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INFORMAL REPORT

TECHNICAL EVALUATION REPORT, PUMP AND VALVE INSERVICE TESTING PROGRAM, INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

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Prep

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TECHNICAL EVALUATION REPORT
PUMP AND VALVE INSERVICE TESTING PROGRAM
INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

Docket No. 50-247

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ABSTRACT

This EG&G Idaho, Inc., report presents the results of our evaluation of the Indian Point Nuclear Generating, Unit No. 2, Inservice Testing Program for safety-related pumps and valves.

FOREWORD

This report is supplied as part of the "Review of Pump and Valve Inservice Testing Programs for Operating Plants" Program 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
INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

1. INTRODUCTION

Contained herein is a technical evaluation of the pump and valve inservice testing (IST) program submitted by the Consolidated Edison Company of New York (Con Edison) for its Indian Point Unit No. 2.

By a letter dated February 16, 1984, Con Edison submitted an IST program for Indian Point Unit No. 2. The working session with Con Edison and Indian Point Unit No. 2 representatives was conducted on November 13 and 14, 1985. The licensee's revised program, as attached to his letter to NRC, dated July 18, 1986, which supersedes all previous submittals, was reviewed to verify compliance of proposed tests of Class 1, 2, and 3 safety-related pumps and valves with the requirements of the ASME Boiler and Pressure Vessel Code (the Code), Section XI, 1980 Edition through the Winter of 1981 Addenda.

Any program revisions subsequent to those noted above are not approved. 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 submittal Con Edison has requested relief from the ASME Code testing requirements for specific pumps and valves and these requests have been evaluated individually to determine whether they are indeed impractical. This review was performed utilizing the acceptance criteria of the Standard Review Plan, Section 3.9.6, and the Draft Regulatory Guide and Value/Impact Statement titled "Identification of Valves for Inclusion in Inservice Testing Programs". These IST Program testing requirements apply only to component testing (i.e., pumps and valves) and are not intended to provide the basis to change the licensee's current Technical Specifications for system test requirements.

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&IDs used for this review is contained in Appendix C.

Inconsistencies and omissions in the licensee's 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.

2. PUMP TESTING PROGRAM

The Indian Point Unit No. 2 IST program submitted by Consolidated Edison Company of New York 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 Consolidated Edison Company basis for requesting relief from the pump testing requirements and the reviewer's evaluation of that request is summarized below.

2.1 All Safety-Related Pumps

2.1.1 Instrument Accuracy

2.1.1.1 Relief Request. The licensee has requested relief from the instrument accuracy requirements of Section XI, Paragraph IWP-4120, and proposed to utilize existing instrumentation during pump tests.

2.1.1.1.1 Licensee's Basis for Requesting Relief--Indian Point Unit No. 2 employs pressure instrumentation accurate to ±1/4%. Ranges for these instruments are up to eight times the reference value. The higher accuracy of these instruments effectively off-sets the wider ranges than are permitted under IWP-4120. As Indian Point Unit No. 2 was designed and constructed prior to codification of Section XI, instrumentation upgrading to meet Section XI provisions is not required by regulation. Experience has demonstrated that existing instrumentation is adequate for the detection of changes desired by the Code.

Alternative Testing: None required.

2.1.1.1.2 Evaluation--The reviewer agrees with the licensee's basis because the accuracy and range of the existing instrumentation results in a smaller tolerance band than that required by Section XI even when the instrument range is up to eight times reference value and should reduce the margin of error when recording pressure measurements during pump tests.

2.1.1.1.3 Conclusion--The reviewer concludes that the licensee's use of pressure instrumentation with full-scale ranges of up to eight times reference value and an accuracy tolerance of ±1/4 percent should provide sufficiently accurate data to adequately monitor pump degradation and, therefore, the requested relief should be granted from the requirements of Section XI and no additional accuracy requirements should be imposed.

2.2 Recirculation Pumps

2.2.1 Test Frequency

2.2.1.1 Relief Request. The licensee has requested relief from testing the recirculation pumps, #21 and #22, in accordance with the quarterly frequency requirements of Section XI, Paragraph IWP-3400(a), and proposed to test them during refueling outages.

2.2.1.1.1 Licensee's Basis for Requesting Relief--The recirculation pumps are located inside containment and are not accessible for testing during normal plant operation. Consequently, relief is requested from testing these pumps at the frequency specified by subsection IWP. The function of these pumps is to permit recirculation of the spilled post-LOCA containment inventory. The pumps are sized such that only one pump is required to maintain long term core cooling. Two external low head injection recirculation (residual heat removal) pumps provide additional backup recirculation capability taking suction from a separate sump inside containment. As for the recirculation pumps, only one low head injection/recirculation (residual heat removal) pump is required to maintain long term core cooling. The redundancy afforded by these two sets of redundant pumps far exceeds the requirements of the appropriate General Design Criteria.

The recirculation pumps are the vertical centrifugal type, the pumped fluid providing the bearing lubrication/cooling. They are located in a 12,000 gallon capacity sump inside containment. Each pump is rated at 3000 gpm. Because the pumped fluid serves to lubricate/cool the bearings, the manufacturer recommends against running these pumps dry. Pump design is such that no provisions are available to permit the installation of auxiliary bearing water cooling lines thereby precluding testing these pumps dry. Several approaches to testing the recirculation pumps have been considered. These include full flow at Code frequency, part flow at Code frequency, full flow at refuelings and part flow at refuelings. Of these, only part flow at refuelings is considered practical.

Following are some of the considerations involved with the less practical of these alternatives.

Full flow at Code frequency

Installed recirculation loop piping is sized for minimum flow. A full flow test, therefore, would require the use of the low head injection header to the reactor coolant system and a source of water to maintain sump level. Since the recirculation pumps are low head pumps (250 psig, design discharge pressure), reactor coolant system/recirculation system pressure differential precludes this type of testing.

Full flow at refuelings

The low head injection header could be utilized with the reactor coolant system depressurized. At full flow, one recirculation pump will empty the recirculation sump in less than four minutes, a duration insufficient to permit the required data gathering. In order to test in this mode, a source of makeup to the recirculation pump is required. Since the minimum required RCS shutdown margin must be maintained, a source of borated water of the proper concentration would be required. Although sources are available, there are currently no installed piping systems that would permit making-up borated water of the appropriate concentration at the requisite flow rate (approximately 3000 gpm). Modifications to install such piping require major construction and are ultimately accompanied by an additional contribution to system unreliability and/or risk.

Part flow at Code frequency

Part flow recirculation capability vis-a-vis installed recirculation piping and valves is available. The current Technical Specifications, however, preclude reactor operation at recirculation sump levels sufficient to permit recirculation pump operation. Reactor operation with recirculation sump level below prescribed limits is necessary to maintain margin to the post-LOCA containment flooding level at which safety related equipment not designed or intended for resubmergence would become submerged. As such, a Technical Specification change would be required to permit such testing during normal reactor operation. Notwithstanding a Technical Specification change, a source of borated water of the proper concentration to fill the recirculation sump would be required as well as a method of pumping the water out of containment after testing is completed. Various methods for obtaining borated water of the proper concentration can be postulated; however, each of these would require manual operations inside containment. No means are available for directly pumping water from the recirculation sump out of containment. Therefore, a portable pump and associated hosing would be required to pump water from the recirculation sump to the containment sump where it could then be pumped out of containment to waste hold up tanks. If testing were performed on a quarterly basis as required by Code, approximately 48,000 gallons of additional radwaste per year would require processing. The additional personnel exposure associated with entries into containment during power operation to facilitate filling and draining the sump, making valve line-ups before and after testing, obtaining test data, and processing large volumes of radwaste would be considerable, and we believe, inconsistent with ALARA guidelines. Finally, we believe that entries to containment during power operation for purposes other than visual observation or inspection renders the plant vulnerable to test or other human error with potential challenges to safety systems a possible result.

In addition to the considerations addressed above, we have considered spin testing at Code frequency in conjunction with full Code parameter tests at refuelings. As discussed above, the manufacturer recommends against running these pumps dry; therefore, spin testing would again require numerous in containment manual operations directed at filling and draining the sump. There are no provisions on these pumps that would facilitate the installation of bearing water lube lines. We have further considered rotating the pump shaft manually at Code frequency and concluded that any benefits to be derived from such an operation would be minimal since the pump impellers are not accessible for visual observation and no assurance of impeller rotation could be gained.

Finally, the subject of sump cleanliness is relevant. A detailed evaluation of this matter is contained in Consolidated Edison's (O'Toole) June 10, 1980, letter to the NRC (Denton) which provided our response to the 120 day requirements contained in the NRC's Confirmatory Order of February 11, 1980. Specifically, our response to item E.1.a of the order demonstrates that blockage is not likely to occur and that even if postulated, with the circulation pump sump completely blocked and flow to the other sump reduced by 50%, sufficient post-LOCA recirculation flow would continue via a single operating RHR pump.

Based on the substantial redundancy available, the fact that the backup low head injection/recirculation (RHR) pumps will be tested at the appropriate frequency, and the hardships involved in testing the recirculation pumps at any time other than refuelings, we believe that no substantial safety benefit will be derived from testing at Code frequency.

Alternative Testing: Testing of these pumps will be performed during refueling shutdowns. This is consistent with present Technical Specification requirements for recirculation pump surveillance testing.

2.2.1.1.2 Evaluation--The reviewer agrees with the licensee's basis because these pumps are located inside containment in a normally dry sump and should not be run dry quarterly because the pumped fluid lubricates and cools the pump bearings and damage could result. Water cannot be transferred to the sump to allow pump testing during power operation because the station Technical Specifications limit the level in the sump to provide an adequate collection volume to prevent post-accident equipment flooding. Additionally, pump testing during cold shutdowns could delay reactor startup due to the need to transfer a sufficient water volume to the sump and then pump it to the radioactive waste system for processing.

2.2.1.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of filling the containment recirculation sump to provide a source of water for pump testing during refueling outages should be sufficient to monitor pump degradation and, therefore, the requested relief should be granted from the quarterly test frequency requirements of Section XI and the licensee's proposed alternate testing should be imposed.

2.2.2 Bearing Temperature Measurement

2.2.2.1 Relief Request. The licensee has requested relief from measuring bearing temperature on the recirculation pumps, #21 and #22, in accordance with the requirements of Section XI, Table IWP-3100-1.

2.2.2.1.1 Licensee's Basis for Requesting Relief--These pumps are of the semi-submerged vertical centrifugal type. Except for the uppermost bearing, all other pump shaft bearings are submerged. Furthermore, all pump shaft bearings (including the uppermost bearing) are cooled by the pumped fluid with no access provisions available to permit direct contact bearing temperature measurements. Since the pump bearings are cooled by the pumped fluid, bearing temperatures are subject to variations due to pump water temperatures rendering any comparison with reference bearing temperatures of little practical value. Vibration measurements will provide singularly reliable evidence of pump mechanical condition independent of bearing temperature measurement. These journal bearings lubricated by pumped fluid were never intended to have temperature measurements taken.

Alternative Testing: None.

2.2.2.1.2 Evaluation--The reviewer agrees that annual bearing temperature measurements are impractical for the existing design and are an unreliable method of detecting bearing failure because the data obtained is subject to considerable variation due to influences other than bearing condition.

2.2.2.1.3 Conclusion--The reviewer concludes that deletion of the bearing temperature measurement will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and no alternate testing should be imposed.

2.2.3 Lubricant Level

2.2.3.1 Relief Request. The licensee has requested relief from observing lubricant level or pressure on the recirculation pumps, #21 and #22, in accordance with the requirements of Section XI, Table IWP-3100-1.

2.2.3.1.1 Licensee's Basis for Requesting Relief--The design of these pumps does not incorporate independent lubrication systems having measurable or observable characteristics. The recirculation pumps have bearings lubricated by pumped fluid. For this reason, checking the lubricant level or pressure does not apply.

Alternative Testing: None.

2.2.3.1.2 Evaluation--The reviewer agrees with the licensee that lubricant level or pressure cannot be observed because, due to existing design, the pump bearings are lubricated by the pumped fluid and not by an oil or grease lubrication system.

2.2.3.1.3 Conclusion--The reviewer concludes that observation of lubricant level or pressure is unnecessary due to pump design and that deletion of this requirement will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and no alternate testing should be imposed.

2.3 Safety Injection Pumps

2.3.1 Full-Flow Testing

2.3.1.1 Relief Request. The licensee has requested relief from testing the safety injection pumps, #21, #22, and #23, within one week following refueling outages in accordance with the requirements of Section XI, Paragraph IWP-3400(a), and proposed to utilize the full-flow tests performed during the refueling outage to meet this requirement.

2.3.1.1.1 Licensee's Basis for Requesting Relief--Present plant Technical Specifications and related commitments require full-flow testing of the safety injection pumps prior to startup following each reactor refueling.

These full-flow tests differ from the Section XI required tests of these pumps which are performed under minimum flow conditions using recirculation loops. Full-flow tests are maximum capability tests and serve to verify pump operability at conditions closely approximating those for which the pumps are designed. It is intended that these full-flow tests serve in lieu of the Section XI required recirculation flow tests during refuelings. Subsequent recirculation flow tests will commence three months (±25%) from the corresponding full flow test.

Alternative Testing: Upon resumption of power operation, these pumps will be tested quarterly in the miniflow mode with miniflow reference values commencing within three months (±25%) of the corresponding full-flow test. If for any reason, a full-flow test is not performed during any given refueling, a miniflow test will be performed during that refueling or within one week after the plant is returned to normal operation.

2.3.1.1.2 Evaluation--The reviewer agrees with the licensee's proposal because full-flow pump tests conducted under near design conditions will serve to demonstrate that the pumps are capable of performing their safety function and will augment the quarterly pump tests by providing additional data to utilize in monitoring pump degradation.

2.3.1.1.3 Conclusion--The reviewer concludes that the proposed testing of performing full-flow testing during refueling outages instead of minimum flow recirculation testing within one week of plant startup will enhance the licensee's pump testing program and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

2.3.2 Bearing Temperature Measurement

2.3.2.1 Relief Request. The licensee has requested relief from measuring bearing temperature on the safety injection pumps, #21, #22, and #23, in accordance with the requirements of Section XI, Paragraph IWP-3500(b), and proposed to measure bearing temperature annually after fifteen minutes of pump operation.

2.3.2.1.1 Licensee's Basis for Requesting Relief--Experience indicates bearing temperature to be sufficiently stabilized after fifteen minutes of pump operation. Furthermore, pump operating time for purposes of testing is severely limited by potential pump overheating under the minimum flow condition dictated by the test circuit.

Alternative Testing: For these pumps, bearing temperature will be measured once after fifteen minutes of pump operation on a yearly schedule.

2.3.2.1.2 Evaluation--The reviewer agrees with the licensee's basis because it is the reviewer's opinion that annual bearing temperature measurements are an unreliable method of detecting bearing failure since the data obtained is subject to considerable variation due to influences other than bearing condition. However, the reviewer also agrees with the licensee's proposal to include as much information as possible in the pump monitoring program in order to better assess pump condition.

2.3.2.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of measuring bearing temperature annually after fifteen minutes of pump operation will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

2.4 Containment Spray Pumps

2.4.1 Full-Flow Testing

2.4.1.1 Relief Request. The licensee has requested relief from testing the containment spray pumps, #21 and #22, within one week following refueling outages in accordance with the requirements of Section XI, Paragraph IWP-3400(a), and proposed to utilize the full-flow tests performed during the refueling outage to meet this requirement.

2.4.1.1.1 Licensee's Basis for Requesting Relief--Present plant Technical Specifications and related commitments require full-flow testing of the safety injection and auxiliary boiler feedwater pumps prior to startup following each reactor refueling. Optionally, full-flow tests may be performed on the containment spray pumps at refuelings.

These full-flow tests differ from the Section XI required tests of these pumps which are performed under minimum flow conditions using recirculation loops. Full-flow tests are maximum capability tests and serve to verify pump operability at conditions closely approximating those for which the pumps are designed. It is intended that these full-flow tests serve in lieu of the Section XI required recirculation flow tests during refuelings. Subsequent recirculation flow tests will commence three months (±25%) from the corresponding full flow test.

Alternative Testing: Upon resumption of power operation, these pumps will be tested quarterly in the miniflow mode with miniflow reference values commencing within three months (±25%) of the corresponding full-flow test. If for any reason, a full-flow test is not performed during any given refueling, a miniflow test will be performed during that refueling or within one week after the plant is returned to normal operation.

2.4.1.1.2 Evaluation--The reviewer agrees with the licensee's proposal because full-flow pump tests conducted under near design conditions will serve to demonstrate that the pumps are capable of performing their safety function and will augment the quarterly pump tests by providing additional data to utilize in monitoring pump degradation.

2.4.1.1.3 Conclusion--The reviewer concludes that the proposed testing of performing full-flow testing during refueling outages instead of minimum flow recirculation testing within one week of plant startup will enhance the licensee's pump testing program and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should e imposed.

2.4.2 Bearing Temperature Measurement

2.4.2.1 Relief Request. The licensee has requested relief from measuring bearing temperature on the containment spray pumps, #21 and #22, in accordance with the requirements of Section XI, Paragraph IWP-3500(b), and proposed to measure bearing temperature annually after fifteen minutes of pump operation.

2.4.2.1.1 Licensee's Basis for Requesting Relief--Experience indicates bearing temperature to be sufficiently stabilized after fifteen minutes of pump operation. Furthermore, pump operating time for purposes of testing is severely limited by potential pump overheating under the minimum flow condition dictated by the test circuit.

Alternative Testing: For these pumps, bearing temperature will be measured once after fifteen minutes of pump operation on a yearly schedule.

2.4.2.1.2 Evaluation--The reviewer agrees with the licensee's basis because it is the reviewer's opinion that annual bearing temperature measurements are an unreliable method of detecting bearing failure since the data obtained is subject to considerable variation due to influences other than bearing condition. However, the reviewer also agrees with the licensee's proposal to include as much information as possible in the pump monitoring program in order to better assess pump condition.

2.4.2.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of measuring bearing temperature annually after fifteen minutes of pump operation will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

2.5 Service Water Pumps

2.5.1 Full-Flow Testing

2.5.1.1 Relief Request. The licensee has requested relief from testing the service water pumps, #21, #22, #23, #24, #25, and #26, within one week following refueling outages in accordance with the requirements of Section XI, Paragraph IWP-3400(a), and proposed to utilize the full-flow tests performed during the refueling outage to meet this requirement.

2.5.1.1.1 Licensee's Basis for Requesting Relief--Present plant Technical Specifications and related commitments require full-flow testing of the safety injection and auxiliary boiler feedwater pumps prior to startup following each reactor refueling. Optionally, full-flow tests may be performed on the service water pumps at refuelings.

These full-flow tests differ from the Section XI required tests of these pumps which are performed under minimum flow conditions using recirculation loops. Full-flow tests are maximum capability tests and serve to verify pump operability at conditions closely approximating those for which the pumps are designed. It is intended that these full-flow tests serve in lieu of the Section XI required recirculation flow tests during refuelings. Subsequent recirculation flow tests will commence three months (±25%) from the corresponding full flow test.

Alternative Testing: Upon resumption of power operation, these pumps will be tested quarterly in the miniflow mode with miniflow reference values commencing within three months (±25%) of the corresponding full-flow test. If for any reason, a full-flow test is not performed during any given refueling, a miniflow test will be performed during that refueling or within one week after the plant is returned to normal operation.

2.5.1.1.2 Evaluation--The reviewer agrees with the licensee's proposal because full-flow pump tests conducted under near design conditions will serve to demonstrate that the pumps are capable of performing their safety function and will augment the quarterly pump tests by providing additional data to utilize in monitoring pump degradation.

2.5.1.1.3 Conclusion--The reviewer concludes that the proposed testing of performing full-flow testing during refueling outages instead of minimum flow recirculation testing within one week of plant startup will enhance the licensee's pump testing program and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

2.5.2 Lubricant Level

2.5.2.1 Relief Request. The licensee has requested relief from observing lubricant level or pressure on the service water pumps, #21, #22, #23, #24, #25, and #26, in accordance with the requirements of Section XI, Table IWP-3100-1.

2.5.2.1.1 Licensee's Basis for Requesting Relief--The design of these pumps does not incorporate independent lubrication systems having measurable or observable characteristics. The service water pumps have bearings lubricated by pumped fluid. For this reason, checking the lubricant level or pressure does not apply.

Alternative Testing: None.

2.5.2.1.2 Evaluation--The reviewer agrees with the licensee that lubricant level or pressure cannot be observed because, due to existing design, the pump bearings are lubricated by the pumped fluid and not by an oil or grease lubrication system.

2.5.2.1.3 Conclusion--The reviewer concludes that observation of lubricant level or pressure is unnecessary due to pump design and that deletion of this requirement will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and no alternate testing should be imposed.

2.5.3 Bearing Temperature Measurement

2.5.3.1 Relief Request. The licensee has requested relief from measuring bearing temperature on the service water pumps, #21, #22, #23, #24, #25, and #26, in accordance with the requirements of Section XI, Table IWP-3100-1.

2.5.3.1.1 Licensee's Basis for Requesting Relief--These pumps are of the semi-submerged vertical centrifugal type. Except for the uppermost bearing, all other pump shaft bearings are submerged. Furthermore, all pump shaft bearings (including the uppermost bearing) are enclosed within a cylindrical pipe type housing with no access provisions available to permit direct contact bearing temperature measurements. Since the pump bearings are either submerged or exposed to outdoor ambient conditions, bearing temperatures are subject to relatively large seasonal variations rendering any comparison with reference bearing temperatures of little practical value. Vibration measurements will provide singularly reliable evidence of pump mechanical condition independent of bearing temperature measurement. These are journal bearings lubricated by pumped fluid and, as such, were never intended to have temperature measurements taken.

Alternative Testing: None.

2.5.3.1.2 Evaluation--The reviewer agrees that annual bearing temperature measurements are impractical for the existing design and are an unreliable method of detecting bearing failure because the data obtained is subject to considerable variation due to influences other than bearing condition.

2.5.3.1.3 Conclusion--The reviewer concludes that deletion of the bearing temperature measurement will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and no alternate testing should be imposed.

2.6 Residual Heat Removal Pumps

2.6.1 Full-Flow Testing

2.6.1.1 Relief Request. The licensee has requested relief from testing the residual heat removal pumps, #21 and #22, within one week following refueling outages in accordance with Section XI, Paragraph IWP-3400(a), and proposed to utilize the full-flow tests performed during the refueling outage to meet this requirement.

2.6.1.1.1 Licensee's Basis for Requesting Relief--Present plant Technical Specifications and related commitments require full-flow testing of the safety injection and auxiliary boiler feedwater pumps prior to start-up following each reactor refueling. Optionally, full-flow tests may be performed on the residual heat removal pumps at refuelings.

These full-flow tests differ from the Section XI required tests of these pumps which are performed under minimum flow conditions using recirculation loops. Full-flow tests are maximum capability tests and serve to verify pump operability at conditions closely approximating those for which the pumps are designed. It is intended that these full-flow tests serve in lieu of the Section XI required recirculation flow tests during refuelings. Subsequent recirculation flow tests will commence three months (±25%) from the corresponding full-flow test.

Alternative Testing: Upon resumption of power operation, these pumps will be tested quarterly in the miniflow mode with miniflow reference values commencing within three months (±25%) of the corresponding full-flow test. If for any reason, a full-flow test is not performed during any given refueling, a miniflow test will be performed during that refueling or within one week after the plant is returned to normal operation.

2.6.1.1.2 Evaluation--The reviewer agrees with the licensee's proposal because full-flow pump tests conducted under near design conditions will serve to demonstrate that the pumps are capable of performing their safety function and will augment the quarterly pump tests by providing additional data to utilize in monitoring pump degradation.

2.6.1.1.3 Conclusion--The reviewer concludes that the proposed testing of performing full-flow testing during refueling outages instead of minimum flow recirculation testing within one week of plant startup will enhance the licensee's pump testing program and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

2.6.2 Bearing Temperature Measurement

2.6.2.1 Relief Request. The licensee has requested relief from measuring bearing temperature annually on the residual heat removal pumps, #21 and #22, in accordance with the requirements of Section XI, Paragraph IWP-3500(b), and proposed to measure bearing temperature after fifteen minutes of pump operation.

2.6.2.1.1 Licensee's Basis for Requesting Relief--Experience indicates bearing temperature to be sufficiently stabilized after fifteen minutes of pump operation. Furthermore, pump operating time for purposes of testing is severely limited by potential pump overheating under the minimum flow condition dictated by the test circuit.

Alternative Testing: For these pumps, bearing temperature will be measured once after fifteen minutes of pump operation on a yearly schedule.

2.6.2.1.2 Evaluation--The reviewer agrees with the licensee's basis because it is the reviewer's opinion that annual bearing temperature measurements are an unreliable method of detecting bearing failure since the data obtained is subject to considerable variation due to influences other than bearing condition. However, the reviewer also agrees with the licensee's proposal to include as much information as possible in the pump monitoring program in order to better assess pump condition.

2.6.2.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of measuring bearing temperature annually after fifteen minutes of pump operation will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

2.6.3 Lubricant Level

2.6.3.1 Relief Request. The licensee has requested relief from observing lubricant level or pressure on the residual heat removal pumps, #21 and #22, in accordance with the requirements of Section XI, Table IWP-3100-1.

2.6.3.1.1 Licensee's Basis for Requesting Relief--The design of these pumps does not incorporate independent lubrication systems having measurable or observable characteristics. The residual heat removal pumps have bearings lubricated by pumped fluid. For this reason, checking the lubricant level or pressure does not apply.

Alternative Testing: None.

2.6.3.1.2 Evaluation--The reviewer agrees with the licensee that lubricant level or pressure cannot be observed because, due to existing design, the pump bearings are lubricated by the pumped fluid and not by an oil or grease lubrication system.

2.6.3.1.3 Conclusion--The reviewer concludes that observation of lubricant level or pressure is unnecessary due to pump design and that deletion of this requirement will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and no alternate testing should be imposed.

2.7 Component Cooling Pumps

2.7.1 Bearing Temperature Measurement

2.7.1.1 Relief Request. The licensee has requested relief from measuring bearing temperature on the component cooling pumps, #21, #22, and #23, in accordance with the requirements of Section XI, Paragraph IWP-3500(b), and proposed to measure bearing temperature annually after fifteen minutes of pump operation.

2.7.1.1.1 Licensee's Basis for Requesting Relief--Experience indicates bearing temperature to be sufficiently stabilized after fifteen minutes of pump operation. Furthermore, pump operating time for purposes of testing is severely limited by potential pump overheating under the minimum flow condition dictated by the test circuit.

Alternative Testing: For these pumps, bearing temperature will be measured once after fifteen minutes of pump operation on a yearly schedule.

2.7.1.1.2 Evaluation--The reviewer agrees with the licensee's basis because it is the reviewer's opinion that annual bearing temperature measurements are an unreliable method of detecting bearing failure since the data obtained is subject to considerable variation due to influences other than bearing condition. However, the reviewer also agrees with the licensee's proposal to include as much information as possible in the pump monitoring program in order to better assess pump condition.

2.7.1.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of measuring bearing temperature annually after fifteen minutes of pump operation will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

2.8 Auxiliary Component Cooling Pumps

2.8.1 Bearing Temperature Measurement

2.8.1.1 Relief Request. The licensee has requested relief from measuring bearing temperature on the auxiliary component cooling pumps, #21 and #22, in accordance with the requirements of Section XI, Paragraph IWP-3500(b), and proposed to measure bearing temperature annually after fifteen minutes of pump operation.

2.8.1.1.1 Licensee's Basis for Requesting Relief--Experience indicates bearing temperature to be sufficiently stabilized after fifteen minutes of pump operation. Furthermore, pump operating time for purposes of testing is severely limited by potential pump overheating under the minimum flow condition dictated by the test circuit.

Alternative Testing: For these pumps, bearing temperature will be measured once after fifteen minutes of pump operation on a yearly schedule.

2.8.1.1.2 Evaluation--The reviewer agrees with the licensee's basis because it is the reviewer's opinion that annual bearing temperature measurements are an unreliable method of detecting bearing failure since the data obtained is subject to considerable variation due to influences other than bearing condition. However, the reviewer also agrees with the licensee's proposal to include as much information as possible in the pump monitoring program in order to better assess pump condition.

2.8.1.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of measuring bearing temperature annually after fifteen minutes of pump operation will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

2.8.2 Lubricant Level

2.8.2.1 Relief Request. The licensee has requested relief from observing lubricant level or pressure on the auxiliary component cooling pumps, #21 and #22, in accordance with the requirements of Section XI, Table IWP-3100-1.

2.8.2.1.1 Licensee's Basis for Requesting Relief--The design of these pumps does not incorporate independent lubrication systems having measurable or observable characteristics. Lubrication is by sealed grease type bearings. For these reasons checking the lubricant level or pressure does not apply.

Alternative Testing: None.

2.8.2.1.2 Evaluation--The reviewer agrees with the licensee that lubricant level or pressure cannot be observed because, due to existing design, these bearings are grease lubricated and sealed.

2.8.2.1.3 Conclusion--The reviewer concludes that observation of lubricant level or pressure is unnecessary due to bearing design and that deletion of this requirement will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and no alternate testing should be imposed.

2.9 Auxiliary Boiler Feedwater Pumps

2.9.1 Flow Measurement

2.9.1.1 Relief Request. The licensee has requested relief from measuring flow on the turbine driven auxiliary boiler feedwater pump, #22, in accordance with the requirements of Section XI, Paragraph IWP-3100, and proposed to measure flow rate during refueling outages.

2.9.1.1.1 Licensee's Basis for Requesting Relief--The test circuit employed for quarterly testing of this pump does not incorporate flow measurement instrumentation. Testing of this pump will be accomplished with all valves in the flow path in the full open position, thereby system resistance will be fixed and test results repeatable. Acceptance criteria will be predicated on obtaining acceptable head values at the design minimum flow condition.

By using the same test circuit aligned in the same manner from test to test, system resistance is effectively fixed. Pump degradation is readily observed by trending delta-p across the pump. Since delta-p varies as the flow squared ($\Delta p = KQ^2$), changes in ΔP are an earlier indicator of pump degradation than are changes in flow. Although flow cannot be recorded and trended, the test procedure proposed for this pump satisfies the intent of the Code, which is to identify changes in performance. These procedures, together with alert and action range trending, will assure that information sufficient to assess pump condition and the need for repair are readily available.

With respect to the turbine driven auxiliary boiler feedwater pump 22, full-flow testing accomplished at refuelings incorporates a different flow path that provides for both flow measurement as well as head, thus flow measurement is obtained at a refueling frequency.

The staff position concerning flow measurements on the turbine driven auxiliary boiler feedwater pump is that instrumentation must be installed to measure flow during testing in order to provide reasonable assurance of operational readiness. The staff agrees that flow measurements taken at the refueling frequency are better than not at all but questions the accuracy of pump readiness predictions due to the interval between measurements. We continue to believe that quarterly testing this pump in a fixed resistance system using head measurement alone to assess hydraulic performance, together with full flow/full parameter tests at refuelings, will provide the reasonable assurance of operational readiness the staff is seeking.

Alternative Testing: Quarterly tests will be accomplished in a fixed resistance system using head as the indicator of hydraulic performance in lieu of varying system resistance to a specified flow and then measuring head.

2.9.1.1.2 Evaluation--The reviewer does not agree with the licensee's basis because the NRC staff position is that both pump flow rate and differential pressure must be measured quarterly in accordance with Section XI, Table IWP-3100-1, in order to assess pump hydraulic condition and that lack of installed instrumentation is not an adequate long term justification for not making these Code required measurements.

2.9.1.1.3 Conclusion--The reviewer concludes that the licensee should be required to perform system modifications to allow testing this pump in accordance with Section XI. Interim relief should be granted pending the licensee making modifications to permit meeting the Code. For the balance of the period of the current fuel cycle, interim relief should be granted to test this pump as proposed by the licensee. The licensee should make these modifications prior to the end of the next refueling outage (1987). The reviewer concludes that requiring the licensee to make these modifications prior to the next refueling outage (1987) would impose unnecessary hardship on the licensee without a compensating increase in the level of safety.

2.9.2 Full-Flow Testing

2.9.2.1 Relief Request. The licensee has requested relief from testing the auxiliary boiler feedwater pumps, #21, #22, and #23, within one week following refueling outages in accordance with Section XI, Paragraph IWP-3400(a), and proposed to utilize the full-flow tests performed during the refueling outage to meet this requirement.

2.9.2.1.1 Licensee's Basis for Requesting Relief--Present plant Technical Specifications and related commitments require full-flow testing of the auxiliary boiler feedwater pumps prior to startup following each reactor refueling.

These full-flow tests differ from the Section XI required tests of these pumps which are performed under minimum flow conditions using recirculation loops. Full-flow tests are maximum capability tests and serve to verify pump operability at conditions closely approximating those for which the pumps are designed. It is intended that these full-flow tests serve in lieu of the Section XI required recirculation flow tests during refuelings. Subsequent recirculation flow tests will commence three months (±25%) from the corresponding full flow test.

Alternative Testing: Upon resumption of power operation, these pumps will be tested quarterly in the miniflow mode with miniflow reference values commencing within three months (±25%) of the corresponding full-flow test. If for any reason, a full-flow test is not performed during any given refueling, a miniflow test will be performed during that refueling or within one week after the plant is returned to normal operation.

2.9.2.1.2 Evaluation--The reviewer agrees with the licensee's proposal because full-flow pump tests conducted under near design conditions will serve to demonstrate that the pumps are capable of performing their safety function and will augment the quarterly pump tests by providing additional data to utilize in monitoring pump degradation.

2.9.2.1.3 Conclusion--The reviewer concludes that the proposed testing of performing full-flow testing during refueling outages instead of minimum flow recirculation testing within one week of plant startup will enhance the licensee's pump testing program and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

2.9.3 Bearing Temperature Measurement

2.9.3.1 Relief Request. The licensee has requested relief from measuring bearing temperature on the auxiliary boiler feedwater pumps, #21, #22, and #23, in accordance with the requirements of Section XI, Paragraph IWP-3500(b), and proposed to measure bearing temperature annually after fifteen minutes of pump operation.

2.9.3.1.1 Licensee's Basis for Requesting Relief--Experience indicates bearing temperature to be sufficiently stabilized after fifteen minutes of pump operation. Furthermore, pump operating time for purposes of testing is severely limited by potential pump overheating under the minimum flow condition dictated by the test circuit.

Alternative Testing: For these pumps, bearing temperature will be measured once after fifteen minutes of pump operation on a yearly schedule.

2.9.3.1.2 Evaluation--The reviewer agrees with the licensee's basis because it is the reviewer's opinion that annual bearing temperature measurements are an unreliable method of detecting bearing failure since the data obtained is subject to considerable variation due to influences other than bearing condition. However, the reviewer also agrees with the licensee's proposal to include as much information as possible in the pump monitoring program in order to better assess pump condition.

2.9.3.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of measuring bearing temperature annually after fifteen minutes of pump operation will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

2.10 Charging Pumps

2.10.1 Bearing Temperature Measurement

2.10.1.1 Relief Request. The licensee has requested relief from measuring bearing temperature on the charging pumps, #21, #22, and #23, in accordance with the requirements of Section XI, Paragraph IWP-3500(b), and proposed to measure bearing temperature annually after fifteen minutes of pump operation.

2.10.1.1.1 Licensee's Basis for Requesting Relief--Experience indicates bearing temperature to be sufficiently stabilized after fifteen minutes of pump operation. Furthermore, pump operating time for purposes of testing is severely limited by potential pump overheating under the minimum flow condition dictated by the test circuit.

Alternative Testing: For these pumps, bearing temperature will be measured once after fifteen minutes of pump operation on a yearly schedule.

2.10.1.1.2 Evaluation--The reviewer agrees with the licensee's basis because it is the reviewer's opinion that annual bearing temperature measurements are an unreliable method of detecting bearing failure since the data obtained is subject to considerable variation due to influences other than bearing condition. However, the reviewer also agrees with the licensee's proposal to include as much information as possible in the pump monitoring program in order to better assess pump condition.

2.10.1.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of measuring bearing temperature annually after fifteen minutes of pump operation will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

2.10.2 Trending Test Parameters

2.10.2.1 Relief Request. The licensee has requested relief from comparing quarterly pump test parameter values to fixed reference values on the charging pumps, #21, #22, and #23, and proposed to establish alternate alert and action ranges with a limit of 75 gpm per pump as the minimum acceptable flow rate.

2.10.2.1.1 Licensee's Basis for Requesting Relief--The charging pumps are positive displacement, 98 gpm design flow rate, variable speed pumps employed in a variable resistance system. They serve to maintain chemistry control, provide reactor coolant pump seal injection flow, and reactor coolant pump lower radial bearing cooling flow. They also provide a means of reactivity control via boron addition.

With regard to the emergency boration function, the chemical and volume control system malfunction resulting in dilution, as analyzed in the FSAR, is relevant. Three cases are analyzed including dilution during refueling, dilution during startup, and dilution at power. The analysis concludes that, because of the procedures involved in the dilution process, an erroneous dilution is considered incredible. Nevertheless, if an unintentional dilution of boron in the reactor coolant does occur, numerous alarms and indications are available to alert the operator to the condition. The maximum reactivity addition due to dilution is slow enough to allow the operator to determine the cause of the addition and take corrective action before excessive shutdown margin is lost. Since there is only a single, common source of reactor makeup water to the reactor makeup water system, corrective action can be readily accomplished by isolating this single source thereby terminating the dilution. Thus, emergency boration capability is not required to mitigate a dilution event.

Should the operator wish to maintain the plant in a shutdown condition following a dilution event, he may reborate using any one of the three boration paths available to him.

Since the safety analyses in the FSAR did not take credit for the operation of the changing pumps, charging pumps are not required to mitigate an accident. However, it is highly desirable to be able to maintain reactor coolant pump (RCP) seal water supply as well as to cope with small primary system leaks without actuating safeguards equipment. The former requires 32 gpm while the latter is dependent on the break size and location. A 3/8 inch (equivalent diameter hole) cold leg break (with FL/D = 0) has been established as the maximum size for which it would be both desirable and reasonable to mitigate without safety injection initiation. Total charging flow of 130 gpm has been calculated as permitting the RCS to reach equilibrium pressure above the low pressure reactor trip setpoint (1800 psig) for such a break. Since the Tech. Spec. permits operation with two charging pumps available, 130 gpm results in 65 gpm per charging pump. Allowing an additional 10 gpm for conservatism results in the 75 gpm acceptance criteria.

There are no instrumented bypass loops available to facilitate quarterly testing of these pumps. The normal flow path precludes adjusting system resistance to a reference value in subsequent quarterly tests due to the demands of the reactor coolant pump seals and the normal pressure variations of the reactor coolant system. As such, no comparison to reference values can be made.

Alternative Testing: The parameters identified in the table will be measured quarterly and trended. A minimum operability criteria of 75 gpm per pump (nominal full flow) has been established. Experience with data trending has permitted synthesizing alert and action ranges for these parameters. These ranges are wider than specified in Table IWP-3100-2 as permitted by IWP-3210. It should be noted that charging pump service life between rebuilding is about 2000 hours, therefore, a given pump will not likely experience more than two consecutive IST program pump tests before being rebuilt. The pump decreasing capacity is due to continuous degradation of plunger packing.

2.10.2.1.2 Evaluation--The reviewer agrees with the licensee's proposal because the licensee has established a minimum acceptable pump flow rate that considers what appears to be a sufficiently conservative margin. The reviewer also agrees with the proposal to establish ranges of test quantities other than those required by Table IWP-3100-2 because the Code allows use of different ranges if those of Table IWP-3100-2 cannot be met. It is the reviewer's opinion that the significant, and thereby limiting, test parameter will be the pump flow rate due to the very short service life of the pump plunger packing. Since failure of the packing requires that pump maintenance be performed, the licensee is placing into service an essentially new pump each 2000 hours which requires that a new set of reference values be established for subsequent tests. It is conceivable that, after being repaired, a given pump could be taken out of service for maintenance before Section XI required that it be tested and, since the service life is approximately 83 days, this would render the newly established reference values meaningless.

2.10.2.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of establishing and trending charging pump reference values to the extent practical and of repairing pumps when they can no longer meet the 75 gpm minimum acceptable flow rate should be sufficient to assure operational readiness and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

2.11 Fuel Oil Transfer Pumps

2.11.1 Lubricant Level

2.11.1.1 Relief Request. The licensee has requested relief from observing lubricant level or pressure on the fuel oil transfer pumps, #21, #22, and #23, in accordance with Section XI, Table IWP-3100-1.

2.11.1.1.1 Licensee's Basis for Requesting Relief--The design of these pumps does not incorporate independent lubrication systems having measurable or observable characteristics. The fuel oil transfer pumps have bearings lubricated by pumped fluid. For this reason, checking the lubricant level or pressure does not apply.

Alternative Testing: None.

2.11.1.1.2 Evaluation--The reviewer agrees with the licensee that lubricant level or pressure cannot be observed because, due to existing design, the pump bearings are lubricated by the pumped fluid and not by an oil or grease lubrication system.

2.11.1.1.3 Conclusion--The reviewer concludes that observation of lubricant level or pressure is unnecessary due to pump design and that deletion of this requirement will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

2.11.2 Bearing Temperature and Vibration Measurements

2.11.2.1 Relief Request. The licensee has requested relief from measuring bearing temperature and vibration on the fuel oil transfer pumps, #21, #22, and #23, in accordance with the requirements of Section XI, Paragraphs IWP-3300 and -4510.

2.11.2.1.1 Licensee's Basis for Requesting Relief--The fuel oil transfer pumps are submerged within the fuel oil storage tanks precluding direct access to the pump bearings for vibration and bearing temperature measurements.

Alternative Testing: A best effort will be made to obtain vibration measurements off of the pump motor housing. This information is not expected to be repeatable, however, an attempt will be made to trend the data.

2.11.2.1.2 Evaluation--The reviewer agrees with the licensee's basis because these pumps are submerged and inaccessible, therefore, portable temperature and vibration instrumentation cannot be effectively utilized during testing since the required instrumentation is not permanently installed. Also, vibration measurements taken from the motor may not provide useful information due to the physical separation between the pump and motor.

2.11.2.1.3 Conclusion--The reviewer concludes that deletion of the bearing temperature and vibration measurements will not affect the licensee's monitoring program for these pumps and, therefore, the requested relief should be granted from the requirements of Section XI and no alternate testing should be imposed.

2.11.3 Flow Measurement

2.11.3.1 Relief Request. The licensee has requested relief from measuring flow on the fuel oil transfer pumps, #21, #22, and #23, in accordance with the requirements of Section XI, Paragraph IWP-3100, and proposed to test these pumps in a fixed resistance flow path and to trend the pump differential pressure.

2.11.3.1.1 Licensee's Basis for Requesting Relief--The test circuit employed for quarterly testing of these pumps does not incorporate flow measurement instrumentation. Testing of these pumps will be accomplished with all valves in the flow path in the full open position, thereby system resistance will be fixed and test results repeatable. Acceptance criteria will be predicated on obtaining acceptable head values at the design minimum flow condition.

By using the same test circuit aligned in the same manner from test to test, system resistance is effectively fixed. Pump degradation is readily observed by trending delta-p across the pump. Since delta-p varies as the flow squared ($\Delta p=KQ^2$), changes in ΔP are an earlier indicator of pump degradation than are changes in flow. Although flow cannot be recorded and trended, the test procedure proposed for this pump satisfies the intent of the Code, which is to identify changes in performance. These procedures, together with alert and action range trending, will assure that information sufficient to assesses pump condition and the need for repair are readily available.

Alternative Testing: The fuel oil transfer pumps will be tested in a fixed resistance system using head as the indicator of hydraulic performance in lieu of varying system resistance to a specified flow and then measuring head.

2.11.3.1.2 Evaluation--The reviewer agrees with the licensee's proposal because testing the pumps in a fixed resistance flow path should duplicate conditions from test to test and should provide sufficiently accurate information to use in monitoring pump degradation. Additionally, the NRC staff has previously discussed this proposed test method and has approved it.

2.11.3.1.3 Conclusion--The reviewer concludes that the licensee's proposed test method should provide adequate monitoring of pump degradation to reasonably assure their operational readiness and, therefore, the requested relief should be granted from the requirements of Section XI and no alternate testing should be imposed.

2.12 Boric Acid Transfer Pumps

2.12.1 Bearing Temperature Measurement

2.12.1.1 Relief Request. The licensee has requested relief from measuring bearing temperature on the boric acid transfer pumps, #21 and #22, in accordance with the requirements of Section XI, Paragraph IWP-3500(b), and proposed to measure bearing temperature annually after fifteen minutes of pump operation.

2.12.1.1.1 Licensee's Basis for Requesting Relief--Experience indicates bearing temperature to be sufficiently stabilized after fifteen minutes of pump operation. Furthermore, pump operating time for purposes of testing is severely limited by potential pump overheating under the minimum flow condition dictated by the test circuit.

Alternative Testing: For these pumps, bearing temperature will be measured once after fifteen minutes of pump operation on a yearly schedule.

2.12.1.1.2 Evaluation--The reviewer agrees with the licensee's basis because it is the reviewer's opinion that annual bearing temperature measurements are an unreliable method of detecting bearing failure since the data obtained is subject to considerable variation due to influences other than bearing condition. However, the reviewer also agrees with the licensee's proposal to include as much information as possible in the pump monitoring program in order to better assess pump condition.

2.12.1.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of measuring bearing temperature annually after fifteen minutes of pump operation will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

2.12.2 Lubricant Level

2.12.2.1 Relief Request. The licensee has requested relief from observing lubricant level or pressure on the boric acid transfer pumps, #21 and #22, in accordance with Section XI, Table IWP-3100-1.

2.12.2.1.1 Licensee's Basis for Requesting Relief--The design of these pumps does not incorporate independent lubrication systems having measurable or observable characteristics. The boric acid transfer pumps have bearings lubricated by pumped fluid. For this reason, checking the lubricant level or pressure does not apply.

Alternative Testing: None.

2.12.2.1.2 Evaluation--The reviewer agrees with the licensee that lubricant level or pressure cannot be observed because, due to existing design, the pump bearings are lubricated by the pumped fluid and not by an oil or grease lubrication system.

2.12.2.1.3 Conclusion--The reviewer concludes that observation of lubricant level or pressure is unnecessary due to pump design and that deletion of this requirement will not affect the licensee's pump monitoring program and, therefore, the requested relief should be granted from the requirements of Section XI and no alternate testing should be imposed.

2.12.3 Flow Measurement

2.12.3.1 Relief Request. The licensee has requested relief from measuring flow on the boric acid transfer pumps, #21 and #22, in accordance with the requirements of Section XI, Paragraph IWP-3100, and proposed to test these pumps in a fixed resistance flow path and to trend the pump differential pressure.

2.12.3.1.1 Licensee's Basis for Requesting Relief--The test circuit employed for quarterly testing of these pumps does not incorporate flow measurement instrumentation. Testing of these pumps will be accomplished with all valves in the flow path in the full open position, thereby system resistance will be fixed and test results repeatable. Acceptance criteria will be predicated on obtaining acceptable head values at the design minimum flow condition.

By using the same test circuit aligned in the same manner from test to test, system resistance is effectively fixed. Pump degradation is readily observed by trending delta-p across the pump. Since delta-p varies as the flow squared ($\Delta p = KQ^2$), changes in ΔP are an earlier indicator of pump degradation than are changes in flow. Although flow cannot be recorded and trended, the test procedure proposed for these pumps satisfies the intent of the Code, which is to identify changes in performance. These procedures, together with alert and action range trending, will assure that information sufficient to assesses pump condition and the need for repair are readily available.

The staff position concerning flow measurements on the boric acid transfer pumps is that instrumentation must be installed to measure flow rate during testing, if flow rate cannot be accurately calculated, in order to provide reasonable assurance of their continuing operational readiness. The test circuits employed for testing of the boric acid transfer pumps provide for recirculating the boric acid solution back to the storage tank, as such, no change in level occurs when the pumps are tested, hence there is no opportunity that would permit the calculation of flow rate. In addition, as for the charging pump (see Relief Request No. 8), the boric acid transfer pumps are not required to mitigate the consequences of any design basis accident although they can be used for, or to assist in, that purpose. We continue to believe that the test method/justifications described above are adequate to demonstrate continuing operational readiness of the boric acid transfer pumps and that the installation of flow instrumentation should not be required.

Alternative Testing: Quarterly tests will be accomplished in a fixed resistance system using head as the indicator of hydraulic performance in lieu of varying system resistance to a specified flow then measuring head.

2.12.3.1.2 Evaluation--The reviewer does not agree with the licensee's basis because the NRC staff position is that both pump flow rate and differential pressure must be measured quarterly in accordance with Section XI, Table IWP-3100-1, in order to assess pump hydraulic condition and that lack of installed instrumentation is not an adequate long term justification for not making these Code required measurements.

2.12.3.1.3 Conclusion--The reviewer concludes that the licensee should be required to perform system modifications to allow testing this pump in accordance with Section XI. Interim relief should be granted pending the licensee making modifications to permit meeting the Code. For the balance of the period of the current fuel cycle, interim relief should be granted to test these pumps as proposed by the licensee. The licensee should make these modifications prior to the end of the next refueling outage (1987). The reviewer concludes that requiring the licensee to make these modifications prior to the next refueling outage (1987) would impose unnecessary hardship on the licensee without a compensating increase in the level of safety.

3. VALVE TESTING PROGRAM

The Indian Point Unit No. 2, IST program submitted by Consolidated Edison Company was examined to verify that all valves that are included in the program are subjected to the periodic tests required by the ASME Code, Section XI, and the NRC positions and guidelines. The 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. Each Consolidated Edison Company basis for requesting relief from the valve testing requirements and the reviewer's evaluation of that request is summarized below and grouped according to system and valve category.

3.1 Auxiliary Coolant System

3.1.1 Category A Valves

3.1.1.1 Relief Request. The licensee has requested relief from exercising valve 744, auxiliary coolant return header isolation, in accordance with Section XI, Paragraph IWV-3410, and proposed to full-stroke exercise this valve during refueling outages.

3.1.1.1.1 Licensee's Basis for Requesting Relief--Full-stroke testing of this valve quarterly is impractical in that the failure of the valve in the closed position nullifies the function of the RHR pumps in the LPSI mode should an emergency occur concurrent with the valve failure. The valve cannot be exercised at cold shutdowns because closing the valve will terminate the normal RHR cooling mode (required to maintain cold shutdown). It is also impractical to part-stroke exercise the valve since this valve is an open or closed only valve. In addition, Technical Specifications effectively require one RHR pump operable at all times; closing 744 makes the RHR pumps inoperable.

Alternative Testing: This valve will be full-stroke exercised at refueling outages.

3.1.1.1.2 Evaluation--The reviewer agrees with the licensee's basis because the licensee's Technical Specifications require that valve 744 remain open during power operation to provide the flow path from low head safety injection and during cold shutdowns to provide the flow path for decay heat removal. Both of these safety functions would be lost if this valve failed shut while testing because it is installed in a non-redundant section of piping.

3.1.1.1.3 Conclusion--The reviewer concludes that full-stroke exercising this valve during refueling outages when the low pressure safety injection and decay heat removal functions can be removed from service should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.1.1.2 Relief Request. The licensee has requested relief from exercising valves 797, reactor coolant pumps cooling water supply, 784, reactor coolant pumps motor bearing cooler return, and FCV-625, reactor coolant pumps thermal barrier return, in accordance with the requirements of Section XI, Paragraph IWV-3410, and proposed to full-stroke exercise these valves during those cold shutdowns when all reactor coolant pumps are secured or at least during each refueling outage.

3.1.1.2.1 Licensee's Basis for Requesting Relief--These valves are open or closed only valves; therefore, part-stroke testing of these valves is impractical. Also, full-stroke exercising these valves quarterly while the plant is at normal operating power is impractical because this would isolate cooling water to the RC pumps.

Alternative Testing: These valves will be full-stroke exercised at cold shutdowns provided the RC pumps are secured. If one or more RC pumps are not secured at cold shutdowns, the associated valves will be tested at intervals no greater than refuelings.

3.1.1.2.2 Evaluation--The reviewer agrees that these valves cannot be exercised during power operation and that, since all reactor coolant pumps may not be secured each cold shutdown, exercising these valves may not be possible at the cold shutdown frequency. The cooling water supply and return to and from the reactor coolant pumps is through common headers and if any one of these valves failed shut while testing and any reactor coolant pump was running, thermal damage to that pump could occur.

3.1.1.2.3 Conclusion--The reviewer concludes that full-stroke exercising these valves during those cold shutdowns when all reactor coolant pumps are secured and during refueling outages should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.1.2 Category B Valves

3.1.2.1 Relief Request. The licensee has requested relief from exercising valves 822A and 822B, residual heat exchanger component cooling water outlet isolations, in accordance with the requirements of Section XI, Paragraph IWV-3410, and proposed to full-stroke exercise these valves during those cold shutdowns when all reactor coolant pumps are secured or at least during each refueling outage.

3.1.2.1.1 Licensee's Basis for Requesting Relief--Full-stroke testing of these valves during normal plant operation may divert flow from the component cooling system via the 12 inch return lines. This could result in reduced cooling flow to the RC pump coolers and thermal barriers which could create a potential for overheating and damage to the RC pumps.

Alternative Testing: These valves will be full-stroke exercised at cold shutdowns provided the RC pumps are secured. If one or more RC pumps are not secured at cold shutdowns, the associated valves will be tested at intervals no greater than refuelings.

3.1.2.1.2 Evaluation--The reviewer agrees that these valves cannot be exercised during power operation and that exercising at the cold shutdown frequency may not be possible because all reactor coolant pumps may not be secured each cold shutdown. Exercising these valves while any reactor coolant pump is running could result in overheating the running pump due to diverting component cooling flow from the reactor coolant pumps and through the residual heat exchangers.

3.1.2.1.3 Conclusion--The reviewer concludes that full-stroke exercising these valves during those cold shutdowns when all reactor coolant pumps are secured and during refueling outages should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.1.2.2 Relief Request. The licensee has requested relief from exercising valves 769, reactor coolant pumps cooling water supply, 786, reactor coolant pumps motor bearing cooler return, and 789, reactor coolant pumps thermal barrier return, in accordance with the requirements of Section XI, Paragraph IWV-3410, and proposed to full-stroke exercise these valves during those cold shutdowns when all reactor coolant pumps are secured or at least during each refueling outage.

3.1.2.2.1 Licensee's Basis for Requesting Relief--Full-stroke testing of these valves quarterly during normal plant operation would cause a loss of cooling water to the RC pumps bearing oil coolers or the thermal barriers or both and would damage the RC pumps. Part-stroke testing is also impractical because these are open or closed only valves.

Alternative Testing: These valves will be full-stroke exercised during cold shutdowns provided the RC pumps are secured. If one or more RC pumps are not secured at cold shutdowns, the associated valves will be tested at intervals no greater than refuelings.

3.1.2.2.2 Evaluation--The reviewer agrees that these valves cannot be exercised during power operation and that, since all reactor coolant pumps may not be secured each cold shutdown, exercising these valves may not be possible at the cold shutdown frequency. The cooling water supply and return to and from the reactor coolant pumps is through common headers and if any one of these valves failed shut while testing and any reactor coolant pump was running, thermal damage to that pump could occur.

3.1.2.2.3 Conclusion--The reviewer concludes that full-stroke exercising these valves during those cold shutdowns when all reactor coolant pumps are secured and during refueling outages should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.2 Boiler Feedwater System

3.2.1 Category B Valves

3.2.1.1 Relief Request. The licensee has requested relief from measuring the stroke time of valves FCV-405A, B, C, and D, turbine driven auxiliary feedwater pump discharge header flow control, and FCV-406A, B, C, and D, motor driven auxiliary feedwater pump discharge header flow control, in accordance with Section XI, Paragraph IWV-3413(a) and (b).

3.2.1.1.1 Licensee's Basis for Requesting Relief--These are normally open and fail-open valves. Their stroke time is manually adjustable in the control room. As such, the stroke-time testing is of no consequence.

Alternative Testing: None.

3.2.1.1.2 Evaluation--The reviewer agrees that these valves cannot be accurately stroke timed because they are controlled with a "thumb-wheel" type controller and initiation of valve movement is subject to considerable variation. The stroke time measurements of these valves would be very difficult to repeat due to the absence of valve control switches and would not contribute meaningful data to utilize in monitoring valve degradation.

3.2.1.1.3 Conclusion--The reviewer concludes that full-stroke exercising these valves quarterly without stroke timing should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the stroke time measurement requirements of Section XI and no alternate testing should be imposed.

3.2.2 Category C Valves

3.2.2.1 Relief Request. The licensee has requested relief from exercising valves BFD-79, -79-1, -79-2, and -79-3, common turbine and motor driven auxiliary feedwater pump header checks, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to partial-stroke exercise these valves during cold shutdowns and to full-stroke exercise them during refueling outages.

3.2.2.1.1 Licensee's Basis for Requestion Relief--Exercising these check valves quarterly during normal operation is impractical since the auxiliary feedwater pumps must be activated to flow ambient temperature water from the CST to the SG which can result in thermal shocking of the SG tube sheet.

Full-stroke exercising at cold shutdown is impractical because the high flow rates required for full-stroke exercising make it difficult to control water levels in the SG. Excessively high water levels in the SG can result in water in the steamlines and can lead to turbine damage when power operations are resumed.

Alternative Testing: These valves will be part-stroke exercised at cold shutdowns during operation of the auxiliary feedwater pumps and full-stroke exercised at refuelings in conjunction with the full flow test of the auxiliary feedwater pumps.

3.2.2.1.2 Evaluation--The reviewer agrees with the licensee that these valves cannot be exercised during power operation because cold water injection would create thermal stresses in the steam generator and could reduce the service lifetime of the steam generator internals. The reviewer also agrees that these valves cannot be full-stroke exercised during cold shutdowns because the steam generator does not provide a sufficient expansion volume to accommodate the flow required and water could overflow from the steam generator into the main steam lines and then through the main turbine during the subsequent startup, possibly causing damage to the turbine blades.

3.2.2.1.3 Conclusion--The reviewer concludes that partial-stroke exercising these valves during cold shutdowns and full-stroke exercising them during refueling outages should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.2.2.2 Relief Request. The licensee has requested relief from exercising valves BFD-34 and -39, motor driven auxiliary feedwater pump discharge checks, BFD-35, -37, -40, and -42, motor driven auxiliary feedwater pump header checks, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to partial-stroke exercise these valves during cold shutdowns and to full-stroke exercise them during refueling outages.

3.2.2.2.1 Licensee's Basis for Requesting Relief--These check valves are normally closed and have an emergency function to open when the AFW pumps (motor driven) are activated to provide condensate storage tank water to the steam generator. BFD-39 and BFD-34 are downstream of the AFW pump test recirculation lines thus precluding any exercising during monthly pump tests.

Part-stroke testing at cold shutdowns and full-stroke exercising at refueling outages is justified based upon the reasons given for the BFD-79 series valves:

Exercising these check valves quarterly during normal operation is impractical since the auxiliary feedwater pumps must be activated to flow ambient temperature water from the CST to the SG which can result in thermal shocking of the SG tube sheet.

Full-stroke exercising at cold shutdown is impractical because the high flow rates required for full-stroke exercising make it difficult to control water levels in the SG. Excessively high water levels in the SG can result in water in the steamlines and can lead to turbine damage when power operations are resumed.

Alternative Testing: These valves will be part-stroke exercised at cold shutdowns during operation of the auxiliary feedwater pumps and full-stroke exercised at refuelings in conjunction with the full flow test of the auxiliary feedwater pumps.

3.2.2.2.2 Evaluation--The reviewer agrees with the licensee that these valves cannot be exercised during power operation because cold water injection would create thermal stresses in the steam generator and could reduce the service lifetime of the steam generator internals. The reviewer also agrees that these valves cannot be full-stroke exercised during cold shutdowns because the steam generator does not provide a sufficient expansion volume to accommodate the flow required and water could overflow from the steam generator into the main steam lines and then through the main turbine during the subsequent startup possibly causing damage to the turbine blades.

3.2.2.2.3 Conclusion--The reviewer concludes that partial-stroke exercising these valves during cold shutdowns and full-stroke exercising them during refueling outages should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.2.2.3 Relief Request. The licensee has requested relief from exercising valves BFD-31, turbine driven auxiliary feedwater pump discharge check, BFD-47, -47-1, -47-2, and -47-3, turbine driven auxiliary feedwater pump header checks, in accordance with Section XI, Paragraph IWV-3520, and proposed to full-stroke exercise these valves during refueling outages.

3.2.2.3.1 Licensee's Basis for Requesting Relief--Exercising these valves quarterly during normal operation is impractical for the reasons given for the BFD-79 series valves, i.e., thermal shocking of the SG tube sheet. (See Item 3.2.2.1).

Full- or part-stroke exercising of these valves at cold shutdowns is impractical because there is no steam present to run the turbine driven AFW pumps.

Alternative Testing: These valves will be full-stroke exercised during refueling outages in conjunction with the full flow test of the turbine driven auxiliary feedwater pumps.

3.2.2.3.2 Evaluation--The reviewer agrees with the licensee that these valves cannot be exercised during power operation because cold water injection would create thermal stresses in the steam generator and could reduce the service lifetime of the steam generator internals. These valves cannot be exercised during cold shutdowns because there is no steam available to power the turbine driven pump and the only flow path available is from that pump.

3.2.2.3.3 Conclusion--The reviewer concludes that the proposed alternate testing of full-stroke exercising these valves during the performance of turbine driven auxiliary feedwater testing at refueling outages should be sufficient to demonstrate valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.3 Chemical and Volume Control System

3.3.1 Category A Valves

3.3.1.1 Relief Request. The licensee has requested relief from exercising valves 4925, 4926, 4927, 4928, 250A, B, C, D, reactor coolant pump seal water supply isolations, in accordance with the requirements of Section XI, Paragraph IWV-3410, and proposed to full-stroke exercise these valves in pairs during those cold shutdowns when the associated reactor coolant pump is secured or at least during each refueling outage.

3.3.1.1.1 Licensee's Basis for Requesting Relief--Because these valves are open and close only valves it is impractical to part-stroke these valves. Full-stroke exercising the valves quarterly during normal plant operation is also impractical since this action would perturb RC pump seal water flow and thus damage the seals as a result.

Alternative Testing: These valves will be full-stroke exercised at cold shutdowns provided the RC pumps are secured. If one or more RC pumps are not secured at cold shutdowns, the associated valves will be tested at intervals no greater than refuelings.

3.3.1.1.2 Evaluation--The reviewer agrees that these valves cannot be exercised during power operation because seal water must be supplied to the reactor coolant pumps at all times while they are running. Exercising these valves at the cold shutdown frequency may not be possible because the reactor coolant pumps may not be secured each cold shutdown.

3.3.1.1.3 Conclusion. The reviewer concludes that full-stroke exercising these valves in pairs during those cold shutdowns when the associated reactor coolant pump is secured and during each refueling outage should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.3.1.2 Relief Request. The licensee has requested relief from exercising valve 222, reactor coolant pump seal water leak-off return header isolation, in accordance with the requirements of Section XI, Paragraph IWV-3410, and proposed to full-stroke exercise this valve during those cold shutdowns when all reactor coolant pumps are secured and during refueling outages.

3.3.1.2.1 Licensee's Basis For Requesting Relief--Valve 222 is an open or closed only valve; therefore, part-stroke testing of this valve is impractical. This valve cannot be full-stroke exercised during normal plant operation because a loss of RC pump seal water low would result, damaging the RC pumps.

Alternative Testing: This valve will be full-stroke exercised at cold shutdowns provided the RC pumps are secured. If one or more RC pumps are not secured at cold shutdowns, the associated valves will be tested at intervals no greater than refuelings.

3.3.1.2.2 Evaluation--The reviewer agrees that this valve cannot be exercised any time any of the reactor coolant pumps are running because the pump seal leak-off return from all the pumps is through a common header and pump seal damage could result if seal water flow were stopped. Exercising this valve at the cold shutdown frequency may not be possible because all the reactor coolant pumps may not be secured each cold shutdown.

3.3.1.2.3 Conclusion--The reviewer concludes that full-stroke exercising this valve during cold shutdowns when all reactor coolant pumps are secured and during each refueling outage should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.4 Condensate and Boiler Feed Pump System

3.4.1 Category C Valves

3.4.1.1 Relief Request. The licensee has requested relief from exercising valves CT-25, -28, and -31, auxiliary feedwater pump city water suction supply checks, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to implement a sample disassembly/inspection program during refueling outages.

3.4.1.1.1 Licensee's Basis for Requesting Relief--It is impractical to full flow test the operability of these valves at any time due to the stringent chemistry requirements of the boiler feedwater system. Allowing city water to flow past these valves would contaminate the boiler feedwater system and steam generators.

Alternative Testing: The city water supply services as an unlikely back-up to the inventory in the condensate storage tank. The condensate storage tank is the primary source of auxiliary feedwater. The supply line from the condensate storage tank to the auxiliary feedwater pumps is independent of the city water supply line and hence does not require the use of either CT-25, 28 or 31. No credit is taken for the city water supply to the auxiliary feedwater pumps in the FSAR safety-analyses. In addition, there are other sources of auxiliary feedwater available that do not require the use of CT-25, 28 or 31. These include large inventories available in the condenser hotwells and the Indian Point Unit No. 1 water factory.

The installation of test connections to facilitate part-stroke testing have been determined impractical due to physical piping/valve arrangement. Recognizing the several sources of alternate supplies of auxiliary feedwater, the high likelihood that the city water supply will never be called upon, and the hardship that would be imposed in order to accomplish full flow testing, we believe that periodic disassembly of these valves at five year intervals, sufficient to verify disk freedom of movement, is a practical alternative.

NRC has determined that a sample disassembly inspection program where one valve of the group is disassembled/inspected to demonstrate operability each refueling outage until all valves in the group are inspected is an acceptable alternative. Accordingly, one valve of the group will be disassembled/inspected, each refueling outage. After all three valves have been disassembled/inspected, and assuming the inspection results so warrant, a report may be submitted to NRC requesting relief (for justification) to longer intervals between tests.

3.4.1.1.2 Evaluation--The reviewer agrees with the licensee's basis that these valves cannot be exercised with flow during power operation or cold shutdown without introducing low quality city water into the suction piping of the auxiliary feedwater pumps and from there into the steam generators. The city water contains impurities which would upset the secondary water chemistry and could cause chemical stress damage to the steam generators. The reviewer also agrees with the licensee's proposed disassembly because the NRC staff has concluded that a valve sampling disassembly/inspection utilizing a manual full-stroke of one disk is an acceptable method to verify a check valve's full-stroke capability. The sampling technique requires that each valve in the group must be of the same design (manufacturer, size, model number, and materials of construction) and must 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-stroked at each refueling 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-stroked at the same outage.

Following successful disassembly, inspection, and manual full-stroking of all the check valves in the group, the licensee may submit a relief request to the NRC requesting a change of the intervals between these tests. This relief request should contain all pertinent historical maintenance data on each valve, including the inspection and maintenance data obtained at each disassembly/inspection and manual full-stroke. Photographs should be provided of the valve "as found" internals, noting particularly any anomalies encountered.

3.4.1.1.3 Conclusion--The reviewer concludes that the proposed sample disassembly program performed during refueling outages should demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.4.1.2 Relief Request. The licensee has requested relief from exercising valves CT-26, -29, and -32, auxiliary feedwater pump suction checks, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to partial-stroke exercise these valves at a cold shutdown frequency and to full-stroke exercise them during refueling outages.

3.4.1.2.1 Licensee's Basis for Requesting Relief--These valves are part-stroke exercised during start-up and shutdown of the reactor plant and are therefore part-stroke exercised during cold shutdown. In addition, these valves are part-stroke exercised during quarterly auxiliary feedwater pump testing.

Full-flow testing of the auxiliary feedwater pumps is conducted during refuelings. The pump suction check valves must necessarily be full-stroke exercised during this test. Full-stroke exercising these auxiliary feedwater pump suction check valves requires that the associated auxiliary feedwater pump be operating. Operating these pumps during normal operation would interfere with automatic steam generator level control, likely causing a plant trip. The auxiliary feedwater pumps normally operate during start-up and shutdown, however, the pump flow rate (and hence the degree to which the suction check valves are exercised) is largely dependent on the conditions associated with the particular heatup or cooldown (e.g., the required heatup/cooldown rate and the particular auxiliary feedwater pumps that are operable and/or operating). In practice, during a typical heatup or cooldown auxiliary feedwater flow will be sufficient to full-stroke exercise the suction check valves, however this cannot be guaranteed for all heatup and cooldowns. Accordingly, credit is taken for only part-stroke exercising these valves at cold shutdowns. In addition to part-stroke exercising these valves during heatup/cooldown and full-stroke exercising at refuelings, these valves are part-stroked quarterly during the auxiliary feedwater pump miniflow test. Flow rate through the suction check valves during the pump mini-flow tests is limited to a part-stroke exercise due to the size of the mini-flow test recirculation line. We believe the exercise program that these valves are subject to between refuelings provides adequate assurance that these valves will function as required.

In addition, NRC IE Bulletin 79-13 identified the potential for feedwater line cracking as a result of injecting relatively cold auxiliary feedwater (40° - 60°F) into relatively hot main feedwater piping (426°F). In response to that bulletin Con Edison described the IP2 design and operational practices which we believe minimize the potential for such cracking. Indeed IP2 has experienced no such cracking to date. Full flow testing these valves at anytime other than refuelings is contrary to these successfully implemented practices intended to minimize the potential for thermal shock to the feedwater piping and steam generators.

Alternative Testing: The three check valves will be part-stroke exercised during quarterly AFW pump testing and full-stroke exercised during the full-flow pump test at refuelings. In addition these valves are part-stroked at cold shutdowns as part of the normal AFW system operation.

3.4.1.2.2 Evaluation--The reviewer agrees with the licensee that these valves cannot be full-stroke exercised during power operation because the only full flow path available is into the steam generators via the feedwater headers and the relatively cold water being pumped could cause thermal stress damage to the feedwater piping and steam generator internals. Also, the flow required could result in a loss of steam generator water level control and a reactor trip. The reviewer also agrees that verification of sufficient flow to full-stroke exercise these valves cannot be done during startup from or approach to cold shutdown because the flow required could disrupt heatup and increase startup time or could cause plant cooldown limits to be exceeded.

3.4.1.2.3 Conclusion--The reviewer concludes that the proposed alternate testing of part-stroke exercising these valves quarterly during pump tests and during cold shutdowns and full-stroke exercising them during refueling outages should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.5 Fuel Oil to Diesel Generator System

3.5.1 Category B Valves

3.5.1.1 Relief Request. The licensee has requested relief from measuring the stroke time of valves LCV-1207A, -1207B, -1208A, -1208B, -1209A, and -1209B, diesel generator fuel oil day tank level control, in accordance with Section XI, Paragraph IWV-3413(a) and (b).

3.5.1.1.1 Licensee's Basis for Requesting Relief--The valves are operated from level controllers associated with each diesel's fuel oil day tank. The level controllers function automatically signalling the valves open/closed depending on tank level. There is no manual control switch associated with these valves, hence there is no means to initiate valve cycling manually for purposes of measuring stroke time. Credit is taken for stroking these valves during performance of the diesel generator surveillance test. Redundant tank level indication is provided to alert the operator to a low level condition in any day tank.

Alternative Testing: These valves are exercised during diesel generator surveillance tests.

3.5.1.1.2 Evaluation--The reviewer agrees that these valves cannot be accurately stroke timed because they are each controlled by a fuel oil tank level control system and initiation of valve movement is subject to considerable variation. The stroke time measurements of these valves would be very difficult to repeat due to the absence of valve control switches and would not contribute meaningful data to utilize in monitoring valve degradation.

3.5.1.1.3 Conclusion--The reviewer concludes that the alternate testing of verifying proper valve operation during the performance of diesel generator tests should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the stroke time measurement requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.6 Hydrogen Recombiner System

3.6.1 Category C Valves

3.6.1.1 Relief Request. The licensee has requested relief from exercising valves 1879A, 1879B, 1880A, and 1880B, hydrogen recombiner gas supply checks, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to verify valve operability during recombiner testing at refueling outages.

3.6.1.1.1 Licensee's Basis for Requesting Relief--These valves are located inside containment. The capability of these valves to function is normally checked by proper operation of the recombiner. It is impractical to test these valves during normal operations because they are inside containment and the recombiner is not tested during plant operation. Although the valves could be tested during cold shutdown, the frequency of the recombiner test (i.e., at refuelings) precludes testing the valves during this period also.

Alternative Testing: These valves will be exercised during the hydrogen recombiner tests (PT-R15) at refuelings.

3.6.1.1.2 Evaluation--The reviewer does not agree with the licensee because no technical information has been provided that explains why these valves cannot be exercised during cold shutdowns other than cold shutdowns are not the test frequency of the hydrogen recombiners. Additionally, the licensee has stated in this relief request that these valves could be tested during cold shutdown conditions. The reviewer does agree that these valves should not be exercised during power operation because the recombiner must be operated to do so and that could result in an undesirable increase in the containment heat load.

3.6.1.1.3 Conclusion--The reviewer concludes that the licensee should also full-stroke exercise these valves during cold shutdowns.

3.6.1.2 Relief Request. The licensee has requested relief from exercising valves 1881A, recombiner hydrogen supply check, 1881C, recombiner oxygen supply check, and 1881D, recombiner nitrogen supply check, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to verify valve operability during recombiner testing at refueling outages.

3.6.1.2.1 Licensee's Basis for Requesting Relief--These lines are brought into service only during operation of the hydrogen recombiner. This test is conducted during refuelings and proper operation (i.e., pressures) ensures the functioning of these check valves.

Alternative Testing: These valves will be exercised during the hydrogen recombiner tests (PT-R15) at refuelings.

3.6.1.2.2 Evaluation--The reviewer does not agree with the licensee because no technical information has been provided that explains why these valves cannot be exercised during cold shutdowns other than cold shutdowns are not the test frequency of the hydrogen recombiners. The reviewer does agree that these valves should not be exercised during power operation because the recombiner must be operated to do so and that could result in an undesirable increase in the containment heat load.

3.6.1.2.3 Conclusion--The reviewer concludes that the licensee should also full-stroke exercise these valves during cold shutdowns.

3.7 Instrument Air System

3.7.1 Category A Valves

3.7.1.1 Relief Request. The licensee has requested relief from exercising valve PCV-1228, containment instrument air supply, in accordance with the requirements of Section XI, Paragraph IWV-3410, and proposed to full-stroke exercise this valve during refueling outages.

3.7.1.1.1 Licensee's Basis for Requesting Relief--This valve is an open or close only valve so that part-stroke exercising is impractical. Full-stroke exercising the valve quarterly during power operations or at cold shutdowns is also impractical because it shuts off the operating air supply to the valves inside containment that may be required to function during both power and cold shutdown operations.

Alternative Testing: This valve will be full-stroke exercised at refueling outages.

3.7.1.1.2 Evaluation--The reviewer agrees with the licensee that this valve should not be exercised during power operation because the resulting loss of instrument air could cause a loss of valve control which could result in a reactor trip. The reviewer also agrees that this valve should not be exercised during cold shutdowns because if it were to fail shut while testing, the loss of air could result in failure of valves needed to support shutdown cooling operations.

3.7.1.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of full-stroke exercising this valve during refueling outages when instrument air to the containment can be secured should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.7.2 Category A/C Valves

3.7.2.1 Relief Request. The licensee has requested relief from exercising valve IA-39, containment instrument air supply check, in accordance with the requirements of Section XI, Paragraphs IWV-3410 and -3520, and proposed to verify closure (its safety position) during refueling outages.

3.7.2.1.1 Licensee's Basis for Requesting Relief--Exercising the valve closed would require securing the operating air supply to the other valves in the containment which are required to be operational during power and cold shutdown operations. Also, existing plant design and construction provides no means for indication or verification of check valve disk motion in either direction. The proper position for satisfying the containment isolation function is confirmed by acceptable Category A valve leak rate testing results. Relief from full-stroke exercising of this valve is therefore requested.

Alternative Testing: Verification of proper valve operation will be made during Category A leak testing requirements of IWV-3420.

3.7.2.1.2 Evaluation--The reviewer agrees with the licensee that, due to plant design, the only method available to verify valve closure is leak testing. This valve cannot be exercised shut during power operation because the resulting loss of instrument air could cause a loss of valve control which could result in a reactor trip. The reviewer also agrees that this valve should not be exercised during cold shutdowns because the loss of air could result in failure of valves needed to support shutdown cooling operations.

3.7.2.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of verifying valve closure during the performance of leak testing at refueling outages should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.8 Isolation Valve Seal Water System

3.8.1 Category B Valves

3.8.1.1 Relief Request. The licensee has requested relief from exercising valves 3500 - 3519, seal system water and nitrogen supply, in accordance with the requirements of Section XI, Paragraphs IWV-3300 and -3410, and proposed to verify proper valve operation during refueling outages.

3.8.1.1.1 Licensee's Basis for Requesting Relief--These valves are physically sealed making a visual, physical verification of valve position impossible. For the reasons noted in Item 3.8.2.1, these valves will be exercised at a refueling frequency by establishing flow through their respective check valve.

Alternative Testing: Exercise at refueling.

3.8.1.1.2 Evaluation--The reviewer agrees that since these valves are enclosed and stem or disk movement cannot be observed, the only method available to verify that the disk changes position is by establishing flow through the valve and observing that flow at the downstream test connection. However, the interfacing process system must be depressurized and possibly drained so the test connection can be opened without creating a personnel hazard due to pressure, temperature, or contamination. In most cases, this can be done only during refueling outages.

3.8.1.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of verifying valve movement during refueling outages when various systems can be removed from service should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising and position verification requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.8.2 Category C Valves

3.8.2.1 Relief Request. The licensee has requested relief from exercising valves 1500 - 1543, 1545 - 1550, 5602, 1454, 1406, and 1456, seal system water and nitrogen supply checks, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to full-stroke exercise them during refueling outages.

3.8.2.1.1 Licensee's Basis for Requesting Relief--These valves form a boundary between the IVSW system and the process lines served by the IVSW system. The test connections installed to permit flow testing these check valves are located between their respective check valve and the process lines being served. With the process line in service, flow verification of these valves is precluded by the process fluid effluxing through the test connection. As such, these valves can only be exercised at refuelings.

In addition, the isolation valve seal water system serves a containment isolation function. As such, it is appropriately tested at a frequency consistent with the leak testing of the associated CIVs on a refueling basis, consistent with 10CFR50 Appendix J, Type C, requirements.

Alternative Testing: Exercised at refueling.

3.8.2.1.2 Evaluation--The reviewer agrees with the licensee that, since these valves are enclosed and disk movement cannot be observed, the only method available to verify that the disk changes position is by establishing flow through the valve and observing that flow at the downstream test connection. However, the interfacing process system must be depressurized and possibly drained so the test connection can be opened without creating a personnel hazard due to pressure, temperature, or contamination. In most cases, this can be done only during refueling outages.

3.8.2.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of verifying valve movement during refueling outages when various systems can be removed from service should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.9 Main Steam System

3.9.1 Category B Valves

3.9.1.1 Relief Request. The licensee has requested relief from measuring the stroke time of valves PCV-1134, - 1135, -1136, and -1137, atmospheric steam dumps, in accordance with the requirements of Section XI, Paragraph IWV-3413(a) and (b), and proposed to full-stroke exercise them without stroke timing during cold shutdowns.

3.9.1.1.1 Licensee's Basis for Requesting Relief--These valves are remote manual rheostat controlled valves and are operated from the control room. It is impractical to exercise these valves during normal plant operations due to the steam flow that would ensue. It is impractical to time these valves because they can act as throttle valves and are fully opened or closed only by operator action. Due to the rheostat control of these valves, reproducible times would not generally be obtainable.

Alternative Testing: These valves will be full-stroke exercised during cold shutdowns and will not be timed during this exercise test.

3.9.1.1.2 Evaluation--The reviewer agrees that these valves cannot be accurately stroke timed because they are controlled with a "thumb-wheel" type controller and initiation of valve movement is subject to considerable variation. The stroke time measurements of these valves would be very difficult to repeat due to the absence of valve control switches and would not contribute meaningful data to utilize in monitoring valve degradation. The reviewer also agrees that these valves should not be exercised during power operation because a reactor trip and uncontrolled cooldown could result if one were to fail open while testing.

3.9.1.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of full-stroke exercising these valves during cold shutdowns without stroke timing should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the stroke timing requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.10 Personnel Airlock

3.10.1 Category A Valves

3.10.1.1 Relief Request. The licensee has requested relief from exercising valves 85C, 85D, 95C, and 95D, airlock pressure equalizing containment isolations, in accordance with Section XI, Paragraph IWV-3410, and proposed to verify closure (their safety position) during refueling outages.

3.10.1.1.1 Licensee's Basis for Requesting Relief--There are no positive means available for exercising these valves. Proper operation may be deduced when making periodic entries to containment. In addition, the Appendix J tests for leak rate serve to verify the operability of these valves.

Alternative Testing: Leak test per Appendix J.

3.10.1.1.2 Evaluation--The reviewer agrees that these valves cannot be individually exercised because they are mechanically interlocked with the airlock doors and are exercised each time the doors are operated. Due to this design, the only method available to verify closure is leak testing at refueling outages.

3.10.1.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of verifying valve closure during the performance of leak testing at refueling outages should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.10.2 Category A/C Valves

3.10.2.1 Relief Request. The licensee has requested relief from exercising valves 85A, 85B, 95A, and 95B, airlock pressure relief checks, in accordance with the requirements of Section XI, Paragraphs IWV-3410 and -3520, and proposed to verify closure (their safety position) during refueling outages.

3.10.2.1.1 Licensee's Basis for Requesting Relief--There are no positive means available for exercising these valves. Proper operation may be deduced when making periodic entries to containment. In addition, the Appendix J tests for leak rate serve to verify the operability of these valves.

Alternative Testing: Leak test per Appendix J.

3.10.2.1.2 Evaluation--The reviewer agrees with the licensee because these spring loaded check valves are located inside containment and are not equipped with position indication.

3.10.2.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of verifying valve closure during the performance of leak testing at refueling outages should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.11 Post-Accident Containment Vent System

3.11.1 Category B Valves

3.11.1.1 Relief Request. The licensee has requested relief from stroke timing and verifying the position indication of valves FCV-1308 and -1309, containment post-accident vents, in accordance with the requirements of Section XI, Paragraphs IWV-3413(a), (b) and -3300, and proposed to exercise these valves quarterly and to verify a change of position during refueling outages.

3.11.1.1.1 Licensee's Basis for Requesting Relief--The control system for these valves provides for demand position indication only. The valve is physically sealed such that position indication by visual observation is not possible. No direct position indication (e.g. limit switch, indicating lights, etc.) is provided to establish stem/disk position. The system requires a delta-p in excess of 2 psig in order to establish flow; this is in excess of the normal operating pressure for containment precluding position indication on a quarterly or refueling basis. In addition, the rate of valve movement is dependent on the rate of change of the manually operated control system, thus valve timing has no significance.

Alternative Testing: These valves will be exercised quarterly with position indication determined using the demand position. In addition, these valves will be exercised during refuelings by pressurizing the line upstream (containment side) and verifying a prompt change in pressure or flow upon stroking the valve open in order to verify the adequacy of the valve demand position indication (IWV-3300).

The ILRT will be utilized as the pressurizing medium during those refuelings that the ILRT is required to be performed.

3.11.1.1.2 Evaluation--The reviewer agrees that these valves cannot be accurately stroke timed because they are controlled with a "thumb-wheel" type controller and initiation of valve movement is subject to considerable variation. The stroke time measurements of these valves would be very difficult to repeat due to the absence of valve control switches and would not contribute meaningful data to utilize in monitoring valve degradation. The reviewer also agrees that, since these valves are totally enclosed with no moving parts visible, an alternate, indirect method of position verification must be utilized. The licensee's proposed pressurization test will demonstrate that the valve being tested will shut and, by venting the test pressure through the valve, will demonstrate that the disk will move to some position off of the seat. Due to the design of these valves, pressurization testing is the only method available to utilize to verify valve movement.

3.11.1.1.3 <u>Conclusion</u>--The reviewer concludes that the alternate testing proposed of exercising these valves quarterly without stroke timing and performing pressurization testing during refueling outages to verify valve movement should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the stroke timing and position verification requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.12 Safety Injection System

3.12.1 Category A/C Valves

3.12.1.1 <u>Relief Request</u>. The licensee has requested relief from exercising valves 895A - D, safety injection accumulator outlet checks, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to exercise these valves during refueling outages.

3.12.1.1.1 <u>Licensee's Basis for Requesting Relief</u>--The SIS configuration is such that the only practical way the valves can be exercised is by blowing down water from the accumulators to the RCS. 895A through 895D are upstream and in series with 897A through 897D which are held closed at this condition by a differential pressure of about 1550 psig (RCS at 2200 psig vs. accumulators at 640 psig). Therefore, flow cannot be established from the accumulators during normal power conditions.

Part of the low-temperature overpressurization protection requirements at cold shutdowns are that MOV's 894A through 894D be closed when the RCS pressure is reduced below 1000 psig. These MOVs are in the accumulator outlet lines and are upstream and in series with the subject check valves; therefore, flow cannot be established from the accumulators during these cold shutdown conditions. Based on information supplied by the valve manufacturer, these valves will be full open when velocity through the valve exceeds 5-6 ft./sec. A test has been developed that will produce a velocity in excess of 8 ft./sec. thereby assuring a full-stroke exercise of both the 895 and 897 series check valves.

In addition, accumulator discharge line resistance will be calculated from the test data and compared to engineering estimates of equivalent L/D (line losses) for each accumulator discharge line. Line resistances (as determined by test) which are less than or equal to the engineering estimate of line resistance are proof that the line is clear and all valves in the line are functioning as designed. Delta-p instrumentation across the check valves is not necessary since the overall line resistance will be evaluated by this method including the normal resistance to flow provided by the valves. Line resistance in excess of the engineering estimates are indicative of a reduction in flow area as by the introduction of foreign matter or improper valve operation. Any such increase in line resistance will require evaluation for corrective action.

The general test format is as follows; the details are subject to change as necessary in order to accomplish the goals described above.

Each accumulator will be instrumented with a pressure recorder to record pressure versus time during the blowdown. At each refueling, starting with the accumulators at least 50% liquid filled and pressurized to between 60 and 100 psig, each accumulator will be discharged and pressure decay versus time recorded during the discharge. With the initial accumulator pressure and gas volume known and the final gas pressure recorded, the final gas volume can be determined from the ideal gas law ($P_1 V_1^{\gamma} = P_2 V_2^{\gamma}$). With the final gas volume known, the amount of liquid discharged over the discharge interval is determined and flow rate is established. As noted above, flow rate in excess of 5-6 ft/sec constitutes a full-stroke exercise. With flow rate determined and delta-p across the accumulator discharge line known (delta-p is the difference between accumulator pressure and RCS pressure at any point in time), the line resistance can be calculated ($\Delta P=KQ^2$). The calculated line resistance is then compared to the engineering line loss estimates (equivalent L/D) and the acceptability of the results determined as described above.

Once the initial test is performed, evaluated, and determined acceptable using the evaluation methods described above, the evaluation of subsequent tests becomes a simple matter of comparing the subsequent blowdown pressure decay curve to the curve initially found acceptable. Any subsequent blowdown pressure decay curve that is equal to or faster than the initially evaluated curve (assuming the same initial conditions) will permit the conclusion that the valves have been full-stroked and the discharge line resistance remains within design limits, i.e., the valves are functioning as required.

Alternative Testing: These valves will be full-stroke exercised as described above at refueling outages.

3.12.1.1.2 Evaluation--The reviewer does not agree that the licensee's proposed alternate testing will reliably demonstrate full-stroke exercising of these valves because: (1) the losses in each accumulator discharge line are to be estimated and, (2) the differential pressure of the entire line is to be measured instead of the differential pressure of each check valve as required by the NRC staff during reduced flow testing. Additionally, there is no assurance that the valve disk strokes completely open during the initial flow test because the licensee has not provided the inspection history of each valve and the internal condition of each valve is unknown at the time of testing.

3.12.1.1.3 Conclusion--The reviewer concludes that, since these valves cannot be exercised in accordance with Section XI, the licensee should be required to perform a sample disassembly/inspection program similar to that described in Item 3.4.1.1 and that relief should be granted from the exercising requirements of Section XI if the licensee utilizes the sample disassembly/inspection program. The sample disassembly/inspection program should be imposed until such time that the licensee provides an acceptable alternate testing method to the staff which must subsequently be approved before implementation.

3.12.1.2 Relief Request. The licensee has requested relief from exercising valves 897A-D, combined low pressure safety injection/accumulator discharge checks, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to full-stroke exercise them during cold shutdowns.

3.12.1.2.1 Licensee's Basis for Requesting Relief--Valves 897A and 897C are in the flow paths from the high pressure safety injection (HPSI) pumps and valves 897A through 897D are in the flow paths from the recirculation pumps RHR pumps, and from their respective accumulators. The system configuration is such that the only practical way the valves can be exercised is by putting flow through them from one of the SI pumps or accumulators.

During normal power operations, the RCS pressure is approximately 2200 psig. None of the SI pumps or accumulators have the pressure capability to overcome the RCS pressure in order to establish flow through the check valves. Valves 838A through 838D are in series with 897A through 897D respectively and, therefore, the same basis for relief applies.

Alternative Testing: All eight check valves will be full-stroke exercised during cold shutdowns when the RHR mode of cooling is in progress. In addition, valves 897A-D will be full-stroke exercised as described in Item 3.12.1.1 for valves 895A-D as these valves are in series with the 895s and are necessarily exercised when the 895 valves are exercised by accumulator discharge.

3.12.1.2.2 Evaluation--The reviewer agrees that these valves cannot be exercised during power operation because a driving head to provide the flow does not exist due to the higher reactor coolant system pressure. The Code allows the licensee to exercise those valves during cold shutdowns that cannot be exercised during power operation and the reviewer agrees that valves 838A-D can be full-stroke exercised each cold shutdown while the residual heat removal system is in operation because the system can be operated at design accident capacity. However, the reviewer questions if the 897A-D valves can be full-stroke exercised utilizing residual heat removal system flow due to the difference in piping size and the fact that they must also accommodate full safety accumulator discharge flow. (See Item 3.12.1.1 for the licensee's proposed testing of the 895A-D valves and Appendix B, Item 7.1, for the cold shutdown testing of valves 838A-D). On this basis, the licensee's proposed testing of the 897A-D valves should be considered a partial-stroke exercise due to the different valve sizes and required flow rates. Additionally, there is no assurance that the valve disk strokes completely open during the initial accumulator discharge testing because the licensee has not provided the inspection history of each valve and the internal condition of each valve is unknown at the time of testing. Disassembly and manually full-stroking to verify valve operation has been accepted by the NRC staff as an acceptable alternate testing method and appears to be the only method available to the licensee.

3.12.1.2.3 Conclusion--The reviewer concludes that since these valves cannot be exercised in accordance with Section XI, the licensee should be required to perform a sample disassembly/inspection program similar to that described in Item 3.4.1.1 and that relief should be granted from the exercising requirements of Section XI if the licensee utilizes the sample disassembly/inspection program. The sample disassembly/inspection program should be imposed until such time that the licensee provides an acceptable alternate testing method to the staff which must subsequently be approved before implementation.

3.12.1.3 Relief Request. The licensee has requested relief from exercising valves 857A-D, 857G-H, 857M, and 857F, hot leg safety injection header checks, 857J, and 857K, cold leg safety injection header checks, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to full-stroke exercise these valves during refueling outages.

3.12.1.3.1 Licensee's Basis for Requesting Relief--The SIS configuration is such that the only practical way the valves can be exercised is by activating the HPSI pumps and establishing flow through the valves. During normal plant operation, the RCS pressure is approximately 2200 psig. The HPSI pumps do not have the pressure capability (design discharge pressure approximately 1700 psig) to overcome the RCS pressure and establish flow through the check valves. In addition, part of the temperature overpressure protection requirements at cold shutdowns is such that the HPSI pumps be deactivated when the RCS is pressurized and below 1900 psig. This is to prevent an inadvertent pressurization of the RCS by the HPSI pumps at this time. Therefore, flow cannot be established through the check valves by the HPSI pumps during cold shutdowns.

Alternative Testing: These valves will be full-stroke exercised during refueling outages.

3.12.1.3.2 Evaluation--The reviewer agrees with the licensee that, due to plant design, the only available full flow path is into the reactor coolant system. At power, safety injection pump pressure is too low to overcome reactor coolant system pressure and, at cold shutdown, exercising these valves with flow could result in a low-temperature overpressurization of the reactor coolant system.

3.12.1.3.3 Conclusion--The reviewer concludes that the proposed alternate testing of full-stroke exercising these valves at refueling outages should demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.12.1.4 Relief Request. The licensee has requested relief from exercising valves 867A and B, containment spray pump discharge checks, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to full-stroke exercise these valves during refueling outages.

3.12.1.4.1 Licensee's Basis for Requesting Relief--These valves are located downstream of the containment spray pump mini-flow test line and because of this cannot be part-stroke exercised quarterly during the mini-flow test of the containment spray pumps. These valves can be full-stroke exercised at refuelings through a disconnect that allows for operations other than containment spray.

Alternative Testing: These valves will be full-stroke exercised at refueling outages.

3.12.1.4.2 Evaluation--The reviewer agrees that, due to system design, these valves cannot be exercised using system flow because the only flow path available is into containment and would result in spraying the containment causing equipment damage and requiring extensive containment cleanup. This system is equipped with removable spoolpieces, located inside containment, which can be removed and redirected to provide a flow path to the refueling canal. These valves can then be full-stroke exercised utilizing system flow while filling the refueling canal without introducing water into the containment spray headers.

3.12.1.4.3 Conclusion--The reviewer concludes that the proposed alternate testing of full-stroke exercising these valves during refueling outages when ample time is available to redirect the spoolpieces to prevent spraying the containment should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.12.2 Category B Valves

3.12.2.1 Relief Request. The licensee has requested relief from exercising valves 880A-K, containment charcoal filter fire protection supplies, in accordance with the requirements of Section XI, Paragraph IWV-3410, and proposed to full-stroke exercise these valves during refueling outages.

3.12.2.1.1 Licensee's Basis for Requesting Relief--The only function of these valves is to open in the unlikely event that a charcoal filter fire occurs. During normal operation, these valves are maintained in a closed position to assure that no water enters the charcoal beds which could degrade charcoal performance. The piping arrangement is such that a standing head of water can accumulate behind these valves with no means of draining this water off prior to cycling the valves. Thus, quarterly cycling would likely result in water entering the charcoal beds which is unacceptable.

Alternative Testing: These valves will be full-stroke exercised at refuelings prior to charcoal filter performance testing such that, if charcoal filter degradation occurs, appropriate corrective action can be instituted prior to return to power operation.

3.12.2.1.2 Evaluation--The reviewer agrees that these valves should not be exercised during power operation due to the possibility of wetting the charcoal which requires that the filter be replaced in order to maintain the filtering ability. Repairs cannot be accomplished during power operation because the filters are located inside containment and are inaccessible. The reviewer also agrees that these valves should not be exercised during cold shutdowns because the time required to perform maintenance, i.e., filter replacement if wetted, could delay reactor startup and return to power.

3.12.2.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of full-stroke exercising these valves during refueling outages should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.12.2.2 Relief Request. The licensee has requested relief from exercising valves 1802A and B, containment recirculation pump discharges, in accordance with the requirements of Section XI, Paragraph IWV-3410, and proposed to full-stroke exercise them during refueling outages.

3.12.2.2.1 Licensee's Basis for Requesting Relief--Opening either valve during normal plant operation will cause the RWST to drain to containment. The only time the RWST is drained sufficiently to permit stroking 1802A and 1802B is at refuelings.

Alternative Testing: These valves will be full-stroke exercised at refuelings.

3.12.2.2.2 Evaluation--The reviewer agrees that these valves should not be exercised during power operation or cold shutdowns because, since these are parallel valves, opening either valve provides a flow path from the refueling water storage tank to the containment sump through the normally open recirculation pump minimum flow line and would flood the containment sump.

3.12.2.2.3 Conclusion--The reviewer concludes that the proposed alternate testing of full-stroke exercising these valves during refueling outages when the level in the refueling water storage tank is low enough to prevent flow to the containment sump should be sufficient to demonstrate valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.12.3 Category C Valves

3.12.3.1 Relief Request. The licensee has requested relief from exercising valves 857E and L, cold leg safety injection header checks, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to full-stroke exercise these valves during refueling outages.

3.12.3.1.1 Licensee's Basis for Requesting Relief--The SIS configuration is such that the only practical way the valves can be exercised is by activating the HPSI pumps and establishing flow through the valves. During normal plant operation, the RCS pressure is approximately 2200 psig. The HPSI pumps do not have the pressure capability (design discharge pressure approximately 1700 psig) to overcome the RCS pressure and establish flow through the check valves. In addition, part of the temperature overpressure protection requirements at cold shutdowns is such that the HPSI pumps be deactivated when the RCS is pressurized and below 1900 psig. This is to prevent an inadvertent pressurization of the RCS by the HPSI pumps at this time. Therefore, flow cannot be established through the check valves by the HPSI pumps during cold shutdowns.

Alternative Testing: These valves will be full-stroked exercised during refueling outages.

3.12.3.1.2 Evaluation--The reviewer agrees with the licensee that, due to plant design, the only available full flow path is into the reactor coolant system. At power, safety injection pump pressure is too low to overcome reactor coolant system pressure and, at cold shutdown, exercising these valves with flow could result in a low-temperature overpressurization of the reactor coolant system.

3.12.3.1.3 Conclusion--The reviewer concludes that the proposed alternate testing of full-stroke exercising these valves at refueling outages should demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.12.3.2 Relief Request--The licensee has requested relief from exercising valves 849A, B, 852A, and B, safety injection pump discharge checks, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to full-stroke exercise these valves during refueling outages.

3.12.3.2.1 Licensee's Basis for Requesting Relief--Full-stroke exercising these valves quarterly while the plant is at normal operating power is impractical in that the RCS pressure is at approximately 2250 psig. This pressure locks out these check valves at the RCS/SIS interface that is downstream and in series with the subject check valves. The head available from the safety injection pump is not great enough to overcome the RCS pressure, thereby preventing flow. It is also impractical to exercise these valves at cold shutdowns since the SI pumps are deactivated when the RCS pressure goes below 1900 psig as part of the low-temperature overpressurization protection requirements.

Alternative Testing: These valves will be full-stroke exercised during refueling outages

3.12.3.2.2 Evaluation--The review agrees with the licensee that, due to plant design, the only available flow path is into the reactor coolant system. At power, safety injection pump pressure is too low to overcome reactor coolant system pressure and, at cold shutdown, exercising these valves with flow could result in a loss-temperature overpressurization of the reactor coolant system. Additionally, these valves are located downstream of the pump minimum flow lines and cannot be partial-stroke exercised during pump tests.

3.12.3.2.3 Conclusion--The reviewer concludes that the proposed alternate testing of full-stroke exercising these valves at refueling outages should demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.12.3.3 Relief Request. The licensee has requested relief from exercising valve 847, safety injection pump refueling water storage tank suction check, in accordance with the requirements of Section XI and proposed to partial-stroke exercise it during pump tests and to full-stroke exercise it during refueling outages.

3.12.3.3.1 Licensee's Basis for Requesting Relief--The only practical means to exercise this check valve is to activate the safety injection pumps and flow water from the RWST to the reactor coolant system (RCS). Full-stroke exercising the valve quarterly while the plant is at normal operating power is impractical in that the RCS pressure is at approximately 2250 psig and this pressure locks out the check valve at the RCS/SIS interface that is downstream and in series with the subject check valve. The head available from the SI pumps is not enough to overcome the

RCS pressure, thereby preventing flow. It is also impractical to exercise the valve at cold shutdowns. The SI pumps are deactivated when the RCS pressure goes below 1900 psig as part of the overpressure protection requirements.

Alternative Testing: This valve will be part-stroke exercised quarterly during SI pump tests and will be full-stroke exercised at refueling outages.

3.12.3.3.2 Evaluation--The reviewer agrees with the licensee that, due to plant design, the only available full flow path is into the reactor coolant system. At power, safety injection pump pressure is too low to overcome reactor coolant system pressure and, at cold shutdown, full-stroke exercising this valve could result in a low-temperature overpressurization of the reactor coolant system. Additionally, this valve cannot be partial-stroke exercised during cold shutdowns because the pumps are deactivated to prevent an inadvertent overpressurization.

3.12.3.3.3 Conclusion--The reviewer concludes that the proposed testing of partial-stroke exercising this valve during pump tests and full-stroke exercising it during refueling outages should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.12.3.4 Relief Request. The licensee has requested relief from exercising valve 881, residual heat removal pumps refueling water storage tank suction check, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to full-stroke exercise this valve during refueling outages.

3.12.3.4.1 Licensee's Basis for Requesting Relief--This valve cannot be part-stroke exercised quarterly during the RHR pump mini-flow test because the test line taps in downstream of this valve. Although an 8 inch bypass line is provided around the RHR pumps for the purpose of pumping refueling water back to the RWST following refueling operation, its use during normal operations would render both RHR pumps inoperable in the LPSI mode. This line could potentially serve to permit part-stroke exercising of valve 881 during cold shutdowns when RHR pump operability is not required by Tech. Specs., however, the duration of a typical cold shutdown is such that the decay heat load is sufficiently large so as to preclude diverting any significant flow from the discharge header.

Alternative Testing: This valve will be exercised (nominally full-stroked) at refuelings using the RHR pumps to refill the primary system.

3.12.3.4.2 Evaluation--The reviewer agrees with the licensee that, due to system design, the only full flow path available is into the reactor coolant system and cannot be utilized during power operation because the residual heat removal pumps cannot overcome reactor coolant system pressure. Also, this valve cannot be partial-stroke exercised during power operation because the system configuration required would defeat the low pressure safety injection function. Exercising this valve during cold shutdown could result in a loss of decay heat removal capability due to valve failure when shifting to the system test configuration.

3.12.3.4.3 Conclusion--The reviewer concludes that the proposed alternate testing of full-stroke exercising this valve during refueling outages while filling the reactor refueling cavity should be sufficient to demonstrate proper valve operability and, therefore, the requested relief should be granted from the exercising requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.12.3.5 Relief Request. The licensee has requested relief from exercising valves 879A and B, charcoal filter fire protection supply checks, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to partial-stroke exercise these valves at five year intervals.

3.12.3.5.1 Licensee's Basis for Requesting Relief--The only function of these valves is to open in the extremely unlikely event that a charcoal filter fire occurs. Because of their position in the containment spray system, it is impossible to operationally full-stroke these valves except by the initiation of containment spray, which is not practical. Also, these valves cannot be part-stroke exercised during the CS pump mini-flow test. In addition, exercising these valves by operation of the system would require opening the downstream isolation valves and dousing the charcoal filter with water.

It should be noted that the charcoal filters are but one of the methods available for post-LOCA atmospheric cleanup. The two containment spray system trains with their large supply of borated water provide atmospheric cleanup capability and are considered up to eight times more effective than charcoal filters for this purpose.

Alternative Testing: These valves will be part-stroke exercised at five year intervals in conjunction with the containment spray nozzle air flow test. This method of flow verification is not amenable to quantification, hence we are considering it a part-stroke verification.

Given the necessarily low probability of LOCA occurring simultaneously with the failure of a fan cooler unit fan causing charcoal filter temperatures sufficiently high to require dousing, we believe that measures such as more frequent part-stroke exercising or sample disassembly/ inspection to demonstrate the operability of these valves are unnecessary and unwarranted.

Consolidated Edison currently has a reanalysis effort underway directed at eliminating the need for charcoal filters and, therefore, also eliminating the need for these valves. Indian Point Unit No. 2 is one of very few Westinghouse Plants equipped with charcoal filters inside containment. This effort is expected to be completed in June 1986 with a license amendment application and Technical Specification change request to be submitted for NRC review and approval subsequent to completion. If the lines are ultimately retained, a sample disassembly program or valve replacement with valves of a mechanically exercisable design will be considered.

3.12.3.5.2 Evaluation--The reviewer agrees that these valves cannot be partial- or full-stroke exercised using system flow without spraying the equipment in containment in addition to wetting charcoal filters, however, the reviewer does not agree with the licensee's proposed alternate test frequency. Since these valves cannot be exercised without resulting in water damage to other components, and the proposed alternate testing is unacceptable to the NRC staff, the licensee should be required to perform a sample disassembly/inspection of these valves each refueling outage in order to verify their continued operational readiness in accordance with the NRC staff position described in Item 3.4.1.1. The licensee has stated that these valves may be removed from the system and, therefore, deleted from the program, but has not provided the documentation to verify that this system modification has been performed.

3.12.3.5.3 Conclusion--The reviewer concludes that a disassembly/inspection utilizing a manual full-stroke is the only method available to full-stroke these valves and that the licensee should be required to perform this testing at each refueling outage on a sampling basis. The reviewer also concludes that, if the sample disassembly/inspection is utilized, relief should be granted from the exercising requirements of Section XI. The sample disassembly/inspection program should be imposed until such time that the licensee provides an acceptable alternate testing method to the staff which must subsequently be approved before implementation.

3.12.3.6 Relief Request. The licensee has requested relief from exercising valves 886A and B, inside recirculation pump discharge checks, in accordance with the requirements of Section XI, Paragraph IWV-3520, and proposed to partial-stroke exercise and radiograph them during refueling outages.

3.12.3.6.1 Licensee's Basis for Requesting Relief--When the recirculation pumps are activated, the recirculation mode from the recirculation sump to the RCS, is established. Valves 886A and 886B are located inside containment, therefore, the only means of exercising them is by activating the recirculation pumps.

Full-stroke exercising these valves quarterly during normal plant operations or during any other condition is impractical since the recirculation pumps are in a normally dry recirculation sump. Operation of these pumps in a dry condition will damage the pumps. For the reasons discussed in pump Relief Request R-R1, there is no practical means available to permit full flow operation of the recirculation pumps and hence no practical means of full flow exercising these check valves. Part-stroke exercising during the mini-flow test of the recirculation pumps is the only practical means of exercising these valves.

We have considered a sample disassembly/inspection program for these valves, however, they are physically located in a high radiation area (inside the crane wall, below the RHR heat exchangers) with general area radiation of 200 mr/hr, 1R/hr on contact. As an alternate to a sample disassembly/inspection program we propose to radiograph each valve at refuelings while the associated pump operates with the recirculation flow (mini-flow) through the valve. Radiographs are expected to be of sufficient clarity to show the valve disk and permit an assessment as to the overall operability of the valve including the extent of valve stroke. If this effort is unsuccessful, a sample disassembly program will then be considered for these valves.

Alternative Testing: Valves 886A and 886B will be part-stroke exercised at refuelings when the mini-flow test of the recirculation pumps is accomplished. In addition, each valve will be radiographed during the mini-flow test with the radiographic results used to assess valve operability.

3.12.3.6.2 Evaluation--The reviewer agrees that these valves cannot be exercised quarterly or during cold shutdowns because the associated pumps are installed in a normally dry sump inside containment. The sump is manually filled during refueling outages to permit limited pump testing and that, in turn, allows partial-stroke exercising these valves. Full-stroke exercising cannot be accomplished at any time because the only full flow path is into the containment spray headers and would result in water damage to equipment in containment. However, the reviewer does not agree that the licensee's proposed partial-stroke exercise testing during refueling outages adequately demonstrates the full-stroke capability of these valves because this reduced flow test (160 gpm vs. 3000 gpm accident flow rate) may not move the check valve disk to the full flow position and does not assure that it will move there when required by system demands, therefore, the licensee should be required to perform a sample disassembly/inspection to manually full-stroke exercise these valves during refueling outages in order to verify their continued operational readiness in accordance with the NRC staff position described in Item 3.4.1.1.

3.12.3.6.3 Conclusion--The reviewer concludes that a disassembly/inspection utilizing a manual full-stroke is the only method available to full-stroke exercise these valves and that the licensee should be required to perform this testing at each refueling outage on a sampling basis. The reviewer also concludes that, if the sample disassembly/inspection is utilized, relief should be granted from the exercising requirements of Section XI. The sample disassembly/inspection program should be imposed until such time that the licensee provides an acceptable alternate testing method to the staff which must subsequently be approved before implementation.

3.13 Service Water System

3.13.1 Category A/C Valves

3.13.1.1 Relief Request. The licensee has requested relief from exercising valves SWN-42-1, -2, -3, -4, and -5, containment building ventilation cooling coil service water supply header reliefs, in accordance with the requirements of Section XI, Paragraph IWV-3410.

3.13.1.1.1 Licensee's Basis for Requesting Relief--These valves are normally closed during normal operation and have a safety function to close. They are, therefore, passive valves. The operability of these valves is inconsequential with regard to the safety function which they perform; therefore, in accordance with NRC guidelines, they are not required to be stroked.

Alternative Testing: These valves are tested in accordance with 10 CFR 50, Appendix J, (Type C) leak test.

3.13.1.1.2 Evaluation--The reviewer does not agree that these relief valves are passive valves because Section XI, Table IWV-3700-1, identifies Category C safety relief valves as active valves and requires that they be tested in accordance with Paragraph IWV-3510. Additionally, Paragraph IWV-3512 states that valves tested in accordance with IWV-3512 are not required to be additionally leak tested in accordance with IWV-3420 (Category A).

3.13.1.1.3 Conclusion--The reviewer concludes that the licensee should be required to test these valves in accordance with Section XI, Paragraph IWV-3510, and to revise the IST program accordingly,therefore, this request for relief should be denied.

3.13.2 Category B Valves

3.13.2.1 Relief Request. The licensee has requested relief from exercising valves FCV-1111 and -1112, conventional plant equipment service water supply, in accordance with the requirements of Section XI, Paragraph IWV-3410, and proposed to full-stroke exercise them during those cold shutdowns when conventional plant equipment is not needed.

3.13.2.1.1 Licensee's Basis for Requesting Relief--One of these valves is normally open during normal plant operation and the other normally closed. The open valve is closed at some time following an accident condition. Full- or part-stroke exercising the open valve during normal plant operation is impractical because doing so would reduce or secure flow to plant equipment requiring this cooling water. This could cause damage to plant equipment (e.g., turbine hydrogen coolers).

Alternative Testing: These valves will be full-stroke exercised at those cold shutdowns when the conventional plant equipment is not in use. In addition, these valves may be stroked during plant operation during those infrequent instances when it becomes necessary to realign service water system headers.

3.13.2.1.2 Evaluation--The reviewer agrees that these valves should not be exercised during power operation because cooling water flow could be lost to some balance of plant equipment and overheating could occur. The reviewer also agrees that equipment operation may not permit exercising these valves each cold shutdown due to the various equipment combinations required to accommodate changing plant conditions. It should be noted that these valves are manual, Category B, valves but the licensee has failed to request relief from measuring the stroke time when they are exercised; however, it is the reviewer's opinion that measuring the stroke time of a manual valve is meaningless and that relief should also be granted from the requirements of Paragraphs IWV-3413(a) and (b). It is also the reviewer's opinion that the licensee should exercise these valves at least at a refueling outage frequency because the test interval proposed by the licensee is very flexible and no definite interval has been established.

3.13.2.1.3 Conclusion--The reviewer concludes that the licensee should be required to exercise these valves during refueling outages and during those cold shutdowns when cooling water to various pieces of balance of plant equipment can be interrupted without resulting in equipment damage. The reviewer also concludes that relief should be granted from the exercising and stroke timing requirements of Section XI for these manual valves. The licensee's proposed alternate testing should be imposed.

3.13.2.2 Relief Request. The licensee has requested relief from exercising valves TCV-1104 and -1105, containment building ventilation cooling coils service water outlets, in accordance with the requirements of Section XI, Paragraph IWV-3410.

3.13.2.2.1 Licensee's Basis for Requesting Relief--When operated normally closed, these valves will be exercised quarterly. However, when operated normally open these valves are considered passive as their safety function is to open. Therefore, when operated normally open, no valve exercising need be required.

Alternative Testing: As described above.

3.13.2.2.2 Evaluation--The licensee has categorized these valves Category B or Category B, passive, depending on valve position during system operation and is testing each valve in accordance with the appropriate requirements in effect at the time of testing. Since the valve category changes with the position of each valve, and the valve position changes with system demand and configuration, the deviation from the Code is that each valve may not be exercised each quarterly interval. The reviewer agrees with the licenesee's proposed testing because the valves are in their safety position when open and do not have to change position. If the valves are closed, they cannot be considered to be passive because they are required to change to the open position. The licensee is testing the valves in accordance with the Section XI, Category B, requirements when the valves are operated in the normally closed position.

3.13.2.2.3 Conclusion--The reviewer concludes that the licensee's proposed alternate testing of full-stroke exercising, measuring stroke time, and fail-safe testing these valves when they are operated in the closed (active) position should be sufficient to demonstrate valve operability and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.14 General Relief Requests

3.14.1 Containment Isolation Valves

3.14.1.1 Relief Request. The licensee has requested relief from leak testing all primary containment isolation valves in accordance with the requirements of Section XI, Paragraph IWV-3420, and proposed to leak test these valves in accordance with 10 CFR 50, Appendix J.

3.14.1.1.1 Licensee's Basis for Requesting Relief--The NRC staff has concluded that the Category A valve leak rate test requirements of IWV for Containment Isolation Valves have been superseded by Appendix J, Type C, requirements.

Alternative Testing: All Category A valves listed will meet 10 CFR 50, Appendix J (Type C), leak testing requirements in lieu of Section XI requirements.

3.14.1.1.2 Evaluation--The reviewer agrees with the licensee's basis because the NRC staff position is that the applicable leak test procedures and requirements for containment isolation valves are determined by 10 CFR 50, Appendix J. Relief from Paragraphs IWV-3420 through -3425 for containment isolation valves presents no safety problems since the requirements of these paragraphs are met by Appendix J requirements. However, the licensee should be required to comply with the Analysis of Leakage Rates and Corrective Action Requirements Paragraphs IWV-3426 and -3427 unless relief is requested from these paragraphs and subsequently granted by the NRC staff.

3.14.1.1.3 Conclusion--The reviewer concludes that the alternate method of leak testing containment isolation valves in accordance with the requirements of 10 CFR 50, Appendix J, is acceptable and, therefore, the requested relief should be granted from the requirements of Section XI, Paragraphs IWV-3420 through -3425. The licensee should be required to comply with the requirements of Paragraphs IWV-3426 and -3427 until relief from these paragraphs is requested and approved by the NRC staff; additionally, the licensee's proposed alternate testing should be imposed and should include Paragraphs IWV-3426 and -3427.

3.14.2 Valve Position Indication Verification

3.14.2.1 Relief Request. The licensee has requested relief from visually verifying the position of the following valves in accordance with the requirements of Section XI, Paragraph IWV-3300, and proposed to verify that the remote position indication is correct during leak testing performed during refueling outages.

Valves:

- Post-Accident Containment Air Sampling System

5018	5021	5024
5019	5022	5025
5020	5023	

- Reactor Coolant System

3418
3419

- Waste Disposal System

3416
3417

- Hydrogen Recombiner System

3420	IV-1A	IV-3A
3421	IV-1B	IV-3B
3422	IV-2A	IV-5A
3423	IV-2B	IV-5B

3.14.2.1.1 Licensee's Basis for Requesting Relief--All the valves listed are Valcor solenoid valves. The valves are totally sealed making a visual, physical verification of valve position impossible. However, all valves have remote position indication. This indication together with the leak rate test conducted in accordance with Appendix J will allow for actual valve position verification.

Alternative Testing: These valves will have their remote position indicators verified correct during the 10 CFR 50, Appendix J (Type C), leak testing requirements.

3.14.2.1.2 Evaluation--The reviewer agrees that the only practical method available to utilize to verify the accuracy of the remote position indication is leak testing since these valves are completely enclosed and no moving parts are visible.

3.14.2.1.3 Conclusion--The reviewer concludes that the licensee's proposed alternate testing of leak testing during refueling outages should be sufficient to verify the accuracy of the remote position indication and, therefore, the requested relief should be granted from the requirements of Section XI and the licensee's proposed alternate testing should be imposed.

3.14.3 Containment Isolation Valve Seal System

3.14.3.1 Relief Request. The licensee has requested relief from assigning leak rate limits to the following individual containment isolation valves in accordance with the requirements of Section XI, Paragraph IWV-3426, and proposed to assign a limiting leak rate to valve seal zones, i.e., groups of valves.

Valves:

Safety Injection System

867A	859A	885A
878A	859C	885B

Reactor Coolant System

548	519	3419
549	3418	4136
552		

Auxiliary Coolant System

793	798	743
796	791	1870

Sampling System

956A	5132
956B	958
956C	959
956D	990A
956E	990B
956F	990D
956G	4399
956H	

Chemical and Volume Control System

201	4925	250A
202	4926	250B
205	4927	250C
226	4928	250D
227		

Post-Accident Air Sampling

5022	5024

Hydrogen Recombiner System

IV-2A	IV-2B

Steam Generator Blowdown & Sampling		Waste Disposal System	
PCV-1214	PCV-1216	1786	1705
PCV-1214A	PCV-1216A	1787	1728
PCV-1215	PCV-1217	5459	3416
PCV-1215A	PCV-1217A	1789	3417
		1702	1788
			1723

Miscellaneous CIVs

PCV-1190	E1	SA-24
PCV-1191	E2	SA-24-1
PCV-1192	E3	MW-17
FCV-1170	E5	MW-17-1
FCV-1171	PCV-1234	
FCV-1172	PCV-1235	
FCV-1173	PCV-1236	
PCV-1229	PCV-1237	
PCV-1230		

3.14.3.1.1 Licensee's Basis for Requesting Relief--Paragraph IWV-3426 requires that a limiting leak rate be established for each valve subject to leak rate testing. Accordingly, each valve would require that it be tested individually to assess its compliance with the limiting leak rate established. Most of the valves listed above are equipped with seal systems to maintain an air or water seal at a pressure above the peak containment pressure reached during a DBE. The seal systems are arranged by zones or manifolds. Each zone supplies several CIVs. These zones are used to pressurize the valves served by that zone for purposes of leak rate testing. Accordingly, the leak rate obtained is on a zone specific basis and represents a total leak rate for all the valves served by that zone or manifold. This arrangement facilitates testing by reducing exposure to personnel while permitting testing to be accomplished with equipment that would be in service under DBE conditions.

Similarly, for valves not equipped with seal systems that are pressurized for leak testing by applying the test medium in between two CIV's, the overall leak rate is the sum of the leakage for both isolation valves.

Alternative Testing: Leak rates will be determined for the above valves on a zone or penetration basis in lieu of obtaining individual valve leak rates. The zone or penetration leak rate will be trended as required.

3.14.3.1.2 Evaluation--The reviewer agrees with the licensee because 10 CFR 50, Appendix J, allows this type of testing where valve seal systems are employed. Additionally, the licensee's proposal to leak test containment isolation valves in accordance with Appendix J has been discussed in Item 3.14.1.1 of this report.

3.14.3.1.3 Conclusion--The reviewer concludes that the licensee's proposed leak testing technique of testing valves in groups and trending the leakage for the group is in accordance with Appendix J and, therefore, the requested relief should be granted from the requirements of Section XI, Paragraph IWV-3426 and the licensee's proposed alternate testing should be imposed.

3.14.4 Rapid-Acting Valves

3.14.4.1 Relief Request. The licensee has requested relief from the power operated valve trending requirements of Section XI, Paragraph IWV-3417(a), for all rapid-acting, power operated valves whose function is safety-related and proposed to apply a maximum stroke time limit of 2 seconds to all rapid-acting, power operated valves; i.e., those valves with normal stroke times of less than 2 seconds, and has also requested relief from measuring the stroke time of the diesel generator air start valves in accordance with the requirements of Section XI, Paragraph IWV-3413(a), and proposed to verify proper valve operation by ensuring that the diesels start with the required time limit.

3.14.4.1.1 Licensee's Basis for Requesting Relief--The rapid stroke time of these valves is such that changes in stroke time of as much as 50% or greater are not readily observable by the manual timing methods employed. Relief from the trending requirements of IWV-3417(a) presents no safety concerns for these valves since variations in stroke time will be affected by slight variations in the response times of the personnel performing the tests. This relief is applicable to valves having a maximum limiting stroke time of 2 seconds.

With respect to the diesel generator air starting solenoid valves, (DA-24 through DA-24-5), the diesel generators are required to start within a specified time interval commencing from solenoid energization. In lieu of attempting to measure the stroke time of these rapid-acting valves, confirmation that the diesel has started within the specified time interval will serve in lieu of actual valve stroke time measurements.

Alternative Testing: None required.

3.14.4.1.2 Evaluation--The reviewer agrees with the licensee's proposal to place a 2 second maximum limit on stroke time for rapid-acting power operated valves. The reviewer also agrees that the only method available to verify proper operation of the diesel generator starting air solenoids is to verify that the diesel generator starts in the required time limit during Technical Specification tests instead of measuring the stroke time of the valves.

3.14.4.1.3 Conclusion--The reviewer concludes that the proposed alternate method of assigning a maximum stroke time to valves with stroke times of less than or equal to 2 seconds should provide meaningful data to adequately monitor valve degradation and, therefore, the requested relief should be granted from the stroke time trending requirements of Section XI. The reviewer also concludes that the proposed alternate testing of verifying starting solenoid valve operation by monitoring acceptable diesel generator start times should demonstrate proper valve operability and, therefore, the requested relief should be granted from the stroke timing requirements of Section XI for the diesel generator air start solenoid valves. In both these cases, no alternate testing should be imposed.

3.14.5 Valve Stroke Timing Acceptance Criteria

3.14.5.1 Relief Request. The licensee has requested relief from the corrective action requirements of Section XI, Paragraph IWV-3417(a).

3.14.5.1.1 Licensee's Basis for Requesting Relief--Per IWV-3417(a), power operated valves exhibiting an increase in stroke time of 25% or more from the previous test for valves with full stroke times greater than 10 seconds or 50% or more for valves with stroke times less than or equal to 10 seconds shall have their test frequency increased to monthly until corrective action is taken. No provisions are made within the Code to evaluate the cause of any such increase in stroke time. No provisions are identified in the Code, at all, dealing with a decrease in stroke time. One particularly significant reason for a change in stroke time that is not indicative of valve degradation is the system condition (pressure, flow rate, etc.) between tests. If system conditions vary from test to test, valve stroke time will be affected.

Alternative Testing: If a valve test indicates a change in stroke time sufficient to warrant a change in test frequency per IWV-3417(a), an analysis shall be performed to determine the cause of the stroke time difference. Items to be considered for such an analysis shall include: system conditions at the time of each test, manufacturer's information and valve stroke history. If, after considering these factors and any other pertinent information the stroke time deviation can be satisfactorily explained and documented, the test frequency need not be increased. If the valve has been stroke tested monthly and the above analysis indicates that the new stroke time is acceptable, test frequency may be revised to quarterly.

3.14.5.1.2 Evaluation--The reviewer does not agree with the licensee's proposal because an incorrect assumption made during the analysis could result in the corrective action requirements of the Code not being met and valve degradation going undetected. It is the reviewer's opinion that the licensee cannot assure valve operational readiness by not complying with the requirements of Section XI, Paragraph IWV-3417(a), and by reassigning valve stroke time valves as necessary to fit any given situation.

3.14.5.1.3 Conclusion--The reviewer concludes that the licensee should be required to comply with the corrective action requirements of Section XI, Paragraph IWV-3417(a), and, therefore, the requested relief should not be granted.

3.14.6 Valve Replacement, Repair, and Maintenance

3.14.6.1 Relief Request. The licensee has requested relief from testing all active Category B valves in the main steam and boiler feedwater systems in accordance with the requirements of Section XI, Paragraph IWV-3200, and proposed to perform testing required as a result of maintenance at some time when plant conditions permit.

3.14.6.1.1 Licensee's Basis for Requesting Relief--The valves identified are valves in the main steam and feedwater systems that cannot be exercised quarterly during normal power operation and for which valve specific relief from the quarterly exercise requirement to a cold shutdown or refueling frequency has been requested.

Paragraph IWV-3200 could possibly be interpreted such that if a packing adjustment to any one of these valves is required during power operation, a full- or part-stroke exercise and/or stoke time test/exercise might be required following such an adjustment. Exercising valves in the steam and feedwater systems at power results in a high potential for tripping the reactor due to steam/feedwater flow perturbations. For the MSIVs, exercising at power is totally precluded because the control systems are arranged such that as soon as the valve disk leaves the full open position a unit trip signal is generated.

Packing adjustments are necessary from time to time to minimize packing leakage that can impact such aspects of plant operation as: personnel protection, ALARA considerations, housekeeping, flood protection, safe and reliable power operation.

Considerable experience in this area using qualified maintenance and operations personnel leads us to conclude that exercising/timing a valve immediately following packing adjustment is not warranted. To do so requires substantially reducing plant load thereby effecting a steam/feedwater flow perturbation that increases the potential for inadvertent reactor trip and unnecessary and unwarranted cycling of the unit. Packing adjustments at power are made in small increments with the intent of reducing leakage, not eliminating it completely. This approach helps to minimize the potential for binding associated with overtightening.

Currently, Technical Specifications require the performance of a turbine stop/control valve cycling test on a periodic frequency. This test requires a load reduction to about 30% reactor power thus permitting either full- or part-stroke exercising of most valves in the steam and feedwater systems at that time.

Accordingly, we are requesting that any IWV-3200 testing of these valves that may be required as a result of packing adjustments performed with the reactor at power be deferred until the next turbine stop/control valve test required by the Technical Specifications. For those valves that cannot be exercised at power, such as the MSIVs (MS-1s) without causing a unit trip, stroke testing would be deferred until the next planned outage of sufficient duration.

Alternative Testing: Valve testing required as a result of packing adjustment performed with the reactor at power may be deferred until the next turbine stop/control valve test required by Technical Specifications for valves in the main steam and feedwater systems that can be stroke tested in conjunction with the turbine stop/control valve test. For valves that can only be tested with the reactor shut down (i.e., when stroking the valve at power would result in a reactor trip), any testing required as a result of packing adjustment will be deferred until the next planned outage of sufficient duration not to exceed the Section XI required test frequency (i.e., quarterly, cold shutdown, refueling, etc.).

3.14.6.1.2 Evaluation--The reviewer does not agree with the licensee's basis because no valves have been identified and an indeterminate time interval has been proposed. It is conceivable that maintenance could be performed on a valve and then that valve would not be tested and demonstrated operable until the next refueling outage. There is no assurance that the valve could perform its safety function if required to do so from the time the maintenance was performed until testing has been done to verify its operability. Also, it is the reviewer's opinion that no interpretation of Paragraph IWV-3200 is necessary because it clearly states that valves will be tested after maintenance has been performed and then goes on to give examples of various routine maintenance functions.

3.14.6.1.3 Conclusion--The reviewer concludes that the licensee should be required to comply with Section XI, Paragraph IWV-3200, and, therefore, the requested relief should not be granted.

APPENDIX A
(RESERVED)

APPENDIX B

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 -3522 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, location, or system design. These valves either cannot or should not be exercised during power operation. These valves are listed below and grouped according to the system in which they are located.

1. AUXILIARY COOLANT SYSTEM

1.1 Category A Valves

Valves 743 and 1870, residual heat removal pumps minimum flow isolations, cannot be exercised during power operation because if the valves were closed and the RHR pumps were needed to start, they would start against a dead head and possibly damage the pumps. Also, these valves are locked open valves and are required to be open during an accident. These valves will be full-stroke exercised at cold shutdowns.

Valves 730 and 731, residual heat removal pumps reactor coolant suction isolations, cannot be exercised during power operation because they are interlocked to prevent their opening at RCS pressures in excess of RHR entry conditions. These valves will be full-stroke exercised at cold shutdowns.

1.2 Category A/C Valves

Valve 741A, residual heat removal return header check, cannot be full-stroke exercised during power operation because the LPSI mode of emergency cooling would have to be initiated to do so. This valve will be part-stroked quarterly and full-stroke exercised at cold shutdowns during the normal shutdown cooling mode of operation of the RHR pumps.

1.3 Category B Valves

Valves 746 and 747, low head safety injection and residual heat removal loop injection isolations, cannot be exercised during power operation. Full-stroke exercising these valves quarterly during normal plant operations would be inconsistent with NRC guidelines for excluding valves from cycling tests in that cycling these valves could subject the LHSI/RHR system to pressures in excess of their design pressure. It is assumed for purposes of a cycling test that one or more of the upstream check valves has failed. No positive methods are available for determining the pressure or lack thereof on the high pressure side of the valve to be cycled. These valves will be full-stroke exercised at cold shutdowns.

1.4 Category C Valves

Valves 738A and 738B, residual heat removal pump discharge checks, cannot be full-stroke exercised during power operation. Full-stroke testing of these valves during normal operation is impractical as it would require a full flow test of the RHR pumps through the SI system. This is impractical as it would require safety injection flow to the RCS which is at a higher pressure than the RHR pumps can deliver. These valves will be part-stroke exercised quarterly during the RHR pump mini-flow test and full-stroke exercised at cold shutdowns by momentary full flow operation of an RHR pump.

2. BOILER FEEDWATER SYSTEM

2.1 Category B Valves

Valves FCV-417L, 427L, 437L, and 447L, main feedwater regulating valve bypass valves, cannot be exercised during power operation. These valves are normally closed during normal plant operations and are used during initial startup of the secondary steam generating system. Exercising these valves quarterly is impractical because the increased flow caused by the opening of the valve would cause a feedwater flow/steam generator level mismatch and cause an unnecessary oscillation in the flow control network and steam generator water level and potential plant trip. These valves will be full-stroke exercised at cold shutdowns or prior to startup following cold shutdowns.

Valves FCV-417, 427, 437, and 447, main feedwater regulating valves, cannot be exercised during power operation. Exercising these valves quarterly is impractical during power operation in that it would shut off the feedwater to the steam generator which could result in a reactor trip condition. These valves will be full-stroke exercised at cold shutdowns or prior to startup following cold shutdowns.

Valves BFD-2-21 and -2-22, boiler feedwater pump discharge, cannot be exercised during power operation because it would shut off the feedwater to steam generators and trip the plant. These valves will be full-stroke exercised at cold shutdowns.

3. CHEMICAL AND VOLUME CONTROL SYSTEM

3.1 Category A Valves

Valves 201 and 202 are containment isolation valves and function as remote manual letdown flow isolation valves in the letdown line to the nonregenerative heat exchanger. Part-stroke exercising of these valves is impractical since these are open or close only valves. Full-stroke exercising of these valves is also impractical during normal plant operation because it would inhibit the control of the reactor coolant level control system. These valves will be full-stroke exercised at cold shutdowns.

Valves 205 and 226 are remote manual flow isolation valves in the charging line leading to the regenerative heat exchangers. Part-stroke exercising of these valves is impractical because they are open or closed only valves. Full-stroke exercising of these valves quarterly during normal plant operation is impractical because it would inhibit the control of the reactor coolant level control system. Closing these valves at any time during normal plant operation would shut down the charging flow creating a potential for a low level reactor trip. These valves will be full-stroke exercised at cold shutdowns.

3.2 Category B Valves

Valve 333, charging pump suction boric acid supply, cannot be exercised during power operation. The boric acid storage tanks contain high concentrations of borated water for emergency shutdown purposes. Cycling 333 would result in aligning this source of high concentrated boric acid solution to the charging pump suction. Charging pump flow must be maintained to provide injection flow to the reactor coolant pump seals. Hence cycling this valve would result in a reactivity transient due to the injection of high concentrated boric acid solution which, if left unchecked, would cause a reactor shutdown. Such cycling during power operation is undesirable, hence cold shutdown cycling has been proposed. Cold shutdown testing will provide assurance that this valve will function as required. This valve will be full-stroke exercised during cold shutdowns.

Valve LCV-112B, charging pump refueling water storage tank suction, cannot be exercised during power operation. The refueling water storage tank contains high concentrations of borated water for emergency shutdown purposes. Cycling LCV-112B would result in aligning this source of high concentrated boric acid solution to the charging pump suction. Charging pump flow must be maintained to provide injection flow to the reactor coolant pump seals. Hence cycling this valve would result in a reactivity transient due to the injection of high concentrated boric acid solution which, if left unchecked, would cause a reactor shutdown. Such cycling during power operation is undesirable, hence cold shutdown cycling has been proposed. Cold shutdown testing will provide assurance that this valve will function as required. This valve will be full-stroke exercised during cold shutdowns.

Valve LCV-112C, charging pump volume control tank suction, cannot be exercised during power operation because it is in the suction line to charging pumps which provide for reactor coolant makeup and seal injection flow. The reactor coolant pump seals require injection flow whenever the pumps are operating. Stroking LCV-112C closed during normal operation would require realigning the charging pump suction to an alternate supply. Available alternate supplies from the refueling water storage tank and boric acid storage tanks both contain high concentrations of borated water which, if injected, would result in a reactivity transient and eventual plant shutdown. Cold shutdown testing will provide assurance that this valves will function as required. This valve will be full-stroke exercised during cold shutdowns.

3.3 Category C Valves

Valve 290, charging pump refueling water storage tank suction check, cannot be exercised during power operation. The refueling water storage tank contains high concentrations of borated water for emergency shutdown purposes. Cycling 290 would result in aligning this source of high concentrated boric acid solution to the charging pump suction. Charging pump flow must be maintained to provide injection flow to the reactor coolant pump seals. Hence cycling this valve would result in a reactivity transient due to the injection of high concentrated boric acid solution which, if left unchecked, would cause a reactor shutdown. Such cycling during power operation is undesirable, hence cold shutdown cycling has been proposed. Cold shutdown testing will provide assurance that this valve will function as required. Valve 290 will be exercised during cold shutdowns.

Valve 332, charging pump suction boric acid supply check, cannot be exercised during power operation. System arrangement is such that valve 332 cannot be exercised unless valve 333 is open to permit flow from the boric acid storage system. Aligning this flow path during power operation will result in a reactivity transient due to the introduction of highly concentrated boric acid solution from the boric acid storage system. Valve 332 will be full-stroke exercised at cold shutdowns using primary water to the suction of the boric acid transfer pumps delivering to the charging pumps for delivery to the RCS.

Valve 4924, charging pump suction boric acid supply check, cannot be exercised during power operation. System arrangement is such that this valve can be exercised only when the emergency boration path is aligned. Aligning this path during power operation will result in a reactivity transient due to the introduction of high concentrated boric acid solution from the boric acid storage system. This valve will be full-stroke exercised at cold shutdowns using primary water to the suction of the boric acid transfer pumps delivering to the charging pumps for delivery to the RCS.

4. CONTAINMENT PURGE SYSTEM

4.1 Category A Valves

Valves FCV-1170 and -1171, containment purge supply isolations, and FCV-1172 and -1173, containment purge exhaust isolations, cannot be exercised during power operation because they are normally closed during power operation and have a safety function to close; therefore, they are generally considered passive valves. An administrative goal has been established to limit the amount of time these valves may be open during plant operation. As such, exercising will be accomplished at cold shutdowns. These valves will be full-stroke exercised at cold shutdowns.

5. MAIN STEAM SYSTEM

5.1 Category B Valves

Valves PCV-1134, -1135, -1136, and -1137, atmospheric steam dumps, cannot be exercised during power operation due to the steam flow that would ensue. It is impractical to time these valves because they can act as throttle valves and are fully opened or closed only by operator action.

Due to the rheostat control of these valves, reproducible times would not generally be obtainable. These valves will be full-stroke exercised during cold shutdowns. These valves will not be timed during this exercise test. (See Item 3.9.1.1 for the discussion of stroke time measurements for these valves.)

Valve PCV-1133, priming ejectors steam supply pressure control, cannot be exercised during power operation because it would require securing the priming ejectors during the test or disrupting steam flow should the valve fail to reopen. Due to the function of the valve (i.e., pressure regulation), it is part-stroked at indeterminate times during normal operation. This valve will be full-stroke exercised and timed at cold shutdowns.

5.2 Category B/C Valves

Valves MS-1-21, -22, -23, and -24, MSIVs, cannot be full-stroke or part-stroke exercised quarterly because to do so would cause a reactor trip. The reactor trip would be caused by the turbine tripping off line. The turbine trip is caused by a Valve Position Change Signal. The Technical Specifications require these valves be full-stroke tested and timed to their safe position during refuelings. These valves will be full-stroke exercised and timed at cold shutdowns.

5.3 Category C Valves

Valves MS-2-21, -22, -23, and -24, main steam non-return checks, cannot be exercised during power operation because they are normally open during power operation passing nuclear generated steam to the turbine-generator unit. There are no means available to physically stroke these valves either on-line or off-line. However, as they are normally open check valves and are equipped with external position indication that is physically observable, physical observation to assure these valves are in the closed position can be verified at cold shutdown. These valves will be verified closed at cold shutdowns.

6. REACTOR COOLANT SYSTEM

6.1 Category B Valves

Valves HCV-3100 and -3101, reactor vessel head vents, cannot be exercised during power operation. These valves are motor operated pressure isolation valves in the reactor coolant system and act as part of the vessel head vent portion. These valves are normally closed during normal plant operation. These valves are opened when it is necessary to vent the reactor vessel head. These valves were installed as part of the TMI action items and are required to be operable during normal plant operations. Consistent with NRC's SER for this system (NRC, Varga to Con Ed, O'Toole, dated September 9, 1983) these valves will be stroked at cold shutdowns.

Valves 535 and 536, PORV blocks, and PCV-455C and PCV-456, PORVs, will be exercised in accordance with NRC staff guidelines. Part-stroke exercising these valves at any time is impractical because these are open or close only valves. Consistent with the criteria contained in NRC's SER for the remote reactor head vent (NRC, Varga to Con Ed, O'Toole, dated September 9, 1983), valves PCV-455C and PCV-456 will be exercised at cold shutdowns. Valves 535 and 536 will be exercised and stroke time quarterly when maintained in the closed position for durations of 90 days or greater. When maintained in the open position for durations less than 90 days, exercising and stroke timing will be at a cold shutdown frequency.

7. SAFETY INJECTION SYSTEM

7.1 Category A/C Valves

Valves 838A-D, low pressure safety injection header checks, cannot be exercised during power operation. Valves 897A and 897C are in the flowpaths from the high pressure safety injection (HPSI) pumps and valves 897A through 897D are in the flowpaths from the recirculation pumps, RHR pumps, and from their respective accumulators. The system configuration is such that the only practical way the valves can be exercised is by putting flow through them from one of the SI pumps or accumulators. During normal power operations, the RCS pressure is approximately 2200 psig. None of the SI pumps or accumulators have the pressure capability to overcome the RCS pressure in order to establish flow through the check valves. Valves 838A through 838D are in series with 897A through 897D respectively and, therefore, the same basis for relief applies. All eight check valves will be full-stroke exercised during cold shutdowns when the RHR mode of cooling is in progress. In addition, valves 897A-D will be full-stroke exercised as described in Item 3.12.1.1 for valves 895A-D as these valves are in series with the 895s and are necessarily exercised when the 895 valves are exercised by accumulator discharge. Also see Item 3.12.1.2 for a discussion of the testing for valves 897A-D.

7.2 Category B Valves

Valve 1810, safety injection pumps refueling water storage tank suction, cannot be exercised during power operation because it is required by procedure to be deenergized open during normal plant operations to ensure water flow from the RWST to the SI pumps. Because it is a single valve in this line, failure of this valve in the shut position would cause the failure of the SI system and cause the plant to shut down. This valve will be full-stroke exercised at cold shutdowns.

Valve 882, residual heat removal pumps refueling water storage tank suction, cannot be exercised during power operation because it is deenergized open during normal plant operations to ensure proper operability of the RHR system following an accident. Failure of this valve in the closed position during normal operations would preclude the proper operation of the system. This valve will be full-stroke exercised at cold shutdowns.

Valves 842 and 843, safety injection pumps minimum flow isolations, cannot be exercised during power operation. These valves are open or closed only valves; therefore, part-stroke exercising them is impractical. Full-stroke exercising the valves quarterly could compromise the SI pump operation if the valves were in a closed position. If the valves were in the closed position and the pumps were started, the result would be a dead head condition which most likely would cause damage to the pumps. These valves will be full-stroke exercised at cold shutdowns.

Valves 856A, C, D, and E, safety injection cold leg injection isolations, cannot be exercised during power operation. These valves are open and closed only valves; therefore, part-stroke exercising these valves is impractical. Full-stroke exercising these valves quarterly during normal plant operations is impractical because these valves are normally locked open and are required to be open during an emergency situation utilizing the SI system. Failure of one of these valves in the closed position will place the plant in a less conservative condition that may eventually cause plant shutdown. These valves will be full-stroke exercised during cold shutdowns.

Valves 856B and F, safety injection hot leg injection isolations, cannot be exercised during power operation and are capable of being only full-stroke exercised. Full-stroke exercising these valves quarterly during normal plant operation would be impractical in that a failure of these valves concurrent with a loss of coolant accident (LOCA) can result in a steam binding effect which would prevent adequate cooling water from reaching the core. These valves will be full-stroke exercised at cold shutdowns.

APPENDIX C

The Flow Diagrams and Drawings listed below were used during the course of this review.

System	Diagram or Drawing	Revision
Air Conditioning to CCR	9321-F-4050	6
Air Ejector to Containment	9321-F-2025	15
Auxiliary Coolant	9321-F-2720 A227781	39 0
Auxiliary Steam	9321-F-2027	11
Boiler Feedwater	9321-F-2019	31
Chemical and Volume Control	9321-F-2736 A208168	31 2
City Water to Containment	9321-F-2678	35
Condensate and Boiler Feed Pump	9321-F-2018	28
Containment Purge	9321-F-4022 9321-F-2726	18 24
Containment Radiation Monitors R11 and R12 Supply/Return	9321-F-2726 9321-F-7045	24 9
Fan Cooler Filter Units	9321-F-4022	18
Fuel Oil to Diesel Generator	9321-F-2030	12
Hydrogen Recombiner	9321-F-2727	9
Instrument Air	9321-F-2036	18
Isolation Valve Seal Water	9321-F-2746	17
Jacket Water to Diesel Generators	9321-F-2028	7
Main Steam	9321-F-2017	27
Penetration and Liner Weld Joint Channel System	9321-F-2726	24
Personnel Airlock	FSAR Figure 5.2-27	2

System	Diagram or Drawing	Revision
Post-Accident Containment Air Sampling	A208479	2
Post-Accident Containment Venting	9321-F-4061 B208879	10 1
Reactor Coolant	9321-F-2738	40
Safety Injection	9321-F-2735	48
Sampling	9321-F-2745 A227178	20 1
Service Water	9321-F-2722 A209762	35 4
Starting Air to Diesels	9321-F-2029	7
Station Air	9321-F-2035	12
Steam Generator Blowdown	9321-F-2729	18
Waste Disposal	9321-F-2719	44

APPENDIX D

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 should be required to perform system modifications to allow flow measurements on the turbine driven auxiliary boiler feedwater pump, #22, during quarterly tests. (See Item 2.9.1.1)

2. The licensee should be required to perform system modifications to allow flow measurements on the boric acid transfer pumps, #21 and #22, during quarterly tests. (See Item 2.12.3)

3. The licensee should be required to exercise valves 1879A, 1879B, 1880A, and 1880B, hydrogen recombiner gas supply checks, during cold shutdowns. (See Item 3.6.1.1)

4. The licensee should be required to exercise valves 1881A, recombiner hydrogen supply check, 1881C, recombiner oxygen supply check, and 1881D, recombiner nitrogen supply check, during cold shutdowns. (See Item 3.6.1.2)

5. The licensee has incorrectly identified all valves listed on page 14 of 20, "Isolation Valve Seal Water System," as Category C valves when, in fact, the valves are manual, Category B, passive. The licensee should correct this typographical error.

6. The licensee should be required to establish a sample disassembly/inspection program for valves 895A, B, C, and D, safety injection accumulator outlet checks. (See Item 3.12.1.1)

7. The licensee should be required to establish a sample disassembly/inspection program for valves 897A, B, C, and D, combined

low pressure safety injection/accumulator discharge checks. (See Item 3.12.1.2)

8. The licensee should be required to establish a sample disassembly/inspection program for valves 879A and B, charcoal filter fire protection supply checks. (See Item 3.12.3.5)

9. The licensee should be required to establish a sample disassembly/inspection program for valves 886A and B, inside recirculation pump discharge checks. (See Item 3.12.3.6)

10. The licensee has identified valve 990D on page 4 of 6, Sampling System, as having a motor operator when, in fact, it is equipped with a manual operator. The licensee should be required to correct this typographical error.

11. The licensee should be required to test valves SWN-42-1, -2, -3, -4, and -5, containment building ventilation cooling coil service water supply header reliefs, in accordance with Section XI, Paragraph IWV-3510. (See Item 3.13.1.1)

12. The licensee should be required to exercise valves FCV-1111 and -1112, conventional plant equipment service water supply, at least at a refueling outage frequency. (See Item 3.13.2.1)

13. The licensee has incorrectly identified valves PCV-1215A, -1217, and -1217A as PCB-1215A, -1217, and -1217A in General Relief Request C. The licensee should be required to correct this typographical error. (See Item 3.14, 3.1).

14. The licensee should be required to comply with the corrective action requirements of Section XI, Paragraph IWV-3417(a). (See Item 3.14.5.1)

15. The licensee should be required to comply with the post-maintenance testing requirements of Section XI, Paragraph IWV-3200. (See Item 3.14.6.1)

16. The following relief requests have been determined to be unnecessary either because the valves concerned are passive, do not perform a safety-related function, or have been removed from the system. For the sake of clarity, each relief request is listed according to system, relief request number, valve(s) number, and a very brief explanation why the request is unnecessary.

a. Air Conditioning to CCR

a.1 Relief Request No. 1

a.1.1 Valves WRV-1 and WRV-2

a.1.1.1 These valves were the temperature control valves in the cooling water supply to the control room air conditioners. The A/C units have been replaced with air cooled units, therefore, these valves are no longer in service and have been deleted from the IST program. However, the licensee did not delete the relief request from the program.

b. Auxiliary Coolant System

b.1 Relief Request No. 3

b.1.1 Valve 732

b.1.1.1 This valve is the residual heat removal pump reactor coolant loop 2 hot leg suction isolation and has been identified as passive by the licensee. This relief request is unnecessary because Section XI, Table IWV-3700-1, does not require passive valves to be exercised.

b.2 Relief Request No. 10

b.2.1 Valves 774A, B, C, D, and 770

b.2.1.1 These check valves are in the component cooling water supply lines to the reactor coolant pumps. Their safety function is to remain open during pump operation and that function is continuously verified during operation. This relief request is unnecessary because Section XI, Paragraph IWV-3522(b), permits utilizing system flow to exercise check valves.

b.3 Relief Request No. 10

b.3.1 Valve 755

b.3.1.1 This normally open check valve is in the auxiliary component cooling pump bypass line and its safety function is to shut when the pumps respond to safeguards actuations. The licensee is verifying that it shuts during pump testing, therefore, this relief request is unnecessary because Section XI, Paragraph IWV-3522(a) permits utilizing system flow to exercise check valves.

c. Auxiliary Steam System

c.1 Relief Request No. 1

c.1.1 Valves UH-43 and UH-44

c.1.1.1 These valves are containment unit heater auxiliary steam supply isolations and are locked closed. These valves have been identified as passive by the licensee. This relief request is unnecessary because Section XI, Table IWV-3700-1, does not require passive valves to be exercised.

d. Chemical and Volume Control System

d.1 Relief Request No. 1

d.1.1 Valve 227

d.1.1.1 This valve is the charging header flow control station bypass and is normally closed. This valve has been identified as passive by the licensee. This relief request is unnecessary because Section XI, Table IWV-3700-1, does not require passive valves to be exercised.

d.2 Relief Request No. 11

d.2.1 Valve 292

d.2.1.1 This valve is the charging pump volume control tank suction check and has been deleted from the program by the licensee, therefore, this relief request is unnecessary.

d.3 Relief Request No. 13

d.3.1 Valves 362A and 362B

d.3.1.1 These valves are the boric acid transfer pump discharge checks and will be full-stroke exercised during the quarterly pump test, therefore, this relief request is unnecessary.

d.4 Relief Request No. 14

d.4.1 Valves 4000, 4001, 4002, 4003, 4004, and 4005 d.4.1.1 These check valves are the discharge check valves for the charging pumps and have a safety function to remain open during pump operation. That function is continuously verified during pump operation. This relief request is unnecessary because Section XI, Paragraph IWV-3522(b), permits utilizing system flow to exercise check valves.

d.5 Relief Requests No. 16 and No. 17

d.5.1 Valves 251A-251H

d.5.1.1 These valves are the supply checks in the reactor coolant pump seal water supply lines. They have a safety function to remain open during reactor coolant pump operation. Additionally, these valves do not perform a pressure boundary isolation function. These relief requests are unnecessary because Section XI, Paragraph IWV-3522(b), permits utilizing system flow to exercise check valves and closure verification is unnecessary because the valves are not PIVs.

d.6 Relief Request No. 18

d.6.1 Valves 204A and 204B

d.6.1.1 These valves are the charging header valves to the loop 2 hot leg and the loop 1 cold leg and can be exercised quarterly, therefore, this relief request is unnecessary but was not deleted from the program.

d.7 Relief Request No. 19

d.7.1 Valves 210A and 210B

d.7.1.1 These valves are the charging header checks to the loop 2 hot leg and the loop 1 cold leg and can be exercised quarterly, therefore, this relief request is unnecessary because Section XI, Paragraph IWV-3522(b), permits utilizing system flow to exercise check valves.

e. City Water to Containment

e.1 Relief Request No. 1

e.1.1 Valves MW-17 and MW-17-1

e.1.1.1 These valves are locked closed in the city water supply line to the containment building and have been identified as passive by the licensee. This relief request is unnecessary because Section XI, Table IWV-3700-1, does not require passive valves to be exercised.

f. Hydrogen Recombiner System

f.1 Relief Request No. 1

f.1.1 Valves PCV-1, -2, -3A, -3B, and -941

f.1.1.1 These valves are self-contained pressure regulating valves and do not have a required fail-safe position. They are not equipped with control switches. The valves are exempt from testing per IWV-1200 and this relief request was written to document the valve failure mode.

g. Isolation Valve Seal Water System

g.1 Relief Request No. 2

g.1.1 Valves PCV-1076 and PCV-1090

g.1.1.1 These valves are self-contained pressure regulating valves and do not have a required fail-safe position. They are not equipped with control switches. The valves are exempt from testing per IWV-1200 and this relief request was written to document the valve failure mode.

h. Jacket Water to Diesel Generators

h.1 Relief Request No. 1

h.1.1 Valves JW-9, JW-9-1, and JW-9-2

h.1.1.1 These valves are self-contained temperature control valves and are installed in the engine mounted jacket water cooling system. This relief request is unnecessary because Section XI, Paragraph IWV-1200(a) exempts valves utilized for system control from testing.

i. Main Steam

i.1 Relief Request No. 4

i.1.1 Valves MS-45A-D, -46A-D, -47A-D, and -48A-D

i.1.1.1 These are the main steam system safety valves and will be tested in place each refueling outage. This relief request is unnecessary because the Code allows this type of test and the proposed test frequency exceeds that required by the Code.

j. Penetration and Liner Weld Joint Channel System

j.1 Relief Request 1

j.1.1 Valves FCV-1177-1, -2, -3, -4, -1178-1, -2, -3, and -4

j.1.1.1 These pressurization header check valves do not have a safety function to shut and are continuously verified open. This relief request is unnecessary because Section XI, Paragraph IWV-3522(b), permits utilizing system flow to exercise check valves.

j.2 Relief Request 2

j.2.1 Valves FCV-1193 through 1204

j.2.1.1 These are pressure control valves and have no required fail-safe position, therefore, they are exempted from testing by Section XI, Paragraph IWV-1200.

k. Reactor Coolant System

k.1 Relief Request No. 1

k.1.1 Valves 580A and 580B

k.1.1.1 These valves are the dead weight tester isolations and are locked closed. These valves have been identified as passive by the licensee. This relief request is unnecessary because Section XI, Table IWV-3700-1, does not require passive valves to be exercised.

k.2 Relief Request No. 2

k.2.1 Valve 518

k.2.1.1 This valve is the pressurizer relief tank nitrogen supply check and has been identified as passive by the licensee.

This relief request is unnecessary because Section XI, Table IWV-3700-1, does not require passive valves to be exercised.

1. Safety Injection System

1.1 Relief Request No. 1

1.1.1 Valves 863 and 4312

1.1.1.1 These valves are the safety injection accumulator nitrogen supply containment isolations and have been identified as passive by the licensee. This relief request is unnecessary because Section XI, Table IWV-3700-1, does not require passive valves to be exercised.

1.2 Relief Request No. 3

1.2.1 Valves 859A and 859C

1.2.1.1 These valves are in the safety injection pump test flow path, are locked closed manual valves, and have been identified as passive by the licensee. This relief request is unnecessary because Section XI, Table IWV-3700-1, does not require passive valves to be exercised.

1.3 Relief Requests No. 7 and No. 8

1.3.1 Valves 1821, 1822A, 1822B, and 1831

1.3.1.1 These valves are the boron injection tank outlet valves and have been deleted from the program. However, the licensee did not delete the relief requests from the program.

1.4 Relief Request No. 11

1.4.1 Valves 1838A and 1838B

1.4.1.1 These valves are the containment spray pump spray additive tank suction checks and will be full-stroke exercised quarterly. The licensee has deleted the relief request but did not remove it from the program.

m. Station Air System

m.1 Relief Request No. 1

m.1.1 Valves SA-24-2 and SA-24-3

m.1.1.1 These valves are the station air header containment isolation valves and have been identified as passive by the licensee. This relief request is unnecessary because Section XI, Table IWV-3700-1, does not require passive valves to be exercised.

n. Waste Disposal System

n.1 Relief Request No. 1

n.1.1 Valve 1616

n.1.1.1 This valve is the pressure relief tank nitrogen supply containment isolation check and has been identified as passive by the licensee. This relief request is unnecessary because Section XI, Table IWV-3700-1, does not require passive valves to be exercised.

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