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INFORMAL REPORT

TECHNICAL EVALUATION REPORT
PUMP AND VALVE INSERVICE TESTING PROGRAM
KEWAUNEE NUCLEAR POWER PLANT

D. I. Monnie
C. B. Ransom
H. C. Rockhold

Prepared for the

U.S. NUCLEAR REGULATORY COMMISSION

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ABSTRACT

This EG&G Idaho, Inc., report presents the results of our evaluation of the Kewaunee Nuclear Power Plant Inservice Testing Program for pumps and valves whose function is safety related.

FOREWORD

This report is supplied as part of the "Review of Pump and Valve Inservice Testing Programs for Operating Plants" being conducted for the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Division of PWR Licensing A, by EG&G Idaho, Inc., NRR and I&E Support.

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TECHNICAL EVALUATION REPORT

PUMP AND VALVE INSERVICE TESTING PROGRAM

KEWAUNEE NUCLEAR POWER PLANT

1. INTRODUCTION

Contained herein is a technical evaluation of the pump and valve inservice testing (IST) program submitted by the Wisconsin Public Service Corporation (WPSC) for their Kewaunee Nuclear Power Plant.

The working session with the Kewaunee representatives was conducted on March 12 and 13, 1985. The licensee's pump and valve IST program, dated May 17, 1985, was reviewed to verify compliance of proposed tests of pumps and valves whose function is safety related with the requirements of the ASME Boiler and Pressure Vessel Code (the Code), Section XI, 1980 Edition through the Winter of 1981 Addenda.

Any IST program revisions subsequent to those noted above are not addressed in this technical evaluation report (TER). An NRC staff position is that required program changes, such as additional relief requests or the deletion of any components from the IST Program, should be submitted to the NRC under separate cover in order to receive prompt attention, but should not be implemented prior to review and approval by the NRC.

In their IST Program WPSC has requested relief from the ASME Code testing requirements for specific pumps and valves and these requests have been evaluated individually to determine if the required testing is indeed impractical for the specified pumps and valves. This review was performed utilizing the acceptance criteria of the Standard Review Plan, Section 3.9.6, and the Draft Regulatory Guide and Valve/Impact Statement titled "Identification of Valves for Inclusion in Inservice Testing Programs." The IST Program testing requirements apply only to component testing (i.e., pumps and valves), and are not intended to provide the basis to change the licensee's current technical specifications for system test requirements.

Section 2 of this report presents the WPSC bases for requesting relief from the Section XI requirements for the Kewaunee Nuclear Power Plant pump testing program and EG&G's evaluations and conclusions regarding these requests. Similar information is presented in Section 3 for the valve testing program.

The NRC Staff's positions and guidelines concerning inservice testing requirements are provided in Appendix A.

Category A, B and C valves that meet the requirements of the ASME Code, Section XI, and are not exercised quarterly are listed in Appendix B.

A listing of P&ID's used for this review is contained in Appendix C.

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

The details of valve cold shutdown testing justifications are included in Appendix E.

2. PUMP TESTING PROGRAM

The Kewaunee Nuclear Power Plant IST program submitted by Wisconsin Public Service Corporation was examined to verify that all pumps that are included in the program are subjected to the periodic tests required by the ASME Code, Section XI, except for those pumps identified below for which specific relief from testing has been requested and as summarized in Appendix D. Each Wisconsin Public Service Corporation basis for requesting relief from the pump testing requirements and the reviewers evaluation of that request are summarized below.

2.1 Service Water Pumps

2.1.1 Bearing Temperature and Lubricant Level or Pressure

2.1.1.1 Relief Request. The licensee has requested relief from the requirements of Section XI, IWP-3100, for measuring bearing temperature and observing proper lubricant level or pressure for service water pumps 1A1, 1A2, 1B1 and 1B2.

2.1.1.1.1 Licensee's Basis for Requesting Relief--Seal injection flow is used for bearing cooling and the water being pumped provides lubrication. The system design does not provide for monitoring the seal injection water and the submerged impeller pump design does not include bearing temperature measuring capability; therefore, bearing temperature and lubricant level cannot be measured. The seal injection low flow alarm, annunciated in the control room, will provide early indication of loss of cooling water.

2.1.1.1.2 Evaluation--The reviewer agrees that the submerged impeller design of these service water pumps usually does not provide for pump bearing temperature measurement or observing lubricant level or pressure because these bearings are cooled and lubricated by the liquid in the main flowpath. IWP-4310 specifically excludes measurement of bearing temperatures for bearings in the main flowpath of the pump. Because the main flowpath fluid is the lubricant, measurement of fluid temperature or pressure would not be indicative of adequate lubrication or cooling to the pump bearings.

2.1.1.1.3 Conclusion--The reviewer concludes that the system design does not allow measurement of these pump parameters, that the Code does not require measurement of pump bearing temperature and that relief should be granted from the Section XI requirements to observe lubricant level or pressure. Measuring other pump parameters should provide sufficient information for evaluation of proper pump operability.

2.1.2 Inlet Pressure

2.1.2.1 Relief Request. The licensee has requested relief from the requirements of Section XI, IWP-4200, for measuring the inlet pressure of service water pumps 1A1, 1A2, 1B1 and 1B2 and proposed to establish the inlet pressure by reference to the level of water above the pump suction (forebay level).

2.1.2.1.1 Licensee's Basis for Requesting Relief--The service water pumps are of submerged impeller vertical design with no means of direct inlet pressure measurement as required by IWP-4200. The pumps suction side water supply is provided by the forebay.

Additionally, measurement of pump static suction pressure is not possible because all four pumps are submerged in, and take a suction directly from, the forebay. Since there normally is at least two service water pumps operating at all times, static pump suction conditions cannot be obtained.

2.1.2.1.2 Evaluation--The reviewer agrees that pump inlet pressure cannot be measured directly for these vertical submerged impeller design service water pumps and that measurement of the head of water above the pump inlet would provide an adequate measure of the inlet pressure to the pump provided there is no increase in the restriction to flow at the pump inlet. Any flow restriction buildup at the pump inlet would be indicated by a decrease in pump discharge pressure and flowrate and any significant change would require corrective action per IWP-3230.

2.1.2.1.3 Conclusion--The reviewer concludes that relief should be granted from the requirement of Section XI to measure inlet pressure provided the licensee verifies that the inlet to the pump suction is not restricted prior to the quarterly pump test. The suction pressure can be calculated using the measured water height above the pump suction. The proposed alternate testing will give reasonable assurance of pump operability required by the Code and, therefore, is acceptable.

2.2 Safety Injection, Residual Heat Removal, Service Water, Auxiliary Feedwater and Internal Containment Spray Pumps

2.2.1 Pump Flow Rate

2.2.1.1 Relief Request. The licensee has requested relief from the flowrate measurement requirements of Section XI, IWP-3100 and IWP-3400, for the following pumps.

Safety injection pumps 1A and 1B
Residual heat removal pumps 1A and 1B
Auxiliary feedwater pumps 1A, 1B, and 1C
Service water pumps 1A1, 1A2, 1B1 and 1B2
Containment spray pumps 1A and 1B

The licensee proposes to quarterly test all these pumps in a fixed resistance recirculation flowpath without measuring pump flowrate.

In addition, the safety injection pumps will be full flow tested during refueling outages when the installed flowrate instrument will be in the flowpath.

The residual heat removal and auxiliary feedwater pumps will be tested in a flowpath during cold shutdowns that utilizes installed flowrate instrumentation.

The service water and containment spray systems do not have installed flowrate instrumentation to permit this measurement during pump testing.

2.2.1.1.1 Licensee's Basis for Requesting Relief--As allowed by Paragraph IWP-1400 of the ASME code, a pump can be tested in a bypass loop if its normal path cannot be practically tested. These pumps are operated at least once every 3 months and tested using a fixed resistance recirculation path. In each case the recirculation bypasses the installed system flow instrumentation; therefore, measuring flow rate through the bypass loop is not possible.

Since each pump is tested using a fixed resistance flow path, the flow rate is not a variable during test performance. In addition, if the characteristics of the recirculation line were to change, causing a change in flow rate, measuring the pump differential pressure will indicate the change in the pump/test loop system and appropriate corrective actions will be initiated.

The auxiliary feedwater pumps and the residual heat removal pumps are tested in a configuration that allows flow measurement under full-flow conditions on a cold shutdown frequency. The high head safety injection pumps are tested in a configuration that allows flow measurement under full-flow conditions on a refueling outage frequency.

The service water pumps and the containment spray pumps are tested quarterly using a fixed-resistance flow path. System design prohibits measuring flow rate therefore, pump differential pressure will be evaluated to identify pump degradation.

2.2.1.1.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief from the quarterly flow measurement requirements of Section XI for these pumps. The 1977 and later editions of the Code has intentionally deleted the option of measurement of only flowrate or differential pressure during quarterly pump testing. Both of these parameters must be measured to properly assess the hydraulic condition of the pumps. The licensee has not proposed any alternate testing that would provide equivalent information for evaluation of pump degradation. Although the reviewer agrees that the proposed cold shutdown and refueling outage testing where design system flow is established through some of these pumps would provide more meaningful information for evaluation of pump degradation than the quarterly test where a small flowrate is established through the recirculation line, the pump flowrate should be measured for all these safety related pumps during the quarterly tests as required by the Code.

2.2.1.1.3 Conclusion--Based on the above discussion, the reviewer finds the request for relief unacceptable, therefore, the licensee should measure pump flow rate in accordance with the requirements of Section XI. Suitable instrumentation or other means should be provided by the licensee in order to do so. The licensee should make these modifications prior to the end of the next refueling outage. For the balance of the period of the current fuel cycle, interim relief should be granted to test the pumps as proposed by the licensee. The reviewer concludes that requiring the licensee to make these modifications prior to the next refueling outage would impose unnecessary hardship on the licensee without a compensating increase in the level of safety.

2.3 Component Cooling Pumps

2.3.1 Reference Flow Rate

2.3.1.1 Relief Request. The licensee has requested relief from the requirements of Section XI, IWP-3100, for measuring flow rate of component cooling pumps 1A and 1B at a predefined reference flow rate and proposed to make pump performance measurements at a flow condition of nominal flow during power operation plus flow through RHR heat exchanger 1B.

2.3.1.1.1 Licensee's Basis for Requesting Relief--Component cooling flow will vary depending on plant mode and amount of equipment in service needing cooling. Therefore, a stable flow rate at a predefined reference value cannot be reproduced during each quarterly test.

Flow measurements are made from a computer point and differential pressures are measured and recorded. The differential pressure is compared to that predicted by the pump curve for the measured flow rate. Action levels have been established based on the deviation from the predicted pump curve values. This method of establishing action levels is consistent with Paragraph IWP-3110.

2.3.1.1.2 Evaluation--The reviewer agrees that the pump flowrate is determined by the system heat removal requirements and adjustment to a reference flowrate as required by IWP-3100 could result in inadequate heat removal from cooled components causing equipment damage. Comparison of both pump flowrate and differential pressure to the pump curve would provide sufficient information for evaluation of hydraulic degradation of the pump. Assigning alert and required action ranges based on the pump curve would provide acceptance criteria similar to the allowable ranges of test quantities as provided in Table IWP-3100-2 of the Code.

2.3.1.1.3 Conclusion--The reviewer concludes that relief should be granted from the requirement of Section XI for a predetermined flow rate and that the proposed alternate testing should be sufficient to monitor pump performance. The proposed alternate testing will give reasonable assurance of pump operability as required by the Code.

2.3.2 Inlet Pressure Before Pump Startup

2.3.2.1 Relief Request. The licensee has requested relief from the requirements of Section XI, IWP-3100, for measuring inlet pressure of component cooling pumps 1A and 1B prior to pump startup.

2.3.2.1.1 Licensee's Basis for Requesting Relief--At least one component cooling pump is always running during plant operation. Since the pumps are arranged in parallel with common inlet and discharge piping, measuring the "before pump start" inlet pressure provides no meaningful data.

2.3.2.1.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief from the Code requirement to measure pump inlet pressure prior to pump start-up for the component cooling pumps. Since only one pump is normally running and individual pressure instrumentation is available on the inlet of each pump, the required measurement is not impractical and therefore should be made as required by the Code.

2.3.2.1.3 Conclusion--The reviewer concludes that relief should not be granted from the Code requirement to measure inlet pressure prior to pump startup for the component cooling pumps during the quarterly pump tests. Since the individual instrumentation is available at the inlet to each pump and only one of the pumps is normally operating, the inlet pressure to the idle pump can and should be measured prior to pump startup for the required testing.

2.4 Safety Injection Pumps

2.4.1 Bearing Temperature

2.4.1.1 Relief Request. The licensee has requested relief from the requirements of Section XI, IWP-3300 and IWP-3500, for measuring a stabilized bearing temperature of safety injection pumps 1A and 1B once a year and proposed to measure the bearing temperature during refueling outages while filling the reactor cavity. If bearing temperatures are not stabilized by the time the cavity is filled, the temperature reached just prior to the cavity becoming full will be utilized.

2.4.1.1.1 Licensee's Basis for Requesting Relief--The safety injection pumps are limited to a maximum of 30 minutes operation on the mini-flow recirculation line to avoid pump damage; this restriction prevents obtaining stable bearing temperatures during the quarterly pump tests. Lack of adequate expansion volume in the RCS while at cold shutdown prevents obtaining stable bearing temperatures with the plant at cold shutdown.

The bearing temperatures on these pumps are measured during the refueling outage during filling of the refueling cavity. Stabilization of bearing temperature prior to the refueling cavity becoming full may not always be possible. In addition, the bearing oil cooling system for this pump is cooled by the service water system. The system is not temperature stabilized therefore, meaningful results from the recording of this temperature cannot be expected.

2.4.1.1.2 Evaluation--The reviewer agrees that the continued operation of the safety injection pumps on the mini-flow recirculation line could eventually result in pump damage and that run times in excess of 30 minutes may be required for stabilization of pump bearing temperatures. Performance of an extended pump test during cold shutdowns with pump discharge into the RCS could result in overpressurization of the RCS due to inadequate expansion volume and letdown capability. During refueling outages, however, pump runs can be performed with discharge into the refueling cavity permitting stabilized bearing temperature measurements or, if the bearing temperatures fail to stabilize, the final measured temperatures may be compared to the allowable limit specified by the owner to determine if corrective action is necessary.

2.4.1.1.3 Conclusion--The reviewer concludes that the proposed testing method for monitoring of pump bearing temperatures for the safety injection pumps will give adequate information for evaluation of pump bearing condition. Since bearing temperature measurements are required annually and the licensee has proposed this testing during each refueling outage which is approximately annually, the reviewer agrees with the licensees basis and, therefore, relief should be granted from the pump bearing temperature measurement requirements of Section XI.

2.5 Residual Heat Removal Pumps

2.5.1 Bearing Temperature

2.5.1.1 Relief Request. The licensee has requested relief from the requirements of Section XI, IWP-3100, for measuring bearing temperature and observing proper lubricant level or pressure for residual heat removal pumps 1A and 1B.

2.5.1.1.1 Licensee's Basis for Requesting Relief--These pumps depend primarily on the liquid being pumped for lubrication of the pump bearings. The bearing lubricating water flow cannot be verified and pressure cannot be monitored. It is impractical to measure bearing temperature and lubricant level with this system design.

2.5.1.1.2 Evaluation--The reviewer agrees that pump designs that have the pump bearings in the main flowpath usually do not provide for pump bearing temperature measurement or observing lubricant level or pressure because these bearings are cooled and lubricated by the liquid in the main flowpath. IWP-4310 specifically excludes measurement of bearing temperature for bearings in the main flow path of the pump. Because the main flow path fluid is the lubricant, measurement of the fluid temperature or pressure would not be indicative of adequate lubrication or cooling to the pump bearings.

2.5.1.1.3 Conclusion--The reviewer concludes that relief should be granted from the Section XI requirement for observing lubricant level or pressure and that the Code does not require measurement of pump bearing temperature. The measurement of other pump parameters should be sufficient to monitor pump degradation and provide reasonable assurance of pump operability and, therefore, is acceptable.

2.6 Containment Spray Pumps

2.6.1 Inlet Pressure

2.6.1.1 Relief Request. The licensee has requested relief from the requirements of Section XI, IWP-4200, for measuring the inlet pressure of containment spray pumps 1A and 1B and proposed to calculate the pump inlet pressure from the refueling water storage tank (RWST) level.

2.6.1.1.1 Licensee's Basis for Requesting Relief--The pump suction is supplied from the RWST with no installed pressure instrumentation capability. Since the RWST level is confined to a very narrow band by the technical specifications and does not change during test performance, the containment spray pump inlet pressure remains at a constant value and is included as a known quantity in the test procedure. The change in pump inlet pressure with and without the pump running is beyond the accuracy of the calculation method; therefore, inlet pressure before pump start is not recorded.

2.6.1.1.2 Evaluation--The reviewer agrees that the pump inlet pressure cannot be measured directly and that measurement of the head of water above the pump inlet would provide an adequate measure of the inlet pressure to the pump provided there is no increase in the restriction to flow at the pump inlet. Any flow restriction buildup at the pump inlet would be indicated by a decrease in pump discharge pressure and flowrate and any significant changes would require corrective action per IWP-3230.

2.6.1.1.3 Conclusion--The reviewer concludes that relief should be granted from the requirement of Section XI to measure pump inlet pressure and that the licensee's proposal to use the level of water above the pump suction to calculate the inlet pressure of the pump provides sufficient information to adequately monitor pump degradation. The proposed alternate testing will give reasonable assurance of pump operability as required by the Code and, therefore, is acceptable.

2.7 Component Cooling and Containment Spray Pumps

2.7.1 Bearing Temperature

2.7.1.1 Relief Request. The licensee has requested relief from the test requirements of Section XI, IWP-3100, for measuring the bearing temperature of component cooling pumps 1A and 1B and containment spray pumps 1A and 1B and proposed to monitor the lubricant level via a sight glass to ensure adequate lubricant level for cooling.

2.7.1.1.1 Licensee's Basis for Requesting Relief--These pumps utilize an oil cooling reservoir internal to the pump to provide cooling to the bearings. The reservoir is cooled by natural convection through the pump casing (i.e. no cooling water is supplied). The pump design does not provide instrument ports to monitor the reservoir temperature nor does the manufacturer require monitoring the bearing temperature.

2.7.1.1.2 Evaluation--The reviewer agrees that pump bearing temperature cannot be measured because of pump design. The lubricant level will be monitored each quarter to ensure an adequate lubricant level for cooling the bearings. The measurement of pump vibration each quarter would provide an indication of pump mechanical degradation.

2.7.1.1.3 Conclusion--The reviewer concludes that relief should be granted from the requirement of Section XI to measure pump bearing temperature once a year and that the measurement of other pump parameters each quarter should be sufficient to monitor pump degradation and provide reasonable assurance of pump operability as required by the Code and, therefore, is acceptable.

3. VALVE TESTING PROGRAM

The Kewaunee Nuclear Power Plant IST Program submitted by the Wisconsin Public Service Corporation was examined to verify that all valves included in the program are subjected to the periodic tests required by the ASME Code, Section XI, and the NRC positions and guidelines. The reviewer found that, except as noted in Appendix D or where specific relief from testing has been requested, these valves are tested to the Code requirements and the NRC positions and guidelines summarized in Appendix A of this report. Each Wisconsin Public Service Corporation basis for requesting relief from the valve testing requirements and the reviewer's evaluation of that request are summarized below and grouped according to system and valve category.

3.1 General Relief Requests

3.1.1 Leakage Rate Testing of Containment Isolation Valves

3.1.1.1 Relief Request. The licensee has requested relief from the trending requirements of Section XI, Paragraph IWV-3427(b), for the containment isolation valves and proposed to establish leakage limits for containment isolation valves or groups of containment isolation valves and incorporate associated corrective actions into the leakage test program.

3.1.1.1.1 Licensee's Basis for Requesting Relief--Individual valves and groups of valves which are required to perform a containment isolation function under postulated accident conditions are leak tested in accordance with Appendix J to 10 CFR 50 and need not be further leak tested in accordance with Section XI, Paragraphs IWV-3421 through IWV-3425.

Leakage limits for containment isolation valves or groups of containment isolation valves and associated corrective actions have been established in lieu of the trending requirements of IWV-3427(b) of the ASME Code. This method was discussed with the NRC staff during a March 12 and 13, 1985 meeting regarding the Kewaunee Inservice Testing Program.

3.1.1.1.2 Evaluation--The reviewer agrees with the licensee's basis that the applicable leak test procedures and requirements for containment isolation valves are determined by 10 CFR 50, Appendix J (see Section 4 of Appendix A of this report). The licensee is complying with Paragraphs IWV-3426 and IWV-3427(a) of Section XI. The licensee has established leakage limits for containment isolation valves or groups of valves and incorporated associated corrective actions into the leakage test program.

3.1.1.1.3 Conclusion--The reviewer concludes that relief should be granted from the trending requirements of IWV-3427(b) and that the establishment of leakage limits for containment isolation valves or groups of valves and associated corrective actions will give reasonable assurance of the leakage integrity of the containment isolation valves as required by the Code and, therefore, is acceptable.

3.1.2 Valve Corrective Action

3.1.2.1 Relief Request. The licensee has requested relief from the corrective action requirements of Section XI, Paragraph IWV-3417, for all valves and proposed to immediately declare a valve inoperable if the stroke time exceeds the action level limit and proposed to use good engineering judgment to establish upper limit alert and action levels for fast acting valves (those that exhibit normal travel times of less than 5 seconds).

3.1.2.1.1 Licensee's Basis for Requesting Relief--In lieu of the requirements of Paragraph IWV-3417 of the ASME code, alert and action levels based on minimum/maximum acceptable stroke times have been established. When a valve exhibits a stroke time exceeding the alert level, the valve testing frequency is increased to monthly until the condition is corrected (for valves which are tested only at cold or refueling shutdowns the condition is investigated and resolved prior to leaving the shutdown mode). If a valve's stroke time exceeds the action level limit, the valve will be declared inoperable.

A normal operating range has been established which defines the historical variance in the stroke times during past exercises. Stroke times which are not within the normal range are not necessarily indicative of degradation or unacceptability, however further monitoring may be warranted.

For valves which normally exhibit a stroke time of less than 10 seconds, the alert level is defined as the value at which the measured stroke time is less than 50% of the normal stroke time or greater than 150% of the normal stroke time.

For valves which normally exhibit a stroke time of greater than 10 seconds, the alert level is defined as the value at which the stroke time is less than 75% of the normal stroke time or greater than 125% of the normal stroke time.

The action level is defined as the value at which the measured stroke time is either less than half of the alert minimum stroke time or greater than twice the alert maximum stroke time.

Fast acting valves (those that exhibit normal travel times of less than 5 seconds) will not have a lower limit alert or action level. The upper limit alert and action levels will be established using good engineering judgment.

In all cases if a predefined limit exists (such as FSAR limits, good engineering judgment, etc.) the most limiting of either the predefined limit or the calculated limit will be used.

The establishment of stroke time ranges meets the intent of the ASME code by providing a method of identifying degradation of valve performance and establishing limits at which corrective action must be taken.

3.1.2.1.2 Evaluation--The reviewer does not agree with the licensee's basis. The licensee proposed to immediately declare a valve inoperable if its stroke time exceeds the action level limit rather than immediately initiating corrective action as required by the Code. The licensee did not provide technical justification for not immediately initiating corrective action as required by the Code when a valve fails to exhibit the required change of valve stem or disk position or exceeds its specified limiting value of full-stroke time. The licensee defined fast acting valves as valves with stroke times less than 5 seconds whereas NRC defines them with stroke times of 2 seconds or less. The NRC staff's position on fast acting valves is presented in Appendix A, Section 8 of this report. The licensee did not provide technical justification for deviating from this position.

3.1.2.1.3 Conclusion--The reviewer concludes that relief should not be granted from the requirements of IWV-3417. The valve corrective action should be that specified by the Code and the NRC staff position as presented in Appendix A, Section 8 of this report should be applied to fast acting valves.

3.2 Chemical and Volume Control System

3.2.1 Category A Valves

3.2.1.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3400, for the charging pump to regenerative heat exchanger control valve CVC-7 that may also perform a containment isolation function and proposed to verify smooth closure capability when the valve is closed for leakage testing during refueling outages.

3.2.1.1.1 Licensee's Basis for Requesting Relief--Exercise timing tests are not performed on this valve quarterly since it is a control valve required to remain open during normal operation. Since the valve is a manual control valve, measuring closing time is not appropriate.

Since this valve may perform a containment isolation function the valve is closed and leak tested each refueling. When closed for leakage testing, the valve will be verified to exhibit smooth closure capability.

3.2.1.1.2 Evaluation--The reviewer agrees that closing control valve CVC-7 during plant operation would isolate charging flow to the reactor coolant system which could result in plant shutdown. However, the licensee has not provided justification for not full-stroke exercising and stroke timing this valve during cold shutdowns and refueling outages. Because this is a manual control valve, measurement of stroke time can vary due to operator action and trending of the stroke times may provide meaningless information. However, a limiting value of full-stroke time should be assigned to this valve and the valve should be tested during cold shutdowns and refueling outages to verify that the valve closure time does not exceed the limit value.

3.2.1.1.3 Conclusion--The reviewer concludes that relief should be granted from the quarterly exercising timing requirements of Section XI. However, relief should not be granted from full-stroke exercising and stroke timing this valve during cold shutdowns and refueling outages.

3.2.1.2 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3400, for reactor coolant pump seal water return valves CVC-211 and CVC-212 and proposed to exercise these valves during cold shutdowns if the reactor coolant pumps are stopped and during refueling outages.

3.2.1.2.1 Licensee's Basis for Requesting Relief--The safety function of these valves is to provide containment isolation. In the RCP seal return line containment isolation valves were placed in the closed position during power operation it would challenge the seal return relief valve and could cause a loss of RCS water to the pressurizer relief tanks. Therefore closure of these valves during reactor coolant pump operation is not in the best interest of safety.

If the reactor coolant pumps are stopped during a cold shutdown, these valves will be exercised at that time, otherwise they will be exercised during the refueling outage. This ensures that the valves will be exercised at least on a refueling outage frequency.

3.2.1.2.2 Evaluation--The reviewer agrees that closing these valves during pump operation could cause a loss of RCS water and that the valves should only be exercised when the reactor coolant pumps are not operating.

3.2.1.2.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI and that the proposed alternate testing during cold shutdowns when the reactor coolant pumps are stopped and refueling outages should give reasonable assurance of valve operability required by the Code and, therefore, is acceptable.

3.2.2 Category A/C Valves

3.2.2.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3400 and IWV-3500, for containment isolation check valves CVC-205A, CVC-205B, CVC-206A and CVC-206B, the reactor coolant pump seal water injection valves, and CVC-10, the charging to regenerative heat exchanger valve, and proposed to test the valves in accordance with 10 CFR 50, Appendix J during refueling outages which will verify full closure capability.

3.2.2.1.1 Licensee's Basis for Requesting Relief--The safeguard function required for these valves is to provide containment isolation. Exercise tests in the closed direction are not performed during plant operation since these lines are required to operate.

3.2.2.1.2 Evaluation--The reviewer agrees that these valves are required to be open during operation and, therefore, exercise tests should not be performed during plant operation. Valve closure, the safety position, can be verified by Appendix J leak testing.

3.2.2.1.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI and that the proposed alternate testing of verifying valve closure when performing leak rate tests during refueling outages should demonstrate proper valve operability. The reviewer concludes that the proposed alternate testing will give reasonable assurance of valve operability as required by the Code and, therefore, is acceptable.

3.3 Station and Instrument Air System

3.3.1 Category A/C Valves

3.3.1.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3400 and IWV-3500, for containment isolation check valves IA-102 and IA-103, instrument air to containment valves, and proposed to leak test the valves in accordance with 10 CFR 50, Appendix J during refueling outages which will verify full closure capability.

3.3.1.1.1 Licensee's Basis for Requesting Relief--The safeguard function required for these valves is to provide containment isolation. Exercise tests in the closed direction are not performed during plant operation since these lines are required to operate.

3.3.1.1.2 Evaluation--The reviewer agrees that these valves are required to be open during operation and, therefore, exercise tests should not be performed during plant operation. Valve closure, the safety position, can be verified by Appendix J leak testing.

3.3.1.1.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI and that the proposed alternate testing of verifying valve closure when performing leak rate tests during refueling outages should demonstrate proper valve operability. The reviewer concludes that the proposed alternate testing will give reasonable assurance of valve operability as required by the Code and, therefore, is acceptable.

3.3.2 Category B Valves

3.3.2.1 Relief Request. The licensee has requested relief from the stroke timing requirements of Section XI, IWV-3400, for diesel generator 1A air start valves 1 and 2, and diesel generator 1B air start valves 1 and 2 and proposed to monitor the diesel generator start times.

3.3.2.1.1 Licensee's Basis for Requesting Relief--These valves receive an automatic open signal as part of the diesel generator start sequence. There is no operator action necessary to open these valves nor is there any remote position indication. There is no practical method of performing full stroke exercise timing tests on these valves.

Diesel generator 1A air start valves 1 and 2 and diesel generator 1B air start valves 1 and 2 open to supply air to the air start motors on the diesel generator. The valves receive an automatic open signal as part of the diesel generator start sequence. The diesel generators are tested at full load for 4 hours each month. There are two pairs of air start motors per diesel generator which are alternated each test to verify operation of the respective air start valve. This assures that the valves are tested at least once every 3 months. Since no practical method exists to measure the valve full stroke time, the diesel generator start times are monitored to determine valve performance. Any degradation in the operations of the air start valve will be identified by monitoring the diesel start time.

3.3.2.1.2 Evaluation--The reviewer agrees that there is no practical method of directly performing full-stroke timing tests on these valves. These diesel air start valves should be tested in such a way that each individual valve is verified. Also, valve stroke time should be monitored by measuring diesel start time to detect valve degradation.

3.3.2.1.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI and that the proposed alternate testing to monitor diesel start time should give reasonable assurance of proper air start valve operability as required by the code and, therefore, is acceptable.

3.3.2.2 Relief Request. The licensee has requested relief from the stroke timing requirements of Section XI, IWV-3400, for solenoid valves SA-2012A and SA-2012B in the startup compressor and receiver lines to service water return valves from diesel generator coolers, and proposed to monthly test and monitor the diesel generators.

3.3.2.2.1 Licensee's Basis for Requesting Relief--These valves receive an automatic open signal as part of the diesel generator start sequence. There is no operator action necessary to open these valves nor is there any remote position indication. There is no practical method of performing full stroke exercise timing tests on these valves.

Solenoid valves SA-2012A and SA-2012B receive an auto open signal based on diesel RPM during diesel generator start. The valves are verified to be in full open position by observing local indication on the top of the valve. Insufficient valve opening will be indicated by inadequate cooling of the diesel generator components (i.e., high bearing lube oil temperature alarm). Monthly testing and monitoring of the diesel generators will verify proper operation of these valves.

3.3.2.2.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief. These valves open on an auto open signal based on diesel RPM and have local position indication which might provide a means to stroke time the valves. The licensee's basis did not provide either a sufficient technical justification for not stroke timing these valves or a specific alternate test method that would monitor stroke time to detect valve degradation.

3.3.2.2.2 Conclusion--The reviewer concludes that these valves should be stroke timed as per the Code requirements.

3.3.3 Category C Valves

3.3.3.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3500, for check valves SA-2002A and SA-2002B in the service air lines from the air receivers to the diesel generators and proposed to monitor the diesel generator start times.

3.3.3.1.1 Licensee's Basis for Requesting Relief--There is no operator action necessary to open these valves nor is there any remote position indication.

These check valves open to supply air to other valves used to operate the diesel generators and are verified to operate by monitoring the diesel generator start times on a monthly basis.

3.3.3.1.2 Evaluation--The reviewer agrees there is no practical method of directly performing full-stroke exercising tests on these valves. These valves are verified to operate by monitoring the diesel generator start times.

3.3.3.1.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI and that the proposed alternate testing to monitor diesel start time should give reasonable assurance of check valve operability as required by the code and, therefore, is acceptable.

3.4 Service Water System

3.4.1 Category B Valves

3.4.1.1 Relief Request. The licensee has requested relief from the stroke timing requirements of Section XI, IWV-3400, for air operated valves SW-301A and SW-301B in the service water return line from the diesel generator coolers and proposed to monthly test and monitor the diesel generators.

3.4.1.1.1 Licensee's Basis for Requesting Relief--These air operated valves receive an automatic open signal as part of the diesel generator start sequence. There is no operator action necessary to open these valves nor is there any remote position indication. There is no practical method of performing full stroke exercise timing tests on these valves.

These valves receive an auto open signal based on diesel RPM during diesel generator start. The valves are verified to be in full open position by observing local indication on the top of the valve. Insufficient valve opening will be indicated by inadequate cooling of the diesel generator components (i.e., high bearing lube oil temperature alarm). Monthly testing and monitoring of the diesel generators will verify proper operation of the valves.

3.4.1.1.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief. Diesel RPM, if available, and observing local position indication may be utilized to stroke-time these valves. The licensee's basis did not provide either a sufficient technical justification for not stroke timing these valves or a specific alternate test method that would monitor stroke time to detect valve degradation.

3.4.1.1.3 Conclusion--The reviewer concludes that these valves should be stroke timed per the Code requirements.

3.4.1.2 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3400, for motor operated valve SW-1400 that provides emergency makeup service water to the component cooling system and proposed to modify the system design such that exercising testing will be achievable.

3.4.1.2.1 Licensee's Basis for Requesting Relief--Cycling of this valve would result in service water being injected into the component cooling system. The injection of service water (lake water) into the closed loop component cooling system is not desirable. Current system design prohibits exercise testing of this valve. Currently no practical method exists to exercise test this valve, however, a design change request has been initiated which will modify the system design such that exercise testing will be achievable.

3.4.1.2.2 Evaluation--The motor operated valve SW-1400 is not exercised to the requirements of Sections XI. The reviewer agrees with the licensee that the injection of lake water into the component cooling system is not desirable and that the system should be modified to allow exercise testing.

3.4.1.2.3 Conclusion--The reviewer concludes that the system should be modified so that valve SW-1400 can be tested to the requirements of Section XI. For the balance of the current fuel cycle, interim relief should be granted from the exercising requirements of Section XI. The licensee should be required to make the necessary system modifications prior to the end of the next refueling outage and then test this valve to the requirements of Section XI.

3.5 Reactor and Shield Building Ventilation

3.5.1 Category A/C Valves

3.5.1.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3500, for check valve AS-33 which is the containment isolation valve in the containment air sample return line and proposed to verify full closure capability in conjunction with Appendix J testing during refueling outages.

3.5.1.1.1 Licensee's Basis for Requesting Relief--The safeguard function required for this valve is to provide containment isolation. Quarterly exercise tests on the air operated sample isolation valve (AS-32) do exercise this valve in the closed direction during plant operation; however, due to lack of position indication, full closure cannot be verified.

This valve does act as a containment isolation valve and will receive leakage tests in accordance with 10 CFR 50, Appendix J during refueling which will verify full closure capability.

3.5.1.1.2 Evaluation--The reviewer agrees that although this valve is exercised in the closed direction quarterly, full closure cannot be verified due to the lack of position indication. Valve closure can be verified in conjunction with the Appendix J leak testing.

3.5.1.1.3 Conclusion--The reviewer concludes that relief should be granted from the valve seating confirmation requirement of Section XI and that the proposed alternate testing of verifying valve closure during the performance of leak rate tests at refueling outages should demonstrate proper valve operability. The reviewer concludes that the alternate testing proposed will give reasonable assurance of valve operability as required by the Code and, therefore, is acceptable.

3.6 Reactor Coolant System

3.6.1 Category A/C Valves

3.6.1.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3500, for check valve NG-304 in the nitrogen supply line to the pressurizer relief tank and check valve MU-1011 in the reactor makeup water line to the pressurizer relief tank and proposed to verify full closure capability (the only safety position for these valves is closed) of these containment isolation valves in conjunction with Appendix J testing during refueling outages.

3.6.1.1.1 Licensee's Basis for Requesting Relief--These valves are normally closed check valves whose safety function is to remain closed post accident to provide containment isolation (i.e., passive). Periodic opening of these valves during power operation may be necessary to maintain desired pressurizer relief tank level, temperature and pressure. If these valves are opened during power operation, they are opened for short duration only. Opening of these valves would necessitate recategorizing these valves as active, however, no practical means exist to verify full closure of these check valves following their usage.

These valves do act as containment isolation valves and will receive leakage tests in accordance with 10 CFR 50, Appendix J during refueling which will verify full closure capability.

3.6.1.1.2 Evaluation--The reviewer agrees that full closure of these valves can be verified in conjunction with the Appendix J leak testing.

3.6.1.1.3 Conclusion--The reviewer concludes that relief should be granted from the valve seating confirmation requirement of Section XI and that the proposed alternate testing of verifying valve closure during the performance of leak rate tests at refueling outages should demonstrate proper valve operability. The reviewer concludes that the alternate testing proposed will give reasonable assurance of valve operability as required by the Code and, therefore, is acceptable.

3.6.2 Category B Valves

3.6.2.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3400, for pressurizer steam space vent valves PR-33A and PR-33B, reactor head vent valves RC-45A and RC-45B, and valves RC-46 and RC-49 that vent the discharge of the aforementioned vent valves to the pressurizer relief tank or containment and proposed to exercise these solenoid valves during refueling outages.

3.6.2.1.1 Licensee's Basis for Requesting Relief--These valves are the pressurizer and reactor vessel head vent valves. These valves cannot be operated during power operation because opening the valves could relieve reactor coolant water to either the pressurizer relief tank or directly to containment. Unnecessarily challenging these valves during power operation could result in a significant loss of coolant inventory. These valves cannot be exercise tested during cold shutdown conditions for similar reasons. Testing during cold shutdown conditions has indicated that unexpected valve openings can occur. As one of two valves in a series is opened; the associated valve has experienced burping or chattering. Unnecessary challenges to the system under cold shutdown conditions is not warranted.

These valves will be exercise tested on a refueling outage frequency.

3.6.2.1.2 Evaluation--The reviewer agrees that operation of these valves when the plant is pressurized would result in a loss of reactor coolant water and that testing under conditions which would cause chattering could cause unnecessary stress on the valves.

3.6.2.1.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI and that full-stroke exercising these valves during refueling outages should demonstrate proper valve operability. The proposed alternate testing will give reasonable assurance of valve operability required by the Code and, therefore, is acceptable.

3.7 Internal Containment Spray System

3.7.1 Category C Valves

3.7.1.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3500, for check valves ICS-3A and ICS-3B, in the refueling water storage tank (RWST) line to the internal containment spray (ICS) pumps and ICS-4A and ICS-4B downstream of the ICS pump discharge and proposed to partial-stroke exercise these valves during the monthly ICS pump test.

3.7.1.1.1 Licensee's Basis for Requesting Relief--There is no method of full stroke exercising these valves with flow without spraying water into containment. A test line downstream of these valves is designed to recirculate water back to the RWST during the monthly ICS pump test. The test line is sized to pass sufficient flow such that pump damage will not occur, however, no practical method exists to determine full stroke capability under these conditions.

During the quarterly ICS pump run test, partial stroke operation of these check valves will be verified. The system line-up is such that flow can be established through valves ICS-3A(B) and ICS-4A(B) and the test line back to the RWST. Comparisons of pump discharge pressure under different valve configurations will be used to verify that flow exists through check valves ICS-3A(B) and ICS-4A(B). Acceptance criteria based on historical data have been established and predefined corrective actions are implemented as necessary. This method of testing is consistent with the method of Paragraph IWV-3522(b).

3.7.1.1.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief. The reviewer agrees that these valves cannot be full-stroke exercised with flow without spraying water into the containment and that these valves should be partial-stroked during the ICS pump test.

The NRC staff has concluded that a valve sampling disassembly and inspection utilizing a manual full-stroke exercise of the valve disk is an acceptable method to verify a check valve's full-stroke capability. The sampling technique requires that each valve in the group be of the same design (manufacturer, size, model number and materials of construction) and have the same service conditions. Additionally, at each disassembly it must be verified that the disassembled valve is capable of full-stroking and that its internals are structurally sound (no loose or corroded parts).

A different valve of each group is required to be disassembled, inspected and manually full-stroke exercised at each refueling outage, until the entire group has been tested. If it is found that the disassembled valve's full-stroke capability is in question, the remainder of the valves in that group must also be disassembled, inspected and manually full-stroke exercised during the same outage.

3.7.1.1.3 Conclusion--The NRC position is that inspecting the valve internals and manually stroking on a sampling basis each refueling outage is an acceptable testing method. Therefore, the reviewer concludes that relief should be granted from the exercising requirements of Section XI provided that the licensee verifies the full-stroke capability of these valves by disassembly, inspection and manual full-stroke according to the NRC staff position described above.

3.7.1.2 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3500, for check valves RHR-401A and RHR-401B in the residual heat removal (RHR) supply line to the ICS pumps and proposed to partial-stroke these valves during the quarterly RHR pump tests.

3.7.1.2.1 Licensee's Basis for Requesting Relief--Full-stroke verification would require full flow testing of the RHR system concurrent with full flow testing of the ICS system. Since the ICS pumps cannot be full flow tested without spraying water into containment, these check valves which supply RHR water to the ICS pump suction cannot be full-stroke exercised.

During the quarterly RHR pump run test, partial stroke operation of these check valves will be verified. Opening the motor operated suction isolation valves RHR-400A and RHR-400B during the RHR pump test and measuring an increase in pressure on the ICS pump discharge pressure instrumentation will verify partial stroke exercising of these check valves. Acceptance criteria have been established and predefined corrective actions are implemented as necessary. This method of testing is consistent with the method of Paragraph IWV-3522(b).

3.7.1.2.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief. The reviewer agrees that these valves cannot be full-stroke exercised with flow without spraying water into the containment and that these valves should be partial-stroked during the RHR pump test.

The NRC staff has concluded that a valve sampling disassembly and inspection utilizing a manual full-stroke exercise of the valve disk is an acceptable method to verify a check valve's full-stroke capability. The sampling technique requires that each valve in the group be of the same design (manufacturer, size, model number and materials of construction) and have the same service conditions. Additionally, at each disassembly it must be verified that the disassembled valve is capable of full-stroking and that its internals are structurally sound (no loose or corroded parts).

A different valve of each group is required to be disassembled, inspected and manually full-stroke exercised at each refueling outage, until the entire group has been tested. If it is found that the disassembled valve's full-stroke capability is in question, the remainder of the valves in that group must also be disassembled, inspected and manually full-stroke exercised during the same outage.

3.7.1.2.3 Conclusion--The NRC position is that inspecting the valve internals and manually stroking on a sampling basis each refueling outage is an acceptable testing method. Therefore, the reviewer concludes that relief should be granted from the exercising requirements of Section XI provided that the licensee verifies the full-stroke capability of these valves by disassembly, inspection and manual full-stroke according to the NRC staff position described above.

3.7.1.3 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3500, for check valves ICS-8A and ICS-8B in the ISC discharge line and proposed to remove these valves from the piping and physically inspect them once every five years.

3.7.1.3.1 Licensee's Basis for Requesting Relief--Introducing flow through these valves would result in water being sprayed into the containment. The valve design does not provide for the use of a mechanical exerciser, therefore neither partial nor full stroke exercising of these valves is possible.

Removing the valve once every five years is sufficient to identify valve degradation. Results of past inspection have not indicated any need for more frequent disassembly and inspection. More frequent disassembly and inspections would increase the risk of error during reassembly.

These valves are removed from the piping and physically inspected to observe freedom of disk movement once every five years. The visual inspection includes an evaluation of internal wear, pin wear, spring conditions, seat leakage and freedom of disk movement.

3.7.1.3.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief. The reviewer agrees that these valves cannot be partial- or full-stroke exercised with flow without spraying water into the containment.

The NRC staff has concluded that a valve sampling disassembly and inspection utilizing a manual full-stroke exercise of the valve disk is an acceptable method to verify a check valve's full-stroke capability. The sampling technique requires that each valve in the group be of the same design (manufacturer, size, model number and materials of construction) and have the same service conditions. Additionally, at each disassembly it must be verified that the disassembled valve is capable of full-stroking and that its internals are structurally sound (no loose or corroded parts).

A different valve of each group is required to be disassembled, inspected and manually full-stroke exercised at each refueling outage, until the entire group has been tested. If it is found that the disassembled valve's full-stroke capability is in question, the remainder of the valves in that group must also be disassembled, inspected and manually full-stroke exercised during the same outage.

3.7.1.3.3 Conclusion--The NRC position is that inspecting the valve internals and manually stroking on a sampling basis each refueling outage is an acceptable testing method. Therefore, the reviewer concludes that relief should be granted from the exercising requirements of Section XI provided that the licensee verifies the full-stroke capability of these valves by disassembly, inspection and manual full-stroke according to the NRC staff position described above.

3.8 Safety Injection System

3.8.1 Category A/C Valves

3.8.1.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, and IWV-3500, for check valve SI-22B in the accumulator discharge line to the cold leg and proposed to partial-stroke exercise this valve during cold shutdown.

3.8.1.1.1 Licensee's Basis for Requesting Relief--This accumulator discharge check valve cannot be full- or partial-stroke exercised during power operation because the accumulator pressure is less than the RCS pressure. This check valve will be tested during cold shutdowns, however, it is not feasible to exercise this check valve at the design basis LOCA flow rate (approximately 14,000 gpm). Consistent with Paragraph IWV-3522(b), this check valve will be partial flow exercised in a manner demonstrating that the disk moves freely off its seat by comparison of pressure differential and flow rate.

3.8.1.1.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief. The reviewer agrees that this valve cannot be exercised during power operation because the RCS pressure is greater than the accumulator pressure and that the valve should be partial-stroked during cold shutdown provided this testing will not lead to a low-temperature overpressure condition in the RCS.

The NRC staff has concluded that disassembly and inspection utilizing a manual full-stroke exercise of the valve disk is an acceptable method to verify a check valve's full-stroke capability. Additionally, at each disassembly it must be verified that the disassembled valve is capable of full-stroking and that its internals are structurally sound (no loose or corroded parts).

3.8.1.1.3 Conclusion--The NRC position is that inspecting the valve internals and manually stroking the valve each refueling outage is an acceptable testing method. Therefore, the reviewer concludes that relief should be granted from the exercising requirements of Section XI provided that the licensee verifies the full-stroke capability of this valve by disassembly, inspection and manual full-stroke according to the NRC staff position described above.

3.8.1.2 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3500, for check valves SI-303A and SI-303B in the low pressure safety injection (LPSI) line to the reactor vessel and SI-304A and SI-304B in the high pressure safety injection (HPSI) and LPSI line to the reactor vessel and proposed to full-stroke exercise these valves during refueling outages.

3.8.1.2.1 Licensee's Basis for Requesting Relief--These HPSI and LPSI check valves cannot be full or partial stroke exercised during power operation because neither the SI pump head or the RHR pump head is sufficient to overcome RCS pressure. The HPSI check valves cannot be full-stroke exercised using the SI pumps during cold shutdowns since this could result in a challenge to the RCS low-temperature overpressurization protection system.

The LPSI check valves cannot be full-stroke exercised during cold shutdowns since there is not sufficient expansion volume in the RCS to allow flow to be established to test these valves. In addition, these valves cannot be exercised during cold shutdowns since establishing RHR flow through them may cause cooling flow to bypass the core and not remove decay heat.

3.8.1.2.2 Evaluation--The reviewer agrees that these valves cannot be exercised during power operation because the HPSI and LPSI pumps will not overcome RCS pressure. The HPSI valves cannot be full-stroke exercised during cold shutdown because this could lead to a challenge to the low-temperature overpressurization system. The LPSI valves cannot be full-stroke exercised during cold shutdown because there is insufficient expansion volume in the RCS.

3.8.1.2.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI and that the proposed alternate testing of full-stroke exercising these valves during refueling outages, when the reactor vessel head is removed, will give reasonable assurance of valve operability required by the Code and, therefore, is acceptable.

3.8.2 Category C Valves

3.8.2.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3500, for check valves SI-21A, SI-21B and SI-22A in the accumulator discharge lines to the cold legs and proposed to partial-stroke exercise these valves during cold shutdown.

3.8.2.1.1 Licensee's Basis for Requesting Relief--These accumulator discharge check valves cannot be full- or partial-stroke exercised during power operation because the accumulator pressure is less than the RCS pressure. These check valves will be tested during cold shutdowns, however, it is not feasible to exercise these check valves at the design basis LOCA flow rate (approximately 14,000 gpm). Consistent with Paragraph IWV-3522(b), these check valves will be partial flow exercised in a manner demonstrating that the disk moves freely off its seat by comparison of pressure differential and flow rate.

3.8.2.1.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief. The reviewer agrees that these valves cannot be exercised during power operation because the RCS pressure is greater than the accumulator pressure and that these valves should be partial-stroke exercised during cold shutdowns provided this testing will not lead to a low-temperature overpressure condition in the RCS.

The NRC staff has concluded that a valve sampling disassembly and inspection utilizing a manual full-stroke exercise of the valve disk is an acceptable method to verify a check valve's full-stroke capability. The sampling technique requires that each valve in the group be of the same design (manufacturer, size, model number and materials of construction) and have the same service conditions. Additionally, at each disassembly it must be verified that the disassembled valve is capable of full-stroking and that its internals are structurally sound (no loose or corroded parts).

A different valve of each group is required to be disassembled, inspected and manually full-stroke exercised at each refueling outage, until the entire group has been tested. If it is found that the disassembled valve's full-stroke capability is in question, the remainder of the valves in that group must also be disassembled, inspected and manually full-stroke exercised during the same outage.

3.8.2.1.3 <u>Conclusion</u>--The NRC position is that inspecting the valve internals and manually stroking on a sampling basis each refueling outage is an acceptable testing method. Therefore, the reviewer concludes that relief should be granted from the exercising requirements of Section XI provided that the licensee verifies the full-stroke capability of these valves by disassembly, inspection and manual full-stroke according to the NRC staff position described above.

3.8.2.2 <u>Relief Request</u>. The licensee has requested relief from the exercising requirements of Section XI, IWV-3500, for check valves SI-12A, SI-12B, SI-13A and SI-13B in the HPSI line to the cold legs, SI-16A and SI-16B in the HPSI flood line to the reactor vessel, SI-6A and SI-6B at the discharge of the HPSI pumps, and SI-301A and SI-301B in the RWST supply line to the LPSI pumps and proposed to full-stroke exercise these valves during refueling outages.

3.8.2.2.1 <u>Licensee's Basis for Requesting Relief</u>--These HPSI and LPSI check valves cannot be full or partial stroke exercised during power operation because neither the SI pump head or the RHR pump head is sufficient to overcome RCS pressure. The HPSI check valves cannot be full-stroke exercised using the SI pumps during cold shutdowns since this could result in a challenge to the RCS low-temperature overpressurization protection system.

The LPSI check valves cannot be full-stroke exercised during cold shutdowns since there is not sufficient expansion volume in the RCS to allow flow to be established to test these valves. In addition, these valves cannot be exercised during cold shutdowns since establishing RHR flow through them may cause cooling flow to bypass the core and not remove decay heat.

3.8.2.2.2 Evaluation--The reviewer agrees that these check valves cannot be full-stroke exercised during power operation because the HPSI and LPSI pumps will not overcome RCS pressure. The HPSI valves cannot be full-stroke exercised during cold shutdown because this could lead to a challenge to the low-temperature overpressurization system. The LPSI valves cannot be full-stroke exercised during cold shutdown because there is insufficient expansion volume in the RCS.

3.8.2.2.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI and that the proposed alternate testing of full-stroke exercising these valves during refueling outages, when the reactor vessel head is removed, will give reasonable assurance of valve operability required by the Code and, therefore, is acceptable.

APPENDIX A
NRC STAFF POSITIONS AND GUIDELINES

APPENDIX A

NRC STAFF POSITIONS AND GUIDELINES

1. FULL-STROKE EXERCISING OF CHECK VALVES

The NRC's position was stated to the licensee that check valves whose safety function is to open are expected to be full-stroke exercised. Since the disk position is not always observable, the NRC staff position is that verification of the maximum flow rate through the check valve identified in any of the plant's safety analyses would be an adequate demonstration of the full-stroke requirement. Any flow rate less than this will be considered a partial-stroke exercising unless it can be shown that the check valve's disk position at the lower flow rate would permit maximum required flow through the valve. The NRC staff position is that this reduced flow rate method of demonstrating full-stroke capability is the only test that requires measurement of the differential pressure across the valve.

2. VALVES IDENTIFIED FOR COLD SHUTDOWN EXERCISING

The Code permits valves to be exercised during cold shutdowns when exercising is not practical during plant operation and these valves are specifically identified by the licensee and are full-stroke exercised during cold shutdowns, therefore, the licensee is meeting the requirements of the ASME Code. Since the licensee is meeting the requirements of the ASME Code, it is not necessary to grant relief; however, during our review of the licensee's IST program, we have verified that it is not practical to exercise these valves during power operation and that we agree with the licensee's basis.

The NRC differentiates, for valve testing purposes, between the cold shutdown mode and the refueling mode. That is, for valves identified for testing during cold shutdowns, it is expected that the test will be performed both during cold shutdowns and each refueling outage. However, when relief is granted to perform tests on a refueling outage frequency, testing is expected only during each refueling outage. In addition, for extended refueling outages, tests being performed are expected to be maintained as closely as practical to the Code-specified frequencies.

3. CONDITIONS FOR VALVE TESTING DURING COLD SHUTDOWNS

Cold shutdown testing of valves identified by the licensee is acceptable when the following conditions are met:

a. The licensee is to commence testing soon as the cold shutdown condition is achieved, but no later than 48 hours after shutdown and continue until complete or the plant is ready to return to power.

b. Completion of all valve testing is not a prerequisite to return to power.

c. Any testing not completed during one cold shutdown should be performed during any subsequent cold shutdowns starting from the last test performed at the previous cold shutdown.

d. For planned cold shutdowns, where ample time is available and testing all the valves identified for the cold shutdown test frequency in the IST program will be accomplished, exceptions to the 48 hours may be taken.

4. CATEGORY A VALVE LEAK TEST REQUIREMENTS FOR CONTAINMENT ISOLATION VALVES

All containment isolation valves that are Appendix J, Type C, leak tested should be included in the IST program as Category A or A/C valves. The NRC has concluded that the applicable leak test procedures and requirements for containment isolation valves are determined by 10 CFR 50, Appendix J. Relief from Paragraphs IWV-3421 through IWV-3425 (1980 Edition through Winter 1981 Addenda) for containment isolation valves presents no safety problem since the intent of these paragraphs is met by Appendix J requirements; however, the licensee must comply with the Analysis of Leakage Rates and Corrective Action requirements of Paragraphs IWV-3426 and IWV-3427. Based on the considerations discussed above, the NRC staff has concluded that the proposed alternate testing will give reasonable assurance of valve leak-tight integrity as required by the Code.

5. APPLICATION OF APPENDIX J TESTING TO THE IST PROGRAM

The Appendix J review of this plant is completely separate from the IST program review. However, the determinations made by that review are directly applicable to the IST program. The licensee has agreed that, should the Appendix J program be amended, they will amend their IST program accordingly.

6. SAFETY RELATED VALVES

This review was limited to valves whose function is safety related. Valves whose function is safety related are defined as those valves that are needed to mitigate the consequences of an accident and/or to shut down the reactor to the cold shutdown condition and to maintain the reactor in a cold shutdown condition. Valves in this category would typically include certain ASME Code Class 1, 2, and 3 valves and could include some non-Code class valves. It should be noted that the licensee may have included valves whose function is not safety related in their IST program as a decision on their part to expand the scope of their program.

7. ACTIVE VALVES

The NRC staff position is that active valves are those for which changing position may be required to shut down a reactor to the cold shutdown condition or to mitigate the consequences of an accident. Included are valves which respond automatically to an accident signal such as safety injection, valves which may be optionally utilized but are subject to plant operator actions, and valves utilized to establish long term recirculation following a LOCA.

8. RAPID-ACTING POWER OPERATED VALVES

The NRC staff has identified rapid-acting power operated valves as those which stroke in 2 seconds or less. Relief from the trending requirements of Section XI (Paragraph IWV-3417(a), 1980 Edition through Winter of 1981 Addenda) presents no safety concerns for these valves since variations in stroke time will be affected by slight variations in the response time of the personnel performing the tests. However, the staff does require that the licensee assign a maximum limiting stroke time of 2 seconds to these valves in order to obtain this Code relief.

9. VALVES WHICH PERFORM A PRESSURE BOUNDARY ISOLATION FUNCTION

The following valves have been identified by the licensee as pressure boundary isolation valves and have been categorized accordingly. These valves are individually leakrate tested in accordance with the NRC staff acceptance criteria for pressure boundary isolation valves and included in the Kewaunee Nuclear Power Plant technical specifications.

Valve	Current Category	Function
SI-304A SI-304B	A/C A/C	Combined safety injection (SI) and residual heat removal (RHR) pumps to reactor vessel
SI-303A SI-303B	A/C A/C	RHR to reactor vessel
SI-22B	A/C	Accumulator discharge to reactor coolant system (RCS) cold legs

The following valves appear to perform a pressure isolation function, however, they are not all categorized A or A/C as appropriate and are not individually leak tested. In accordance with guidance from the Committee to Review Generic Requirements (CRGR) on July 24, 1985, backfitting of non-Event V PIV leak testing at operating reactors may not be appropriate. Therefore, pending review and approval by CRGR of a PIV testing plan for operating reactors, leak testing of these valves which are not listed in Table 3.4-2 of the licensee's Technical Specifications, is not to be involuntarily imposed on the licensee. The licensee should be advised of his option to only continue leak testing his current technical specification list of PIVs until further notice.

Valve	Current Category	Function
RHR-1A	B	RHR suction from RCS hot legs
RHR-1B	B	
RHR-2A	B	
RHR-2B	B	
RHR-11	B	RHR discharge to Loop B cold leg
SI-16A	C	SI pump to reactor vessel
SI-16B	C	
SI-12A	C	SI pump to RCS cold legs
SI-12B	C	
SI-13A	C	
SI-13B	C	
SI-21A	C	Accumulator discharge to RCS cold legs
SI-21B	C	
SI-22A	C	

The reviewer has verified that these valves have been included in the IST program.

10. PRESSURIZER POWER OPERATED RELIEF VALVES

The NRC has adopted the position that the pressurizer power operated relief valves (PORVs) should be included in the IST program as Category B valves and tested to the requirements of Section XI. However, since the PORVs have shown a high probability of sticking open and are not needed for overpressure protection during power operation, the NRC has concluded that routine exercising during power operation is "not practical" and therefore not required by IWV-3412(a).

If the PORV's function during reactor startup and shutdown is to protect the reactor vessel and coolant system from low-temperature overpressurization conditions, these valves should be exercised prior to initiation of system conditions for which vessel protection is needed and the following test schedule is required.

a. Full-stroke exercise should be performed at each[a] cold shutdown or, as a minimum, once each refueling cycle.

b. Stroke timing should be performed at each cold shutdown or, as a minimum, once each refueling cycle.

c. Fail safe actuation testing should be performed at each cold shutdown.

d. The PORV block valves should be included in the IST program and tested quarterly to provide protection against a small break LOCA should a PORV fail open.

The licensee has included the PORVs (PR-2A and PR-2B) and the associated block valves (PR-1A and PR-1B) in the IST program. The block valves are exercised every 3 months and the PORVs are exercised during refueling outages. The PORVs are currently categorized C.

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a. The staff position described in Section 3 of this appendix regarding cold shutdown testing is not applicable to the PORVs; however, in the case of frequent cold shutdowns, testing of the PORVs is not required more often than each three months.

APPENDIX B
VALVES TESTED DURING COLD SHUTDOWNS

APPENDIX B

VALVES TESTED DURING COLD SHUTDOWNS

The following are Category A, B, and C valves that meet the exercising requirements of the ASME Code, Section XI, and are not full-stroke exercised every three months during plant operation. These valves are specifically identified by the owner in accordance with Paragraph IWV-3412 and are full-stroke exercised during cold shutdowns and refueling outages. The reviewer has reviewed all valves in this Appendix and agrees with the licensee that testing these valves during power operation is not practical due to the valve type, location or system design. These valves should not be full-stroke exercised during power operation. These valves are listed below and grouped according to the system in which they are located.

System	Valve Identification	Function
Residual heat removal	RHR-1A RHR-1B RHR-2A RHR-2B	Pump suction motor-operated isolation valves
	RHR-3A RHR-3B	Pump suction check valves
	RHR-5A RHR-5B	Pump discharge check valves
	RHR-11	Injection flow path motor operated isolation valve
Chemical and volume control	LD-6	Isolation valve in letdown line
Main steam	MS-1A MS-1B	Main steam isolation valves
	MS101A MS101B	Main steam to turbine driven auxiliary feedwater pump check valves
Feedwater	FW-12A FW-12B	Steam generator isolation valves

System	Valve Identification	Function
	FW-13A FW-13B	Feedwater to steam generator check valves
	AFW-1A AFW-1B AFW-1C AFW-4A AFW-4B	Auxiliary feedwater to steam generator check valves
	MU-311A MU-311B MU-311C	Condensate storage tank to auxiliary feedwater pump check valves
Station and instrument air	IA-101	Isolation valve
Reactor and shield building ventilation	VB-10A VB-10B	Containment vacuum breaker air-operated valve

APPENDIX C
P&ID LIST

APPENDIX C
P&ID LIST

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

System	P&ID	Revision
Internal containment spray	M-217 Sh. 1	V
Reactor coolant	X-K100-10	AB
Service water	M-202 M-547	AR
Feedwater	M-205 Sh. 1	AA
Main, auxiliary steam and steam dump	M-203 Sh. 1	DG
Auxiliary coolant	X-K100-18 Sh. 1 X-K100-19 Sh. 2 X-K100-20 Sh. 3	U L M
Chemical and volume control	X-K100-35 Sh. 1 X-K100-36	R X
Safety injection	X-K100-28 Sh. 1 X-K100-29	T L
Reactor and shield building ventilation	M-602	AA
Reactor plant miscellaneous vents, drains and sump pump piping	M-539	G
Reactor building ventilation	M-403	M
Secondary sampling	M-219	V
Miscellaneous gas	M-216	BD
Waste disposal	X-K100-131	AQ
Station and instrument air	M-213	AH
Sampling	X-K100-44 Sh. 1	P

APPENDIX D
IST PROGRAM ANOMALIES IDENTIFIED IN THE REVIEW

APPENDIX D

IST PROGRAM ANOMALIES IDENTIFIED IN THE REVIEW

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

1. The licensee proposed to establish the inlet pressure by reference to the level of water above the suction of the service water pump (see Section 2.1.2.1). The licensee should verify that the inlet to the pump suction is not restricted prior to the quarterly pump test.

2. The licensee proposed to measure the auxiliary feedwater and residual heat removal pumps flow rate during cold shutdowns and measure the high head safety injection pumps flow rate during refueling outages. The flow rate would not be measured during the service water and containment spray pump tests (see Section 2.2.1.1). The lack of installed instrumentation is not an adequate long-term justification for not measuring flow. The licensee should measure the pump flow rate in accordance with the requirements of Section XI.

3. The licensee requested relief from measuring the static inlet pressure of the component cooling pumps (see Section 2.3.2.1). Instrumentation is available for measuring the inlet pressure of each pump. The static inlet pressure should be measured as required by the Code.

4. The licensee proposed valve corrective action requirements that are different than those given in Paragraph IWV-3417 of Section XI (see Section 3.1.2). The licensee did not provide sufficient technical justification for deviating from the code requirements and the supplemental NRC staff position given in

Section 8 of Appendix A. The valve corrective action should be that specified by the Code and the supplemental NRC staff position given in Section 8 of Appendix A should be utilized for fast acting valves.

5. The licensee proposed to verify smooth closure of control valve CVC-7 between the charging pumps and the regenerative heat exchanger when the valve is closed for Appendix J leak testing during refueling outages (see Section 3.2.1.1). The licensee did not provide justification for not full-stroke exercising and stroke timing this valve during cold shutdowns and refueling outages. This valve should be full-stroke exercised and stroke timed during cold shutdowns and refueling outages.

6. The licensee proposed to monthly test and monitor the diesel generators rather than measure the stroke time of solenoid valves SA-2012A and SA-2012B in the startup compressor and receiver lines (see Section 3.3.2.2). The licensee did not provide either sufficient technical justification for not stroke timing the valves or a specific alternate test method that would monitor stroke time to detect valve degradation. These valves should be stroke timed as per the Code requirements.

7. The licensee proposed to monthly test and monitor the diesel generators rather than measure the stroke time of valves SW-301A and SW-301B in the service water return line from the diesel generator coolers (see Section 3.4.1.1). The licensee did not provide either sufficient technical justification for not stroke timing the valves or a specific alternate test method that would monitor stroke time to detect valve degradation. These valves should be stroke timed per the Code requirements.

8. The licensee does not currently exercise emergency makeup water valve SW-1400 but proposed to modify the system design so that the valve can be exercised (see Section 3.4.1.2). The licensee

should make the necessary modifications prior to the end of the next refueling outage and then test the valve according to the requirements of Section XI.

9. The licensee proposed to partial-stroke exercise check valves ICS-3A, ICS-3B, ICS-4A and ICS-4B in the internal containment spray system, during the monthly ICS pump tests (see Section 3.7.1.1). In addition, the licensee should disassemble, inspect and manually full-stroke exercise these valves on a sampling basis each refueling outage.

10. The licensee proposed to partial-stroke exercise check valves RHR-401A and RHR-401B in the RHR supply line to the ICS pumps (see Section 3.7.1.2). In addition, the licensee should disassemble, inspect and manually full-stroke exercise these valves on a sampling basis each refueling outage.

11. The licensee proposed to remove check valves ICS-8A and ICS-8B in the ICS discharge line to the spray nozzles and physically inspect them once every five years (see Section 3.7.1.3). The licensee should disassemble, inspect, and manually full-stroke exercise these valves on a sampling basis each refueling outage.

12. The licensee proposed to partial-stroke exercise check valve SI-22B in the accumulator discharge line during cold shutdowns (see Section 3.8.1.1). The licensee should disassemble, inspect and manually full-stroke exercise this valve on a sampling basis each refueling outage.

13. The licensee proposed to partial-stroke exercise check valves SI-21A, SI-21B and SI-22A in the accumulator discharge lines during cold shutdowns (see Section 3.8.2.1). In addition, the licensee should disassemble, inspect and manually full-stroke exercise these valves on a sampling basis each refueling outage.

14. Table A-1, ISI Valve Exercise Cross Reference Index, that was included in the IST program submittal does not provide the limiting value of stroke time for power operated valves MS-101A and MS-101B in the IST program. These values should be provided or a relief request should be submitted.

15. The service air to containment valves SA-471-1 and SA-471-2 are not exercised according to Table 2 of the submittal. These valves should be exercised or identified as passive or a relief request should be submitted to the NRC.

16. The licensee's final resolution to working meeting Question A.10 (an open item) did not provide sufficient technical justification for not including the diesel generator fuel oil transfer pumps in the IST program. The licensee did not describe and justify the use of alternate means of fuel transfer. These pumps should be included in the program.

17. Table 2, ASME Code Class 1, 2 and 3 valves, in the IST program submittal does not state that check valves SI-206A and SI-206B in the test line to the RWST are exercised. Relief request RR-5 is referenced. This request is for pumps. A proper relief request should be provided or these valves should be exercised according to the Section XI requirements.

18. The reviewer identified a number of valves that appear to perform a pressure boundary isolation function, however, they are not all categorized A or A/C and are not individually leak tested. (See Appendix A, Section 9 for NRC staff position.) The licensee should be advised of his option to only continue leak testing his current technical specification list of PIVs until further notice.

19. The licensee included the PORVs and associated block valves in the IST program. These valves should be categorized and tested in accordance with the NRC staff position in Section 10 of Appendix A. The PORVs should be categorized B rather than C and should be exercised, stroke timed, and fail safe tested during cold shutdowns and refueling outages rather than exercised during refueling outages only.

APPENDIX E

VALVES TESTED DURING COLD SHUTDOWNS--DETAILS

APPENDIX E

VALVES TESTED DURING COLD SHUTDOWNS--DETAILS

The following are Category A, B, and C valves that meet the exercising requirements of the ASME Code, Section XI, and are not full-stroke exercised every three months during plant operation. These valves are specifically identified by the owner in accordance with Paragraphs IWV-3412 and are full-stroke exercised during cold shutdowns and refueling outages. The reviewer has evaluated all valves in this Appendix and agrees with the licensee that testing these valves during power operation is not practical due to the valve type, valve location or system design. These valves should not be full-stroke exercised during power operation. These valves are listed below and grouped according to the system in which they are located.

1. RESIDUAL HEAT REMOVAL SYSTEM

1.1 Category B Valves

The RHR suction valves RHR-1A, RHR-1B, RHR-2A and RHR-2B are interlocked with the RCS pressure and cannot be opened when RCS pressure is above 450 psig. In accordance with Paragraph IWV-3412(a) of the ASME Code, these valves will be full-stroke exercised during cold shutdowns and refueling outages.

Valve RHR-11 is in the normal RHR cooldown flow path and is required to remain closed during plant operation to isolate the low pressure RHR system from the high pressure reactor coolant system. This valve will be full-stroke exercised during cold shutdowns and refueling outages.

1.2 Category C Valves

The RHR pump suction check valves RHR-3A and RHR-3B cannot be exercised during power operation since the flow path involves taking a suction from the RCS hot legs and the suction isolation valves cannot be opened at normal operating RCS pressure. In accordance with Paragraph IWV-3412(a) of the ASME Code, these valves will be full-stroke exercised during cold shutdowns and refueling outages.

The RHR pump discharge check valves RHR-5A and RHR-5B cannot be full-stroke exercised during power operation since the RHR pump head is not sufficient to overcome RCS pressure. These valves are partial stroked on a quarterly basis during the RHR pump test which utilizes a minimum flow recirculation line. In accordance with Paragraph IWV-3412(a) of the ASME Code, these valves will be full-stroke exercised during cold shutdowns and refueling outages.

2. CHEMICAL AND VOLUME CONTROL SYSTEM

2.1 Category A Valves

Exercising isolation valve LD-6 in the letdown line to the closed position during power operation could thermal shock the regenerative heat exchanger and charging piping, possibly causing premature failure. In accordance with Paragraph IWV-3412(a) of the ASME Code, this valve will be full-stroke exercised during cold shutdowns and refueling outages.

3. MAIN STEAM SYSTEM

3.1 Category B/C Valves

Exercising the main steam isolation valves MS-1A and MS-1B (either full or partial stroke) during power operation would cause a plant transient that would result in a plant trip. In accordance with Paragraph IWV-3412(a) of the ASME Code and Technical Specification 4.7, these valves will be full-stroke exercised to the closed position during cold shutdowns and refueling outages.

3.2 Category C Valves

Since the auxiliary feedwater (AFW) pumps are not full flow tested during power operation, full stroke verification for check valves MS101A and MS101B in the steam line to the turbine drive AFW pump cannot be performed during power operation. In accordance with IWV-3412(a), these valves will be partial stroked during the quarterly AFW pump test and full-stroke exercised during cold shutdowns and refueling outages.

4. FEEDWATER SYSTEM

4.1 Category B Valves

Exercising valves FW-12A and FW-12B during power operation would result in a loss of feedwater to the steam generators which would cause a plant trip. In accordance with Paragraph IWV-3412(a) of the ASME Code, these valves will be full-stroke exercised during cold shutdowns and refueling outages.

4.2 Category C Valves

Exercising check valves FW-13A and FW-13B during power operation would result in a loss of feedwater to the steam generators which would cause a plant trip. In accordance with Paragraph IWV-3412(a) of the ASME Code, these valves will be full-stroke exercised during cold shutdowns and refueling outages. The check valves will be verified closed by comparing pressures in the steam generators with the pressures upstream of the valves.

Exercising check valves AFW-1A, AFW-1B, AFW-1C, AFW-4A and AFW-4B during power operation would result in thermal cycling of the feedwater nozzles and piping, which could result in premature component failure. In accordance with Paragraph IWV-3412(a) of the ASME Code, these valves will be full-stroke exercised during cold shutdowns and refueling outages.

Since the auxiliary feedwater (AFW) pumps are not full flow tested during power operation, full stroke-verification for check valves MU-311A, MU-311B, MU-311C and MU-301 in the condensate supply line to the AFW pumps cannot be performed during power operation. In accordance with IWV-3412(a), these valves will be partial stroked during the quarterly AFW pump test and full-stroke exercised during cold shutdowns and refueling outages.

5. STATION AND INSTRUMENT AIR SYSTEM

5.1 Category A Valves

Closure of normally open valve IA-101 would result in the isolation of instrument air to the containment. Removing instrument air to containment results in several air operated valves failing to their safe position. Several systems which are desired operable during power operation, such as charging and letdown, would isolate on loss of instrument air to the system's isolation valves. In accordance with Paragraph IWV-3412(a) of the ASME Code, this valve will be full-stroke exercised during cold shutdowns and refueling outages.

6. REACTOR AND SHIELD BUILDING VENTILATION SYSTEM

6.1 Category A Valves

Opening the containment vacuum breaker valves VB-10A and VB-10B during power operation would result in a violation of Technical Specification 3.6.a regarding containment system integrity. In accordance with Paragraph IWV-3412(a) of the ASME Code, these valves will be full-stroke exercised during cold shutdowns and refueling outages.

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