharge pressure to overcome reactor coolant system operating pressure, it is impractical to full stroke exercise these valves quarterly during power operation. It is impractical to exercise these valves during cold shutdowns because the reactor coolant system does not contain an adequate expansion volume and a low temperature overpressure condition could develop. This system would have to be substantially redesigned to allow testing these valves in accordance with the Code requirements. It would be burdensome to require the licensee to perform system modifications due to the expense involved. These valves are full-stroke exercised during refueling outages when the reactor vessel head is removed to provide the volume to accommodate the flow required. A full stroke exercise during refueling outages should provide reasonable assurance of valve operational readiness.

Based on the impracticality of full-stroke exercising these valves quarterly and during cold shutdowns, the burden on the licensee if these Code requirements were imposed, and the licensee's proposed alternate testing of full-stroke exercising them during refueling outages, relief may be granted from the exercising requirements of Section XI as requested. The licensee should determine if these valves are partial-stroke exercised quarterly and, if necessary, correct the IST program to reflect actual testing.

3.4.4.4 Relief Request. The licensee has requested relief from exercising valve SI-27, high head safety injection/charging pumps refueling water storage tank suction check, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to partial-stroke exercise this valve quarterly if the system configuration permits and to full-stroke exercise it during refueling outages.

3.4.4.4.1 Licensee's Basis for Requesting Relief--This valve is normally closed during power operation but is required to open at the onset of an accident to fulfill its safety function. A full design flow test is required to ensure full stroke. However, during normal operation the charging pump will not develop the required flow. Therefore, relief from quarterly

full-stroke exercising is requested during normal operation. Relief is also requested from cold shutdown exercising because full-flow testing could result in low-temperature overpressurization of the RCS.

Alternate Test: Part-stroke open quarterly if the RWST is supplying the pumps per OST 1.7.4, 5, and 6. Full-stroke exercise open during refueling outages per OST 1.11.14.

3.4.4.4.2 Evaluation--It is impractical to full-stroke exercise this check valve during power operation because the only full flow path is into the reactor coolant system and the charging pumps cannot develop full rated flow against reactor coolant system pressure. This valve cannot be full-stroke exercised during cold shutdown because the reactor coolant system does not contain sufficient expansion volume to accommodate the flow required and a low temperature overpressure condition could result. The licensee's proposal to full-stroke exercise this valve with flow during refueling outages when the reactor vessel head is removed is a reasonable alternative to the full-stroke exercising requirements of the Code. This valve could only be full stroke exercised quarterly or during cold shutdowns if extensive system modifications were performed, such as installing full flow test loops. Making these system modifications would be costly and burdensome to the licensee.

The licensee's proposal to partial-stroke exercise this valve quarterly only when the charging pumps are aligned to the refueling water storage tank is also acceptable because the boron concentration of the refueling water storage tank water could cause reactivity transients in the reactor and force a plant shutdown. For this reason, it would be impractical to partial-stroke this valve every quarter.

However, the licensee has not given sufficient technical justification why a partial stroke test can not be performed while changing modes from power operation to cold shutdown. The licensee will be increasing the boron concentration in the RCS to ensure available shutdown margin while shutting down the plant to cold shutdown. With a charging pump in operation, the suction of the charging pump could be shifted from the VCT to the RWST for a few minutes and complete a partial stroke exercise of this valve. The

licensee should partial stroke exercise this valve when shutting down to cold shutdown.

Based on the impracticality of exercising this valve at the Code required frequency, the burden on the licensee if these Code requirements were imposed, and considering the licensee's proposed alternate testing of full-stroke exercising this valve during refueling outages, relief may be granted from the exercising requirements of Section XI as requested provided the licensee partial stroke exercise this valve when shutting down to cold shutdown.

3.4.4.5 Relief Request. The licensee has requested relief from exercising valves SI-20, -21, -22, combined safety injection hot leg header checks, SI-100, -101, and -102, high head safety injection cold leg header checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke exercise them during refueling outages.

3.4.4.5.1 Licensee's Basis for Requesting Relief--The safety function for these valves is to open in the event of a safety injection. These check valves cannot be full- or part-stroked at power at any frequency due to the potential for a premature failure of the injection nozzles caused by the thermal shock from a cold water injection. Relief from stroke testing at cold shutdowns is also requested since this could result in a low temperature overpressurization of the RCS.

Alternate Test: Full-stroke exercise open per OST 1.11.14 during refueling outages.

3.4.4.5.2 Evaluation--The safety function of valves SI-20, -21, and -22 is to open for high head safety injection to the hot leg for post-accident recirculation. The safety function of valves SI-100, -101, and -102 is to open and supply borated water to the RCS. It is impractical to full or partial-stroke exercise these check valves during power operation because the injection flow path bypasses the regenerative heat exchanger and the cold water could thermal shock the injection nozzles and result in their

premature failure. It is impractical to exercise these valves during cold shutdowns because the reactor coolant system does not contain sufficient expansion volume to accommodate the flow required and a low temperature overpressure condition could occur even if less than design accident flow rates were used. The licensee's proposal to full-stroke exercise these valves with flow during refueling outages when the reactor vessel head is removed is a reasonable alternative to the full-stroke exercising requirements of the Code. The licensee has stated in follow up information that the low head safety injection system is not used for recirculation, therefore, these valves can be full-stroke exercised using the high head pumps only. Full-stroke of the individual valves can be verified because the high head injection headers have flow instrumentation installed in each header. These valves could only be full stroke exercised quarterly or during cold shutdowns if extensive system modifications were performed, such as installing full flow test loops. Making these system modifications would be costly and burdensome to the licensee.

Based on the impracticality of exercising these valves quarterly and during cold shutdowns, the burden on the licensee if these Code requirements were imposed, and considering the licensee's proposed alternative of full-stroke exercising them during refueling outages, relief may be granted from the exercising requirements of Section XI as requested.

3.5 Containment Depressurization System

3.5.1 Category C Valves.

3.5.1.1 Relief Request. The licensee has requested relief from exercising valves RS-158 and -160, outside recirculation spray/low head safety injection discharge headers cross connect checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and has proposed verifying valve operability by check valve sample disassembly/inspection during refueling outages.

3.5.1.1.1 Licensee's Basis for Requesting Relief--These valves are normally closed during power operation but must open to fulfill their safety function in the unlikely event that the LHSI pumps are unable to supply the HHSI pumps. No practical method of testing these valves exists. The volume of water used to test the outside recirc. spray pumps is insufficient to stroke the check valves even if it could be directed to the suction of the LHSI pumps. In addition, there is no installed instrumentation. Therefore, relief from quarterly and cold shutdown exercising is requested.

Alternate Test: Maintenance to visually inspect one valve per refueling per CMP 1/2-75-VELAN CHECK-1M.

3.5.1.1.2 Evaluation--It is impractical to full stroke exercise valves RS-158 and -160 open with flow during power operation or cold shutdown because the only flow path is from the outside recirculation spray pumps to the safety injection headers and the volume of water available for testing the outside recirculation spray pumps is insufficient to exercise the valves. Also, there is no installed flow instrumentation to verify that these valves are full-stroke exercised. The only practical method to verify that these valves full stroke open appears to be disassembly, inspection, and manual valve exercise. Quarterly plant shutdown, cooldown, and disassembly and inspection of these valves would be costly and burdensome to the licensee. The set-up to disassemble and inspect a valve is a complex procedure that is time consuming. Accomplishing this during cold shutdown may delay plant start-up and be a burden on the licensee. Compliance with the Code required testing would require that this system be substantially redesigned. It would be burdensome to require the licensee to perform system modifications in order to exercise these valves due to the time and expense involved.

Disassembly and inspection on a sampling basis may be an acceptable method to assess valve condition when exercising valves with system flow cannot be verified. However, the NRC staff considers valve disassembly and inspection to be a maintenance procedure that is not equivalent to the exercising produced by fluid flow. This procedure has risks which make its routine use as a substitute for testing unacceptable when some method of testing is possible. The NRC staff positions regarding valve disassembly and

inspection are explained in detail in Generic Letter 89-04, Attachment 1, Item 2. The minutes from the public meetings on Generic Letter 89-04, regarding Item 2, further stipulate that a partial-stroke exercise test using flow is expected to be performed after disassembly and inspection is completed but before the valve is returned to service. The licensee should develop a method to verify a part-stroke exercise of these valves.

Based on the impracticality of complying with the Code requirements, the burden on the licensee if the Code requirements were imposed, and considering the licensee's alternate proposal complies with Generic Letter 89-04, Attachment 1, Position 2, relief may be granted from the Code exercising requirements as requested, provided the licensee complies with all the Generic Letter 89-04 guidelines on disassembly and performs a test that verifies part-stroke exercising these valves after reassembly prior to returning them to service.

3.6 Component Cooling Water System

3.6.1 Category A & B Valves.

3.6.1.1 Relief Request. The licensee has requested relief from exercising valves TV-CC-103A, -103A1, -103B, -103B1, -103C, -103C1, reactor coolant pump component cooling water supply isolations, TV-CC-105D1, -105D2, -105E1, -105E2, -107A, -107B, -107C, -107D1, -107D2, -107E1, and -107E2, reactor coolant pump component cooling water return isolations, in accordance with the requirements of Section XI, Paragraph IWV-3412, and has proposed verifying valve operability by full-stroke exercising these valves during cold shutdown when reactor coolant pumps are not operating and during refueling outages.

3.6.1.1.1 Licensee's Basis for Requesting Relief--"Stroking these valves with the reactor coolant pumps running could cause damage to pump bearings, stator, and thermal barrier if the valves would fail to reopen. Relief is requested from full-or part-stroke exercising during power operation and cold shutdown when the pump is running.

Alternate Test: Full-stroke exercise and time during cold shutdowns when the reactor coolant pumps are secured and refueling outages per OST 1.1.10."

3.6.1.1.2 Evaluation--Exercising these valves would isolate cooling water flow to the reactor coolant pumps which could damage the pumps if they are operating. Pump failure during power operation could result in a plant shutdown, therefore, it is not practical to exercise these valves quarterly during power operation. During some cold shutdowns, plant conditions may not allow stopping some or all of the pumps to test these valves. Exercising them when any reactor coolant pump is running could result in pump damage, therefore, it is not practical to exercise these valves during each cold shutdown. The licensee would have to shutdown, cooldown and reduce RCS pressure and temperature within capacity of the residual heat removal system in order to secure the reactor coolant pumps. Performing this each cold shutdown could delay plant start-up and be a burden to the licensee. The licensee's proposal to full-stroke and time these valves during cold shutdowns when the RCP's are secured and during refueling outages provides a reasonable assurance of operational readiness.

Based on the impracticality of exercising these valves quarterly and during cold shutdowns when reactor coolant pumps are running, the burden on the licensee if the Code requirements were imposed, and considering that the licensee's proposed alternate testing provides an acceptable alternative to the Code requirements, relief may be granted as requested from the requirements of Section XI.

3.6.1.2 Relief Request. The licensee has requested relief from assigning maximum permissible leak rates to TV-CC-110F1 and TV-CC-110F2, outside containment isolation cooling water return valves, as required by Section XI, Paragraphs IWV-3426 and IWV-3427(a). The licensee has proposed to assign a maximum permissible leak rate to the entire barrier, which includes both valves, and then use this criteria for initiating corrective action in accordance with IWV-3427(a).

3.6.1.2.1 Licensee's Basis for Requesting Relief--As shown on the attached figure for Penetration 11, the configuration of this containment

penetration (i.e. two outside containment isolation valves in parallel) is such that individual leakage rates for each specific valve cannot be determined using the test method of 10 CFR 50, Appendix J. In this case, assigning maximum permissible leakage rates for each valve would not be practical.

Alternate Testing: Assign a maximum permissible leakage rate for the entire barrier to then be used as the criteria for initiating corrective action in accordance with IWV-3427(a).

3.6.1.2.2 Evaluation--Leak rate testing containment isolation valves together as a group instead of individually can be found to be acceptable when it is demonstrated that individual testing is impractical and when the group limit is assigned to each individual valve.

However, according to the figure for penetration 11, it appears that both valves TV-CC-110F1 and TV-CC-110F2 can be individually leak tested. The penetration can be pressurized via valve connection 417 and then individual leak rates may be monitored from valve connection 419 or 420 for TV-CC-110F2, valve connection 418 or 427 for TV-CC-110F1, and valve connection 416 for TV-CC-110D. It does not appear impractical nor excessively burdensome for the licensee to assign individual leak rates to these valves according to Paragraph IWV-3426 of the Code. Immediate compliance with the Code requirements may create a hardship for the licensee. An interim period should be provided for the licensee to develop test procedures and prepare to perform this testing.

Although i* does not provide a means to monitor individual valve leakage rates, leak rate testing these valves as a group during the interim period should provide reasonable assurance of their leak tight integrity during the interim period. The licensee has stated that a maximum leakage limit will be assigned to the penetration and that corrective action will be initiated if that limit is exceeded. The licensee's proposed alternative should provide a reasonable assurance of operational readiness during this interim period.

Based on the determination that it would be a hardship on the licensee if the Code requirements were immediately imposed, and considering that leak testing these valves as a pair should provide reasonable assurance of their leak tight integrity during the interim period, interim relief may be granted for a period of one year or until the next refueling outage, which ever is longer.

3.6.2 Category C Valves.

3.6.2.1 Relief Request. The licensee has requested relief from exercising valves CC-289, -290, and -291, reactor coolant pumps thermal barrier component cooling water supply checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and has proposed verifying closure of these valves, their safety position, during refueling outages.

3.6.2.1.1 Licensee's Basis for Requesting Relief--The safety function of these valves is to close to prevent reverse flow to the low pressure CCR system in the event a thermal barrier leaks. The only way to test for closure is to perform a leak test on the valves or by valve disassembly and inspection. Therefore, relief is requested from quarterly and cold shutdown stroke tests.

Alternate Test: Valve closure is verified by a leak test at refueling outages per 1BVT 1.60.7.

3.6.2.1.2 Evaluation--It is impractical to exercise these valves closed quarterly during power operation because they have no remote position indication and are located inside containment. These valve are inaccessible because containment entry is not allowed at power due to personnel safety and radiation exposure considerations. The associated reactor coolant pump must be stopped when exercising any one of these valves because valve testing requires isolating component cooling water to that pump. Loss of component cooling water during pump operation could damage the pump resulting in possible pump failure. It would be burdensome to require the licensee to perform a plant shutdown and cooldown quarterly in order to establish plant

conditions that allow stopping reactor coolant pumps. Likewise, reducing the RCS temperature enough to allow stopping the pumps and testing these valves each cold shutdown could delay plant startup. The licensee's proposal to perform a reverse flow closure verification test during refueling outages when ample time is available to establish the proper plant conditions and connect the necessary test equipment is an acceptable test method and should provide a reasonable assurance of their capability to perform their reverse flow closure function.

Based on the impracticality of exercising these valves quarterly and during cold shutdowns, the burden on the licensee if the Code requirements were imposed, and considering that the licensee's proposed alternate testing should provide reasonable assurance of operational readiness, relief may be granted from the exercising frequency requirements of Section XI as requested.

3.7 Main Steam System

3.7.1 Category C Valves.

3.7.1.1 Relief Request. The licensee has requested relief from exercising valves MS-18, -19, and -20, auxiliary feed pump steam supply checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and has proposed verifying valve operability by partial-stroke testing two of the three open during quarterly pump testing (the third valve will not be part-stroked because the manual isolation valve is locked closed) and full-stroke exercising these valves open during start-up from cold shutdowns and verifying valve closure during refueling outages.

3.7.1.1.1 Licensee's Basis for Requesting Relief--The function of these valves is to open to allow steam flow to run the turbine driven aux feed pump and to close to prevent steam generator cross-connection in the event of a high energy line break. A Full-stroke to the opened position can only be verified only by a full-flow test of the aux feed pump performed during startup from cold generators resulting in a plant trip and shutdown. The quarterly pump test runs the pump on recirculation only and does not require

full steam flow. A Full-stroke to the closed position can be verified only by a leak test to be performed during refueling outages.

NOTE: To prevent the loss of all three steam generators in the event of a line break, one of the manual isolation valves upstream of the check valves is locked shut during normal operation.

Alternate Test: Two of the valves will be part-stroked open during the quarterly pump test per OST 1.24.4. The third valve will not be part-stroke exercised because the manual isolation valve is locked closed. All three valves will be full-stroked open each startup from cold shutdown when the turbine driven aux feed pump is full-flow tested per OST 1.24.9. The valves will be verified to full-stroke closed during refueling outages per leak test OST 1BVT 1.60.7.

3.7.1.1.2 Evaluation--In order to verify maximum required accident flow rate through these valves it would be necessary to establish full flow output from the turbine driven auxiliary feedwater pump. The only full flow path for the auxiliary feedwater pump is into the steam generators. It would be impractical to full-stroke exercise these valves quarterly by establishing flow into the steam generators because injection of the relatively cool feedwater could thermal shock the aux feed to main feed injection nozzles. This could result in the premature failure of these nozzles. Furthermore, the injection of relatively cold water into the steam generators at power could cause a power and pressure transient and possibly result in a plant trip. It is impractical to verify valve closure during power operation because the only feasible method is leak testing and that requires that the system be taken out of service and involve personnel safety hazards because of single valve protection from high energy systems. Procedures required for leak rate testing during cold shutdown could delay plant startup and be burdensome to the licensee. The licensee's proposal to partial-stroke open two out of three valves quarterly during pump testing, to full stroke exercise all three valves open at start-up from cold shutdowns, and to verify valve closure by leak testing during refueling outages should provide a reasonable assurance of operational readiness.

Based on the impracticality of full-stroke exercising these valves quarterly and during cold shutdowns, the burden on the licensee if these Code requirements were imposed, and considering the licensee's proposed alternate testing of partial-stroke exercising them quarterly, full-stroke exercising them open following cold shutdowns, and verifying closure during refueling outages provides an acceptable alternative to the Code requirements, relief may be granted from the frequency requirements of Section XI as requested.

3.7.1.2 Relief Request. The licensee has requested relief from exercising valves MS-80, -81, and -82, steam generator residual heat release reverse flow check valves, in accordance with the requirements of Section XI, Paragraph IWV-3522, and has proposed verifying valve operability by check valve sample disassembly/inspection on a refueling outage frequency.

3.7.1.2.1 Licensee's Basis for Requesting Relief--The safety function of these valves is to close to prevent steam generator cross connection in the event of a high energy line break. Relief is requested from at power and cold shutdown full-stroke closure testing because there is no installed instrumentation to check for reverse flow and the headers are normally cross connected and pressurized. No way exists to isolate and systematically check operation of these valves.

Alternate Test: Maintenance to disassemble and inspect one valve per refueling outage per CMP 1-75-CRANE VCW-60A-1M.

3.7.1.2.2 Evaluation--It is impractical to verify these valves in the closed position quarterly during power operations because there are no isolation valves in these lines and the lines come directly off the main steam piping and are pressurized to main steam header pressure. It is impractical to verify valve closure during cold shutdowns because the required leak testing equipment and boundary setup is detailed and time consuming and could delay plant startup which would be burdensome to the licensee.

The minutes of the Public Meeting on Generic Letter 89-04 state that the use of disassembly and inspection to verify the reverse flow closure

capability of check valves may be found to be acceptable only where reverse flow closure cannot practically be verified by flow or pressure measurements. The licensee has not adequately demonstrated the impracticality of performing a reverse flow closure test on these valves during refueling outages. Therefore, the licensee should develop a method to verify the reverse flow closure of these valves at refueling outages other than by sample disassembly and inspection.

The Minutes of the Public Meeting on Generic Letter 89-04 also state that partial-stroke exercise testing with flow is expected to be performed after valve disassembly and inspection is completed but before returning the valve to service. This post inspection testing provides a degree of confidence that the disassembled valve has been reassembled properly and that the disk moves freely.

Immediate compliance with the Code required testing could result in plant shutdown and an extended outage. The licensee needs an interim period in which they can develop a method and procedures for performing the required reverse flow closure testing. In the interim period, the use of sample disassembly and inspection should provide a reasonable assurance of these valves to perform their safety function in the closed direction provided the disassembly is performed in accordance with the Generic Letter 89-04, Attachment 1, Item 2 and the NRC staff positions as stated in the minutes of the public meetings on Generic Letter 89-04.

Based on the impracticality of exercising these valves quarterly or during cold shutdown, the burden on the licensee if the Code requirements were immediately imposed, and considering the licensee's proposed alternate testing provides reasonable assurance of operational readiness during the interim period, interim relief may be granted for a period of one year or until the next refueling outage, whichever is longer. During this time, the licensee should develop a method to verify reverse flow closure of these valves other than by sample disassembly and inspection.

3.8 River Water System

3.8.1 Category C Valves.

3.8.1.1 Relief Request. The licensee has requested relief from exercising valves RW-106 and -107, river water supply header checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and has proposed verifying closure of these valves during refueling outages.

3.8.1.1.1 Licensee's Basis for Requesting Relief--The safety function of these valves is to open to permit river water flow to safety-related components during an accident and to close if the auxiliary river water pumps are supplying the river water headers. The closure of these valves can only be verified by valve disassembly and internal inspection or by reverse flow leak testing.

Alternate Test: Full-stroked open quarterly per OST 1.30.2, 3, and 6. Full-stroked closed during refueling outages in conjunction with OST 1.30.8.

3.8.1.1.2 Evaluation--It is impractical to verify closure of these valves during power operation or cold shutdown because that would require removing the associated river water header from service which, in turn, would require removing all of the equipment cooled by that header from service to prevent damage from overheating. Some of the equipment cooled by these loops of river water are the emergency diesel generator cooling system heat exchangers, charging pump lube oil coolers, and primary component cooling water heat exchangers. Isolating or altering the flow to some of these heat exchangers could cause damage to some primary components, such as, reactor coolant pumps, or render equipment inoperable, such as, the emergency diesel generators causing the licensee to enter a limiting condition for operation and possibly shutting down the plant. It is impractical to leak test these valves during cold shutdown because setting up and performing this testing could result in delaying the return to power which would be costly and burdensome to the licensee. Reverse flow leak testing these valves each refueling outage gives adequate assurance of operational readiness and provides a reasonable alternative to the Code requirements.

Based on the determination that compliance with the Code frequency requirements is impractical, the burden on the licensee if the requirements are imposed, and the licensee's proposed test frequency, relief should be granted as requested.

3.8.1.2 Relief Request. The licensee has requested relief from exercising valves RW-110, -111, -112, and -113, diesel generator heat exchanger inlet checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and has proposed verifying the full-stroke capability of these valves by check valve sample disassembly/inspection every five years.

3.8.1.2.1 Licensee's Basis for Requesting Relief--The safety function of these valves is to permit river water flow to the diesel generator heat exchangers. In order to fulfill their function, as per IE Bulletin 83-03, the integrity of these valves must be verified. The valve integrity can only be verified through valve disassembly and internal inspection.

Alternate Test: Part-stroked open quarterly per OST 1.36 & 2. Full-stroked in both the open and closed direction through a sample valve disassembly and inspection per CMP 1/2-75-WAFER CHECK-1M every 5 years.

3.8.1.2.2 Evaluation--Due to the lack of installed instrumentation and the system design, it is impractical to verify a full-stroke exercise of these valves at power or during cold shutdown. Plant technical specifications require the emergency diesel generators to remain operable during particular plant modes and check valve testing could render the diesels inoperable. Compliance with the Code required testing would require system design changes and modifications and making these modifications would be burdensome and impractical for the licensee.

The licensee's proposed alternative should provide reasonable assurance of operation readiness if the disassembly and inspection is performed in accordance with the Generic Letter.

Disassembly and inspection on a sampling basis may be an acceptable method to use to assess valve condition when individually exercising valves with system flow cannot be verified. However, the NRC staff considers valve disassembly and inspection to be a maintenance procedure that is not equivalent to the exercising produced by fluid flow. This procedure has risks which make its routine use as a substitute for testing unacceptable when some method of testing is possible.

The licensee has not made it clear whether they intend to disassemble and inspect each valve of the group at least once every 5 years, or if they intend to disassemble and inspect only one valve every 5 years on a rotational basis. Check valve sample disassembly and inspection using a manual full-stroke of the disk is an acceptable alternate method to verify the full-stroke capability of check valves provided that one valve of the group is inspected <u>each</u> refueling outage. Other NRC staff positions regarding valve disassembly and inspection are explained in detail in Generic Letter 89-04, Position 2. The minutes from the public meetings in Generic Letter 89-04 regarding Position 2 further stipulate that a partial-stroke exercise test using flow is expected to be performed after disassembly and inspection is completed but before the valve is returned to service.

Based on the impracticality of complying with the Code requirements, the burden on the licensee if the Code requirements were imposed, and considering the licensee's proposed alternate testing is an acceptable alternative to the Code requirements, relief may be granted as requested, provided the licensee disassemble and inspects these valves in compliance with Generic Letter 89-04, Attachment 1, Item 2 and the Minutes of the Public Meetings on Generic Letter 89-04.

3.8.1.3 <u>Relief Request</u>. The licensee has requested relief from exercising valves, RW-135 and -136, control room redundant cooling coils river water supply checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and has proposed verifying valve operability by full-stroke exercising these valves during refueling outages.

3.8.1.3.1 Licensee's Basis for Requesting Relief--The safety function of these valves is to open to ensure a supply of cooling water to the Control Room Redundant Cooling Coils. Stroke testing to the open position can only be performed by placing these units into service and shutting down the normal Control Room Air Conditioning Units or valve disassembly. Due to the resultant temperature transient that this transfer would cause in the Unit 1 control area (i.e., Control Room, Computer Room, Process Control, Relay and Communication Room) and the Unit 2 control area as well due to the joint Control Rooms, relief from quarterly and cold shutdown testing is requested.

Alternate Test: Full-stroked open during refueling outages after placing the Control Room Redundant Cooling Coils into service by verifying their ability to maintain a habitable environment in the control area.

3.8.1.3.2 Evaluation--The licensee has not provided sufficient technical information that demonstrates that shifting control room cooling units quarterly or during cold shutdowns is impractical or a hardship without a compensating increase in the level of quality and safety. Therefore, long term relief from the Code exercising frequency should not be granted. The licensee has stated that a temperature transient will occur, but has not described the magnitude of the temperature transient, the equipment affected, or how the equipment will respond to the temperature transient. Furthermore, since the Control Room Cooling Units supply both Unit control rooms, it is unlikely that conditions will exist were both Units are in refueling at the same time to facilitate this testing.

Although the licensee has not provided an adequate technical justification for not testing these valves quarterly or during cold shutdown, immediate compliance with the Code required testing would be burdensome for the licensee due to the time required to develop alternate testing and to implement new procedures. Therefore, an interim period of one year or until the next refueling outage, whichever is longer, should be given the licensee to investigate and develop procedures for testing these valves to the Code required frequency. The licensee's proposal to full-stroke exercise these valves at refueling outages should provide assurance of valve operational readiness during the interim period.

Although the licensee has not adequately demonstrated the impracticality or hardship of full-stroke exercising these valves quarterly or during cold shutdowns, based on the determination that immediate compliance with the Code required test frequency is impractical and would be a burden on the licensee, and considering that the licensee's proposed alternative should provide adequate assurance of valve operational readiness during the interim period, interim relief from the exercising frequency requirements of Section XI may be granted for the period of one year or until the next refueling outage, whichever is longer. During this interim period, the licensee should develop a method to test these valves in accordance with the Code.

3.8.1.4 Relief Request. The licensee has requested relief from exercising valves, RW-197, and -198, river water return parallel check valves from the RS heat exchanger, in accordance with the requirements of Section XI, Paragraph IWV-3522, and has proposed verifying valve operability by visually inspecting one valve per refueling outage.

3.8.1.4.1 Licensee's Basis for Requesting Relief--These valves are normally closed during power operation but must open to fulfill their safety function to ensure cooling water flow through the RS heat exchangers during an accident. Since these check valves are in parallel non-instrumented branch lines only total flow measurements are possible using instrumentation located upstream from the valves. Due to the lack of installed instrumentation on the branch lines, relief from quarterly and cold shutdown stroke testing of these valves to their full open position is requested.

Alternate Test: Maintenance to visually inspect one valve per refueling per CMP 1/2-75-WAFER CHECK-1M.

3.8.1.4.2 Evaluation--There are no flow elements, instrument connections, or flow instruments installed in the river water lines containing these check valves, therefore, flow cannot readily be used to verify that the valves individually full-stroke exercise. Also, individual part-stroke exercising may not be positively verified since the parallel flow paths are not instrumented. The Code required testing could be verified only after

installation of flow instrumentation in each parallel flow path or by using non-intrusive flow instruments or valve diagnostics. It would be burdensome to require the licensee to perform system modifications to install flow instrumentation due to the expense involved.

Disassembly and inspection may be an acceptable method to assess valve condition when individually exercising valves with system flow cannot be verified. However, the NRC staff considers valve disassembly and inspection to be a maintenance procedure that is not equivalent to the exercising produced by fluid flow. This procedure has risks which make its routine use as a substitute for testing unacceptable when some method of testing is possible. The NRC staff positions regarding valve disassembly and inspection are explained in detail in Generic Letter 89-04, Attachment 1, Item 2. The minutes from the Public Meeting on Generic Letter 89-04 further stipulate that a part-stroke exercise test using flow is expected to be performed after disassembly and inspection is completed but before the valve is returned to service.

The licensee should investigate a method that verifies part-stroke exercising these valves. One of the options the licensee may consider is the use of portable flow instrumentation to verify flow through each valve. Another alternative available to the licensee is to verify that these valves open sufficiently to pass the maximum required accident flow rate during flow testing by the use of non-intrusive diagnostic testing techniques at least once each refueling outage.

The licensee's proposed alternative should provide reasonable assurance of operational readiness and provide an acceptable level of quality and safety provided they perform the sample disassembly in accordance with GL 89-04, Attachment 1, Item 2, and part-stroke exercise the affected valve prior to returning it to service following valve disassembly and inspection.

Based on the impracticality of complying with the Code requirements, the burden on the licensee if the Code requirements were imposed, and considering the licensee's proposed alternative, relief may be granted from the Code requirements provided the licensee perform sample disassembly in accordance

Generic Letter 89-04 and the valves are part-stroke exercised following reassembly but prior to returning them to service. The licensee should actively investigate the use of portable flow instrumentation or non-intrusive diagnostic techniques to demonstrate that these valves full-stroke exercise open during flow testing. This relief request should be revised or deleted if another method is developed to verify full-stroke capability of these valves.

3.8.1.5 Relief Request. The licensee has requested relief from exercising valves, RW-675, -676, and -677, river water pump seals backup supply checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and has proposed verifying valve operability by full-stroke exercising these valves during refueling outages.

3.8.1.5.1 Licensee's Basis for Requesting Relief--The only method for testing the valves in the backup seal water supply system involves putting unfiltered river water into the pump seals. In order to minimize the degradation to the pump seals that this causes and reduce maintenance, relief is requested from quarterly and cold shutdown stroke testing.

Alternate Test: Full-stroked xercise during refueling outages per OST 1.30.2, 3 & 6.

3.8.1.5.2 Evaluation--It is impractical to exercise these valves during power operation or cold shutdown because the only flow path through these valves is from the river water header into the pump seals and supplying unfiltered river water to the pump seals could result in accelerated seal wear and subsequent seal failure. Seal failure would require the removal of the affected pump from service so the seal could be replaced. Pump repairs during normal operations could result in plant shutdown or could delay reactor startup from cold shutdown which would be burdensome to the licensee. The licensee's proposed alternative should provide reasonable assurance of valve operational readiness.

Based on the impracticality of full- or partial-stroke exercising these valves quarterly and during cold shutdowns, the burden on the licensee if these Code requirements were imposed, and considering that the licensee's

proposed alternative of full-stroke exercising these valves during refueling outages should provide reasonable assurance of valve operational readiness, relief may be granted from the exercising requirements of Section XI as requested.

3.9 Emergency Diesel Generator System

3.9.1 Category B Valves.

3.9.1.1 Relief Request. The licensee has requested relief from stroke timing valves SOV-DA-101, -102, -103, and -104, in accordance with the requirements of Section XI, Paragraph IWV-3413, and has proposed verifying valve operability by indirectly stroke timing these valves during the monthly diesel generator tests.

3.9.1.1.1 Licensee's Basis for Requesting Relief--These valves are quick acting and do not have position indication. The operation of these valves will be monitored by each individual diesel generator's start failure alarm circuit. Malfunctions which will cause the annunciator panel START FAILURE light to come on and the alarm bell to ring are:

1. Engine fails to crank above 40 RPM within 3 seconds after a start signal is received or

2. Engine cranks above 40 RPM within 3 seconds but fails to exceed 100 RPM within 4 seconds after a start signal is received.

Individual valves will be tested monthly on an alternating frequency by using a different set of air starting motors each month to crank the engine. This will ensure each bank is capable of starting the diesel generator in the required time and that the air start solenoids are not degrading.

Alternate Test: Stroked and indirectly timed by the START FAILURE annunciator on an alternating frequency in conjunction with monthly diesel generator OSTs

1.36.1 & 2 to ensure compliance with the ASME XI requirement for stroke testing on a quarterly frequency.

3.9.1.1.2 Evaluation--These valves are totally enclosed and have no externally visible indication of valve position. It is impractical to directly measure the stroke times of these valves because there is no way to determine when a valve receives a signal to open or when it reaches the open position. These valves are rapid-acting valves which normally stroke almost instantly and when they do not operate promptly, they most commonly fail to operate at all. Valve full-stroke times cannot be measured unless significant system modifications are made to permit this testing. It would be burdensome for the licensee to make such modifications because of the time and expense involved and the limited amount of additional information that would be provided.

These valves function to admit starting air to the diesel generators, therefore, valve opening can be indirectly verified by monitoring the diesel generator start times to insure that the diesel cranks above the specified limits. Measuring the diesel start times gives an indication of possible valve degradation since any significant change in valve stroke time would result in longer diesel generator start times with an unacceptable time being indicated by control room alarms described above. The licensee's proposed testing of measuring diesel generator start times while alternating the diesel generator starting air solenoids, should provide indication of proper valve operation and allow detection of degradation, thereby giving reasonable assurance of valve operational readiness.

Based on the determination that it is impractical to comply with the Code required testing method, the burden on the licensee if the Code requirements were imposed, and considering the adequacy of the licensee's proposed alternate testing, relief may be granted form the Code requirements as requested.

3.10 Control Air Vent System

3.10.1 Category B Valves.

3.10.1.1 Relief Request. The licensee requested relief from exercising valves TV-VS-101A, -101B, -101C, -101D, and -101E, control room emergency air bottle outlet isolations, in accordance with the requirements of Section XI, Paragraphs IWV-3412 and -3413, and proposed verifying valve operability by full-stroke exercising these valves every 18 months.

3.10.1.1.1 Licensee's Basis for Requesting Relief--These valves are shut at power but are required to open to fulfill their safety function. Quarterly full- or part-stroke exercising is not possible without risking violating Technical Specification bottle pressure and time requirements. In addition, the air bottles are now shared between Units 1 and 2, making testing during cold shutdowns impracticable. Also, these valves do not have control switches and lack valve position indicating lights in the control room.

Alternate Test: Full-stroked exercised but not timed every 18 months per 3BVT 1.44.1.

3.10.1.1.2 Evaluation--The licensee has not described the consequences of exceeding the Technical Specification pressure and time limitations concerning these air bottles, i.e., the Action Statement requirements, and whether or not quarterly stroking and timing would violate these requirements. The licensee has indicated that testing during cold shutdowns is impractical, but the valves will be full-stroked but not timed every 18 months. The 18 months may fall while the unit is at power, cold shutdown, or refueling without even considering the operating mode of Unit 2. The licensee has not provided an adequate technical justification for not exercising these valves quarterly during power operation or during cold shutdowns.

The licensee's proposed testing of full-stroke exercising these valves every 18 months per 3BVT 1.44.1 but not timing them, does not provide

sufficient information to monitor for valve degradation. The licensee should investigate alternative methods to monitor valve degradation, such as using non-intrusive valve diagnostics.

It would be burdensome on the licensee to immediately comply with the Code without time to investigate and research the problem. Interim relief should be granted to provide the licensee time to investigate the problem, develop or design new testing methods, and implement new procedures. While the licensee's proposal is unacceptable for the long term since it provides no information on valve degradation, it does verify that the valves exercise open, their safety position, and should be acceptable for the short term.

Based on the determination that it would be a burden on the licensee if the Code requirements were immediately imposed, and considering the licensee's proposal should provide reasonable assurance of valve operational readiness during the interim period, interim relief may be granted from the Section XI requirements for a period of one year or until the next refueling outage, whichever is longer. During this interim, the licensee should develop a method to monitor for degradation of these valves.

3.11 Containment Purge Dampers

3.11.1 Category A Valves

3.11.1.1 Relief Request. The licensee has requested relief from assigning maximum permissible leak rates for containment purge exhaust fan containment isolation dampers, VS-D-5-3A and -3B, as required by Section XI, Paragraphs IWV-3426 and -3427(a) of the Code. The licensee has proposed to assign a maximum permissible leak rate to the entire penetration and test these valves as a group and then apply corrective action per IWV-3427(a).

3.11.1.1.1 Licensee's Basis for Requesting Relief--As shown on the attached figure for Penetration 90, the configuration of this containment penetration (i.e. a single test connection located between two containment isolation dampers in series) is such that individual leakage rates for each

specific damper cannot be determined using the test method of 10 CFR 50, Appendix J. In this case, assigning maximum permissible leakage rates for each damper would not be practical.

Alternate Testing: Assign a maximum permissible leakage rate for the entire penetration to then be used as the criteria for initiating corrective action in accordance with IWV-3427(a).

3.11.1.1.2 Evaluation--Valves, VS-D-5-3A & -3B, are containment purge dampers that are in a series configuration with a valve inside containment and one valve outside containment. According to the figure of penetration 90, there is only one test connection that can be practically used to leak test these valves and it is located inbetween the valve combination. It appears the only practical method available is to test these valves as a group and assign a maximum permissible leakage rate to the group/penetration. The system would require modifications to meet the requirements of Section XI, Paragraphs IWV-3426 and -3427(a). These modifications would require cutting and welding with possible piping replacement or additions. These system modifications would be costly and require an extended shutdown period which would be a hardship to the licensee without a compensating increase in the level of safety at the plant. The licensee's proposed alternative to assign a maximum permissible leakage rate for the entire penetration to then be used as the criteria for initiating corrective action in accordance with IWV-3427(a) should provide reasonable assurance of valve leak tight integrity.

Based on the determination that compliance with Code requirements would result in hardship without a compensating increase in the level of safety and considering the licensee's proposed alternate testing provides an acceptable alternative to the Code requirements, relief may be granted as requested from the Section XI requirements.

3.11.1.2 Relief Request. The licensee has requested relief from assigning maximum permissible leak rates for containment purge supply fan containment isolation dampers, VS-D-5-5A, -5B and -6, as required by Section XI, Paragraphs IWV-3426 and -3427(a) of the Code. The licensee has proposed

to assign a maximum permissible leak rate to the entire penetration and test these valves as a group and then apply corrective action per IWV-3427(a).

3.11.1.2.1 Licensee's Basis for Requesting Relief--As shown on the attached figure for Penetration 91, the configuration of this containment penetration (i.e. a single test connection located between three penetration isolation dampers) is such that individual leakage rates for each specific damper cannot be determined using the test method of 10 CFR 50, Appendix J. In this case, assigning maximum permissible leakage rates for each damper would not be practical.

Alternate Testing: Assign a maximum permissible leakage rate for the entire penetration to then be used as the criteria for initiating corrective action in accordance with IWV-3427(a).

3.11.1.2.2 Evaluation--Valves, VS-D-5-5A, -5B & -6, are containment purge dampers that are in a series/parallel arrangement with each other with one of the valves inside containment and two of the valves located outside containment. According to the figure of penetration 91, there is only one test connection that can be practically used to leak test these valves and it is located inbetween the valve combination. It appears the only practical method available is to test these valves as a group and assign a maximum permissible leakage rate to the group/penetration. The system would require modifications to meet the requirements of Section XI, Paragraphs IWV-3426 and -3427(a). These modifications would require cutting and welding with possible piping replacement or additions. These system modifications would be costly and require an extended shutdown period which would be a hardship to the licensee without a compensating increase in the level of safety at the plant. The licensee's proposed alternative to assign a maximum permissible leakage rate for the entire penetration to then be used as the criteria for initiating corrective action in accordance with IWV-3427(a) should provide reasonable assurance of valve leak tight integrity.

Based on the determination that compliance with Code requirements would result in hardship without a compensating increase in the level of safety and considering the licensee's proposed alternate testing provides an acceptable

alternative to the Code requirements, relief may be granted as requested from the Section XI requirements.

3.12 Containment Vacuum and Hydrogen Recombination Systems

3.12.1 Category A Valves

3.12.1.1 Relief Request. The licensee requested relief from assigning maximum permissible leak rates for containment suction isolation valves, TV-CV-5-150A, -150B and HY-101 and -103, as required by Section XI, Paragraphs IWV-3426 and -3427(a) of the Code. The licensee proposed to assign a maximum permissible leakage rate for the two valve combinations of, TV-CV-150B and HY-101, and TV-CV-150A and HY-103, to then be used as the criteria for initiating corrective action in accordance with IWV-3427(a).

3.12.1.1.1 Licensee's Basis for Requesting Relief--As shown on the attached figure for Penetration 93, the configuration of this containment penetration (i.e. two in series isolation valves in each of two parallel branch lines) is such that individual leakage rates for each specific valve cannot be determined using the test method of 10 CFR 50, Appendix J. In this case, assigning maximum permissible leakage rates for each damper would not be practical.

Alternate Testing: Assign a maximum permissible leakage rate for the two valve combinations of, TV-CV-150B and HY-101, and TV-CV-150A and HY-103, to then be used as the criteria for initiating corrective action in accordance with IWV-3427(a).

3.12.1.1.2 Evaluation--Valves, TV-CV-150A and -150B, and valves, HY-101 and -103, are containment suction isolation valves that are in a series/parallel arrangement with each other. This arrangement consists of 2 valves inside containment in parallel lines with each other connected by a single line to the other 2 valves outside containment in a similar parallel configuration. According to the figure of penetration 93, assigning individual leakage rates for each valve cannot be determined because of the lack of test connections and the piping configuration. It appears the only

practical method available is to test these valves as a group and assign a maximum permissible leakage rate to the two valve combinations of , TV-CV-150B and HY-101, and TV-CV-150A and HY-103. The system would require modifications to meet the requirements of Section XI, Paragraphs IWV-3426 and -3427(a). These modifications would require cutting and welding with possible piping replacement or additions. These system modifications would be costly and require an extended shutdown period which would be a hardship to the licensee without a compensating increase in the level of safety at the plant. The licensee's proposed alternative to assign a maximum permissible leakage rate to the two valve combinations of , TV-CV-150B and HY-101, and TV-CV-150A and HY-103, and to then be used as the criteria for initiating corrective action in accordance with IWV-3427(a) should provide reasonable assurance of valve leak tight integrity.

Based on the determination that compliance with Code requirements would result in hardship without a compensating increase in the level of safety and considering the licensee's proposed alternate testing provides an acceptable alternative to the Code requirements, relief may be granted as requested from the Section XI requirements.

3.12.1.2 Relief Request. The licensee requested relief from assigning maximum permissible leak rates for containment suction isolation valves, TV-CV-5-150C, -150D and HY-102 and -104, as required by Section XI, Paragraphs IWV-3426 and -3427(a) of the Code. The licensee proposed to assign a maximum permissible leakage rate for the two valve combinations of, TV-CV-150C and HY-102, and TV-CV-150D and HY-104, to then be used as the criteria for initiating corrective action in accordance with IWV-3427(a).

3.12.1.2.1 Licensee's Basis for Requesting Relief--As shown on the attached figure for Penetration 92, the configuration of this containment penetration (i.e. two in series isolation valves in each of two parallel branch lines) is such that individual leakage rates for each specific valve cannot be determined using the test method of 10 CFR 50, Appendix J. In this case, assigning maximum permissible leakage rates for each damper would not be practical.

Alternate Testing: Assign a maximum permissible leakage rate for the two valve combinations of, TV-CV-150C and HY-102, and TV-CV-150D and HY-104, to then be used as the criteria for initiating corrective action in accordance with IWV-3427(a).

3.12.1.2.2 Evaluation--Valves, TV-CV-150C and -150D, and valves, HY-102 and -104, are containment suction isolation valves that are in a series/parallel arrangement with each other. This arrangement consists of 2 valves inside containment in parallel lines with each other connected by a single line to the other 2 valves outside containment in a similar parallel configuration. According to the figure of penetration 92, individual leakage rates for each specific valve cannot be determined because of the lack of test connections and the piping configuration. It appears the only practical method available is to test these valves as a group and assign a maximum permissible leakage rate to the two valve combinations of, TV-CV-150C and HY-102, and TV-CV-150D and HY-104. The system would require modifications to meet the requirements of Section XI, Paragraphs IWV-3426 and -3427(a). These modifications would require cutting and welding with possible piping replacement or additions. These system modifications would be costly and require an extended shutdown period which would be a hardship to the licensee without a compensating increase in the level of safety at the plant. The licensee's proposed alternative to assign a maximum permissible leakage rate to the two valve combinations of , TV-CV-150C and HY-102, and TV-CV-150D and HY-104, and to then be used as the criteria for initiating corrective action in accordance with IWV-3427(a) should provide reasonable assurance of valve leak tight integrity.

Based on the determination that compliance with Code requirements would result in hardship without a compensating increase in the level of safety and considering the licensee's proposed alternate testing provides an acceptable alternative to the Code requirements, relief may be granted as requested from the Section XI requirements.

APPENDIX A

P&ID LIST

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P&ID LIST

The P&IDs listed below were used during the course of this review.

System	P&ID	Revision
Reactor Coolant System	RM 155A	9
	RM 155B	10
Chemical and Volume Control System	RM 159A	10
	RM 159B	10
Vent and Drain Systems	RM 169A	8
Residual Heat Removal System	RM 156A	7
Safety Injection System	RM 167A	8
	RM 167B	9
Containment Spray System	RM 165A	9
Containment Cooling and Purge System	RB 2B	22
	RB 129B	2
	RB 102A	5
Chemical and Volume Control System	RM 159A	10
	RM 159B	10
	RM 172D	7
Post Accident Combustible Gas Control System	RM 150C	2
	RM 150A	6
	RM 150B	8
Waste Processing System	RM 172A	7
Radioactive Drains and Vents System	RM 169A	8
Steam Generator Blowdown Processing System	RM 180A	8
Spent Fuel Cooling System	RM 162A	5
Main and Auxiliary Steam System	RM 120A	11
	RM 122A	10
Auxiliary Feedwater System	RM 124A	11

System	P&ID	Revision
Fire Water System	RB 16C	2
Sampling System	RM 168A	7
	RM 179A	9
	RM 179B	7
Component Cooling Water System	RM 157A	8
	RM 157B	5
	RM 157C	6
	RM 157D	7
Service Air System	RM 140A	10
Instrument Air System	RM 140B	5
	RM 140D	2
River Water System	RM 127A	16
	RM 127B	8
Diesel Generator Air Start System	RM 151A	6
Control Room Ventilation and Filtration System	RM 140B	5
Diesel Generator Fuel Oil System	RM 151A	6

APPENDIX B

IST PROGRAM ANOMALIES IDENTIFIED DURING THE REVIEW

APPENDIX B

IST PROGRAM ANOMALIES IDENTIFIED DURING THE REVIEW

Inconsistencies and omissions in the licensee's program noted during the course of this review are summarized below. The licensee should resolve these items in accordance with the evaluations, conclusions, and guidelines presented in this report.

1. In TER section 2.1.1.1, Pump Relief Request 1, the licensee requested to measure vibration velocity instead of vibration displacement for all pumps in the IST program except residual heat removal and low head safety injection pumps. Furthermore, the licensee requested to stop taking annual bearing temperature measurements on these same pumps. The licensee's proposal to monitor pump vibration velocity in lieu of displacement and annual bearing temperature measurements provides an acceptable alternative to the Code requirements provided that the licensee complies with all of the vibration measurement requirements of ANSI/ASME OM-6, Draft 8 or later version. The licensee requested relief from annual bearing temperature measurements but has indirectly inferred that they are going to use vibration velocity measurements. The licensee should submit a separate relief request requesting relief from taking vibration displacement measurements and using instead vibration velocity measurements.

2. In TER Section 2.2.1.1, Pump Relief Request 2, the licensee has requested relief from measuring inlet pressure for charging pumps, CH-P-1A, -1B, and -1C and has requested to calculate inlet pressure based on the height of fluid above the pump suction. Examination of the P&ID's indicate test connections where instrumentation could be installed. Interim relief was granted to allow the licensee time to investigate this possibility. Provisions were added to ensure the calculations performed are within the accuracy that would result from installed instruments

meeting the Code accuracy requirements. For further details see the above mentioned TER section.

3. In TER Section 2.3.1.1, Pump Relief Request 2, the licensee has requested relief from measuring inlet pressure for boric acid pumps, CH-P-2A, and -2B and has requested to calculate inlet pressure based on the height of fluid above the pump suction. Provisions were added to ensure the calculations performed are within the accuracy that would result from installed instruments meeting the Code accuracy requirements. For further details see the above mentioned TER section.

4. In TER Section 2.3.2.1, Pump Relief Request 3, the licensee has requested relief from measuring flow rate for the boric acid pumps, CH-P-2A and -2B, and has proposed to calculate flow during refueling outages. Relief was granted with provisions to ensure the calculations performed are within the accuracy that would result from installed instruments meeting the Code accuracy requirements. Provisions were also added to require the licensee to establish two sets of reference data for pump vibrations since the flow at refueling uses a different flow path than is used during quarterly testing. For further details see the above mentioned TER section.

5. In TER Section 2.5.1.1, Pump Relief Request 2, the licensee has requested relief from measuring inlet pressure for Safety Injection Pumps, SI-P-1A and -1B, and has proposed to calculate inlet pressure based on the height of fluid above the pump suction. Relief was granted with provisions to ensure the calculations performed are within the accuracy that would result from installed instruments meeting the Code accuracy requirements. For further details see the above mentioned TER section.

6. In TER Section 2.6.1.1, Pump Relief Request 2, the licensee has requested relief from measuring inlet pressure for quench spray pumps, QS-P-1A and -1B, and has requested to calculate inlet

pressure based on the height of fluid above the pump suction. Examination of the P&ID's indicate test connections where instrumentation could be installed. Interim relief was granted to allow the licensee time to investigate this possibility. Provisions were added to ensure the calculations performed are within the accuracy that would result from installed instruments meeting the Code accuracy requirements. For further details see the above mentioned TER section.

7. In TER Section 2.8.1.1, Pump Relief Request 2, the licensee has requested relief from measuring inlet pressure for the inside recirculation spray pumps, RS-P-1A and -1B, and has proposed to calculate inlet pressure based on the height of fluid above the pump suction. Relief was granted with provisions to ensure the calculations performed are within the accuracy that would result from installed instruments meeting the Code accuracy requirements. For further details see the above mentioned TER section.

8. In TER Section 2.9.1.1, Pump Relief Request 2, the licensee has requested relief from measuring inlet pressure for the outside recirculation spray pumps, RS-P-2A and -2B, and has proposed to calculate inlet pressure based on the height of fluid above the pump suction. Relief was granted with provisions to ensure the calculations performed are within the accuracy that would result from installed instruments meeting the Code accuracy requirements. For further details see the above mentioned TER section.

9. In TER Section 2.10.1.1, Pump Relief Request 8, the licensee has requested relief from measuring flow rate quarterly for auxiliary feedwater pumps, FW-P-2, -3A, and -3B, and has proposed to measure flow rate on a refueling outage frequency. Relief was granted provided the licensee investigate several discrepancies noted by the reviewers. The licensee has not indicated that testing can be performed at cold shutdown, but cold shutdown justification #25 indicates that the discharge checks associated with these pumps will be full stroked open at cold shutdown. The licensee's relief

request does not indicate the same testing as proposed by the pump testing outline. Finally, the licensee should establish vibration reference values for both test configurations, since the quarterly tests establishes flow through a minimum recirculation line and the full flow injection line is used for the refueling outage testing. For further details see the above mentioned TER section.

10. In TER Section 2.11.1.1, Pump Relief Request 2, the licensee has requested relief from measuring inlet pressure for the river water pumps, WR-P-1A, -1B, and -1C, and has proposed to calculate inlet pressure based on the height of fluid above the pump suction. Relief was granted with provisions to ensure the calculations performed are within the accuracy that would result from installed instruments meeting the Code accuracy requirements. For further details see the above mentioned TER section.

11. In TER Section 2.12.2.1, Pump Relief Request 10, the licensee has requested relief from measuring flow rate for the diesel fuel oil transfer pumps, EE-P-1A, -1B, -1C, and -1D, and has proposed to calculate flow rate using rate of change in day tank level. Provisions were added to ensure the calculations were within the accuracy that would result from installed instrumentation meeting the Code accuracy requirements. For further details see the above mentioned TER section.

12. In TER Section 3.3.1.1, Relief Request 7, the licensee proposed to assign a maximum permissible leakage rate to the associated penetration and not to the individual valves, TV-CH-200A, -200B, and -200C as required by the Code. This is acceptable as long as the limiting leak rate for the penetration is conservative considering the number and size of the valves in the group and does not allow excessive leakage through any particular valve in the group to go uncorrected. For further details see the above mentioned TER section.

13. In TER Section 3.4.2.1, Relief Request 16, the licensee has requested relief from exercising safety injection cold leg check valves, SI-10, -11, and -12, quarterly and has proposed to exercise them during refueling outages. Provisional relief was granted because the licensee stated that no flow instrumentation was installed in these lines. Therefore, it was unclear as to how the licensee was going to verify a full stroke open of these valves. For further details see the above mentioned TER section.

14. In TER Section 3.4.2.2, Relief Request 18, the licensee has requested relief from quarterly exercising low head safety injection check valves, SI-23, -24, and -25, and has proposed full stroke exercising these valves on a refueling basis. Provisional relief was granted because the licensee stated that no flow instrumentation was installed in these lines. Therefore, it was unclear as to how the licensee was going to verify a full stroke open of these valves. For further details see the above mentioned TER section.

15. In TER Section 3.4.2.3, Relief Request 20, the licensee has requested relief from quarterly exercising accumulator discharge check valves, SI-48, -49, -50, -51, -52, and -53, and has proposed to full stroke exercise them at refueling outages. Provisional relief was granted because the licensee stated that no flow instrumentation was installed in these lines. Therefore, it was unclear as to how the licensee was going to verify a full stroke open of these valves. For further details see the above mentioned TER section.

16. In TER Section 3.4.2.4, Relief Request 21, the licensee has requested relief from quarterly exercising safety injection check valves, SI-83 and -84, and has proposed to full stroke exercise them at refueling. According to the P&ID's supplied, it appears that these check valves can be partial stroked exercised at cold shutdowns. Provisional relief was granted provided the licensee develop a method to partial stroke exercise these valves at cold

shutdown. For further details see the above mentioned TER section.

17. In TER Section 3.4.2.5, Relief Request 22, the licensee has requested relief from quarterly exercising check valves, SI-94 and -95, and has proposed to full stroke exercise them at refueling. According to the P&ID's supplied, it appears that these check valves can be partial stroked exercised at cold shutdowns. Provisional relief was granted provided the licensee develop a method to partial stroke exercise these valves at cold shutdown. For further details see the above mentioned TER section.

18. In TER Section 3.4.3.1, Relief Request 23, the licensee has requested relief from quarterly exercising boron injection tank inlets, MOV-SI-867A and -867B, and has proposed to full stroke exercise them at refueling. The licensee has not demonstrated that it is impractical to exercise these valves during cold shutdowns when charging pump discharge pressure is significantly lower. Relief was denied because the licensee has not provided an adequate technical justification to not full-stroke exercising these valves at the Code specified frequency. For further details see the above mentioned TER section.

19. In TER Section 3.4.4.1, Relief Request 13, the licensee has requested relief from quarterly exercising check valves, SI-1 and -2, and has proposed to disassemble and inspect these valves, once per refueling. Provisional relief was granted to ensure the licensee performs the disassembly in accordance with the Generic Letter positions and the discussions on the Meeting Minutes for Generic Letter 89-04, which requires a partial stroke test upon reassembly and prior to returning the valves to service. For further details see the above mentioned TER section.

20. In TER Section 3.5.1.1, Relief Request 25, the licensee has requested relief from quarterly exercising check valves, RS-158 and -160, and has proposed to disassemble and inspect these valves

on a refueling rotation. Provisional relief was granted to ensure the licensee performs the disassembly in accordance with the Generic Letter positions and the discussions on the Meeting Minutes for Generic Letter 89-04, which requires a partial stroke test upon reassembly and prior to returning the valves to service. For further details see the above mentioned TER section.

21. In TER Section 3.6.1.2, Relief Request 27, the licensee has proposed to assign a maximum leak rate to an entire penetration barrier instead of assigning individual valve leak rates to valves TV-CC-110F1 and -110F2 as required by the Code. Interim relief was granted for one year or until the next refueling outage, whichever is longer. This interim relief was based on the review of the supplied drawing to the reviewers. It appears that in this penetration individual leak rates can be assigned as required by the Code. For further details see the above mentioned TER section.

22. In TER Section 3.7.1.2, Relief Request 30, the licensee has requested relief from quarterly exercising check valves, MS-80, -81, and -82, and has proposed to disassemble and inspect these valves on a refueling rotation. Provisional relief was granted to ensure the licensee performs the disassembly in accordance with the Generic Letter positions and the discussions on the Meeting Minutes for Generic Letter 89-04, which requires a partial stroke test upon reassembly and prior to returning the valves to service. Interim relief was granted to the licensee for developing a method to check reverse flow closure of these valves at refueling outages other than by sample disassembly and inspection. For further details see the above mentioned TER section.

23. In TER Section 3.8.1.2, Relief Request 32, the licensee has requested relief from quarterly exercising check valves, RW-110, -111, -112, and -113, and has proposed to disassemble and inspect these valves on a refueling rotation. Provisional relief was granted to ensure the licensee performs the disassembly

inaccordance with the Generic Letter positions and the discussions on the Meeting Minutes for Generic Letter 89-04, which requires a partial stroke test upon reassembly and prior to returning the valves to service. Also, it was unclear exactly what the licensee meant by once every 5 years; whether it was one valve every 5 years or all the valves would be tested once every 5 years. For further details see the above mentioned TER section.

24. In TER Section 3.8.1.3, Relief Request 33, the licensee has requested relief from quarterly exercising check valves, RW-135 and -136, and has proposed to full stoke these valves during refueling outages. The licensee has not given sufficient technical justification for not testing these valves quarterly or during cold shutdown. Interim relief was granted to give the licensee time to investigate this problem. For further details see the above mentioned TER section.

25. In TER Section 3.8.1.4, Relief Request 34, the licensee has requested relief from quarterly exercising check valves, RW-197 and -198, and has proposed to disassemble and inspect these valves on a refueling outage rotation. Provisional relief was granted provided the licensee performs the sample disassembly in accordance with GL 89-04, Attachment 1, Item 2, and partial-stroke exercise the affected valves prior to returning them to service following disassembly and inspection. For further details see the above mentioned TER section.

26. In TER Section 3.10.1.1, Relief Request 37, the licensee has requested relief from quarterly stroking and timing valves TS-VS-101A, -101B, -101C, -101D, and -101E, and has proposed to full stroke these valve once every 18 months but not time them. The licensee's proposal does not provide sufficient information to monitor for valve degradation. Furthermore, the licensee's time frame of 18 months does not seem to be justified. Interim relief was granted for the period of one year or until the next refueling

outage, whichever is longer. For further details see the above mentioned TER section.

27. The licensee should investigate a method that verifies full and partial stroke exercising of various valves. One of the options the licensee may consider is installing flow instrumentation or using portable instrumentation so the flow rate through these valves being tested could be verified. The instrumentation used would have to meet the accuracy requirements of the Code in order to acceptable. Another alternative the licensee can do to verify that these valves open sufficiently to pass full system flow rate is the use of non-intrusive diagnostic testing techniques. The final option is the use of disassembly and inspection as detailed in the Generic Letter 89-04, Position 2 and the Minutes from the Meeting on GL 89-04.

Disassembly together with inspection to verify the full-stroke capability of check valves is an option only where full-stroke exercising cannot practically be performed by flow or by other positive means. The NRC staff considers valve disassembly and inspection to be a maintenance procedure that is not a test and not equivalent to the exercising produced by fluid flow. This procedure has some risk which may make its routine use as a substitute for testing undesirable when some method of testing is possible. Check valve disassembly is a valuable maintenance tool that can provide a great deal of information about a valve's internal condition and as such should be performed under the maintenance program at a frequency commensurate with the valve type and service.

The use of valve diagnostics to determine that a check valve opens or shuts fully or sufficiently to pass or prevent maximum required accident flow during a partial flow test is considered an acceptable means to satisfy the Code requirements. The licensee should investigate the use of alternate testing methods to full-stroke exercise these valves, such as using non-intrusive

diagnostic techniques to demonstrate whether they swing fully open or closed during a partial flow test.

If the licensee's investigation reveals that a full-stroke test with flow is not feasible, then valve disassembly may be used as an alternative to Code testing provided that the licensee performs this procedure in accordance with Generic Letter 89-04 and provides an assurance of proper reassembly by performing a partial-stroke test or reverse flow closure test of each valve prior to returning it to service following disassembly and inspection procedure, where possible.

28. In TER Section 3.4.4.3, Relief Request RR-15, the licensee requested relief from quarterly excercising low head safety injection pump discharge check valves SI-6 and -7 in accordance with IWV-3522 and proposed to partial-stroke exercise these valves quarterly and full-stroke exercise them at refueling outages. Provisional relief was granted because the licensee did not give adequate technical information as to how these valves are partial-stroke exercised during the quarterly pump test. For further details see the above mentioned TER section.

29. In TER Section 3.4.4.4, Relief Request RR-19, the licensee requested relief from quarterly exercising check valve SI-27, high head safety injection/charging pump refueling water storage tank suction valve, and proposed to partial-stoke exercise this valve quarterly and full-stroke exercise it during refueling outages. Provisional relief was granted provided the licensee partial stroke exercise this valve when shutting down from power operation to cold shutdown in addition to the testing all ready mentioned in the TER section. For further details see the above mentioned TER section.