EGG-NTA-10099

Enclosure

TECHNICAL EVALUATION REPORT
PUMP AND VALVE INSERVICE TESTING PROGRAM
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT 2

Docket No. 50-261

C. B. Ransom
R. S. Hartley

Published March 1992

Idaho National Engineering Laboratory
EG&G Idaho, Inc.
Idaho Falls, Idaho 83415

Prepared for the
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
Under DOE Contract No. DE-AC07-76ID01570
FIN No. A6812
TAC No. M81309

ABSTRACT

This EG&G Idaho, Inc., report presents the results of our evaluation of relief requests for the inservice testing program for safety-related pumps and valves at H. B. Robinson Steam Electric Plant, Unit 2.

PREFACE

This report is part of the "Review of Pump and Valve Inservice Testing Programs for Operating Reactors (III)" program 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.

B&R 920-19-05-02-0
FIN No. A6812
Docket No. 50-261
TAC No. M81309

CONTENTS

TECHNICAL EVALUATION REPORT
PUMP AND VALVE INSERVICE TESTING PROGRAM
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT 2

1. INTRODUCTION

This report provides the results of the technical evaluation of certain relief requests from the pump and valve inservice testing (IST) program for H. B. Robinson Steam Electric Plant, Unit 2 (H. B. Robinson Unit 2) submitted by Carolina Power and Light (CP&L) Company.

Section 2 presents the CP&L Company bases for requesting relief from the requirements for pumps followed by an evaluation and conclusion. Section 3 presents similar information for valves.

Appendix A lists piping and instrument diagrams (P&IDs) and figures used during this review.

Appendix B lists program inconsistencies and omissions, and identifies needed program changes.

1.1 IST Program Description

The CP&L Company submitted the H. B. Robinson, Unit 2, pump and valve IST program with a letter dated August 1, 1991. This program covers the third ten year IST interval, which runs from February 19, 1992, to February 18, 2002. The relief requests pertain to requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (the Code), Section XI, 1986 Edition, and the Code of Federal Regulations (CFR), 10 CFR 50.55a.

1.2 IST Requirements

10 CFR 50.55a(g) states that IST of certain ASME Code Class 1, 2, and 3 pumps and valves will be done per the ASME Code, Section XI, Subsections IWP and IWV, except where relief is granted by NRC in accordance with 10 CFR 50.55a(a)(3)(i), (a)(3)(ii), or (g)(6)(i). CP&L Company requests relief from the ASME Code testing requirements for specific pumps and valves. Certain of these requests are evaluated in this Technical Evaluation Report (TER) using the acceptance criteria of the Standard Review Plan, Section 3.9.6, NRC Generic Letter No. 89-04 (GL 89-04), "Guidance on Developing Acceptable Inservice Testing Programs," and 10 CFR 50.55a. Other requests in the licensee's IST program that are not evaluated in this TER, may be granted by provisions of GL 89-04 or addressed in previously issued Safety Evaluations.

1.3 Scope and Limits of the Review

The scope of this review is limited to the relief requests addressed in this TER and the cold shutdown justifications submitted with the licensee's IST program. Other portions of the program, such as general discussions, pump and valve test tables, etc., are not necessarily reviewed. Endorsement of these aspects of the program by the reviewer or NRC is not stated or implied. Any deviation from the Code test method, frequency, or other requirement

should be identified in the IST program and submitted according to 10 CFR 50.55a for review and approval by NRC prior to implementation.

The evaluations in this TER are applicable only to the components or groups of components identified by the submitted requests. These evaluations may not be extended to apply to similar components that are not identified by the request at this or any other comparable facility without separate review and approval by NRC. Further, the evaluations and recommendations are limited to the requirement(s) and/or function(s) explicitly discussed in the applicable TER section. For example, the results of an evaluation of a request involving testing of the containment isolation function of a valve cannot be extended to allow the test to satisfy a requirement to verify the valve's pressure isolation function, unless that extension is explicitly stated.

CP&L Company provided several cold shutdown justifications for exercising Category A, B, and C valves during cold shutdowns and refueling outages instead of quarterly. These justifications were reviewed and found to be acceptable except as noted in Appendix B.

2. PUMP TESTING PROGRAM

The following relief requests were evaluated against the requirements of the ASME Code, Section XI, 10 CFR 50.55a, and applicable NRC positions and guidelines. A summary is presented for each relief request followed by the licensee's basis for relief and the evaluation with the reviewer's recommendations. They are grouped according to topic or system.

2.1 All Pumps in the IST Program

2.1.1 Pump Vibration Velocity Measurements

2.1.1.1 Relief Request. GPRR-1 requests relief from the pump vibration displacement measurement requirements of the Code, Paragraph IWP-4500, for all safety-related pumps listed in the H. B. Robinson Unit 2 pump and valve IST program. The licensee proposes to measure pump vibration in units of velocity and evaluate the measurements per the specified acceptance criteria.

2.1.1.1.1 Licensee's Basis for Requesting Relief--ASME Section XI requires pump vibration measurement in displacement amplitude, (peak-to-peak composite), to be taken during each inservice test. Although not identified by Section XI, vibration can also be accurately measured using vibration velocity measurements. The criteria for vibration measurement is not sensitive/dependent on the pump speed and provides an absolute value for acceptable limits on vibration. In addition, this technique is an industry accepted method which is sensitive to vibrational changes that are indicative of developing mechanical problems. Velocity measurements provide an acceptable predictive tool to detect changes in the vibration that indicate a mechanical problem.

Since Section XI does not address vibration velocity measurement, acceptance criteria will be in accordance with ASME/ANSI OMa-1988, Part 6. The vibration instruments will be excluded from the range requirements of IWP-4120 as allowed by GPRR-4.

Alternate Testing: Pump vibration measurements will be in vibration velocity (in/sec). Acceptance criteria is summarized below.

Vibration, Velocity (in/sec), Acceptance Criteria*

	Acceptable Range	Alert Range	Required Action
Vertical Horizontal Centrifugal Pump (>600 RPM)	0-2.5Vr or 0-.325in/sec	>2.5Vr-≤6Vr or >.325-≤.7in/sec	>6Vr or >.7in/sec

*Note: The most limiting of the two ranges given is applicable.

	Acceptable Range	Alert Range	Required Range
Positive Displacement Pumps	0-2.5 Vr	>2.5Vr-≤6Vr	>6Vr

Vr = Vibration Reference Value

2.1.1.1.2 Evaluation--Pump bearing degradation results in increased vibration at frequencies several times pump rotational speed. These high frequency bearing noises would not produce a significant increase in pump vibration displacement measurements for pumps that operate at 600 rpm or above and could go undetected. However, these high frequency noises would result in relatively large changes in vibration velocity measurements which could permit detection of mechanical degradation and corrective action prior to catastrophic failure of the pump. Because of the high frequencies of the vibrations associated with the bearings of pumps that operate at 600 rpm or above, vibration velocity measurements are generally much better than vibration displacement measurements in monitoring mechanical condition and detecting bearing degradation for these pumps.

The licensee proposed to measure vibration velocity instead of displacement for monitoring the mechanical condition of all of the pumps in their IST program. 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 for pumps that operate at 600 rpm or above. Therefore, the licensee's proposed alternate test method is superior to the Code required testing method.

Section XI does not provide allowable ranges for vibration velocities and since the relationship between displacement and velocity is frequency dependent, a mathematical conversion of the Code displacement ranges is not appropriate. ASME/ANSI OMa-1988, Part 6, provides allowable ranges for pump vibration velocity measurements that have been found to be acceptable by the NRC. The licensee proposes to use the ranges and limits specified in this version of the O&M Standard to evaluate vibration measurements. The staff has determined that the test methods and other aspects of vibration measurement and evaluation specified in Part 6 are an integral package with the acceptance criteria. Therefore, the licensee should comply with all of the vibration measurement requirements of ASME/ANSI OMa-1988, Part 6.

Based on the determination that pump vibration velocity measurements provide more information to evaluate pump mechanical condition and to detect bearing degradation than the Code required displacement readings for pumps that operate at 600 rpm or above, and considering the licensee's proposal to follow the acceptance criteria of ASME/ANSI OMa-1988, Part 6, relief should be granted from the Code requirements with the following provision. The licensee should comply with all of the vibration measurement requirements of ASME/ANSI OMa-1988, Part 6.

2.1.2 Pump Bearing Temperature Measurements

2.1.2.1 Relief Request. GPRR-2 requests relief from the bearing temperature measurement requirements of the Code, Paragraph IWP-3100, for All safety related pumps listed in the H. B. Robinson Unit 2 IST Program. The licensee proposes to evaluate pump mechanical condition by measuring pump vibration velocity quarterly per ANSI/ASME OMa-1988, Part 6.

2.1.2.1.1 Licensee's Basis for Requesting Relief--It has been demonstrated by experience that bearing temperature rise occurs only minutes prior to bearing failure. The likelihood of a yearly bearing temperature

measurement detecting this failure is at best a remote possibility. Some industry data has shown that bearing temperature changes due to degrading bearings only occurs after major degradation has occurred at the pump. Prior to a significant change in bearing temperature, the vibration measurements obtained during quarterly surveillance testing of the pumps will provide the necessary information for determining an impending failure.

Due to plant conditions and/or system design, some safety-related pumps can only be tested while on minimum flow recirculation. Due to the potential for possible pump damage, the maximum allowable operating time on minimum flow recirculation is procedurally restricted to thirty (30) minutes. This maximum allowable operating time is not adequate for obtaining stable bearing temperature measurements, as required by the ASME Code. It has been determined at least one (1) hour of pump operation is necessary to achieve stable bearing temperatures. The small probability of detecting of bearing failure by temperature measurement does not justify the additional pump operating time required to obtain the measurements.

Based on history on safety-related pumps, the majority of possible pump bearing degrading problems were detected with vibration monitoring techniques. This is not unusual, as vibration monitoring is performed on a more frequent basis due to the requirements of the H. B. Robinson's IST Pump and Valve Program and the H. B. Robinson Vibration Monitoring Program. The frequency of inspections varies from every two (2) weeks to once per quarter. This variation in schedules are due to either a program requirement, the type of pump, or a test result indicating a possible problem which requires more frequent monitoring to ensure the continued operability of the particular pump to meet the intended safety function.

In addition, vibration monitoring techniques are considered to be more accurate and reliable than temperature monitoring for determining bearing degradation. The more sophisticated vibration instrumentation utilized in the vibration monitoring program, as well as in the IST Program for analysis/evaluation purposes, has proven to provide more meaningful and useful information than could ever be obtained with temperature data.

Based on information obtained through the Nuclear Operations and Maintenance Information Service (NOMIS), many utilities have taken the position that yearly bearing temperature measurements will not provide reliable indication of bearing degradation, and utilize vibration monitoring to provide accurate and timely information for determining pump bearing condition.

This position seems to agree with the approved American National Standard (ANSI/ASME OM-6) for Inservice Testing of Pumps (sponsored and published by the American Society of Mechanical Engineers), as the standard does not identify or require bearing temperature measurements as a test parameter for determining pump operability.

Therefore, the H. B. Robinson IST Program believes that this Request for Relief from taking yearly pump bearing temperature measurements is justified and should be granted, as temperature monitoring on pump bearings is not reliable; and that other pump parameters, (vibration, flow rate, P ...)

measured and evaluated during surveillance test activities, provide/assures safety-related pumps are operable to meet their intended safety function.

Alternate Testing: Vibration monitoring utilizing more sophisticated vibration instrumentation for analysis/evaluation of pump bearing conditions will be performed at least quarterly, in accordance with ANSI/ASME OM-6, 1988.

2.1.2.1.2 Evaluation--Annual bearing temperature measurement is an unreliable method for detecting a change in bearing condition. A temperature rise in a failing bearing usually occurs only just before failure. This makes detecting impending bearing failure by annual bearing temperature measurement very unlikely. Bearing temperatures taken yearly provide little statistical basis for determining the incremental degradation of a bearing. Requiring this measurement would be a hardship on the licensee without a compensating increase in the level of plant safety.

Measurement of pump vibration velocity, per ANSI/ASME OMa-1988, Part 6, provides much better information about bearing condition. The proposed testing gives adequate assurance of operational readiness.

Based on the determination that the proposal provides a reasonable assurance of operational readiness and compliance with the Code would result in hardship without a compensating increase in the level of safety, relief should be granted as requested.

2.1.3 Flow Rate Instrument Accuracy

2.1.3.1 Relief Request. GPRR-3 requests relief from the instrument accuracy requirements of the Code, Paragraph IWP-4110, for the flow rate instrumentation for all safety related pumps listed in the H. B. Robinson IST program. The licensee proposes to utilize ultrasonic flow instruments that are accurate to ±3% of the indicated flow rate.

2.1.3.1.1 Licensee's Basis for Requesting Relief--The majority of H. B. Robinson Unit 2 systems do not have instrumentation installed that will measure flow rates. The licensee will use ultrasonic equipment to measure flow rates in accordance with the Code. Manufacturer specifications for the ultrasonic equipment quote an intrinsic accuracy of 1-3%. IWP-4110 requires flow rates to be measured with an accuracy of ±2% of full scale. From discussions with the manufacturer and from previous experience in use of ultrasonics for flow measurement, the licensee anticipates highly accurate results. The licensee will require an accuracy of ±3% when employing ultrasonics. The benefits of a possible ±1% increase in accuracy for an internally installed instrument over the ultrasonics would not warrant the expense of many plant modifications. Furthermore, use of externally mounted ultrasonic transducers will preclude incidence of problems inherently associated with an internally installed measurement device e.g., increased system resistance, flow obstruction, inoperability of system for maintenance or repair. The licensee requests generic relief to employ ultrasonics with a required accuracy of ±3% for all Section XI pumps as desired.

Alternate Testing: The ultrasonic equipment, which is accurate to ±3% at any point on the calibrated range, will be utilized to measure flow rates for all Section XI pumps as desired.

2.1.3.1.2 Evaluation--The instrument accuracy requirements of IWP-4110 are to ensure that test measurements are sufficiently sensitive to changes in pump condition to allow detection of degradation. The use of less accurate instrumentation could introduce data scatter which could make it impractical to comply with the Code allowable ranges. Applying less restrictive acceptance criteria together with less accurate measurements could reduce the ability to detect degradation and permit significantly degraded pumps to remain in service.

The licensee's proposal to utilize ultrasonic instruments accurate to ±3% of the indicated reading may provide measurements that are sufficiently repeatable to monitor pump condition and detect degradation. The Code does not define or provide criteria for the repeatability of instrumentation. However, in situations where portable instrumentation is used, repeatability can be an important factor. If the licensee establishes procedures and controls that permit measurements sufficiently repeatable to allow detection of pump degradation, the proposed testing would be acceptable. However, if there is significant data scatter of the test measurements so the allowable ranges of Table IWP-3100-2 cannot be applied, it is questionable that the measurements are sufficiently repeatable to detect pump degradation and use of the instruments would not be acceptable.

Insufficient information is provided for a determination of the long term acceptability of the licensee's proposal, therefore, long term relief should not be granted. Meeting the Code requirements would involve purchasing and installing highly accurate instruments. This would be costly and could require an extended plant outage, which would constitute a hardship for the licensee without a compensating increase in the level of quality and safety. The licensee should determine the in-situ accuracy and repeatability of these instruments in each system application. They should also determine if the measurements are sufficiently repeatable to use the Code allowable ranges to permit detection of hydraulic degradation. An interim period of one year or until the next refueling outage, whichever is longer, should be provided for the licensee to gather this data and make these determinations. The proposal to measure pump flow rates with ultrasonic instruments that are at least ±3% accurate should provide indication that is adequate to evaluate pump condition during the interim period.

Based on the determination that the proposal provides a reasonable assurance of operational readiness during the interim period and that immediate compliance with the Code would result in hardship without a compensating increase in the level of safety, interim relief should be granted for one year or until the next refueling outage, whichever is longer. The licensee should obtain the necessary information and determine if these instruments will permit detection of pump degradation. For any applications where the accuracy/repeatability is unacceptable as described above, the licensee should obtain instruments that meet the Code requirements.

2.1.4 Digital Instrument Accuracy and Range

2.1.4.1 Relief Request. GPRR-4 requests relief from the instrument accuracy and full-scale range requirements of the Code, Paragraphs IWP-4110 and -4120, for digital instruments used for testing safety related pumps in the IST program. The licensee proposes to use digital instrumentation with an accuracy of ±3% or better at any point of the calibrated range.

2.1.4.1.1 Licensee's Basis for Requesting Relief--Digital instrumentation generally does not have a defined upper-end to their scale like analog instrumentation, they usually go to infinity. The digital instrumentation used at H. B. Robinson has been demonstrated by calibration to have an accuracy of ±3% or better at any point on their scale in lieu of the Code required ±2% of full scale. The ±3% accuracy at any point on the scale converts to an absolute accuracy equal to or better than the code required ±2%. For example, using a pressure reference of 100 psi and an actual full scale range of 300 psi.

(a) Code
3 x reference value of 100 psi = 300 psi
instrument accuracy, 2% x 300 psi = ±6 psi

(b) H. B. Robinson
reference value = 100 psi
instrument accuracy at point on scale where reading is taken = 3% x 100 psi = 3 psi.

As demonstrated above, the utilization of digital instrumentation which is calibrated to ±3% or better at any point on the scale would exceed the accuracy requirements of Section XI. Using the digital instruments would also eliminate the need to maintain the wide range of analog instruments presently required for various pump tests.

Alternate Testing: Digital instrumentation, when utilized for Section XI pump testing, will be required to be calibrated to an accuracy of ±3% or better at any point of the calibrated range.

2.1.4.1.2 Evaluation--Digital instruments do not have indication scales or graduations and are equally accurate for all readings over wide ranges. Therefore, the full-scale range requirements of IWP-4120 are not appropriate for these instruments when they are used for measurements within their calibrated range as specified by the manufacturer. Since the indication readability for digital instruments over their specified range is equivalent or better than analog instruments, relief should be granted from the Code range requirements for digital instruments provided they are used per the operating instructions provided by the instrument manufacturer.

IWP-4110 specifies the quality of the instruments required for IST measurements on safety related pumps. The instrument accuracies specified in Table IWP-4110-1 are the minimum acceptable accuracies. These accuracies are to ensure that test measurements are sufficiently sensitive to changes in pump condition to allow detection of degradation. The use of less accurate instruments could introduce data scatter which could mask pump degradation and

make it impractical to comply with the Code allowable ranges. Therefore, it is advantageous and desirable to utilize the most accurate instruments possible for IST to minimize uncertainty and permit more reliable determination of degradation.

Factoring the maximum allowable instrument full-scale range of IWP-4120 with the minimum allowable instrument accuracy of IWP-4110 produces a worst case criteria for instrument quality. It is not desirable or the intent of the Code that this worst case combination be utilized to justify the use of less accurate instruments for IST. This practice could reduce the ability to detect degradation and permit significantly degraded pumps to remain in service.

The licensee's proposal to utilize digital instruments accurate to ±3% of the indicated reading may provide measurements that are sufficiently repeatable to monitor pump condition and detect degradation. However, the licensee has not indicated the specific applications where these digital instruments might be used. Further, they have not indicated if the currently utilized test instruments in these applications provide more accurate measurements of the test parameters. It may not be appropriate to permit the use of instruments that do not meet the Code accuracy requirement when more accurate instruments are available for pump testing. Therefore, general relief should not be granted as requested.

For specific applications where the digital instruments provide more accurate and repeatable measurements than the currently used test instruments, the use of these digital instruments should be acceptable. However, if there is significant scatter of the test measurements so the allowable ranges of Table IWP-3100-2 cannot be applied, it is questionable that the measurements are sufficiently repeatable to detect pump degradation and use of the instruments may not be acceptable. The licensee should resubmit this relief request and document the specific applications where digital instruments that are less accurate than ±2% are to be used.

2.1.5 Direct Inlet Pressure Measurements

2.1.5.1 Relief Request. GPRR-5 requests relief from the inlet pressure measurement requirements of the Code, Paragraph IWP-3100, for the safety injection, containment spray, boric acid transfer, residual heat removal, and service water pumps. The licensee proposes to calculate inlet pressures based on the head of water above the pump suction.

2.1.5.1.1 Licensee's Basis for Requesting Relief--These pumps are not provided with inlet or differential pressure indicators. These pumps are either submerged in a wet pit or take suction from a storage tank. Therefore, suction pressures are calculated from the fluid level in the tank or pit. During quarterly testing, flow from the pumps is routed through closed systems back to the suction source. Differential pressures will be calculated by using the calculated inlet pressure and the measured discharge pressures and compared to the allowable ranges of Table IWP-3100-2. Suction pressure differences prior to and during pump operation are negligible. IWP-3100-2 does not require the inlet pressure measured during the test to be compared to

a reference, therefore the measured value provides little data useful in determining pump degradation.

Alternate Testing: Pump inlet pressures will not be taken during the performance of the test. Calculated suction pressures will be utilized in the comparison of inlet pressures required by IWP-3100-2 and in the calculation of differential pressures.

2.1.5.1.2 Evaluation--It is impractical to directly measure the inlet pressure of these pumps because there are no installed inlet pressure instruments. It would be necessary to make system modifications to permit direct measurement of this parameter. Many of these pumps are submerged and are inaccessible so direct reading inlet pressure instruments could not be installed. It would be burdensome to require system modifications to allow direct measurement of inlet pressure for these pumps. The expense of modifications would not be justified by the limited amount of additional information that may be provided. The inlet pressure of these pumps is due to the head of water above the level of the pump inlet because the pumps are either submerged in a wet pit or take suction from a storage tank. Calculating the inlet pressure by measuring the water level above the pump suction will allow the licensee to determine the pump differential pressure. Using the calculated differential pressure in conjunction with the measured flow rate should provide adequate information for monitoring the hydraulic condition of the pump and to detect hydraulic degradation.

Based on the impracticality and burden of complying with this Code requirement and considering the proposed testing, relief should be granted from the direct inlet pressure measurement requirements of Section XI as requested.

2.1.6 Delay in Declaring Pumps Inoperable

2.1.6.1 Relief Request. GPRR-6 requests relief from the corrective action requirements of the Code, Paragraph IWP-3230(b), for all safety related pumps listed in the IST program. The licensee proposes to allow a 72 hour evaluation period prior to declaring pumps that fall into the Required Action Range inoperable.

2.1.6.1.1 Licensee's Basis for Requesting Relief--The Allowable, Alert and Required Action ranges used to assess pump operability are set using factors applied to a reference value obtained from previous testing. The Required Action range set in this manner may impose operability limits more restrictive than that required for the pump to fulfill its design function. In other words, operation outside the Required Action range determined from the criteria of Table IWP-3100-2 may not result in a true inoperable condition when system demands and design margins are considered. Since the Required Action range may not define true operability limitations, an alternative to immediately declaring a pump inoperable when this range is exceeded is requested.

Generic Letter 89-04 Attachment 1, Position #8 states in part, "In summary, it is the staff's position that as soon as the data is recognized as being within the Required Action Range for pumps or exceeding the limiting

value for full-stroke time for valves, the associated component must be declared inoperable and the TS action time must be started." For reasons stated above, this position could result in an unnecessary plant transient in order to comply with the Technical Specification action statements. Technical Specification action statements apply only when an inoperable condition exists. The Generic Letter position does not address the fact that the Section XI limits do not in all cases reflect actual equipment operability limits. Therefore, imposing such stringent measures based on conservative acceptance criteria and with no consideration of IWP-3220 allowances is not considered to be in the overall best interests of the plant.

Alternate Testing: An operability determination procedure is used at Robinson for evaluating conditions where such determinations require further evaluation. This formal procedure (OMM-039) allows 72 hours from the point of defining the condition to complete the operability determination. This allows enough time to evaluate the condition properly before entering what could be an unnecessary plant cooldown operation. If the evaluation is not complete within 72 hours, the equipment is declared inoperable and the Technical Specification action statements are imposed. This method is controlled by plant procedure and is only used when additional information/evaluation is needed to make an operability determination.

For pumps, this method recognizes the corrective action by evaluation process identified in IWP-3230(c) and is more conservative than the 96 hours specified in IWP-3220.

2.1.6.1.2 Evaluation--If values of test quantities fall within the Required Action Range of Table IWP-3100-2, the Code requires the pump to be declared inoperable and not returned to service until the cause of the deviation has been determined and the condition corrected. Pump test parameters in the Required Action Range can indicate significant pump degradation. A pump in the Required Action Range might be capable, at that time, of meeting the Technical Specification operability limit, however, its ability to perform its intended safety function in the future is questionable. Section XI testing is intended to detect degradation of a pump and to provide assurance that adequate margins are maintained. When test data indicate that the margins are significantly reduced, the unrestricted 72 hour grace period proposed by the licensee is not acceptable.

Declaring a pump inoperable does not necessarily require change of plant mode and repair or replacement of the pump. Paragraph IWP-3230(c) states that corrective action shall be either replacement or repair per IWP-3111, or an analysis to demonstrate that the condition does not impair pump operability and that the pump will still fulfill its function. The Code also allows instruments to be recalibrated and the test rerun. The action statement in the Technical Specification would provide time for evaluation, including retesting the pump if necessary, before change is required to the plant operating mode.

The licensee has not adequately demonstrated that complying with this Code requirement is impractical or that it presents a hardship without a compensating increase in the level of quality and safety. Therefore, relief

should not be granted as requested and the licensee should comply with Position 8 of GL 89-04.

2.2 Containment Spray Pumps

2.2.1 Reference Flow or Differential Pressure

2.2.1.1 Relief Request. CS-PRR-1 requests relief from establishing reference flow or differential pressure per the Code, Paragraph IWP-3100, for containment spray pumps A and B. The licensee proposes to test these pumps at a reduced flow through the 2 inch minimum flow return lines and compare both flow rate and differential pressure to reference values.

2.2.1.1.1 Licensee's Basis for Requesting Relief--System design does not provide a means of testing these pumps at design flow rates. The pumps can be tested at a reduced flow rate via a 2" return line from each pump discharge to the RWST. The RWST return lines each contain a manual isolation valve. Because this is a reduced flow rate test and due to the concerns about reduced flow rate testing of pumps addressed in NRC Bulletin 88-04, the testing is performed with the RWST return line isolation valve full open (i.e. minimum possible system resistance). As the pump degrades, flow rate and/or differential pressure will decrease. In order to adjust either value to their corresponding reference value would require decreasing the resistance in the flow path. This is not possible since the minimum possible system resistance is used for the performance of this test.

Alternate Testing: Quarterly test containment spray pumps A and B using the associated pump discharge return line to the RWST with the isolation valve full open. Compare both flow rate and differential pressure with their associated reference values to detect degradation.

2.2.1.1.2 Evaluation--Pump flow rate and differential pressure are interdependent parameters. The Code requires establishment of a reference value of one of these parameters during testing and measurement of the other so they can be evaluated together. This practice also ensures that pump tests are performed at nearly identical conditions which improves the validity of other testing (such as vibration measurements) and makes trending meaningful.

It is impractical to vary system resistance to establish reference flow or differential pressure for the containment spray pumps. The only test flow path for these pumps is through a 2 inch test line back to the RWST. The only way to vary resistance of this path is to throttle a manual isolation valve which would reduce the flow rate through this line. This valve should not be throttled for pump testing because reducing pump flow rate may bring it below the manufacturer's recommended minimum flow rate and could cause pump damage (refer to NRC Bulletin 88-04). Major system modifications would be necessary to permit testing these pumps at full or substantial flow where system resistance could be safely adjusted to establish reference flow or differential pressure. It would be burdensome to require the licensee to perform these modifications due to the costs involved.

Quarterly measurement of flow rate and differential pressure while running these pumps in the recirculation path back to the RWST and evaluating

each parameter against its reference value should provide adequate data to determine pump hydraulic condition and detect degradation. Therefore, the proposed testing should provide reasonable assurance of pump operational readiness and should be acceptable. However, when modifications are performed to the containment spray system, the licensee should evaluate the feasibility of making provisions, such as installing a full flow test loop, to permit a more meaningful test of these pumps.

Based on the determination that compliance with the Code requirements is impractical and burdensome, and considering the proposed alternate testing, relief should be granted as requested.

2.3 Residual Heat Removal Pumps

2.3.1 Pressure Gauge Full-Scale Range

2.3.1.1 Relief Request. RHR-PRR-1 requests relief from the pressure gauge full-scale range requirements of the Code, Paragraph IWP-4120, for the residual heat removal (RHR) pumps A and B discharge pressure gauges PI-600 and PI-601. The licensee proposes to use the installed gauges and ensure that they are accurate to ±1% of full-scale range.

2.3.1.1.1 Licensee's Basis for Requesting Relief--Applying the range criteria contained in IWP-4120 would result in requiring the subject gauges to have full-scale values of no greater than approximately 420 psi. The installed gauges have a range of 0-600 psi due to the need to operate the RHR system at pressures greater than 420 psi. A 0-600 psi range is also necessary due to the 600 psi relief setpoint of relief valve RHR-706. A lower gauge range would result in possible overranging and equipment damage. Therefore, the installed 0-600 psi range gauge will be used in these locations.

Alternate Testing: Applying ±2% full scale accuracy requirement of IWP-4110 would result in a calibration tolerance of approximately ±8 psi for a 0-420 psi gauge. A more conservative requirement of ±1% full scale accuracy will be applied to the 0-600 psi range gauges PI-600 and PI-601. This will result in a calibration tolerance of ±6 psi. This tolerance is more conservative than the ASME Section XI requirement for a 0-420 psi range gauge.

2.3.1.1.2 Evaluation--The RHR discharge pressure gauges have full-scale ranges of 600 psi. This is higher than the 420 psi maximum range permitted by IWP-4120. However, it would be impractical to use gauges with full-scale ranges of 420 psi or less because the RHR system may be subjected to pressures as high as 600 psi. Use of a gauge satisfying the Code range requirements in this system could result in instrument damage. Separate instruments that meet the Code requirements would have to be installed on this system during testing to meet the Code requirements. These instruments would have to be removed or isolated during normal RHR system operation so they would not be overranged and damaged. It would be burdensome to require the licensee to install these additional instruments due to the costs involved.

The main reason for instrument full-scale range requirements is to ensure adequate readability and accuracy to provide indication sufficiently

repeatable to allow detection of pump degradation. Using instruments that are twice as accurate as the Code requires would more than compensate for exceeding the Code range requirement by approximately 43%. Allowing the use of 0-600 psig gauges with ±1% full-scale accuracy would provide test data that could be used to evaluate pump hydraulic condition and detect degradation. The proposed alternative allows an adequate assessment of operational readiness and provides a reasonable alternative to the Code instrument quality and range requirements.

Based on the determination that compliance with the Code requirements is impractical and burdensome, and considering the proposed alternate testing, relief should be granted as requested.

3. VALVE TESTING PROGRAM

The following valve relief requests were evaluated against the requirements of ASME Section XI, 10 CFR 50.55a, and applicable NRC positions and guidelines. A summary is presented for each evaluated relief request followed by the licensee's basis for relief and the evaluation with the reviewer's recommendations. They are grouped according to system and Code Category.

3.1 General Valve Relief Requests

3.1.1 Containment Isolation Valves

3.1.1.1 Relief Request. GVRR-1 requests relief from the leak rate testing requirements of the Code, Paragraph IWV-3420, for all containment isolation valves (CIVs). The licensee proposes to test the CIVs served by the Isolation Valve Seal Water System (IVSW) to the requirements of 10 CFR 50, Appendix J. This request is divided and evaluated in two parts. The first part, which deals with valves served by the IVSW system, is evaluated here, the second is evaluated in Section 3.1.1.2.2 of this report.

3.1.1.1.1 Licensee's Basis for Requesting Relief--Containment isolation valves are required to be leakage rate tested in accordance with 10CFR50, Appendix J. IWV-2100(a) defines Category A as "valves for which seat leakage is limited to a specified maximum amount in the closed position of fulfillment of their function." Although for containment isolation valves leakage rates are not limited on an individual basis by Appendix J, they have been determined to be Category A valves.

Since containment isolation valves are Category A, the leakage rate testing requirements of IWV-3420 must be satisfied. The leakage rate testing performed per Appendix J satisfies the requirements of IWV-3421 through IWV-3425, however, it does not satisfy the individual valve leakage rate analysis and corrective actions of IWV-3426 and IWV-3427.

The H. B. Robinson containment has two features in its design that assure adequate integrity during and following a loss of coolant accident. These are the Isolation Valve Seal Water System (IVSW) and the Penetration Pressurization System (PPS). These two systems are conservatively designed, seismically qualified, and operated in accordance with Unit Technical Specifications and the requirement of 10 CFR 50, Appendix J, for seal and surveillance systems that can be used in lieu of local Type C valve testing. For those containment isolation valves that are not within the bounds of IVSW or PPS, Appendix J testing is accomplished by performing individual local leak rate tests on each containment penetration. The results of these tests represents the total leakage from the boundary valves associated with the penetration.

In order to prevent duplicate leakage testing of these valves, a maximum permissible leakage will be established for each individual penetration not served by the IVSW or PPS systems. If this value is exceeded, then corrective action will be taken to restore the leakage rate to within acceptable limits. The proposed actions will be taken in lieu of IWV-3426 and IWV-3427(a).

Double frequency testing, as required by IWV-3427(b), shall not be performed. The usefulness of the data does not justify the burden of complying with this requirement. Corrective Action previously addressed will be sufficient in maintaining acceptable leakage rates.

Alternate Testing: The IVSW and PPS systems will be tested as required by 10 CFR 50, Appendix J. For those containment isolation valves not included in the IVSW or PPS system, leak rate testing will be in accordance with 10 CFR 50, Appendix J, Type C, testing Program. In addition, a maximum permissible leakage criterion will be established for each individual penetration not served by the IVSW or PPS systems. If the local leak rate test leakage criterion is exceeded, corrective action will be taken to restore the leakage rate to within the acceptable value.

3.1.1.1.2 Evaluation--The issue regarding CIVs served by the IVSW system was considered and addressed in the NRC Safety Evaluation Report (SER) dated April 23, 1979. That SER concluded that it is acceptable to use the IVSW system to conduct Appendix J, Type C, tests on the valves served by that system. Relief should be granted provided these valves are tested according to the Type C requirements applicable to valves served by a seal system.

3.1.1.2 Relief Request. GVRR-1 requests relief from the leak rate testing requirements of the Code, Paragraph IWV-3420, for all CIVs not served by the IVSW system. The licensee proposes to leak rate test these valves to the Appendix J, Type C, requirements. Maximum leakage rates will be assigned to each applicable penetration. If the penetration leakage rate is exceeded, corrective actions will be taken.

3.1.1.2.1 Licensee's Basis for Requesting Relief-- See Section 3.1.1.1.1 of this report for the licensee's basis for requesting relief and proposed alternate testing.

3.1.1.2.2 Evaluation--The procedures and requirements specified in 10 CFR 50, Appendix J, for Type C tests of containment isolation valves, are essentially equivalent to Code Paragraphs IWV-3421 through -3425 for assessing the containment isolation capability. The test adequately determines the ability to isolate the containment under peak accident conditions. Appendix J does not require measurement of individual valve leak rates or assignment of individual limits. Also, Appendix J does not require comparing or establishing corrective action requirements based on individual valve leak rates, as does the Code in Paragraphs IWV-3426 and -3427(a), "Analysis of Leakage Rates" and "Corrective Action," respectively. The intent of these two requirements is different; Appendix J evaluates the containment system as a whole, whereas the Code assesses operational readiness of individual components.

The licensee indicated that the proposed actions for analysis of leakage rates and corrective action are to be taken in lieu of those required by IWV-3426 and -3427(a). The licensee has not shown that meeting these IWV requirements is impractical or an excessive hardship for the affected valves, nor is the proposal shown to be equivalent to or a reasonable alternative to IWV-3426 and -3427(a). If the CIVs evaluated here can be tested only in groups or if there are other problems that make relief necessary, these issues

and the proposed alternate testing should be thoroughly described in a new or revised relief request.

Leak testing these valves to the requirements of both Appendix J, Type C, and Code Paragraphs IWV-3421 through -3425, would constitute a hardship without a compensating increase in the level of safety. Efforts would be duplicated with marginal additional benefit to safety. Testing per Appendix J and Paragraphs IWV-3426 and -3427(a), as specified in GL 89-04, Position 10, gives adequate assurance of operational readiness for performing the containment isolation function.

The requirements of IWV-3427(b) are applicable to every Category A valve that performs a leakage restriction function, other than or in addition to, containment isolation. Valves in this group include pressure isolation valves, even if they also perform a containment isolation function. The proposal to not endorse IWV-3427(b) does not provide a reasonable alternative to the Code for these valves.

Based on the conclusion that testing to both requirements would constitute a hardship without a compensating increase in the level of quality or safety and that Appendix J, Type C, testing essentially meets the requirements of Paragraphs IWV-3421 through -3425 for assessing the containment isolation capability, relief should be granted with the following provisions. The licensee should test these valves to the requirements of Appendix J, Type C, and Paragraphs IWV-3426 and -3427(a) according to GL 89-04, Position 10. This relief is limited to assessing the containment isolation capability of these valves. Relief from IWV-3427(b) applies only to testing of the containment isolation function. For Category A valves that perform any other function, in addition to or other than containment isolation, the requirements of IWV-3427(b) should be met.

3.1.2 Nitrogen and Air Supply Check Valves

3.1.2.1 Relief Request. GVRR-2 requests relief from the exercising requirements of the Code, Paragraph IWV-3520, for all nitrogen and air supply check valves with the exception of valves listed on GVRR-4. The licensee proposed to functionally test these valves during their associated component or system tests.

3.1.2.1.1 Licensee's Basis for Requesting Relief--Defining and verifying full flow through small check valves in air and gas systems is typically impractical.

Check valves installed in air and gas systems are to regulate pressure not flow. These valves will only open when a differential pressure exists across the valve, in which case the valve is only required to open enough to reestablish the pressure. The valves are functionally tested during their associated component and/or system test. Defining and trying to verify maximum accident flow through the check valve would not provide additional assurance of the associated components operability.

Disassembly of these valves to verify full stroke is not practical due to their size and design.

Alternate Testing: All safety related check valves in gas and air systems will be functionally tested during their associated component and/or systems test. Opening and/or closing of these valves will be verified, as applicable, during these tests.

3.1.2.1.2 Evaluation--These are simple check valves without local or remote position indication. Section XI requires that they be exercised to the position required to fulfill their function. Since the valves' positions are not determined during exercise, the only method to verify a full-stroke exercise of these valves with flow would be the method outlined in Position 1 of GL 89-04. This Generic Letter position requires that the maximum accident condition flow be verified through check valves. Due to the nature of the nitrogen and air supply system, it is impractical to determine the maximum accident condition flow for these valves. Even if this flow rate could be determined, it is impractical to measure the flow rate through these valves because there are no installed flow instruments. Flow instruments would have to be installed or these valves replaced with ones having position indication to allow compliance with the Code requirements. Making these modifications would be burdensome to the licensee because of the costs involved.

These valves allow nitrogen/air to pass from the supply headers into the valve operator accumulators. Flow is initiated only when the pressure in the accumulators falls below the supply header pressure. When the power operated valve is stroked, the supply check valve will open to recharge the accumulator. The design accident flow for the check valve would be experienced when the accumulator is recharged in sufficient time for the power operated valve to meet its intended safety function.

The licensee has not provided sufficient information about the test methods or frequency of the associated component testing to allow an evaluation of the adequacy of the proposed functional testing of these check valves. Therefore, long term relief should not be granted as requested. The licensee should provide additional information that demonstrates the long term adequacy of the functional testing or they should develop and implement alternate testing that verifies a full-stroke exercise of these valves at the Code required frequency. The licensee should consider the use of non-intrusive techniques to show that these valves fully open when flow is initiated through them. Another possible test would be to measure the time required to recharge the accumulators after stroking the power operated valves. An interim period should be provided for the licensee to investigate the options and develop the necessary documentation.

Although it may not be adequate for the long term, the proposed testing demonstrates that these valves do partially open to permit recharging of the valve operating accumulators. This testing should allow assessment of operational readiness during the interim period and provide a reasonable short term alternative to the Code method and frequency requirements.

Based on the determination that immediate compliance with the Code requirements is impractical and burdensome, and considering the proposed alternate testing, interim relief should be granted for one year or until the end of the next refueling outage, whichever is longer.

3.1.3 Power Operated Valves

3.1.3.1 Relief Request. GVRR-3 requests relief from the corrective action requirements of the Code, Paragraph IWV-3417(b), for all power operated safety related valves in the IST program. The licensee proposed to allow a 72 hour evaluation period prior to declaring valves that fall into the Required Action Range inoperable.

3.1.3.1.1 Licensee's Basis for Requesting Relief--Stroke time limits are set using a variety of methods. Some limiting values are based on Technical Specifications while others are based on factors applied to previous baseline tests. As with pumps, exceeding these limits do not always result in an inoperable condition. In accordance with IWV-3413(a), limiting stroke time values are to be set by the owner. Previous NRC Region II direction is to set these limits at a value that will allow an early detection of degradation to occur. It was suggested that the maximum stroke time for the valve to actuate in order to meet system demands not be used as the operability limit. This is because, due to design margins, actual stroke times and necessary stoke times based on system demands are often very different in comparison.

Since the current practice of setting stroke time limits are often conservative when compared to system requirements, an alternative to immediately declaring a valve inoperable when the stroke time is exceeded is requested. Note that relief is not requested for the immediate inoperability determination for valves that fail to exhibit the required change of position. The relief is requested only for those valves that exceed the maximum stroke time value. Also, this request for relief does not apply to valves that have stroke time limits specified in the Technical Specifications.

Generic Letter 89-04, Attachment 1, Position #8, states in part, "In summary, it is the staff's position that as soon as the data is recognized as being within the Required Action Range for pumps or exceeding the limiting value for full-stroke time for valves, the associated component must be declared inoperable and the TS action time must be started." For reasons stated above, this position could result in an unnecessary plant transient in order to comply with the Technical Specification action statements. Technical Specification action statements apply only when an inoperable condition exists. The Generic Letter position does not address the fact that the Section XI limits do not in all cases reflect actual equipment operability limits. Therefore, imposing such stringent measures based on conservative acceptance criteria and with no consideration of IWV-3417(b) allowances is not considered to be in the overall best interests of the plant.

Alternate Testing: An operability determination procedure is used at Robinson for evaluating conditions where such determinations require further evaluation. This formal procedure (OMM-039) allows 72 hours from the point of defining the condition to complete the operability determination. This allows enough time to evaluate the condition properly before entering what could be an unnecessary plant cooldown operation. If the evaluation is not complete within 72 hours, the equipment is declared inoperable and the Technical Specification action statements are imposed. This method is controlled by plant procedure and is only used when additional information/evaluation is needed to make an operability determination.

For valves, this method recognizes the conservative practices used in setting maximum stroke time as specified in previous Region II directives and the fact that exceeding these values often does not result in an inoperable condition.

3.1.3.1.2 Evaluation--If measured stroke time exceeds the limiting value of full-stroke time set by the Owner, the Code requires corrective action to begin immediately. The Code further states that if the condition is not, or cannot be, corrected within 24 hours, the valve shall be declared inoperative. Significant increases in valve stroke times can indicate significant valve degradation. A valve whose stroke time exceeds the limiting value of stroke time might be capable, at that time, of meeting the system operability and Technical Specification limits, however, its ability to perform its intended safety function in the future is questionable. Section XI testing is intended to detect degradation of components and to provide assurance that adequate margins are maintained. When test data indicate that the margins are significantly reduced, the unrestricted 72 hour grace period proposed by the licensee is not acceptable.

Declaring a valve inoperable does not necessarily require change of plant mode. The action statement in the Technical Specification would provide time for evaluation, including retesting the valve if necessary, before change is required to the plant operating mode. The Code also allows instruments to be recalibrated and the test rerun.

The licensee has not adequately demonstrated that complying with this Code requirement is impractical or that it presents a hardship without a compensating increase in the level of quality and safety. Therefore, relief should not be granted as requested and the licensee should comply with Position 8 of GL 89-04.

3.1.4 Nitrogen and Air Supply Check Valves

3.1.4.1 Relief Request. GVRR-4 requests relief from the exercising requirements of the Code, Paragraph IWV-3520, for the nitrogen and air supply check valves SA-80, IA-525, IVSW-68A, IVSW-68B, IVSW-68C and IVSW-68D. The licensee proposed to functionally test these check valves during their associated component and/or systems test.

3.1.4.1.1 Licensee's Basis for Requesting Relief--Defining and verifying full flow through small check valves in air and gas systems is typically impractical.

Accident flow rates are not important to these check valves, only that they open to allow the system to function post-accident. SA-80 and IA-525 will pass air into the containment until a predetermined pressure is reached, then the containment will be vented. Therefore, the check valve only needs to open to permit pressurization, not to pass a predetermined flow rate. The IVSW check valves only need to pass enough flow to keep the IVSW system pressurized post-accident. Maximum accident flow rate is not a realistic or determinable quantity.

Disassembly of the IVSW valves to verify full stroke is not practical due to their size and design. Stroking of SA-80 and IA-525 will be verified at cold shutdown intervals. IVSW-68A, 68B, 68C, and 68D will be exercised at refueling intervals.

Alternate Testing: These check valves will be functionally tested during their associated component and/or systems test.

3.1.4.1.2 Evaluation--These are simple check valves without local or remote position indication. Section XI requires that they be exercised to the position required to fulfill their function. Since valve position is not determined during exercise, the only method to verify a full-stroke exercise of these valves with flow would be the method outlined in Position 1 of GL 89-04. This Generic Letter position requires that the maximum accident condition flow be verified through check valves. Since no criteria are specified for the flow rates through these valves during accidents, it is impractical to determine the maximum accident condition flow for these valves. Even if this flow rate could be determined, it is impractical to measure the flow rate through these valves because there are no installed flow instruments. Flow instruments would have to be installed or these valves replaced with ones having position indication to allow compliance with the Code requirements. Making these modifications would be burdensome to the licensee because of the costs involved.

Valves SA-80 and IA-525 allow air to flow from the supply headers into the containment until a predetermined pressure is reached. These valves only need to open to permit this pressurization, no required flow rate is specified. The maximum required accident flow for these check valves would be the flow necessary to pressurize the containment in the minimum time specified in any accident analysis, if a time is stipulated. The IVSW check valves only need to pass enough nitrogen flow to keep the IVSW tank and system pressurized. The design accident flow for the IVSW check valves would be the worst case expected flow required to keep the IVSW system pressurized during an accident.

The licensee has not provided sufficient information about the test methods or frequency of the associated system testing to allow an evaluation of the adequacy of the proposed functional testing of these check valves. Therefore, long term relief should not be granted as requested. The licensee should provide additional information that demonstrates the adequacy of the functional testing or they should develop and implement alternate testing that verifies a full-stroke exercise of these valves at the Code required frequency. The licensee should consider the use of non-intrusive techniques to show that these valves fully open when flow is initiated through them. Another possible test would be to measure the time required to pressurize the containment or recharge the IVSW system after it has been bled down. An interim period should be provided for the licensee to investigate testing options and develop the necessary documentation.

Although it may not be adequate for the long term, the proposed testing demonstrates that these valves do open to permit flow into containment or into the IVSW tank. This testing should allow assessment of operational readiness

during the interim period and provide a reasonable short term alternative to the Code method and frequency requirements.

Based on the determination that immediate compliance with the Code requirements is impractical and burdensome, and considering the proposed alternate testing, interim relief should be granted for one year or until the end of the next refueling outage, whichever is longer.

3.2 Isolation Valve Seal Water System

3.2.1 Category B and C Valves

3.2.1.1 Relief Request. IVSW-VRR-1 requests relief from the test frequency requirements of Section XI, Paragraphs IWV-3411 and -3521, for the check and power-operated valves in the IVSW system listed in the IST program. The licensee proposes to exercise these valves per the Code during each refueling outage.

3.2.1.1.1 Licensee's Basis for Requesting Relief--The IVSW system has been accepted by the NRC as meeting the requirements of a seal system as defined by 10 CFR 50, Appendix J. The system is also required by Technical Specification 3.3.6 to be operational during power operations to maintain containment integrity, should it be required for post-accident service. Quarterly and/or cold shutdown testing of the IVSW system would require the removal of associated containment isolation valves of major systems, which are in use during plant operation and cold shutdown. Operation of these containment isolation valves could result in a plant trip, an inadvertent initiation of a safety signal and/or isolation of essential features or processes.

10 CFR 50, Appendix J requires all containment isolation valves and the seal system to be tested every refueling not to exceed two years. Tech. Spec 4.4.2 requires the IVSW system to be tested every refueling. Because of the unusual condition the plant must be placed in to test the IVSW system, it is impractical to test at cold shutdown.

Alternate Testing: All valves in the IVSW system that are included in the IST program will be tested as required by IWV every refueling outage.

3.2.1.1.2 Evaluation--These are check valves and power-operated valves in the seal water supply path to valves at various containment penetrations. The check valves are simple checks not equipped with position indication or external operators. The only method readily available for exercising them open is to initiate flow into the associated seal space (between the associated containment isolation valves). This testing requires extensive setup and the reconfiguration of several systems. This testing is impractical to perform quarterly during power operation or during cold shutdowns.

Testing the closure function of these check valves requires establishing a reverse differential pressure across them. This also requires extensive preparation and is a complicated and time consuming test. It is impractical to perform this test quarterly or each cold shutdown. System redesign and

modifications are needed to exercise these check valves open or closed quarterly or at each cold shutdown. These modifications would be costly and burdensome to the licensee. Testing these check valves per the Code during refueling outages allows an adequate assessment of operational readiness and provides a reasonable alternative to the Code test frequency requirements.

The power-operated valves covered by this request, PCV-1922A and -1922B, are indicated in the IST program to be normally closed. They are in parallel paths with in-line isolation valves. The licensee has not shown that these valves cannot be exercised quarterly or each cold shutdown per the Code requirements. The NRC is authorized by law to grant relief from the Code requirements when the licensee demonstrates either that their proposed alternatives would provide an acceptable level of quality and safety, that compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality or safety, or that the Code requirements are impractical. The proposed alternative is not shown to provide an acceptable level of quality and safety. The licensee has not shown that a hardship results from testing these valves at the Code frequency and that there would be no compensating increase in safety. And lastly, whereas it may be inconvenient to exercise the valves at the Code frequency, it is not shown to be impractical. Therefore, relief should not be granted.

Based on the determination that compliance with the Code requirements is impracticable and burdensome and considering the proposed testing frequency, relief should be granted for the affected IVSW check valves, as requested. Relief should not be granted to defer testing power-operated valves, PCV-1922A and -1922B. They should be tested at the Code frequency.

3.3 Emergency Diesel Generator System

3.3.1 Category B Valves

3.3.1.1 Relief Request. DA-VRR-1 requests relief from measuring the stroke time per Section XI, Paragraph IWV-3413, for emergency diesel generator (EDG) air start valves, DA-19A, -19B, -23A, and -23B. The licensee proposes to alternately isolate one diesel air start header and exercise one of these valves per diesel during monthly EDG testing.

3.3.1.1.1 Licensee's Basis for Requesting Relief--These valves were supplied as part of the EDG skid. The valves were not provided with individual control switches nor any position indication, therefore stroke timing by local or remote position indication is not possible. Significant degradation or failure of these valves to operate would, however, be indicated by an increased starting time on the EDG or its failure to start.

Alternate isolation of the air start headers, to verify individual valve performance is accomplished by closing an upstream isolation valve. The selection of which valve to isolate is procedurally controlled and based on the date of the test with each air start solenoid valve tested on a monthly basis.

Alternate Testing: In lieu of the individual valve stroke time measurement required by IWV-3413, failure of the EDG to start, during monthly testing,

will be evaluated to determine if the cause can be attributed to the associated starting air valves. Alternate isolation of the air headers every month will verify individual performance of these valves. Valve stroke time testing will not be performed.

3.3.1.1.2 Evaluation--These solenoid-actuated valves function to admit starting air to the EDG. They are in parallel paths to the diesel starting blowers, two valves for diesel A and two for diesel B. They are actuated by the diesel start sequence and are not equipped with local or remote position indication. Their actuation cannot be verified by direct observation of valve stem movement. Therefore, it is impractical to perform direct stroke time measurements per the Code for these valves. Installation of position indication or other instruments to show valve position would require system redesign and would be costly and burdensome. A method for adequately assessing the condition of these valves is essential to the determination of operational readiness.

These valves must actuate quickly to start the EDGs within the time limits specified in the plant Technical Specifications. In their normal configuration, failure of one of these valves to open would not be indicated by an increase in starting time. This is because of the parallel configuration. However, the licensee proposes to test at least two of the four valves each month by isolating one of the parallel supply trains and starting the diesel. In this case, failure or significant degradation of the unisolated valve would be indicated by an increase in start time or a complete failure of the diesel to start. Failure of the diesel to start and load in the time allowed can be caused by several different mechanisms. Any of these would result in an investigation into the cause of the failure. The proposed testing at the increased frequency allows an adequate assessment of operational readiness of these valves and provides a reasonable alternative to the Code.

Based on the determination that compliance with the Code requirements is impracticable and burdensome, and since the licensee's proposal provides a reasonable alternative to the Code, relief should be granted as requested.

3.3.1.2 Relief Request. DA-VRR-3 requests relief from the stroke time test method requirements of Section XI, Paragraph IWV-3413, for EDG fuel oil day tank supply valves EV-1963A-1, -2, EV-1963B-1, and -2. The licensee proposes to assess their operability monthly by considering these valves' ability to fill the diesel fuel oil day tank during EDG tests.

3.3.1.2.1 Licensee's Basis for Requesting Relief--The valves were not provided with switches or any other actuation devices nor position indicators, therefore stroke timing by local or remote position indication is not possible. Significant degradation or failure of these valves to operate would, however, be indicated by the inability to fill the EDG day tank during operation of the EDGs.

Alternate Testing: In lieu of the individual valve stroke time measurement required by IWV-3413, operability will be determined by the ability to fill the diesel day tank, during monthly testing.

3.3.1.2.2 Evaluation--These power-operated valves are not equipped with local or remote position indication. They are not equipped with manual control switches, but instead are controlled by system demand for diesel fuel oil. This makes obtaining accurate stroke times very difficult. System modifications are needed to directly measure the stroke times of these valves. This modification would be expensive and burdensome to the licensee. However, it may be prudent at some later date to consider installing provisions for stroke time testing these valves. A method of stroke timing or otherwise adequately evaluating these valves' condition is needed to assess their operational readiness.

The proposal to verify the valves are opening and closing monthly during EDG surveillance testing, by confirming filling of the day tank, is acceptable on an interim basis. Yet, it may not adequately evaluate valve condition and present a reasonable long term alternative to the Code test method requirements. During the interim period the licensee should consider the adequacy of the proposed method, as well as other methods, such as those using ultrasonics, magnetics, and acoustics for stroke timing or otherwise monitoring the condition of these valves. Also, appropriate acceptance criteria should be assigned so that a severely degraded valve is identified for corrective action.

Based on the determination that complying with the Code requirements is impracticable and burdensome, and considering the licensee's proposal, relief should be granted for an interim period of one year or until the next refueling outage, whichever is longer. During this period, the licensee should consider methods of measuring the stroke times or otherwise adequately monitoring the condition of these valves.

3.3.2 Category C Valves

3.3.2.1 Relief Request. DA-VRR-2 requests relief from the test method requirement for reverse flow closure of Section XI, Paragraph IWV-3520, for EDG air start receiver supply check valves DA-9A, -9B, -33A, and -33B. The licensee proposes to verify closure capability of each set of series check valves quarterly.

3.3.2.1.1 Licensee's Basis for Requesting Relief--These check valves are installed in series and are not provided with a means to facilitate individual exercising. There are no vents, drains, or test valves located between each pair of valves, therefore, no practical method exists to verify proper operation of the individual valves upon reversal of flow. The fact that two valves are in series lessens the probability of failure to retard backflow.

Alternate Testing: Each set of series check valves will be tested quarterly, in the reverse direction, as a unit.

3.3.2.1.2 Evaluation--These series check valves are in the compressor supply lines to the EDG air start receivers. They must close to prevent loss of energy in their associated receiver in the case of an upstream line break. They are installed in series without intermediate test taps or other provisions to allow an individual reverse flow closure test. It is

impractical to individually verify their closure upon reversal of flow at any frequency. A practical method that will adequately verify the closure capability of these series check valves would be leak testing the pair. The licensee proposes to test the reverse flow closure capability of these valves in pairs quarterly. The corrective action that will be taken upon failure of the pair is not described. However, if excessive leakage is noted, both valves are indicated to be failed and must be repaired or replaced as required by the Code. The licensee's proposed testing allows an adequate assessment of component condition and provides a reasonable alternative to the Code requirements.

Based on the determination that compliance with the Code requirements is impracticable and burdensome, and considering the proposed alternate testing, relief should be granted as requested.

3.4 Safety Injection System

3.4.1 Category A/C Valves

3.4.1.1 Relief Request. SI-VRR-3 requests relief from the test method and frequency requirements of Section XI, Paragraph IWV-3520, for SI combined injection check valves, SI-875A, -875B, and -875C. The licensee proposes to exercise the check valves open, with less than the required accident flow rate, at each refueling. Reverse flow closure and leak testing will be performed at cold shutdown.

The check valves in this request are also addressed, with other valves, in request SI-VRR-4 (see Section 3.4.1.2. of this report). In that request, the licensee proposes to part-stroke exercise them each cold shutdown and "full flow" exercise them each refueling outage. The assumption is made that the "full flow" exercise referred to in SI-VRR-4 is based on the proposal in the alternate testing section of SI-VRR-3, rather than a separate test. The part-stroke exercise referred to in the following evaluation is based on the proposal in SI-VRR-4. The proposed tests for valves SI-875A, -875B, and -875C are evaluated here and not in the evaluation of SI-VRR-4.

3.4.1.1.1 Licensee's Basis for Requesting Relief--A flow of 1692 gpm is the minimum flow which will fully open the check valves in accordance with calculations developed per SOER 86-03. Accident flow through the check valves is 8900 gpm. A flow rate of greater than or equal to 3000 gpm through each valve is achieved during the RHR pump test performed each cold shutdown. Accident flow is not reasonably achievable therefore the check valves would have to be disassembled to be in compliance with GL 89-04. These check valves are in a high radiation area and disassembling these check valves would provide no added assurance of operability when the minimum flow to open the check valves is exceeded by at least 1300 gpm.

Alternate Testing: Full flow exercise the check valves, using 3000 gpm as the minimum flow required to be verified through the check valves, at each refueling. Reverse flow and leak testing will be performed at cold shutdown.

3.4.1.1.2 Evaluation--Check valves SI-875A, -875B, and -875C are in the combined injection path for the SI accumulators, high head SI, and

residual heat removal (RHR) system. It is impractical to full or part-stroke exercise them during power operations as the only flow path through them is from the RHR pumps, SI pumps, or SI accumulators into the RCS. These sources have or produce insufficient outlet pressure to establish flow into the RCS at normal pressure. Extensive system modifications are needed to allow a full-stroke exercise of these valves quarterly during power operations. These modifications would be costly and burdensome.

The licensee proposes to part-stroke exercise these check valves open with flow (See alternate testing proposal in relief request SI-VRR-4) and to leak test them to verify their closure capability each cold shutdown. The proposed frequency for these tests is reasonable.

Regarding the full-stroke exercise requirement, the licensee proposes to exercise these valves open with a flow rate of at least 3000 gpm each refueling outage. The proposed rate is less than the maximum required accident flow rate through these valves, which is 8900 gpm. This high rate is based on the accident condition SI accumulator discharge flow rate. According to the licensee's calculations, a flow rate of 1692 gpm will fully open these check valves. The proposed refueling outage test flow rate of 3000 gpm probably opens these valves enough to pass the maximum required accident flow rate and would qualify as a full-stroke exercise if the obturator position could be determined.

The flow rate through these valves during cold shutdown decay heat removal operations might also be sufficient to fully open them. However, they are not equipped with external position indicators and the licensee cannot verify a full-stroke exercise based solely on the lower flow rate. Passing and verifying the maximum required accident flow rate through each of these valves during refueling outages, when the vessel head is removed to provide an adequate expansion volume, would constitute a full-stroke exercise, but might not be practical. It would involve discharging the SI accumulators into the RCS, which could result in damage to reactor internal components. The licensee should actively investigate other methods, including non-intrusive, of testing these valves.

It might be possible to use non-intrusive diagnostic techniques to determine if these valves open fully or sufficiently to pass the maximum required accident flow. If that test can be done, it is considered an acceptable alternative to full flow testing. An interim period should be provided for the licensee to investigate whether non-intrusive methods can be used. This period should be based on the period prescribed in the NRC SER dated July 9, 1991. By the end of this period, the licensee should implement full-stroke testing with diagnostics, either each cold shutdown or each refueling outage, as practicable, or show that this alternate method is impractical. The licensee should also consider disassembly and inspection per GL 89-04, Position 2, if full-stroke exercising is not feasible.

Based on the determination that compliance with the Code requirements is impracticable and burdensome, and considering the proposed alternate testing and frequency, interim relief should be granted for 12 months or until the end of the next refueling outage (for each unit), whichever is longer. This interim period starts on July 9, 1991.

3.4.1.2 Relief Request. SI-VRR-4 requests relief from the test frequency requirements of Section XI, Paragraph IWV-3521, for high head SI check valves SI-876A. -876B, and -876C. The licensee proposes to part-stroke exercise and reverse flow and leak test these valves each cold shutdown and to full-stroke exercise them with flow each refueling outage.

Three check valves, SI-875A, -875B, and -875C, included in this relief request are evaluated in Section 3.4.1.1 of this report with relief request SI-VRR-3. The alternate testing section of this request was considered during the evaluation of request SI-VRR-3. Therefore, the following evaluation addresses only valves SI-876A, -876B, and -876C.

3.4.1.2.1 Licensee's Basis for Requesting Relief--The RHR pumps will not develop sufficient head to open the check valves during power operations. These check valves are in the three SI lines and are tested in pairs in series. Two pair of the check valves (A&C Loops) are not isolable and must be tested in parallel. To test these valves in parallel, the RHR system must be placed in an unusual operation condition during cold shutdown.

Specialized strap-on ultrasonic flow equipment must be utilized to perform the full flow test due to no existing in-line flow measuring devices. These check valves are in a high radiation area and performing the full flow test at cold shutdown would cause unnecessary exposure to the testing personnel installing the ultrasonic flow equipment.

Alternate Testing: Partial flow exercise each cold shutdown, full flow exercise the check valves each refueling outage. Reverse flow and leak testing will be performed at cold shutdown intervals.

3.4.1.2.2 Evaluation--The only available path for full-stroke exercising these check valves with flow is into the RCS. These check valves cannot be full- or part-stroke exercised with flow quarterly during power operation as neither the SI nor RHR pumps can develop the head needed to overcome RCS pressure. During cold shutdowns, the RHR system provides reactor core decay heat removal. Diverting RHR flow through these valves during cold shutdowns to verify a full-stroke exercise with flow of each valve is a complicated procedure that would place the RHR system in an abnormal alignment. The possibility exists that cooling water flow to the core could be disrupted if this testing were performed during cold shutdowns. Additionally, special temporary ultrasonic flow equipment is used to verify the flow rate through these valves as there are no installed flow measuring devices. Since these valves are located in a high radiation area, the test presents a personnel hazard during setup. Extensive system modifications are needed to allow full-stroke exercising of these valves quarterly or during cold shutdowns. These modifications would be costly and burdensome.

The proposal to part-stroke exercise these valves quarterly with flow through the minimum flow recirculation line and to full-stroke exercise them per the Code each refueling outage provides reasonable alternative to the Code test frequency requirements.

Based on the determination that compliance with the Code test frequency is impracticable and burdensome, and since the licensee's proposal provides a

reasonable alternative to the Code, relief should be granted as requested from the Code test frequency requirements.

3.4.1.3 Relief Request. SI-VRR-5 requests relief from the leak rate testing requirements of Section XI, Paragraph IWV-3420, for SI boron injection tank (BIT) system valves, SI-873A and -873D. The licensee proposes to leak test these series check valves as a pair during cold shutdowns.

3.4.1.3.1 Licensee's Basis for Requesting Relief--These check valves are installed in series and are not provided with a means to facilitate individual exercising. There are not vents, drains, or test valves located between this pair of valves, therefore, no practical method exists to verify proper operation of the individual valves upon reversal of flow. The fact that two valves are in series lessens the probability of failure to retard backflow. The high to low pressure interface is at SI-873A, which is the third valve in the series, and not at SI-873D, the second valve in the series. Therefore an intersystem LOCA is not a concern between check valves SI-873D and -873A.

Alternate Testing: The check valves will be leak tested, in series, at cold shutdowns with a duration greater than 72 hours (ref. Technical Specification Table 4.1-3).

3.4.1.3.2 Evaluation--These check valves are located in series in the injection line from the BIT to the RCS Loop 3 cold leg. Valve SI-873D is downstream of SI-873A and is Categorized A/C because it performs a pressure isolation function along with valve SI-875C. Valve SI-873A, which is Categorized C, is the third valve in series from the RCS and is not identified as a pressure isolation valve. The piping system between check valves SI-873D and -873A does not contain the test tap needed to individually leak rate test valve SI-873D. The nearest upstream test tap is between valve SI-873A and the BIT. Therefore, individually leak rate testing valve SI-873D is impractical at any frequency. Requiring installation of a test tap to individually leak rate test this valve would involve system modifications. These modifications would be costly and burdensome to the licensee.

However, the leak tight integrity of the series valve pair as a unit can be verified by leak testing. The licensee proposes to leak test the pair during cold shutdowns (with a duration greater than 72 hours). Leak rate testing these valves as a pair per IWV-3420 allows an adequate assessment of operational readiness and provides a reasonable alternative to the Code. Since excessive leakage through the pair during the test would indicate that both valves are excessively degraded, both valves should be declared inoperable and repaired or replaced as required in that case.

Based on the determination that compliance with the Code test method and frequency requirements is impractical and burdensome, and the licensee's proposal provides a reasonable alternative to the Code, relief should be granted as requested.

3.4.2 Category C Valves

3.4.2.1 Relief Request. SI-VRR-1 requests relief from the test frequency requirements of the Section XI, Paragraph IWV-3521, for safety injection (SI) boron injection tank (BIT) line to cold leg check valves, SI-873A through -873F, and hot leg injection check valves, SI-874A, and -874B. The licensee proposes to full-stroke exercise these valves with flow each refueling.

3.4.2.1.1 Licensee's Basis for Requesting Relief--Exercising the hot and cold leg injection check valves during power operation is not possible due to the SI pumps not being able to develop sufficient head to overcome normal RCS pressure. Use of another pump would result in an undesirable temperature transient in the RCS. Letdown capability will not allow full flow testing with the reactor head on during cold shutdown. Such testing at cold shutdown would increase the probability of a low temperature over pressurization event. While in the system configuration for this refueling interval testing, SI-849 will also be exercised.

Alternate Testing: Full flow exercise at each refueling.

3.4.2.1.2 Evaluation--These are simple check valves. They are not equipped with external operators or position indicators. It is impractical to full-stroke exercise them with flow quarterly during power operation because the only full flow path is into the RCS. The charging pumps cannot develop full design accident flow against operating reactor pressure. These valves cannot be full-stroke exercised with flow during cold shutdown because the RCS does not contain sufficient expansion volume to accommodate the flow required. Full-stroke exercising during cold shutdown could cause a low temperature overpressure condition in the RCS.

Full-stroke exercising these valves quarterly or during cold shutdown would require system redesign and modifications. These modifications would be costly and burdensome to the licensee. The proposal to full-stroke exercise these valves with flow per the Code each refueling outage allows an adequate assessment of valve condition and provides a reasonable alternative to the Code test frequency requirements.

Based on the determination that compliance with the Code test frequency is impracticable and burdensome, and since the licensee's proposed frequency is reasonable, relief should be granted as requested from the Code test frequency requirements.

3.4.2.2 Relief Request. SI-VRR-1 requests relief from the test frequency requirements of the Section XI, Paragraph IWV-3521, for safety injection (SI) test line check valve, SI-849. The licensee proposes to full-stroke exercise this valve with flow each refueling.

3.4.2.2.1 Licensee's Basis for Requesting Relief--Exercising the hot and cold leg injection check valves during power operations is not possible due to the SI pumps not being able to develop sufficient head to overcome normal RCS pressure. Use of another pump would result in an undesirable temperature transient in the RCS. Letdown capability will not

allow full flow testing with the reactor head on during cold shutdown. Such testing at cold shutdown would increase the probability of a low temperature over pressurization event. While in the system configuration for this refueling interval testing, SI-849 will also be exercised.

Alternate Testing: Full flow exercise at each refueling.

3.4.2.2.2 Evaluation--This is a simple check valve in a test return line from the SI hot leg injection and accumulator fill line. The valve is not equipped with an external operator or position indicator. The test return line is equipped with a flow indicator that can be used to verify a full-stroke open exercise of this valve with flow. There are two normally closed manually operated valves in the test return line. Whereas it might be impractical to open these manual valves quarterly during power operation, to full-stroke exercise valve SI-849 with flow, the licensee has not shown that the test is impractical or burdensome, either quarterly or during cold shutdowns. Therefore, the proposal to full-stroke exercise this valve with flow each refueling outage is not shown to be a reasonable alternative to the Code test frequency requirements.

The NRC is authorized by law to grant relief from the Code requirements when the licensee demonstrates either that their proposed alternatives would provide an acceptable level of quality and safety, that compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality or safety, or that the Code requirements are impractical. The proposed alternative is not shown to provide an acceptable level of quality and safety. The licensee has not shown that a hardship results from testing this valve at the Code frequency and that there would be no compensating increase in safety. And lastly, whereas it may be inconvenient to exercise the valve at the Code frequency, it is not shown to be impractical. Therefore, relief should not be granted from the Code test frequency requirements.

3.4.2.3 Relief Request. SI-VRR-2 requests relief from the test frequency requirements of Section XI, Paragraph IWV-3521, for SI pump discharge check valves, SI-879A, -879B, and -879C. The licensee proposes to part-stroke exercise them and verify reverse flow closure quarterly. During refueling outages these valves will be full-stroke exercised open with flow.

3.4.2.3.1 Licensee's Basis for Requesting Relief--Exercising these valves during power operations is not possible due to the SI pumps not being able to develop sufficient head to overcome normal RCS pressure. Use of another pump would result in an undesirable temperature transient in the RCS. Letdown capability will not allow full flow testing with the reactor head on during cold shutdown. Such testing at cold shutdown would increase the probability of a low temperature over pressurization event.

Alternate Testing: Part stroke exercise quarterly and full flow exercise at each refueling. Reverse flow testing will be performed quarterly.

3.4.2.3.2 Evaluation--These are simple check valves. They are not equipped with external operators or position indicators. It is impractical to full-stroke exercise them with flow quarterly during power operation because

the only full flow path is into the RCS. The charging pumps cannot develop full design accident flow against operating RCS pressure. These valves cannot be full-stroke exercised with flow during cold shutdown because the RCS does not contain sufficient expansion volume to accommodate the required flow rate. Full-stroke exercising them open during cold shutdown could cause a low temperature overpressure condition of the RCS.

Full-stroke exercising these valves open quarterly or each cold shutdown would require system redesign and modifications. This would be costly and burdensome to the licensee. The proposal to part-stroke exercise these valves open and exercise them closed quarterly and to full-stroke exercise them with flow each refueling outage allows an adequate assessment of valve condition and provides a reasonable alternative to the Code test frequency requirements.

Based on the determination that compliance with the Code test frequency is impracticable and burdensome, and since the licensee's proposal provides a reasonable alternative to the Code, relief should be granted as requested from the Code test frequency requirements.

3.4.2.4 Relief Request. SI-VRR-6 requests relief from the test method and frequency requirements of Section XI, Paragraph IWV-3520, for SI hot leg injection check valves SI-874A and -874B. The licensee proposes to pass full flow through these valves in parallel each refueling outage in lieu of performing an individual full-stroke exercise test per the Code.

3.4.2.4.1 Licensee's Basis for Requesting Relief--A non-isolable cross-tie exists between the check valves (SI-874A and -874B) and the motor operated valves (SI-866A and -866B) which eliminates the ability to have flow through one check valve at a time. Verifying accident flow through each valve individually is not reasonably achievable, therefore the check valves would have to be disassembled to be in compliance with Generic Letter 89-04. These check valves are in a high radiation area and disassembling these check valves would provide no added assurance of operability. Additionally, these valves have screw-in bonnets that are seal welded and past experience has shown that these valves gall when disassembly is attempted.

Alternate Testing: Flow will be passed through the two (2) parallel lines at each refueling outage.

3.4.2.4.2 Evaluation--These check valves are in parallel lines. They are simple check valves not equipped with position indication or external operators. There is no installed provision for external verification of valve position (i.e., pipe taps). There is a piping cross-connect that is not equipped with and isolation valve just upstream of these valves. This arrangement makes it very difficult to verify the flow rate through either valve at any frequency. Requiring installation of instruments, such as flow measuring devices, to verify valve position would involve system redesign and modifications. These modifications would be costly and burdensome to the licensee.

Besides the lack of installed instruments, it is impractical to verify an open exercise of these valves quarterly during power operation because the only full flow path is into the RCS. The charging pumps cannot develop full

design accident flow against operating reactor pressure. These valves cannot be verified to exercise open during cold shutdown because the RCS does not contain sufficient expansion volume to accommodate the required flow rate. Exercising them open during cold shutdown could cause a low temperature overpressure condition in and subsequent damage to the RCS.

The licensee proposes to exercise these valves open, with flow directed to both parallel paths, each refueling outage. However, this does not demonstrate the full-stroke open exercise of these valves per the Code or GL 89-04, Position 1. The licensee should actively investigate other test methods, including non-intrusive, of verify a full-stroke exercise of these valves.

It might be possible to use non-intrusive diagnostic techniques to determine if these valves open fully or sufficiently to pass the maximum required accident flow. If that can be done, it is considered an acceptable alternative to full flow testing. An interim period should be provided for the licensee to investigate whether non-intrusive methods can be used. This period should be based on the period prescribed in the NRC SER dated July 9, 1991. By the end of this period, the licensee should implement full-stroke testing with diagnostics, either each cold shutdown or each refueling outage, as practicable, or show that this alternate method is impractical. The licensee should also consider disassembly and inspection per GL 89-04, Position 2, if full-stroke exercising is not feasible.

Based on the determination that compliance with the Code requirements is impracticable and burdensome, and considering the proposed alternate testing and frequency, interim relief should be granted for the period described above.

3.5 Chemical and Volume Control System

3.5.1 Category A/C Valves

3.5.1.1 Relief Request. CVC-VRR-3 requests relief from the test frequency requirements of the Code, Paragraph IWV-3520, for the chemical and volume control normal makeup check valve CVC-312C. The licensee proposed to exercise this valve open quarterly and exercise it closed and leak rate test it every refueling outage.

3.5.1.1.1 Licensee's Basis for Requesting Relief--Due to the system design, the only method available to verify reverse flow and perform a leak test is to isolate the entire charging line to allow pressurizing the space downstream of the check valve. Isolating charging flow during power operation would cause level perturbation and could result in a unit trip. Due to the special equipment and system configuration required to perform this test, it has been determined to be impractical to perform at cold shutdown intervals.

Alternate Testing: Reverse flow closure and leak test will be performed every refueling outage, utilizing a separate, removable test rig.

3.5.1.1.2 Evaluation--It is impractical to exercise this check valve closed quarterly during power operations because it is located in the

normal charging flow path and it would be necessary to isolate charging flow to perform this testing. Stopping charging flow during power operations would cause fluctuations in pressurizer level and plant perturbations which could result in a plant trip. Further, stopping and reestablishing flow through the regenerative heat exchanger could thermal shock the heat exchanger and result in damage or premature failure. Extensive system modifications would be required to permit quarterly testing of this valve. Making these modifications would be burdensome to the licensee due to the costs and extended plant outage that would be involved.

Reverse flow closure testing of this valve during cold shutdowns requires isolating the normal charging flow path. Stopping charging flow could cause pressurizer level (only when it is not isolated or water solid) and RCS pressure fluctuations. The time necessary to establish the requisite system conditions, set up the test equipment, run the test, and restore the system to normal, could delay plant start-up from cold shutdown.

This charging water header check valve will be verified open with normal charging flow quarterly and exercised to the closed position during each reactor refueling outage. This testing allows an adequate assessment of the open and the reverse flow closure capabilities of this valve and provides a reasonable alternative to the Code test frequency requirements.

Based on the determination that compliance with the Code requirements is impractical and burdensome, and considering the proposed alternate testing, relief should be granted as requested.

3.5.2 Category C Valves

3.5.2.1 Relief Request. CVC-VRR-1 requests relief from the test frequency requirements of Section XI, Paragraph IWV-3521, for chemical and volume control system valves CVC-351 and -357. The licensee proposes to part-stroke exercise both valves and to reverse flow test CVC-357 quarterly. Additionally, both valves will be full flow exercised once per refueling outage.

3.5.2.1.1 Licensee's Basis for Requesting Relief--Full flow exercising these valves during power operation would cause undesirable RCS temperature and/or boron concentration changes which could result in a plant trip. Running the charging pumps at full flow during cold shutdown with the reactor vessel head in place could result in a low temperature over pressurization of the RCS.

Alternate Testing: Full flow exercise once per refueling outage and partial stroke exercise quarterly. Reverse flow testing of CVC-357 will be performed quarterly.

3.5.2.1.2 Evaluation--These check valves are normally closed. Valve CVC-351 opens to allow charging suction from the boric acid pumps for emergency boration. Valve CVC-357 opens for charging pump suction from the RWST and closes to prevent the volume control tank from discharging into the RWST. It is impractical to full-stroke exercise these valves open with flow either quarterly during power operation or each cold shutdown. Full-stroke

exercising either of these valves open quarterly would result in injection of relatively high concentration boron into the RCS. During power operation, this would result in reactor power and pressurizer level fluctuations and could cause a reactor trip. These valves cannot be verified to full-stroke exercise open during cold shutdown because the RCS does not contain sufficient expansion volume to accommodate the required flow rate. Exercising during cold shutdown could cause a low temperature overpressure condition and subsequent damage to the RCS. System modifications are needed to allow full-stroke exercising these valves quarterly or each cold shutdown. These modifications would be costly and burdensome.

The licensee proposes to part-stroke exercise these valves open quarterly and to full-stroke exercise them with flow per the Code each refueling outage. Also, valve CVC-357 will be verified to close quarterly. The proposed test frequency allows an adequate assessment of operational readiness and provides a reasonable alternative to the Code requirements.

Based on the determination that compliance with the Code test frequency requirements is impracticable and burdensome, and that the proposal provides a reasonable alternative, relief should be granted from the test frequency requirements as requested.

3.5.2.2 Relief Request. CVC-VRR-2 requests relief from the exercising frequency requirements of the Code, Paragraph IWV-3520, for the chemical and volume control supply to reactor coolant pump (RCP) seals check valves, CVC-298A, CVC-298B, CVC-298C, CVC-298D, CVC-298E, CVC-298F. The licensee proposed to verify valve closure during refueling outages.

3.5.2.2.1 Licensee's Basis for Requesting Relief--Reverse flow exercising these valves would require stopping seal water flow to the pumps. The interruption of seal water flow during power operation, even for a short time, could result in extensive damage to the pump seals. Due to the system design, the only method available to verify reverse flow is to connect a separate, removable test rig. Due to the special equipment and system configuration required to perform this test it has been determined to be impractical to perform at cold shutdown intervals.

Alternate Testing: Reverse flow closure will be verified every refueling outage.

3.5.2.3.2 Evaluation--It is impractical to exercise these check valves closed quarterly during power operations because this would require stopping RCP seal water flow. RCP seals can be damaged if seal water flow is stopped whenever the RCPs are running. The RCP seals serve as a pressure boundary for the reactor coolant system (RCS), therefore, seal failure could result in unisolable leakage of reactor coolant. Stopping seal flow during power operations allows reactor coolant flow from the higher pressure RCS across the seal surfaces. RCS flow out the seals is a concern because the reactor coolant contains corrosion and wear products ("CRUD") which could cause accelerated wear of the seals and premature seal failure due to the abrasive nature of these particles as they pass through the seals.

Reverse flow closure testing of these valves during cold shutdowns requires stopping the RCPs. Stopping the RCPs during cold shutdowns, especially ones of short duration, solely to perform this testing may not be practical. The time necessary to establish the requisite system conditions, set up the test equipment, run the test, and restore the system to normal, could delay plant start-up from cold shutdown. There is also a concern with stopping seal water flow with RCS pressure greater than 100 psig because there would be a sufficient pressure differential across the seals to result in flow from the RCS which could damage the seals as described above.

It is impractical to exercise these valves during any plant condition that could result in abnormal seal wear which could lead to a seal failure, since a seal failure is an unisolable RCS leak. It would be burdensome for the licensee to make the required system modifications that would allow testing these valves quarterly during power operations since these modifications would be costly and could result in reduced system reliability.

The seal water check valves will be exercised to the closed position during each reactor refueling outage. This testing allows an adequate assessment of the reverse flow closure capability of these valves and provides a reasonable alternative to the Code test frequency requirements.

Based on the determination that compliance with the Code requirements is impractical and burdensome, and considering the proposed alternate testing, relief should be granted as requested.

3.6 Penetration Pressurization System

3.6.1 Category B Valves

3.6.1.1 Relief Request. PPS-VRR-1 requests relief from the exercising and stroke time measurement requirements of the Code, Paragraphs IWV-3412 and -3413, for penetration pressurization air supply and bleed-off valves, EV-1721A, EV-1722, EV-1743, EV-1727, EV-1728, EV-1723, and EV-1724. The licensee proposed to verify proper operability of these valves by performing Section XI testing of the associated containment isolation valves.

3.6.1.1.1 Licensee's Basis for Requesting Relief--These valves operate only when the switch for their associated containment isolation valves is repositioned. They do not have independent control switches, nor do they have their own remote indicator. The valves change position to vent or supply air to the innerspace between their associated containment isolation valves when the containment isolation valves' switch is repositioned. If these valves fail to function, the associated containment isolation valves will fail their Section XI required test.

Alternate Testing: These valves will not be independently tested. All testing will be performed during testing of the associated valves.

3.6.1.1.2 Evaluation--These are three-way solenoid valves that either supply air to pressurize the penetration or provide a vent path. They do not have local or remote valve position indication or independent control switches. Therefore, it is impractical to measure the full-stroke times for

these solenoid valves. It would be necessary to make system modifications to permit compliance with the Code stroke time measurement requirement. Requiring the licensee to make these modifications would be burdensome due to the costs involved.

The licensee has not provided sufficient information about the test methods or frequency for the associated containment isolation valves to allow an evaluation of the adequacy of the proposed testing of the solenoid valves. However, the proposal does not appear to adequately monitor for degradation of these valves. Therefore, long term relief should not be granted as requested. The licensee should provide additional information that demonstrates the adequacy of the proposed testing or they should develop and implement alternate testing that verifies a full-stroke exercise of these valves and monitors their degradation at the Code required frequency. The licensee should consider the use of non-intrusive techniques to test these valves. An interim period should be provided for the licensee to investigate testing options and develop the necessary documentation.

Although it may not be adequate for the long term, the proposed testing demonstrates that these valves have not failed. This testing should allow assessment of operational readiness during the interim period and provide a reasonable short term alternative to the Code requirements.

Based on the determination that immediate compliance with the Code requirements is impractical and burdensome, and considering the proposed alternate testing, interim relief should be granted for one year or until the end of the next refueling outage, whichever is longer.

3.7 Main Feedwater System

3.7.1 Category C Valves

3.7.1.1 Relief Request. FW-VRR-1 requests relief from the test frequency requirements of the Code, Paragraph IWV-3520, for main feedwater (FW) header check valves, FW-8A, FW-8B and FW-8C. The licensee proposed to verify closure of these valves during every refueling outage.

3.7.1.1.1 Licensee's Basis for Requesting Relief--These check valves cannot be exercised closed during power operation since this would isolate main feedwater flow to the steam generators and would result in a unit trip. Verifying closure of these valves during cold shutdown has been determined to be impractical due to the complicated test methods used in pressurizing the steam generators with nitrogen.

Alternate Testing: Reverse flow exercise at refueling interval.

3.7.1.1.2 Evaluation--IWV-3520 requires that check valves be exercised to their safety function position(s) quarterly, if practical, or during cold shutdowns. It would be necessary to isolate feedwater to a steam generator in order to exercise one of these valves closed, and isolating feedwater flow during power operations would result in loss of steam generator level control which could cause a plant trip. Since this testing would cause

a plant transient which could lead to a plant trip, it is not considered to be practical during power operations.

These valves do not have position indication or a means to force the obturator to the closed position. Therefore, the only practical non-intrusive methods available to verify valve closure are leak testing or observing a differential pressure across the valve. A system modification such as replacing these valves with ones that have position indication would be necessary to comply with the Code requirements. It would be burdensome to require the licensee to make the necessary modifications due to the high costs involved.

The licensee has proposed to verify valve closure during refueling outages. Due to the time required to set up special test equipment and pressurize the steam generators with nitrogen, it is not practical to perform this testing during cold shutdowns. The licensee's proposed testing allows an adequate assessment of operational readiness and provides a reasonable alternative to the Code frequency requirements.

Based on the determination that compliance with the Code requirements is impractical and burdensome, and considering the proposed alternate testing, relief should be granted as requested.

3.8 Reactor Coolant System

3.8.1 Category B Valves

3.8.1.1 Relief Request. RCS-VRR-1 requests relief from the remote position indication verification requirements of the Code, Paragraph IWV-3300, for reactor coolant system high point vent valves RC-567, RC-568, RC-569, RC-570, RC-571 and RC-572. The licensee has not proposed alternate testing to verify valve position indication.

3.8.1.1.1 Licensee's Basis for Requesting Relief--These valves are rapid acting, globe type, solenoid actuated valves which are totally enclosed thereby preventing visual determination of valve position. Due to system design and configuration, there is no practical way to verify the remote position indicator accurately reflects valve position.

Alternate Testing: No remote valve position indication verification will be performed.

3.8.1.1.2 Evaluation--These valves are totally enclosed solenoid actuated valves on the RCS that open to vent noncondensable gases. Valve obturator position cannot be determined by visual observation of these valves unless they are substantially disassembled. The correct positioning of these valves can be important to the safe operation of the plant. Therefore, it is not acceptable to never verify that valve position indication accurately reflects actual valve position. The licensee has not proposed an alternate means of position indication verification. Therefore, long term relief should not be granted from this Code requirement. Even though the accuracy of valve position indication cannot be verified by visual observation, it should be

done by some positive means, such as observation of pressure or flow in the downstream piping.

Requiring immediate compliance with this Code requirement would be a hardship to the licensee and may not provide a compensating increase in the level of quality and safety. Therefore, an interim period should be allowed for the licensee to develop and implement a method to perform remote position verification. The licensee's proposal of verifying valve operational readiness by exercising and fail-safe testing during cold shutdowns should provide an acceptable level of quality and safety during the interim period.

Since valve position indication is not periodically verified, the licensee may not be adequately assuring valve operational readiness. The measurement and evaluation of stroke times for power operated valves provides a means to monitor valve condition. Without a concise method of determining when valve stroke is completed, it is extremely difficult to obtain meaningful stroke time data. Therefore, the licensee's proposal may not provide an adequate means of monitoring valve condition and detecting degradation. If not already being done, some means should be developed and implemented to monitor valve condition and detect degradation.

Based on the determination that immediate compliance with the Code requirements is impractical and burdensome, and considering the proposed alternate testing, interim relief should be granted for one year or until the end of the next refueling outage, whichever is longer. During this interim period the licensee should develop an adequate means of verifying valve position indication and, if applicable, monitoring for valve degradation.

APPENDIX A

P&ID AND FIGURE LIST

APPENDIX A

P&ID AND FIGURE LIST

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

System	P&ID or Figure	Revision
Main & Extraction Steam System	G-190196 Sh. 1	32
	G-190196 Sh. 2	24
	G-190196 Sh. 3	19
	G-190196 Sh. 4	3
Feedwater & Condensate System	G-190197 Sh. 1	46
	G-190197 Sh. 2	33
	G-190197 Sh. 3	31
	G-190197 Sh. 4	23
Service & Cooling Water System	G-190199 Sh. 1	35
	G-190199 Sh. 2	33
	G-190199 Sh. 3	22
	G-190199 Sh. 4	36
	G-190199 Sh. 5	34
	G-190199 Sh. 6	29
	G-190199 Sh. 7	29
	G-190199 Sh. 8	25
	G-190199 Sh. 9	34
	G-190199 Sh. 10	29
Instrument & Station Air System	G-190200 Sh. 1	16
	G-190200 Sh. 2	20
	G-190200 Sh. 3	22
	G-190200 Sh. 4	4
	G-190200 Sh. 5	8
	G-190200 Sh. 6	2
	G-190200 Sh. 7	5
	G-190200 Sh. 8	10
	G-190200 Sh. 9	9
	G-190200 Sh. 10	4
Primary Make-up Water System	G-190202 Sh. 1	22
	G-190202 Sh. 2	24
	G-190202 Sh. 3	9
	G-190202 Sh. 4	4
	G-190202 Sh. 5	3
	G-190202 Sh. 6	4
	G-190202 Sh. 7	1

ID and Figure List (Continued)

System	P&ID or Figure	Revision
Emergency Diesel Generator System	G-190204A Sh. 1	16
	G-190204A Sh. 2	8
	G-190204A Sh. 3	8
Fuel Oil System	G-190204D Sh. 1	5
	G-190204D Sh. 2	9
	G-190204D Sh. 3	1
Steam Generator Blowdown System	G-190234 Sh. 1	22
	G-190234 Sh. 2	25
Penetration Pressurization System	G-190261 Sh. 1	14
	G-190261 Sh. 2	16
	G-190261 Sh. 3	11
	G-190261 Sh. 4	18
Isolation Valve Seal Water System	G-190262 Sh. 1	17
HVAC System	G-190304 Sh. 1	32
	G-190304 Sh. 2	25
	G-190304 Sh. 3	11
	G-190304 Sh. 4	1
Primary Sampling System	5379-353 Sh. 1	20
Component Cooling Water System	5379-376 Sh. 1	25
	5379-376 Sh. 2	22
	5379-376 Sh. 3	18
	5379-376 Sh. 4	23
Chemical & Volume Control System	5379-685 Sh. 1	30
	5379-685 Sh. 2	34
	5379-685 Sh. 3	22
CVCS Boron Recirculation Process	5379-686 Sh. 1	21
	5379-686 Sh. 2	16
Liquid Waste Disposal System	5379-920 Sh. 1	28
	5379-920 Sh. 2	25
	5379-920 Sh. 3	32
	5379-920 Sh. 4	28
	5379-920 Sh. 5	25
	5379-920 Sh. 6	22
	5379-920 Sh. 7	0
Gaseous Waste Disposal System	5379-921 Sh. 1	21
	5379-921 Sh. 2	24

P&ID and Figure List (Continued)

System	P&ID or Figure	Revision
Safety Injection System	5379-1082 Sh. 1	25
	5379-1082 Sh. 2	29
	5379-1082 Sh. 3	22
	5379-1082 Sh. 4	21
	5379-1082 Sh. 5	26
Residual Heat Removal System	5379-1484 Sh. 1	20
Reactor Coolant System	5379-1971 Sh. 1	28
	5379-1971 Sh. 2	29
Containment Sampling System	HBR2-6490 Sh. 1	8
Containment Venting & H_2 Recombiner	HBR2-6933 Sh. 1	12
Fire Protection System	HBR2-8255 Sh. 1	6
	HBR2-8255 Sh. 2	19
	HBR2-8255 Sh. 3	5
	HBR2-8255 Sh. 4	4
	HBR2-8255 Sh. 5	7
	HBR2-8255 Sh. 6	8

APPENDIX B

IST PROGRAM ANOMALIES

APPENDIX B
IST PROGRAM ANOMALIES

Inconsistencies and omissions in the 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 in this report.

1. GPRR-1 requests relief from the pump vibration displacement measurement requirements of the Code for all safety-related pumps (refer to Section 2.1.1.1 of this report). The licensee proposed to measure pump vibration in units of velocity and evaluate the measurements per the acceptance criteria specified in ASME/ANSI OMa-1988, Part 6. The staff has determined that the test methods and other aspects of vibration measurement and evaluation specified in Part 6 are an integral package with the acceptance criteria. Therefore, the licensee should comply with <u>all</u> of the vibration measurement requirements of ASME/ANSI OMa-1988, Part 6.

2. GPRR-3 requests relief from the instrument accuracy requirements of the Code for the flow rate instrumentation for all safety related pumps (refer to Section 2.1.3.1 of this report). The licensee proposed to utilize ultrasonic flow instruments that are accurate to ±3% of the indicated flow rate. Insufficient information is provided for a determination of the long term acceptability of the licensee's proposal, therefore, long term relief should not be granted. The licensee should determine the in-situ accuracy and repeatability of these instruments in each system application. They should also determine if the measurements are sufficiently repeatable to use the Code allowable ranges to permit detection of hydraulic degradation. Interim relief should be granted for a period of one year or until the next refueling outage, whichever is longer, to allow the licensee time to gather data and determine the adequacy of these instruments.

3. GPRR-4 requests relief from the instrument accuracy and full-scale range requirements of the Code for digital instruments used for testing safety related pumps (refer to Section 2.1.4.1 of this report). Digital instruments do not have indication scales or graduations and are equally accurate for all readings over wide ranges. Therefore, the full-scale range requirements of IWP-4120 are not appropriate for these instruments when they are used for measurements within their calibrated range as specified by the manufacturer. Relief should be granted from the Code range requirements for digital instruments provided they are used per the operating instructions provided by the instrument manufacturer.

   The licensee proposes to use digital instrumentation with an accuracy of ±3% or better at any point of the calibrated range. The proposed digital instruments may provide measurements that are sufficiently repeatable to monitor pump condition and detect degradation. However, the licensee has not indicated the specific applications where these digital instruments might be used. Further, they have not indicated if the currently utilized test instruments in these applications provide more accurate measurements of the test parameters. It may not be appropriate to permit the use of instruments that do not meet the Code

accuracy requirement when more accurate instruments are available for pump testing. Therefore, general relief should not be granted as requested.

For specific applications where the digital instruments provide more accurate and repeatable measurements than the currently used test instruments, the use of these digital instruments should be acceptable. However, if there is significant data scatter of the test measurements so the allowable ranges of Table IWP-3100-2 cannot be applied, it is questionable that the measurements are sufficiently repeatable to detect pump degradation and use of the instruments may not be acceptable. The licensee should resubmit this relief request and document the specific applications where digital instruments that are less accurate than ±2% are to be used.

4. GPRR-6 requests relief from the corrective action requirements of the Code for all safety related pumps (refer to Section 2.1.6.1 of this report). The licensee proposed to allow a 72 hour evaluation period prior to declaring pumps that fall into the Required Action Range inoperable. Pump test parameters in the Required Action Range can indicate significant pump degradation. Section XI testing is intended to detect degradation of a pump and to provide assurance that adequate margins are maintained. When test data indicate that the margins are significantly reduced, the unrestricted 72 hour grace period proposed by the licensee is not acceptable. The licensee has not adequately demonstrated that complying with this Code requirement is impractical or that it presents a hardship without a compensating increase in the level of quality and safety. Therefore, relief should not be granted as requested and the licensee should comply with Position 8 of GL 89-04.

5. GVRR-1 requests relief from the leak rate testing requirements of the Code for all CIVs served by the IVSW system (refer to Section 3.1.1.1 of this report). The licensee proposed to test these valves by testing the IVSW system to the requirements of 10 CFR 50, Appendix J. The issue regarding CIVs served by the IVSW system was considered and addressed in the NRC SER dated April 23, 1979. That SER concluded that it is acceptable to use the IVSW system to conduct Appendix J, Type C, tests on the valves served by that system. Relief should be granted provided these valves are tested according to the Type C requirements applicable to valves served by a seal system.

6. GVRR-1 also requests relief from the leak rate testing requirements of the Code for all other CIVs not served by the IVSW system (refer to Section 3.1.1.2 of this report). The licensee proposes to leak rate test these valves to the Appendix J, Type C, requirements. Maximum leakage rates will be assigned to each applicable penetration. If the penetration leakage rate is exceeded, corrective actions will be taken. Relief should be granted with the following provisions. The licensee should test these valves to the requirements of Appendix J, Type C, and Paragraphs IWV-3426 and -3427(a) according to GL 89-04, Position 10. This relief is limited to assessing the containment isolation capability of these valves. Relief from IWV-3427(b) applies only to testing of the containment isolation function. For Category A valves that perform any other function, in addition to or other than containment isolation, the

requirements of IWV-3427(b) should be met. If these CIVs can be tested only in groups or if there are other problems that make relief necessary, these issues and the proposed alternate testing should be thoroughly described in a new or revised relief request.

7. GVRR-2 requests relief from the exercising requirements of the Code for all nitrogen and air supply check valves with the exception of valves listed on GVRR-4 (refer to Section 3.1.2.1 of this report). The licensee proposed to functionally test these valves during their associated component or system tests. The licensee has not provided sufficient information about the test methods or frequency of the associated component testing to allow an evaluation of the adequacy of the proposed functional testing of these check valves. Therefore, long term relief should not be granted as requested. The licensee should provide additional information that demonstrates the long term adequacy of the functional testing or they should develop and implement alternate testing that verifies a full-stroke exercise of these valves at the Code required frequency. The licensee should consider the use of non-intrusive techniques to show that these valves fully open when flow is initiated through them. Another possible test would be to measure the time required to recharge the accumulators after stroking the power operated valves. An interim period should be provided for the licensee to investigate the options and develop the necessary documentation.

8. GVRR-3 requests relief from the corrective action requirements of the Code for all power operated safety related valves in the IST program (refer to Section 3.1.3.1 of this report). The licensee proposed to allow a 72 hour evaluation period prior to declaring valves that fall into the Required Action Range inoperable. Significant increases in valve stroke times can indicate significant valve degradation. Section XI testing is intended to detect degradation of components and to provide assurance that adequate margins are maintained. When test data indicate that the margins are significantly reduced, the unrestricted 72 hour grace period proposed by the licensee is not acceptable. The licensee has not adequately demonstrated that complying with this Code requirement is impractical or that it presents a hardship without a compensating increase in the level of quality and safety. Therefore, relief should not be granted as requested and the licensee should comply with Position 8 of GL 89-04.

9. GVRR-4 requests relief from the exercising requirements of the Code for the nitrogen and air supply check valves SA-80, IA-525, IVSW-68A, IVSW-68B, IVSW-68C and IVSW-68D (refer to Section 3.1.4.1 of this report). The licensee proposed to functionally test these check valves during their associated component and/or systems test. The licensee has not provided sufficient information about the test methods or frequency of the associated system testing to allow an evaluation of the adequacy of the proposed functional testing of these check valves. Therefore, long term relief should not be granted as requested. The licensee should provide additional information that demonstrates the adequacy of the functional testing or they should develop and implement alternate testing that verifies a full-stroke exercise of these valves at the Code required frequency. The licensee should consider the use of

non-intrusive techniques to show that these valves fully open when flow is initiated through them. Another possible test would be to measure the time required to pressurize the containment or recharge the IVSW system after it has been bled down. An interim period should be provided for the licensee to investigate testing options and develop the necessary documentation.

10. IVSW-VRR-1 requests relief from the test frequency requirements of Section XI for the check and power-operated valves in the IVSW system (refer to Section 3.2.1.1 of this report). The licensee proposes to exercise these valves per the Code during each refueling outage. PCV-1922A and -1922B, are indicated in the IST program to be normally closed. They are in parallel paths with in-line isolation valves. The licensee has not shown that these valves cannot be exercised quarterly or each cold shutdown per the Code requirements. The proposed alternative is not shown to provide an acceptable level of quality and safety. The licensee has not shown that a hardship results from testing these valves at the Code frequency and that there would be no compensating increase in safety. And lastly, whereas it may be inconvenient to exercise the valves at the Code frequency, it is not shown to be impractical. Therefore, relief should not be granted.

11. DA-VRR-3 requests relief from the stroke time test method requirements of Section XI for EDG fuel oil day tank supply valves EV-1963A-1, -2, EV-1963B-1, and -2 (refer to Section 3.3.1.2 of this report). The licensee proposes to assess their operability monthly by considering these valves' ability to fill the diesel fuel oil day tank during EDG tests. The proposal to verify the valves are opening and closing monthly during EDG surveillance testing, by confirming filling of the day tank, is acceptable on an interim basis. Yet, it may not adequately evaluate valve condition and present a reasonable long term alternative to the Code test method requirements. During the interim period the licensee should consider the adequacy of the proposed method, as well as other methods, such as those using ultrasonics, magnetics, and acoustics for stroke timing or otherwise monitoring the condition of these valves. Also, appropriate acceptance criteria should be assigned so that a severely degraded valve is identified for corrective action.

12. SI-VRR-1 requests relief from the test frequency requirements of the Section XI, Paragraph IWV-3521, for safety injection (SI) test line check valve, SI-849 (refer to Section 3.4.2.2 of this report). The licensee proposes to full-stroke exercise this valve with flow each refueling. The test return line is equipped with a flow indicator that can be used to verify a full-stroke open exercise of this valve with flow. There are two normally closed manually operated valves in the test return line. Whereas it might be impractical to open these manual valves quarterly during power operation, the licensee has not shown that the test is impractical or burdensome, either quarterly or during cold shutdowns. Therefore, the proposal to full-stroke exercise this valve with flow each refueling outage is not shown to be a reasonable alternative to the Code test frequency requirements. Therefore, relief should not be granted from the Code test frequency requirements.

13. SI-VRR-3 requests relief from the test method and frequency requirements of Section XI for SI combined injection check valves, SI-875A, -875B, and -875C (refer to Section 3.4.1.1 of this report). The licensee proposes to exercise the check valves open, with less than the required accident flow rate, at each refueling. The licensee is not verifying a full-stroke exercise of these valves as defined by GL 89-04, Position 1. It might be possible to use non-intrusive diagnostic techniques to determine if these valves open fully or sufficiently to pass the maximum required accident flow. If that test can be done, it is considered an acceptable alternative to full flow testing. An interim period should be provided for the licensee to investigate whether non-intrusive methods can be used. This period should be based on the period prescribed in the NRC SER dated July 9, 1991. By the end of this period, the licensee should implement full-stroke testing with diagnostics, either each cold shutdown or each refueling outage, as practicable, or show that this alternate method is impractical. The licensee should also consider disassembly and inspection per GL 89-04, Position 2, if full-stroke exercising is not feasible.

14. SI-VRR-6 requests relief from the test method and frequency requirements of Section XI for SI hot leg injection check valves SI-874A and -874B (refer to Section 3.4.2.4 of this report). The licensee proposes to pass full flow through these valves in parallel each refueling outage in lieu of performing an individual full-stroke exercise test per the Code. However, this does not demonstrate the full-stroke open exercise of these valves per the Code or GL 89-04, Position 1. The licensee should actively investigate other test methods, including non-intrusive, of verify a full-stroke exercise of these valves. An interim period should be provided for the licensee to investigate whether non-intrusive methods can be used. This period should be based on the period prescribed in the NRC SER dated July 9, 1991. By the end of this period, the licensee should implement full-stroke testing with diagnostics, either each cold shutdown or each refueling outage, as practicable, or show that this alternate method is impractical. The licensee should also consider disassembly and inspection per GL 89-04, Position 2, if full-stroke exercising is not feasible.

15. PPS-VRR-1 requests relief from the exercising and stroke time measurement requirements of the Code for penetration pressurization air supply and bleed-off valves (refer to Section 3.6.1.1 of this report). The licensee proposed to verify proper operability of these valves by performing Section XI testing of the associated containment isolation valves. The licensee has not provided sufficient information about the test methods or frequency for the associated containment isolation valves to allow an evaluation of the adequacy of the proposed testing of the solenoid valves. The proposal does not appear to adequately monitor for degradation of these valves. Therefore, long term relief should not be granted as requested. The licensee should provide additional information that demonstrates the adequacy of the proposed testing or they should develop and implement alternate testing that verifies a full-stroke exercise of these valves and monitors their degradation at the Code required frequency. The licensee should consider the use of non-intrusive techniques to test these valves. An interim period should

be provided for the licensee to investigate testing options and develop the necessary documentation.

16. RCS-VRR-1 requests relief from the remote position indication verification requirements of the Code for reactor coolant system high point vent valves RC-567, RC-568, RC-569, RC-570, RC-571 and RC-572 (refer to Section 3.8.1.1 of this report). The licensee has not proposed alternate testing to verify valve position indication. Therefore, long term relief should not be granted from this Code requirement. Even though the accuracy of valve position indication cannot be verified by visual observation, it should be done by some positive means, such as observation of pressure or flow in the downstream piping. An interim period should be allowed for the licensee to develop and implement a method to perform remote position verification. Since valve position indication is not periodically verified, the licensee may not be adequately assuring valve operational readiness. The measurement and evaluation of stroke times for power operated valves provides a means to monitor valve condition. Without a concise method of determining when valve stroke is completed, it is extremely difficult to obtain meaningful stroke time data. Therefore, the licensee's proposal may not provide an adequate means of monitoring valve condition and detecting degradation. If not already being done, some means should be developed and implemented to monitor valve condition and detect degradation.

SI-VRR-3	Relief Granted (g)(6)(i) Reference 2.2 of Safety Evaluation
SI-VRR-6	Provisional Relief Granted per GL 89-04 Reference 2.3 of Safety Evaluation