Enclosure 1

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TECHNICAL EVALUATION REPORT
PUMP AND VALVE INSERVICE TESTING PROGRAM
VIRGIL C. SUMMER NUCLEAR STATION

Docket No. 50-395

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ABSTRACT

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

FOREWORD

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

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1. INTRODUCTION

Contained herein is a technical evaluation of the pump and valve inservice testing (IST) program submitted by the South Carolina Electric and Gas Company (SCE&GC) for their Virgil C. Summer Nuclear Station.

The working session with the SCE&GC representatives was conducted on February 24 and 25, 1982. The licensee's valve resubmittal IST Program, dated March 17, 1983, with additional valve relief requests transmitted by letters dated August 2, 1984 and January 28, 1985, and the pump resubmittal IST Program, dated March 1, 1983, with pump relief requests in a previous submittal dated January 5, 1983 were reviewed to verify compliance of proposed tests of pumps and valves whose function is safety related with the requirements of the ASME Boiler and Pressure Vessel Code (the Code), Section XI, 1980 Edition through Winter 1980 Addenda. Any IST program revisions subsequent to those noted above are not addressed in this technical evaluation report (TER). An NRC staff position is that required program changes, such as additional relief requests or the deletion of any components from the IST Program, should be submitted to the NRC under separate cover in order to receive prompt attention, but should not be implemented prior to review and approval by the NRC.

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

Section 2 of this report presents the Virgil C. Summer Nuclear Station relief requests and the EG&G's evaluations and conclusions regarding these requests for the pump testing program. Similar information is presented in Section 3 for the valve testing program.

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

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

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

2. PUMP TESTING PROGRAM

The Virgil C. Summer Nuclear Station IST program submitted by South Carolina Electric and Gas Company (SCE&GC) 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 C. Each SCE&GC basis for requesting relief from the pump testing requirements and the EG&G reviewer's evaluation of that request is summarized below.

2.1 Time Allowed for Analysis of Test Data From All Pumps

2.1.1 Relief Request

The licensee has requested relief from the analysis requirements of Section XI, IWP-3220, for analyzing all pump test data within 96 hours after completion of a test. The licensee proposed to exclude weekends and/or holidays from the 96 hour time frame starting at 4:00 P.M. on the day preceding and ending at 8:00 A.M. on the day following the weekend and/or holiday, as applicable.

2.1.1.1 Licensee's Basis for Requesting Relief. The licensee only provided an alternate requirement which was to review test data within 3 working days following the weekend and/or holiday not to exceed 96 hours accumulated time excluding weekends and/or holidays.

2.1.1.2 Evaluation. The reviewer does not agree with the licensee's proposed relief request from the Section XI requirement of analyzing all pump test data within 96 hours after completion of a test. The Code requirement of 96 hours for data analysis allows adequate time for analysis taking into consideration holidays and weekends in conjunction with adequate test planning.

2.1.1.3 Conclusion. The reviewer concludes that relief should not be granted from the Section XI requirement of analyzing all pump test data within 96 hours after completion of a test.

2.2 Diesel Generator Fuel Oil Transfer Pumps

2.2.1 Relief Request

The licensee has requested relief from the test requirements of Section XI, IWP-3100, for measuring bearing temperature, inlet pressure, differential pressure, and vibration amplitude of the diesel generator fuel oil transfer pumps XPP-141A, XPP-141B, XPP-4A and XPP-4B and proposed to utilize pump flow to determine the pumps performance.

2.2.1.1 Licensee's Basis for Requesting Relief. Diesel generator fuel oil transfer pumps are positive displacement pumps with self lubricated internal bearings. Therefore, flow measurement is indicative of pump performance. A flow measurement will be taken when the pumps are used to pump up the diesel fuel oil tank at least once each month.

2.2.1.2 Evaluation. The reviewer agrees that by measuring flow the licensee will provide reasonable assurance of pump hydraulic performance for a positive displacement pump. The licensee has indicated that the pump bearings are sealed and bearing temperature cannot be measured and the reviewer agrees with this position. The parameters specified by the Code for determining pump mechanical characteristics are vibration and bearing temperature. Because the licensee has requested relief from measuring both of these parameters, the pump mechanical characteristics cannot be determined by the licensee. The licensee did not provide a technical basis for not measuring pump vibration.

2.2.1.3 Conclusion. The reviewer concludes that relief should not be granted from measuring pump vibration amplitude as required by the Code. The reviewer concludes that relief should be granted from measuring differential pressure, inlet pressure and bearing temperature. Based on

the consideration discussed above, the staff concludes that the licensee should measure vibration amplitude in addition to pump flow to give reasonable assurance of pump operability as required by the Code.

2.3 Service Water Booster Pumps

2.3.1 Relief Request

The licensee has requested relief from the test requirement of Section XI, IWP-3100, for measuring the flow from service water booster pumps XPP-45A and XPP-45B and proposed to utilize pump differential pressure (dP) to determine the pumps performance.

2.3.1.1 Licensee's Basis for Requesting Relief. A full flow test would be detrimental to water chemistry in the reactor building cooling units. The installed flow element/transmitter is downstream of the recirculation line and would not be representative of total pump flow when the pump is tested by recirculation flow.

The pumps will be tested on recirculation, measuring pump dP utilizing pump suction and discharge pressure instrumentation. Pump dP is indicative of pump performance which satisfies the intent of Section XI.

2.3.1.2 Evaluation. The reviewer does not agree with the licensee's basis for requesting relief from the flow measurement requirement of Section XI. The NRC staff position is that pump flow rate must be measured to assess pump hydraulic conditions, and that lack of installed instrumentation is not an adequate long-term justification for not making this Code required measurement.

2.3.1.3 Conclusion. The reviewer concludes that the licensee should measure pump flow rate in accordance with the requirements of Section XI. Suitable instrumentation or other means should be provided by the licensee in order to do so. The licensee should make these modifications prior to the end of the next refueling outage. For the balance of the period of the

current fuel cycle, interim relief should be granted to test the pumps as proposed by the licensee. The reviewer concludes that requiring the licensee to make these modifications prior to the next refueling outage would impose unnecessary hardship on the licensee without a compensating increase in the level of safety.

2.4 Service Water Pumps

2.4.1 Relief Request

The licensee has requested relief from the test requirements of Section XI, IWP-3100, for measuring vibration and bearing temperature of service water pumps XPP0039A, XPP0039B and XPP0039C and proposed to measure vibration of the motor inboard and outboard bearings and the temperature of the water being pumped.

2.4.1.1 Licensee's Basis for Requesting Relief. These pumps are vertical pumps with the pumping unit housed in a column below the floor structure of the service water pump house. The bearings are inaccessible for measurement of vibration and bearing temperature.

2.4.1.2 Evaluation. The licensee has not shown that measurement of the temperature of the water being pumped will provide a satisfactory indication of pump mechanical characteristics. However, the pump bearings are cooled by the pumped fluid and IWP-4310 excludes measurement of bearing temperature for bearings in the main flow path of the pumped fluid. The measurement of vibration of the motor bearings should provide indication of pump degradation.

2.4.1.3 Conclusion. The reviewer concludes that measurement of pump bearing temperature is not required by the code, relief should be granted from the Code requirement for measuring pump bearing vibration and the licensee's proposal to measure vibration of the motor inboard and outboard bearings should provide sufficient information to adequately monitor pump degradation.

2.5 Boric Acid Transfer Pumps

2.5.1 Relief Request

The licensee has requested relief from the test requirements of Section XI, IWP-3100, for measuring flow, vibration and bearing temperature of boric acid transfer pumps, XPP-13A and XPP-13B, and proposed to utilize pump differential pressure in lieu of measuring flow, annually disassemble and inspect each pump for abnormal wear or degradation in accordance with the Mechanical Maintenance Procedures in lieu of measuring vibration, and measure temperature of the water being pumped rather than bearing temperature.

2.5.1.1 Licensee's Basis for Requesting Relief. There is no installed flow element in the system. These pumps are canned motor/pump units which have water lubricated sleeve bearings. Representative vibration indication cannot be obtained on the pump casing due to the damping effect of the water. Representative bearing temperature indication cannot be obtained due to inaccessibility of the bearing within the motor/pump unit. Pumps will be tested by recirculating to their associated tank and measuring pump dP utilizing tank level as suction pressure.

2.5.1.2 Evaluation. The reviewer does not agree with the licensee's basis for requesting relief from the flow and vibration measurement requirements of Section XI. The NRC staff position is that pump flow rate and vibration must be measured to assess pump operability and that lack of adequate measurement capability is not a long-term justification for not making the Code required measurements. The licensee has not shown that measurement of the pumped fluid temperature will provide a satisfactory indication of pump bearing temperature. However, the pump bearings are cooled by the pumped fluid and IWP-4310 excludes measurement of bearing temperature for bearings in the main flow path of the pumped fluid.

2.5.1.3 Conclusion. The reviewer concludes that the licensee should measure pump flow rate and vibration in accordance with the requirements of Section XI. Suitable instrumentation or other means should be provided by

the licensee in order to do so. The licensee should make these modifications prior to the end of the next refueling outage. For the balance of the period of the current fuel cycle, interim relief should be granted to test the pumps as proposed by the licensee. The reviewer concludes, that requiring the licensee to make these modifications prior to the next refueling outage would impose unnecessary hardship on the licensee without a compensating increase in the level of safety.

2.6 Charging Pumps

2.6.1 Relief Request

The licensee has requested relief from the test requirement of Section XI, IWP-3100, for measuring the flow from charging pumps XPP-43A, XPP-43B and XPP-43C and proposed to utilize pump dP to determine the pumps performance.

2.6.1.1 Licensee's Basis for Requesting Relief. The installed flow element/transmitter is downstream of the seal injection line and would not be representative of total pump flow.

Technical Specification 4.1.2.3.1 states, "the required charging pump shall be demonstrated OPERABLE by verifying, on recirculation flow, a differential pressure across the pump of greater than or equal to 2472 psig is developed."

This test is required to be performed at least once per 31 days except when the vessel head is removed, and thus is indicative of pump performance and satisfies the intent of the Section XI flow test.

2.6.1.2 Evaluation. The reviewer does not agree with the licensee's basis for requesting relief from the flow measurement requirement of Section XI. The NRC staff position is that pump flow rate must be measured

to access the pump hydraulic condition, and that lack of installed instrumentation is not an adequate long-term justification for not making this Code required measurement.

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

2.7 Chilled Water Pumps

2.7.1 Relief Request

The licensee has requested relief from the test requirements of Section XI, IWP-3100, for measuring vibration and bearing temperature of chilled water pumps XPP0048A, XPP0048B and XPP0048C and proposed to annually disassemble and inspect each pump for abnormal wear or degradation in accordance with Mechanical Maintenance Procedures in lieu of measuring vibration and measure the temperature of the water being pumped rather than bearing temperature.

2.7.1.1 Licensee's Basis for Requesting Relief. These pumps are canned motor/pump units which have water lubricated sleeve bearings. Representative vibration indication cannot be obtained on the pump casing due to the damping effect of the water. Representative bearing temperature indication cannot be obtained due to inaccessibility of the bearing within the motor/pump unit.

2.7.1.2 Evaluation. The reviewer does not agree with the licensee's basis for requesting relief from the vibration measurement requirements of Section XI. The NRC staff position is that vibration must be measured to assess pump operability and that lack of adequate measurement capability is not a long-term justification for not making this Code required measurement. The licensee has not shown that measurement of the pumped fluid temperature will provide a satisfactory indication of pump bearing temperature. However, the pump bearings are cooled by the pumped fluid and IWP-4310 excludes measurement of bearing temperature for bearings in the main flow path of the pumped fluid. The measurement of vibration should provide indication of pump degradation.

2.7.1.3 Conclusion. The reviewer concludes that the licensee should measure pump vibration in accordance with the requirements of Section XI. Suitable instrumentation or other means should be provided by the licensee in order to do so. The licensee should make these modifications prior to the end of the next refueling outage. For the balance of the period of the current fuel cycle, interim relief should be granted to test the pumps as proposed by the licensee. Requiring the licensee to make these modifications prior to the next refueling outage would impose unnecessary hardship on the licensee without compensating increase in the level of safety.

3. VALVE TESTING PROGRAM

The Virgil C. Summer Nuclear Station IST Program submitted by the South Carolina Electric and Gas Company was examined to verify that all valves included in the program are subjected to the periodic tests required by the ASME Code, Section XI, and the NRC positions and guidelines. The reviewer found that, except as noted in Appendix C or where specific relief from testing has been requested, these valves are tested to the Code requirements and the NRC positions and guidelines. Each South Carolina Electric and Gas Company basis for requesting relief from the valve testing requirements and the reviewers evaluation of that request is summarized below and grouped according to system and valve category.

3.1 General Relief Request

3.1.1 Passive Containment Isolation Valves

3.1.1.1 Relief Request. The licensee has requested relief from the valve leak rate test requirements of Section XI, IWV-3420, for passive A or A/C containment isolation valves and proposes to leak test these valves in accordance with the requirements of Appendix J, technical specifications and/or surveillance test procedures.

3.1.1.1.1 Licensee's Basis for Requesting Relief--The passive containment isolation valves are required to be tested every eighteen (18) months to two (2) years in accordance with Appendix J and/or Technical Specifications.

3.1.1.1.2 Evaluation--The leak test procedures and requirements for containment isolation valves identified by 10 CFR 50, Appendix J, essentially meet the Section XI Code requirements since it incorporates all of the major elements of Paragraphs IWV-3421 through 3425. Appendix J, Type C, leak rate testing adequately determines the leak-tight integrity of these valves. The 10 CFR 50, Appendix J, leak rate testing does not trend or establish corrective actions based on individual valve leakage rates, therefore, the "Analysis of Leakage Rates" and "Corrective Action" requirements of Section XI, Paragraphs IWV-3426 and 3427 must be followed.

3.1.1.1.3 Conclusion--Relief may be granted from the requirements of Paragraphs IWV-3421 through IWV-3425 of the Code for containment isolation valves that are tested alternatively to the Appendix J, Type C, leak rate requirements based on the equivalency of the proposed alternative testing to the Code requirements. Relief should not be granted from the "Analysis of Leakage Rates" and "Corrective Action" requirements of Section XI, Paragraphs IWV-3426 and IWV-3427.

3.2 Chemical and Volume Control System

3.2.1 Category C Valves

3.2.1.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3520, for charging pump discharge header check valves XVC-8481A, XVC-8481B and XVC-8481C and proposed to partial-stroke exercise the valves quarterly and full-stroke exercise the valves each refueling outage when the vessel head is removed.

3.2.1.1.1 Licensee's Basis for Requesting Relief--Exercising these valves during normal operations would require establishing full charging flow into the reactor coolant system (RCS) causing an overpressure condition and possible reactor trip. During cold shutdown, full charging flow would cause a pressure surge and exceed the maximum pressure for the low temperature of the RCS. These valves will be partial-stroke exercised quarterly and full-stroke exercised each refueling outage when the vessel head is removed.

3.2.1.1.2 Evaluation--The reviewer agrees that these valves cannot be full-stroke exercised during power operation because this would require establishing full charging flow into the RCS which could result in an overpressure condition and possible reactor trip. During cold shutdowns, full charging flow could result in a low-temperature overpressurization of the RCS.

3.2.1.1.3 Conclusion--The reviewer concludes that relief should be granted from the quarterly full-stroke exercising requirement of Section XI. Partial-stroke exercising these valves quarterly during power

operation and full-stroke exercising these valves during refueling outages when the reactor vessel head is removed should provide reasonable assurance of valve operability as required by the Code and, therefore, is acceptable.

3.3 Emergency Feedwater System

3.3.1 Category C Valves

3.3.1.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3520, for check valves XVC-1022A, XVC-1022B, XVC-1034A and XVC-1034B in the service water supply lines to the suctions of the turbine and motor driven emergency feedwater pumps and proposed to disassemble these valves to verify operability during refueling outages.

3.3.1.1.1 Licensee's Basis for Requesting Relief--Testing these valves during plant operations could introduce service water into the emergency feedwater system and eventually into the steam generators causing severe chemistry control problems. Testing these valves during cold shutdown would contaminate the condensate storage tank. Partial-stroke exercising these valves during normal operation would require isolating the applicable emergency feedwater pump which would be a violation of technical specifications. These valves will be disassembled and inspected each refueling outage.

3.3.1.1.2 Evaluation--The reviewer agrees that these valves cannot be exercised during power operation or cold shutdowns due to the possibility of introducing service water into the emergency feedwater system and eventually into the steam generators resulting in severe chemistry control problems. The only feasible method of verifying valve operability is by valve disassembly and inspection of the valves' internals.

3.3.1.1.3 Conclusion--The reviewer concludes that relief should be granted from the quarterly full-stroke exercising requirement of Section XI and that disassembly and inspection of these valves during refueling outages should demonstrate proper valve operability. The

proposed alternate test requirements provide reasonable assurance of valve operability as required by the Code and, therefore, is acceptable.

3.4 Instrument Air System

3.4.1 Category A Valves

3.4.1.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3410, for air operated valve XVG-2660 in the instrument air system line to the reactor containment and proposed to test this valve during each refueling outage.

3.4.1.1.1 Licensee's Basis for Requesting Relief--Testing this valve during plant operation or cold shutdown would isolate reactor building instrument air therefore rendering several systems inoperable. The valve will be tested during each refueling outage.

3.4.1.1.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief. The licensee's basis did not provide technical justification for not exercising this valve quarterly or during cold shutdowns (such as specifying equipment that would lose instrument air and the consequences).

Valve XVG-2660 appears to be in the same line as check valve XVC-2661 which the licensee proposes to test during cold shutdown (refer to Appendix A). The licensee's basis for not testing XVC-2661 during power operation is overexposure to test personnel and not rendering systems inoperable.

3.4.1.1.3 Conclusion--The reviewer concludes that relief should not be granted from the Section XI exercising requirements for valve XVG-2660.

3.4.1.2 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3410, for air operated valves XVG-2662A and XVG-2662B in the instrument air return line from the

containment building and proposed to test these valves each refueling outage.

3.4.1.2.1 Licensee's Basis for Requesting Relief--Testing these valves during plant shutdown would isolate Reactor Building Instrument Air therefore rendering several systems inoperable.

3.4.1.2.2 Evaluation--The reviewer does not agree with the licensing basis for requesting relief. The licensee's basis did not provide technical justification for not full-stroke exercising these valves quarterly or during cold shutdowns.

3.4.1.2.3 Conclusion--The reviewer concludes that relief should not be granted from the quarterly full-stroke exercising requirements of Section XI for valves XVG-2662A and XVG-2662B.

3.5 Safety Injection System

3.5.1 Category A Valves

3.5.1.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3410, for boron injection tank outlet valves XVG-8801A and XVG-8801B and proposed to full-stroke exercise these valves during refueling outages in conjunction with the high head injection check valves.

3.5.1.1.1 Licensee's Basis for Requesting Relief--Testing these valves during normal operation could inject a high concentration of boric acid into the high head safety injection (HHSI) lines and thus into the reactor coolant system (RCS) causing an inadvertent boration and plant shutdown. During cold shutdown, exercising these valves could cause migration of the high concentration boric acid into the HHSI lines, which are not heat traced, causing solidification and blockage of these lines.

These valves will be exercised each refueling outage with the HHSI check valves.

3.5.1.1.2 Evaluation--The reviewer agrees that these valves cannot be exercised during power operation because this exercising could result in injection of a high concentration of boric acid into the RCS which could result in an inadvertent boration and plant shutdown. Exercising these valves during cold shutdowns could result in a possible migration of the high concentration boric acid into the HHSI lines causing solidification and blockage of these lines because they are not heat traced.

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

3.5.1.2 Relief Request. The licensee has requested relief from the quarterly exercising requirements of Section XI, IWV-3410, for low-head safety injection (LHSI) cold leg isolation valves XVG-8888A and XVG-8888B and proposed to full-stroke exercise these valves during cold shutdowns.

3.5.1.2.1 Licensee's Basis for Requesting Relief--Testing these valves during normal plant operations would require isolating one of the LHSI loops. This would violate the Technical Specification 3/4.5.2 that requires two operable independent LHSI loops. These valves will be tested during cold shutdown when one loop of the LHSI can be shut down and tested.

3.5.1.2.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief. The licensee's technical specifications allow a period of 72 hours to restore an inoperable emergency core cooling subsystem to an operable status which will allow the licensee sufficient time to perform the required testing on these valves

during power operation. The reviewer does not interpret the licensee's Technical Specification 3/4.5.2 to preclude testing of these valves quarterly during power operation.

3.5.1.2.3 Conclusion--The reviewer concludes that relief should not be granted from the exercising requirements of Section XI for valves XVG-8888A and XVG-8888B and that the licensee should full-stroke exercise these valves quarterly during power operation to demonstrate proper valve operability.

3.5.1.3 Relief Request. The licensee has requested relief from the valve position indicator verification requirement of Section XI, IWV-3300, for containment sump to RHR pump suction motor-operated isolation valves XVG-8811A and XVG-8811B and proposed to visually verify the valve position per IWV-3300 at least once every five years during regularly scheduled maintenance.

3.5.1.3.1 Licensee's Basis for Requesting Relief--Valves XVG-8811A and XVG-8811B are located inside large bolted valve encapsulation chambers which are an extension of the Reactor Building Containment. Opening the chambers would violate containment integrity and can only be done during a refueling. Several weeks of additional work and testing would be required to remove the chambers to visually verify valve position resulting in undue equipment maintenance and undue personnel radiation exposure.

Visual verification of valve position per IWV-3300 will be performed at least once every five (5) years during regularly scheduled maintenance. In addition, leak test and stroke test results which determine valve operability will be used to verify remote valve indication prior to the five (5) year program.

3.5.1.3.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief. The licensee did not provide sufficient data and information to justify extending the verification period from two to five years.

3.5.1.3.3 Conclusion--The reviewer concludes that relief should not be granted from the requirements of Section XI, Paragraph IWV-3300. These valves with remote position indicators should be observed at least once every two years to verify that valve position is properly indicated.

3.5.2 Category A/C Valves

3.5.2.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3520, for check valves XVC-8997A, XVC-8997B and XVC-8997C between the discharge of the boron injection tank and the RCS cold legs and proposed to full-stroke exercise these valves during refueling outages.

3.5.2.1.1 Licensee's Basis for Requesting Relief--Testing these valves during plant operation will require establishing charging flow through the boron injection tank, not only placing unnecessary thermal stresses on the high head injection piping, but also diluting the boric acid concentration in the boron injection tank and causing an over-boration of the RCS. Testing these valves during cold shutdown also requires establishing charging flow through the high head injection lines. With the RCS at such a low pressure and temperature, an uncontrolled injection of a large volume of water could cause a pressure spike in the system and exceed the pressure-temperature limits. These valves will be tested during each refueling outage when the vessel head is removed and the refueling pool can be used to contain the large volume of water.

3.5.2.1.2 Evaluation--The reviewer agrees that these valves cannot be exercised during power operation because the exercising would require injecting a high concentration of boric acid into the RCS which would result in an over-boration and cause plant shutdown. Full-stroke exercising these check valves during cold shutdowns could result in a low-temperature overpressurization of the RCS.

3.5.2.1.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI for valves

XVC-8997A, XVC-8997B and XVC-8997C and that full-stroke exercising these valves during refueling outages when the reactor vessel head is removed should demonstrate proper valve operability. The proposed alternate test requirements provide reasonable assurance of valve operability as required by the Code, and therefore, is acceptable.

3.5.2.2 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3520, for check valves XVC-8995A, XVC-8995B and XVC-8995C between the HHSI pumps and the RCS cold legs and proposed to full-stroke exercise these valves during refueling outages.

3.5.2.2.1 Licensee's Basis for Requesting Relief--Testing these valves during plant operations requires establishing charging flow through the cold leg recirculation lines placing unnecessary thermal stresses on the recirculation lines. Testing these valves during cold shutdown also requires establishing charging flow through the cold leg recirculation lines. With the RCS at such a low pressure and temperature, an uncontrolled injection of a large volume of water would occur which could cause a pressure spike in the system and exceed the pressure-temperature limits.

These valves will be tested at each refueling outage when the vessel head is removed and the refueling pool can be used to contain the large volume of water.

3.5.2.2.2 Evaluation--The reviewer agrees that these valves cannot be exercised during power operation because charging flow would have to be established through the cold leg recirculation lines which could cause unnecessary thermal stresses on these lines. These unnecessary thermal stresses could result in premature failure of the cold leg recirculation lines. During cold shutdowns, exercising these check valves with charging pump flow could result in a low-temperature overpressurization of the RCS.

3.5.2.2.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI for valves XVC-8995A, XVC-8995B, and XVC-8995C and that full-stroke exercising these valves during refueling outages when the reactor vessel head is removed should demonstrate proper valve operability. The proposed alternate test requirements provide reasonable assurance of valve operability as required by the Code, and, therefore, is acceptable.

3.5.2.3 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3520, for HHSI hot leg loop header check valves XVC-8990A, XVC-8990B and XVC-8990C and proposed to full-stroke exercise these valves during refueling outages.

3.5.2.3.1 Licensee's Basis for Requesting Relief--Testing these valves during normal operations would require establishing charging flow through the hot leg recirculation lines, placing unnecessary thermal stresses on the recirculation lines. Testing these valves during cold shutdown also requires establishing charging flow through the hot leg recirculation lines. With the RCS at such a low pressure and temperature, an uncontrolled injection of a large volume of water would occur which could cause a pressure spike in the system and exceed the pressure-temperature limits.

These valves will be tested at each refueling outage when the vessel head is removed and the refueling pool can be used to contain the large volume of water.

3.5.2.3.2 Evaluation--The reviewer agrees that these valves cannot be exercised during power operation because charging flow would have to be established through the hot leg recirculation lines which would cause unnecessary thermal stresses on these lines. These unnecessary thermal stresses could result in premature failure of the hot leg recirculation lines. During cold shutdowns, exercising these check valves with charging pump flow could result in a low-temperature overpressurization of the RCS.

3.5.2.3.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI for valves XVC-8990A, XVC-8990B and XVC-8990C and that full-stroke exercising these valves during refueling outages when the reactor vessel head is removed should demonstrate proper valve operability. The proposed alternate test requirements provide reasonable assurance of valve operability as required by the Code and, therefore, is acceptable.

3.5.2.4 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3520, for the HHSI hot leg loop header check valves XVC-8992A, XVC-8992B and XVC-8992C and proposed to full-stroke exercise these valves during refueling outages.

3.5.2.4.1 Licensee's Basis for Requesting Relief--Testing these valves during normal operations would require establishing charging flow through the hot leg recirculation lines, placing unnecessary thermal stresses on the recirculation lines. Testing these valves during cold shutdown also requires establishing charging flow through the hot leg recirculation lines. With the RCS at such a low pressure and temperature, an uncontrolled injection of a large volume of water would occur which could cause a pressure spike in the system and exceed the pressure-temperature limits.

These valves will be tested at each refueling outage when the vessel head is removed and the refueling pool can be used to contain the large volume of water.

3.5.2.4.2 Evaluation--The reviewer agrees that these valves cannot be exercised during power operation because charging flow would have to be established through the hot leg recirculation lines which would cause unnecessary thermal stresses on these lines. These unnecessary thermal stresses could result in premature failure of the hot leg recirculation lines. During cold shutdowns, exercising these check valves with charging pump flow could result in a low-temperature overpressurization of the RCS.

3.5.2.4.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI for check valves XVC-8992A, XVC-8992B and XVC-8992C and that full-stroke exercising these valves during refueling outages when the reactor vessel head is removed should demonstrate proper valve operability. The proposed alternate test requirements provide reasonable assurance of valve operability as required by the Code and, therefore, is acceptable.

3.5.2.5 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3520, for accumulator discharge check valves XVC-8948A, XVC-8948B and XVC-8948C, XVC-8956A, XVC-8956B and XVC-8956C and proposed to manually full-stroke exercise these valves during refueling outages.

3.5.2.5.1 Licensee's Basis for Requesting Relief--Testing these valves during plant operations would require initiating flow from the safety injection accumulator to the RCS. The safety injection accumulator does not have the required pressure to overcome normal RCS pressure, therefore, flow could not be established. During cold shutdown, the RCS would not have the volume to contain the large volume of water required to full-stroke exercise these valves, therefore, an overpressure condition for the low temperature would result. During refueling shutdown, exercising these valves with flow could damage the reactor internals due to the large volume of high pressure water injected.

These valves will be disassembled and inspected during each refueling outage.

3.5.2.5.2 Evaluation--The reviewer agrees that these valves cannot be exercised during power operation because the safety injection accumulators do not have sufficient pressure to overcome normal RCS pressure. During cold shutdown, exercising these valves could result in a low-temperature overpressurization of the RCS. During refueling shutdown, exercising these valves with flow could damage the reactor internals due to

the large volume of high pressure water required to full-stroke exercise them. Therefore, the only feasible method of verifying valve operability is by valve disassembly and inspection of the valves' internals.

3.5.2.5.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI for check valves XVC-8948A, XVC-8948B, XVC-8948C, XVC-8956A, and XVC-8956B and XVC-8956C and that disassembly and inspection of the valve's internals during refueling outages should demonstrate proper valve operability. The proposed alternate test requirements provide reasonable assurance of valve operability as required by the Code and, therefore, is acceptable.

3.5.2.6 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3520, for HHSI hot leg loop "C" header check valve XVC-8993C and proposed to full-stroke exercise this valve during refueling outages.

3.5.2.6.1 Licensee's Basis for Requesting Relief--Testing this valve during normal plant operation would cause an inadvertent boration due to the high concentration of boric acid in the refueling water storage tank (RWST), thus a plant shutdown. Also, during normal plant operation establishing flow through this valve with the charging pumps would place unnecessary thermal stresses on the associated safety injection piping. During cold shutdown the RCS does not have the volume to contain the large volume of water required to test the valve and the maximum pressure for the low temperature would be exceeded.

The valve will be tested at the end of each refueling outage when the vessel head is removed and the refueling pool can be used to contain the large volume of water.

3.5.2.6.2 Evaluation--The reviewer agrees that this valve cannot be exercised during power operation because charging flow would have to be established through the hot leg recirculation line which would cause

unnecessary thermal stresses on this line. The unnecessary thermal stress could result in premature failure of the hot leg recirculation line. During cold shutdowns, exercising this valve with charging pump flow could result in a low-temperature overpressurization of the RCS.

3.5.2.6.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI for check valve XVC-8993C and that full-stroke exercising this valve during refueling outages when the reactor vessel head is removed should demonstrate proper valve operability. The proposed alternate test requirements provide reasonable assurance of valve operability as required by the Code and, therefore, is acceptable.

3.5.3 Category B Valves

3.5.3.1 Relief Request. The licensee has requested relief from the quarterly exercising requirements of Section XI, IWV-3410, for valves XVG-8809A and XVG-8809B which are LHSI suction supply isolation valves from the RWST and proposed to full-stroke exercise these valves during cold shutdown.

3.5.3.1.1 Licensee's Basis for Requesting Relief--Testing these valves during normal operation would isolate the RWST from the suction of the LHSI pumps and violate Technical Specification 3/4.5.2 that requires two (2) operable emergency core cooling systems with a flow path capable of taking suction from the RWST on a safety injection signal. These valves will be tested during cold shutdown when one loop of the LHSI system can be shut down and tested.

3.5.3.1.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief. The licensee's technical specifications allow a period of 72 hours to restore an inoperable emergency core cooling subsystem to an operable status which will allow the licensee sufficient time to perform the required testing on these valves

during power operation. The reviewer does not interpret the licensee's Technical Specification 3/4.5.2 to preclude testing of these valves quarterly during power operation.

3.5.3.1.3 Conclusion--The reviewer concludes that relief should not be granted from exercising these valves quarterly during power operation and that the licensee should full-stroke exercise these valves quarterly during power operation to demonstrate proper valve operability.

3.5.4 Category C Valves

3.5.4.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3410, for check valve XVC-8926 in the suction line from the RWST to the charging pumps and proposed to full-stroke exercise this valve during refueling outages.

3.5.4.1.1 Licensee's Basis for Requesting Relief--Testing this valve during normal plant operations would cause an inadvertent boration due to the high concentration of boric acid in the RWST, thus a plant shutdown. During cold shutdown, the RCS does not have the volume to contain the large volume of water required to test the valve and the maximum pressure for the low temperature would be exceeded.

The valve will be tested at each refueling outage when the vessel head is removed and the refueling pool can be used to contain the large volume of water.

3.5.4.1.2 Evaluation--The reviewer agrees that exercising this valve during power operation would result in introducing water with a high concentration of boric acid into the RCS. The highly concentrated boric acid from the RWST could result in an inadvertent boration of the RCS and a plant shutdown. During cold shutdowns, exercising this valve could result in a low-temperature overpressurization of the RCS.

3.5.4.1.3 Conclusion--The reviewer concludes that relief should b granted from the exercising requirements of Section XI for check valve XVC-8926 and that the proposed alternate testing of full-stroke exercising this valve during refueling outages, when the reactor vessel head is removed, should demonstrate proper valve operability. The proposed alternate test requirements provide reasonable assurance of valve operability as required by the Code and, therefore, is acceptable.

3.6 Reactor Building Spray System

3.6.1 Category A Valves

3.6.1.1 Relief Request. The licensee has requested relief from the valve position indicator verification requirement of Section XI, IWV-3300, for the reactor building spray sump motor-operated isolation valves XVG-3004A and XVG-3004B and proposed to visually verify the valve position per IWV-3300 at least once every five years during regularly scheduled maintenance.

3.6.1.1.1 Licensee's Basis for Requesting Relief--Valves XVG-3004A and XVG-3004B are located inside large bolted valve encapsulation chambers which are an extension of the Reactor Building Containment. Opening the chambers would violate containment integrity and can only be done during a refueling. Several weeks of additional work and testing would be required to remove the chambers to visually verify valve position resulting in undue equipment maintenance and undue personnel radiation exposure.

Visual verification of valve position per IWV-3300 will be performed at least once every five (5) years during regularly scheduled maintenance. In addition, leak test and stroke test results which determine valve operability will be used to verify remote valve indication prior to the five (5) year program.

3.6.1.1.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief. The licensee did not provide sufficient data and information to justify extending the verification period from two to five years.

3.6.1.1.3 Conclusion--The reviewer concludes that relief should not be granted from the requirements of Section XI, Paragraph IWV-3300. These valves with remote position indicators should be observed at least once every two years to verify that valve position is properly indicated.

3.6.2 Category A/C Valves

3.6.2.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3520, for reactor building spray header containment isolation check valves XVC-3009A and XVC-3009B and proposed to manually full-stroke exercise these valves during refueling outages.

3.6.2.1.1 Licensee's Basis for Requesting Relief--Testing these valves during plant operation would require placing the reactor building spray system in operation which would result in dousing the containment and filters. The valves will be disassembled and inspected during each refueling outage.

3.6.2.1.2 Evaluation--The reviewer agrees that exercising these valves with flow during power operation or cold shutdowns would result in spraying the containment and filters. Spraying the containment could result in damage to lagging, electrical equipment, etc. The only feasible method of verifying valve operability is by valve disassembly and inspection of the valve's internals.

3.6.2.1.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI for valves XVC-3009A and XVC-3009B and that disassembly and inspection of the valve's internals during refueling outages should demonstrate proper valve

operability. The proposed alternate test requirements provide reasonable assurance of valve operability as required by the Code and, therefore, is acceptable.

3.6.3 Category C Valves

3.6.3.1 Relief Request. The licensee has requested relief from the exercising requirements of Section XI, IWV-3520, for valves XVC-3013A and XVC-3013B, reactor building spray system sodium hydroxide storage tank discharge header check valves, and proposed to manually full-stroke exercise these valves during refueling outages.

3.6.3.1.1 Licensee's Basis for Requesting Relief--Testing these valves during plant operation or cold shutdown would require placing the spray system in operation which would result in dousing the containment and filters or pumping sodium hydroxide into the refueling water storage tank. These valves will be disassembled and inspected during each refueling outage.

3.6.3.1.2 Evaluation--The reviewer agrees that exercising these valves with flow during any plant mode would require either spraying the containment or injecting highly corrosive sodium hydroxide into the refueling water storage tank via the reactor building spray system full flow pump test loop. Therefore, the only feasible method of verifying valve operability is by valve disassembly and inspection of the valve's internals.

3.6.3.1.3 Conclusion--The reviewer concludes that relief should be granted from the exercising requirements of Section XI for valves XVC-3013A and XVC-3013B and that disassembly and inspection of the valve's internals during refueling outages should demonstrate proper valve operability. The proposed alternate test requirements provide reasonable assurance of valve operability as required by the Code and, therefore, is acceptable.

3.7 Hydrogen Removal System

3.7.1 Category A Valves

3.7.1.1 Relief Request. The licensee has requested relief from the valve position indicator verification requirement of Section XI, IWV-3300, for solenoid-operated containment-isolation valves XVX-6050A and XVX-6054 and proposed to use leak test results of 10 CFR 50, Appendix J, once every two years to verify proper valve closure.

3.7.1.1.1 Licensee's Basis for Requesting Relief-- Valves XVX-6050A and XVX-6054 are solenoid actuator valves with no visible external means of verifying valve operation. The leak test results of 10 CFR 50, Appendix J, once every two years is used to verify proper valve closure.

3.7.1.1.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief. The licensee's proposed alternate test would verify valve closure by leak rate measurement, which should permit the verification of the valve remote position indication in the closed position. However, the licensee has not addressed verifying the valve remote position indication in the open position as required by the Code. Proper valve remote indication for the open position should also be verified.

3.7.1.1.3 Conclusion--The reviewer concludes that relief should not be granted from the requirements of Section XI, Paragraph IWV-3300. Proper valve position indication should be verified as required by the Code.

3.8 Sample System

3.8.1 Category A Valves

3.8.1.1 Relief Request. The licensee has requested relief from the valve position indicator verification requirement of Section XI, IWV-3300, for the following solenoid-operated containment-isolation valves and proposed to use leak test results of 10 CFR 50, Appendix J, once every two years to verify proper valve closure.

XVX-9339	XVX-9341	XVX-9356A
XVX-9356B	XVX-9357	XVX-9364B
XVX-9364C	XVX-9365B	XVX-9365C
XVX-9387	XVX-9398A	XVX-9398B
XVX-9398C		

3.8.1.1.1 Licensee's Basis for Requesting Relief--These valves are solenoid actuated valves with no visible external means of verifying valve operation. The leak test results of 10 CFR 50, Appendix J, once every two years is used to verify proper valve closure.

3.8.1.1.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief. The Code requires that valves with remote position indicators be observed at least once every two years to verify that valve operation is accurately indicated. The licensee's proposed alternate test is to verify valve closure during the Appendix J leak tests which should permit the verification of the valve remote position indication in the closed position. However, proper position indication is not verified when the valves are in the open position.

3.8.1.1.3 Conclusion--The reviewer concludes that relief should not be granted from the requirements of Section XI, Paragraph IWV-3300. Proper valve position indication should be verified as required by the Code.

3.9 Stroke Timing Valves

3.9.1 Category A and B Valves

3.9.1.1 Relief Request. The licensee has submitted 28 similar relief requests that requested relief from the stroke timing requirements of Section XI, IWV-3417, and proposed to exercise and time valves (full stroke) at the required frequency to the nearest second not to exceed the maximum stroke time. The valves covered by these relief requests are as follows.

System	Valve	Category	Function	Maximum Stroke Time
Component Cooling Water	IVV-7096	B	Surge tank vent	5
Chemical and Volume Control	XVG-8107 XVG-8108	A B	Charging header isolation	10
	LCV-115C LCV-115E	B	Isolate the volume control tank outlet	10
	XVT-8104	B	Emergency boration	10
Main Feedwater	XVG-1611A XVG-1611B XVG-1611C	B	Isolate main feedwater supply to steam generator	5
Main Steam	XV-2801A XV-2801B XV-2801C	B	Main steam line isolation	5
	XVG-2869A XVG-2869B XVG-2869C	B	Bypass valves for main steam isolation	10
Safety Injection	XVG-8801A XVG-8801B	B	Boron injection tank outlet	10
	XVG-8885 XVG-8884 XVG-8886	B	High head hot leg injection isolation	10
	XVG-8945A XVG-8945B	B	Boron injection recirculation header isolation	10
	XVG-8942	B	Isolates boron injection recirculation outlet header	10
	XVG-8803A XVG-8803B	B	Boron injection tank inlet	10
Service Water	XVT-3164 XVT-3169 XVT-3165	B	Isolates digital rod position indication (DRPI) cooling	10

System	Valve	Category	Function	Maximum Stroke Time
Ventilation	XVB-0001A XVB-0001B XVB-0002A XVB-0002B	A	Reactor building purge isolation	5
Reactor Coolant	PCV-0445A PCV-0444B	B	Pressurizer power operated relief	2
	PCV-0445B	B	Pressurizer power operated relief	10
	XVG-8000A XVG-8000B XVT-8000C	B	Isolates pressurizer power operated relief	10
Hydrogen Removal	XVX-6050A XVX-6054 XVG-6056 XVG-6057 XVG-6066 XVG-6067	A	Reactor building isolation	5
Residual Heat Removal	FCV-0602A FCV-0602B	B	Controls flow through miniflow lines	10
	XVG-8706A XVG-8706B	B	Charging pump suction from RHR loops	10
HVAC Chilled Water	MVT-6412A MVT-6412B MVT-6490A MVT-6490B	B	Isolates control building nonessential loads	5
	MVT-6385A XVT-6385B MVT-6384A XVT-6384B	B	Isolates intermediate building nonessential loads	10
	XVG-6516 XVG-6517 XVG-6518 XVG-6519	B	Supply to component cooling water pumps	7.5

3.9.1.1.1 Licensee's Basis for Requesting Relief--Stroking and timing valves having stroke times <10 seconds introduces manual response error which could exceed the 50% increase limitation.

3.9.1.1.2 Evaluation--The reviewer does not agree with the licensee's basis for requesting relief. The licensee did not provide sufficient information to define the requested relief and to justify the relief request. Due to the problems associated with measuring the stroke times for rapid-acting valves, the NRC will grant relief from the trending requirements of IWV-3417(a) for rapid-acting valves. The NRC identifies rapid-acting valves as those that stroke in less than 2 seconds, and in order to obtain relief, the licensee must assign a limiting value of full-stroke time of 2 seconds to these valves and perform the corrective actions of IWV-3417(b) if the 2 second limit is exceeded.

3.9.1.1.3 Conclusion--The reviewer concludes that relief should not be granted from the stroke timing requirements of Section XI as requested. The NRC staff position for rapid-acting power operated valves is explained above.

APPENDIX A

VALVES TESTED DURING COLD SHUTDOWNS

APPENDIX A
VALVES TESTED DURING COLD SHUTDOWNS

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

1. COMPONENT COOLING WATER SYSTEM

1.1 Category A Valves

Valve XVG-9600, the outside containment isolation valve for the component cooling water supply from the component cooling water booster pumps, cannot be exercised during power operation. Exercising this valve during power operation would require securing cooling water to the reactor coolant pumps which could result in damage to the pumps and a possible plant trip. This valve will be full-stroke exercised during cold shutdowns and refueling outages. (Refer to Item 17 of Appendix C)

Valve XVG-9568, the outside containment isolation valve for the component cooling water supply, cannot be exercised during power operation. Exercising this valve during power operation would require securing cooling water to the reactor coolant pumps which could result in damage to the pumps and a possible plant trip. This valve will be full-stroke exercised during cold shutdowns and refueling outages.

Valves XVG-9605 and XVG-9606, the inside and outside containment isolation valves for component cooling water return, cannot be exercised during power operation. Exercising these valves during power operation would

require securing cooling water to the reactor coolant pumps which could result in damage to the pumps and a possible plant trip. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

1.2 Category A/C Valves

Valve XVC-9570, the inside containment isolation check valve for the component cooling water supply, cannot be exercised during power operation. Verifying closure of this valve, the safety-related position, during power operation would require securing cooling water to the reactor coolant pumps. During plant operation, this could damage the reactor coolant pumps and possibly result in a plant trip. This valve will be full-stroke exercised during cold shutdowns and refueling outages.

Valve XVC-9602, the inside containment isolation check valve for component cooling water supply from the component cooling water booster pumps, cannot be exercised during power operation. Verifying closure of this valve, the safety-related position, during power operation would require securing cooling water to the reactor coolant pumps. During plant operation, this could damage the reactor coolant pumps and possibly result in a plant trip. This valve will be full-stroke exercised during cold shutdowns and refueling outages.

2. CHEMICAL AND VOLUME CONTROL SYSTEM

2.1 Category A Valves

Valves XVG-8107 and XVG-8108, the charging header containment isolation valves, cannot be exercised during power operation. Exercising these valves during normal plant operation would require securing charging and letdown flow, which could result in a loss of volume control and pressurizer level control causing a reactor trip. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

Valve XVT-8152, the letdown flow containment isolation valve, cannot be exercised during power operation. Exercising this valve during normal plant operation would isolate letdown flow; then, thermal shock to the regenerative heat exchanger could occur upon reestablishing letdown flow. This valve will be full-stroke exercised during cold shutdowns and refueling outages.

Valves XVT-8100 and XVT-8112, the containment isolation valves for seal water returns from the reactor coolant pumps (RCPs), cannot be exercised during power operation. Exercising these valves during normal plant operation would interrupt flow from the RCPs central leakage system which could cause the differential pressure across the Number 2 seals to decrease thus causing a failure of the Number 1 seals. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

2.2 Category A/C Valves

Valve XVC-8381, the containment isolation check valve for normal charging, cannot be exercised during power operation. Exercising this check valve during normal plant operation would require securing charging and letdown flow which could result in a loss of volume control and pressurizer level control causing a reactor trip. This valve will be full-stroke exercised during cold shutdowns and refueling outages.

2.3 Category B Valves

Valves LCV-115C and LCV-115E, the volume control tank outlet header isolation valves, cannot be exercised during power operation. Exercising these valves during normal plant operation would require shifting charging pump suction from the volume control tank to the refueling water storage tank. This would cause an over-boration of the RCS and could result in plant shutdown. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

2.4 Category C Valves

Valve XVC-8442, the emergency borate check valve, cannot be exercised during power operation. Exercising this valve during normal plant operation would inject highly concentrated boric acid into the suction of the charging pumps causing an over-boration of the RCS and could result in a plant shutdown. This valve will be full-stroke exercised during cold shutdowns and refueling outages.

3. EMERGENCY FEEDWATER SYSTEMS

3.1 Category B Valves

Valves XVG-1001A and XVG-1001B, the isolation valves in the service water supply to the motor driven auxiliary feedwater pumps, cannot be exercised during power operation. Exercising these valves during normal plant operation could introduce service water into the emergency feedwater pump suction lines and possibly into the steam generators. If service water was introduced into the steam generators, chemistry control problems would result (the introduction of chlorides could result in steam generator mechanical damage). These valves will be full-stroke exercised during cold shutdowns and refueling outages.

Valves XVG-1002 and XVG-1008, the isolation valves in the service water supply to the turbine driven auxiliary feedwater pump, cannot be exercised during power operation. Exercising these valves during normal plant operation could introduce service water into the emergency feedwater pump suction lines and possibly into the steam generators. If service water was introduced into the steam generators, chemistry control problems would result (the introduction of chlorides could result in steam generator mechanical damage). These valves will be full-stroke exercised during cold shutdowns and refueling outages.

Valves XVG-1037A and XVG-1037B, the isolation valves between service water and emergency feedwater systems, cannot be exercised during power operation. Exercising these valves during normal plant operation could

introduce service water into the emergency feedwater pump suction lines and possibly into the steam generators. If service water was introduced into the steam generators, chemistry control problems would result (the introduction of chlorides could result in steam generator mechanical damage). These valves will be full-stroke exercised during cold shutdowns and refueling outages.

3.2 Category C Valves

Valves XVC-1038A, XVC-1038B, XVC-1038C, XVC-1039A, XVC-1039B and XVC-1039C, the emergency feedwater line check valves to the steam generators, cannot be exercised during power operation. Exercising these check valves during normal plant operation would introduce cold auxiliary feedwater to the steam generators thereby inducing unnecessary thermal stress on the emergency feedwater piping and nozzles. These unnecessary thermal stresses could result in premature failure of the associated emergency feedwater piping and nozzles. These check valves will be full-stroke exercised during cold shutdowns and refueling outages.

Valves XVC-1015A and XVC-1015B, the motor driven emergency feedwater pump discharge check valves, cannot be exercised during power operation. Exercising these check valves during normal plant operation would require establishing emergency feedwater flow to the associated steam generators thereby placing unnecessary thermal stress on the emergency feedwater piping and nozzles. This unnecessary thermal stress could result in premature failure of the associated emergency feedwater piping and nozzles. These check valves will be full-stroke exercised during cold shutdowns and refueling outages.

Valve XVC-1016, the turbine driven emergency feedwater pump discharge check valve, cannot be exercised during power operation. Exercising this check valve during normal plant operation would require establishing emergency feedwater flow to a steam generator thereby placing unnecessary thermal stress on the emergency feedwater piping and nozzles. This unnecessary thermal stress could result in premature failure of the associated emergency feedwater piping and nozzles. These check valves will be full-stroke exercised during cold shutdowns and refueling outages.

Valves XVC-1013A, XVC-1013B, and XVC-1014, the motor driven and turbine driven emergency feedwater pump suction check valves, cannot be full-stroke exercised during power operation. Full-stroke exercising these check valves during normal plant operation would require establishing emergency feedwater flow to the steam generators thereby placing unnecessary thermal stress on the emergency feedwater piping and nozzles. This unnecessary thermal stress could result in premature failure of the associated emergency feedwater piping and nozzles. These check valves will be partial-stroke exercised quarterly during the emergency feedwater pump tests and full-stroke exercised during cold shutdowns and refueling outages when the plant is being shut down from minimum load to cold shutdown.

Valves XVC-1019A, XVC-1019B, XVC-1019C, XVC-1020A, XVC-1020B and XVC-1020C, the emergency feedwater line check valves, cannot be exercised during power operation. Exercising these check valves during normal plant operation would require establishing emergency feedwater flow to the steam generators thereby placing unnecessary thermal stress on the emergency feedwater piping and nozzles. Establishing emergency feedwater flow to the steam generators could cause steam generator level control problems and a possible reactor trip. These check valves will be full-stroke exercised during cold shutdowns and refueling outages while shutting down for minimum load to cold shutdown.

4. MAIN FEEDWATER SYSTEM

4.1 Category B Valves

Valves XVG-1611A, XVG-1611B and XVG-1611C, the main feedwater isolation valves, cannot be exercised during power operation. Exercising these valves closed during normal plant operation would isolate main feedwater to the associated steam generators which could result in a reactor trip. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

Valves IFV-478, IFV-488 and IFV-498, the main feedwater control valves, cannot be exercised during power operations because closing these valves

during normal plant operation would isolate main feedwater to the associated steam generators resulting in a loss of steam generator level control which could cause a reactor trip. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

Valves IFV-3321, IFV-3331 and IFV-3341, the main feedwater bypass control valves, cannot be exercised during power operations because these valves are closed at reactor power levels above 25% and opening them during normal plant operation above 25% power would increase the main feedwater flow to the associated steam generators resulting in a loss of steam generator level control which could cause a reactor trip. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

5. INSTRUMENT AIR SYSTEM

5.1 Category A/C Valves

Valve XVC-2661, the instrument air line inside containment isolation check valve. cannot be exercised during power operation. Exercising this valve during normal plant operation would require entry into the reactor building. During plant operation this could cause overexposure to the test personnel. This valve will be verified closed, its safety-related position, during cold shutdowns and refueling outages.

6. MAIN STEAM SYSTEM

6.1 Category B Valves

Valves XVG-2801A, XVG-2801B and XVG-2801C, the main steam line isolation valves, cannot be full-stroke exercised during power operation. Full-stroke exercising any of these valves during normal plant operation would isolate the associated steam generator from the main steam header which would result in a reactor trip. These valves will be partial-stroke exercised quarterly using Surveillance Test Procedure 121.002 and full-stroke exercised during cold shutdowns and refueling outages.

7. SAFETY INJECTION SYSTEM

7.1 Category A Valves

Valves XVG-8884, XVG-8885 and XVG-8886, the HHSI hot and cold leg injection isolation valves, cannot be exercised during power operation. Exercising these valves during normal plant operation would place charging flow through the HHSI line thereby causing unnecessary thermal stresses on the safety injection piping. The thermal stresses on these lines could result in premature failure. During power operation, the charging system cannot be secured since this could result in loss of volume control and pressurizer level control and also a loss of reactor coolant pump seal water flow which could result in a reactor trip. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

7.2 Category A/C Valves

Valves XVC-8998A, XVC-8998B and XVC-8998C, the low head safety injection (LHSI) system to RCS cold leg check valves, cannot be exercised during power operation. Partial-stroke exercising these check valves, using the charging pumps, would place unnecessary thermal stresses on the associated cold leg recirculation lines, which could result in premature failure of these lines. Full-stroke exercising these check valves during normal operation would require establishing flow from the LHSI system. The LHSI pumps do not develop sufficient head to overcome reactor coolant system pressure during power operation. These check valves will be full-stroke exercised during cold shutdowns and refueling outages.

Valves XVC-8988A and XVC-8988B, the LHSI system supply to RCS hot leg check valves, cannot be exercised during power operation. Exercising these valves during normal plant operation would require initiating flow, using the LHSI pumps, into the reactor coolant system. Reactor coolant system pressure is higher than the LHSI pump discharge pressure precluding flow into the reactor coolant system. These check valves will be full-stroke exercised during cold shutdowns and refueling outages.

Valves XVC-8993A and XVC-8993B, the high head safety injection (HHSI) system to RCS hot leg check valves, cannot be exercised during power operation. Partial-stroke exercising these valves, using the charging pumps, would place unnecessary thermal stresses on the associated hot leg recirculation lines, which could cause premature failure of these lines. Full-stroke exercising these valves during normal operation would require establishing flow from the LHSI system into the reactor coolant system. The LHSI pumps do not develop sufficient head to overcome reactor coolant system pressure and establish flow. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

Valves XVC-8974A, XVC-8974B, XVC-8974C, XVC-8973A, XVC-8973B and XVC-8973C, the LHSI system check valves to the cold legs, cannot be exercised during power operation. Exercising these valves during normal plant operation would require initiating flow, using the LHSI pumps, into the reactor coolant system. Reactor coolant system pressure is higher than the LHSI pump discharge pressure precluding flow into the reactor coolant system. These check valves will be full-stroke exercised during cold shutdowns and refueling outages.

7.3 Category B Valves

Valves XVG-8808A, XVG-8808B and XVG-8808C, the safety injection accumulator outlet isolation valves, cannot be exercised during power operation. The plant's technical specifications require these valves to remain open during normal plant operation. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

Valves XVG-8803A and XVG-8803B, the boron injection tank inlet isolation valves, cannot be exercised during power operation. Exercising these valves during normal plant operation could dilute the boron injection tank below the minimum concentration required by the technical specifications. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

8. REACTOR BUILDING SPRAY SYSTEM

8.1 Category B Valves

Valves XVG-3002A and XVG-3002B, the isolation valves for the suction of the reactor building spray pumps from the sodium hydroxide (NaOH) storage tank, cannot be exercised during power operation. Exercising these valves during normal plant operation would require isolating the common discharge line from the NaOH tank to these valves. This would violate the plant's technical specifications by having no NaOH available to the reactor building spray system if an accident occurred. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

9. SERVICE WATER SYSTEM

9.1 Category B Valves

Valves XVG-3107A and XVG-3107B, the isolation valves between the service water system and the industrial cooling water system, cannot be exercised during power operation. Exercising these valves during normal plant operation would cause service water to mix with the industrial cooling water thereby causing a problem with the chemistry control of the industrial cooling water system. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

10. CONTROL ROD DRIVE MECHANISM COOLING WATER SYSTEM

10.1 Category A Valves

Valves XVG-7501, XVG-7502, XVG-7503, and XVG-7504, the inlet and outlet containment isolation valves for the control rod drive mechanism (CRDM) coolers, cannot be exercised during power operation. Failure of any of these valves in the closed position during plant operation could result in overheating of the CRDMs and possible plant trip. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

11. VENTILATION SYSTEM

11.1 Category A Valves

Valves XVB-0001A, XVB-0001B, XVB-0002A and XVB-0002B, the reactor building purge supply and exhaust containment isolation valves, cannot be exercised during power operation. These valves are locked closed and required to remain closed by technical specifications in order to maintain containment integrity during normal plant operation. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

12. REACTOR COOLANT SYSTEM

12.1 Category B Valves

PCV-444B, PCV-445A, and PCV-445B, the pressurizer power operated relief valves, will be exercised during cold shutdowns. This exercising frequency is consistent with the NRC guidelines for pressurizer power operated relief valves.

APPENDIX B

P&ID LIST

APPENDIX B

P&ID LIST

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

System	P&ID	Revision
CRDM Cooling Water	D-302-852	
Reactor Building Purge Supply and Purge Exhaust	D-912-103	12
Steam Generator Blowdown	D-302-701	7
Component Cooling	D-302-611	6
	D-302-612	9
	D-302-613	
Chemical and Volume Control	114E073 Sh. 1	
	114E073 Sh. 3	
	114E073 Sh. 5	
Diesel Generator	D-302-351	4
Feedwater	D-302-083	13
Emergency Feedwater	D-302-085	9
Fire Service	D-302-231	
Post Accident Hydrogen Removal	D-302-861	13
Instrument Air	D-302-273	4
Main Steam	D-302-011	10
Reactor and Auxiliary Building Sump Pumps	D-302-821	9
Reactor Coolant	114E072 Sh. 1	
	114E072 Sh. 2	
Residual Heat Removal	114E074	
Safety Injection	114E075 Sh. 1	
	114E075 Sh. 2	
	114E075 Sh. 3	
Reactor Building Spray	D-302-661	11

System	P&ID	Revision
Nuclear Sampling	D-302-771	5
	D-302-772	
Service Water	D-302-221	6
	D-302-222	12
Chilled Water	D-302-841	7
	D-302-842	6
	D-302-843	5
Waste Processing	114E077 Sh. 1	
Nitrogen Blanketing	D-302-311	3
Station Service Air	D-302-241	10

APPENDIX C

IST PROGRAM ANOMALIES IDENTIFIED IN THE REVIEW

APPENDIX C
IST PROGRAM ANOMALIES IDENTIFIED IN THE REVIEW

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

1. The licensee proposed to analyze pump test data within 3 working days following the weekend and/or holiday not to exceed 96 hours accumulated time excluding weekends and/or holidays (Refer to Section 2.1.1). This is not in agreement with the Code requirement which is to analyze the pump test data within 96 hours after completion of a test. The licensee should analyze the data in accordance with the requirements of Section XI.

2. The licensee did not provide sufficient technical justification for not measuring vibration of the diesel generator fuel oil transfer pumps XPP-141A, XPP-141B, XPP-4A and XPP-4B (Refer to Section 2.2.1). The licensee should measure the vibration amplitude of these pumps.

3. The licensee should be required to make system modifications during the next refueling outage so that flow of the service water booster pumps can be measured in accordance with the Section XI requirements. Interim relief should be granted to test the pumps as proposed by the licensee until the next refueling outage. (Refer to Section 2.3.1.)

4. The licensee should be required to measure the flow rate and vibration of the boric acid transfer pumps in accordance with the requirements of Section XI. The licensee should provide suitable instrumentation or other means to measure these parameters prior to the end of the next refueling outage. Interim relief should

be granted to test the pumps as proposed by the licensee until the next refueling outage. (Refer to Section 2.5.1.)

5. The licensee should be required to make system modifications during the next refueling outage so that flow of the charging pumps can be measured in accordance with the Section XI requirements. Interim relief should be granted to test the pumps as proposed by the licensee until the next refueling outage. (Refer to Section 2.6.1.)

6. The licensee should be required to measure the vibration amplitude of the chilled water pumps in accordance with the requirements of Section XI. The licensee should provide suitable instrumentation or other means to measure vibration prior to the end of the next refueling outage. Interim relief should be granted to test the pumps as proposed by the licensee until the next refueling outage. (Refer to Section 2.7.1.)

7. The licensee proposed to leak test the passive A or A/C containment isolation valves in accordance with the requirements of Appendix J, technical specifications, and/or surveillance test procedures (Refer to Section 3.1.1.1). These valves should also be tested to the Code requirements of Paragraphs IWV-3426 and IWV-3427.

8. The licensee did not provide technical justification for only testing valve XVG-2660 in the instrument air system during each refueling outage (Refer to Section 3.4.1.1). This valve should be full-stroke exercised every 3 months during power operation.

9. The licensee did not provide technical justification for only testing valves XVG-2662A and XVG-2662B in the instrument air return line during refueling outages. These valves should be full-stroke exercised quarterly during power operation. (Refer to Section 3.4.1.2.)

10. The licensee did not provide technical justification for only testing the low-head safety injection cold leg isolation valves XVG-8888A and XVG-8888B during cold shutdowns (Refer to Section 3.5.1.2). These valves should be full-stroke exercised quarterly during power operation.

11. The licensee did not provide technical justification for extending the verification of the valve position indicators to 5 years for containment sump RHR suction isolation valves XVG-8811A and XVG-8811B. These valves should be observed at least once every two years to verify that valve position is properly indicated. (Refer to Section 3.5.1.3.)

12. The licensee did not provide technical justification for not testing RWST isolation valves XVG-8809A and XVG-8809B, in the suction line to the LHSI pumps, quarterly during power operation (Refer to Section 3.5.3.1). These valves should be full-stroke exercised quarterly during power operation.

13. The licensee did not provide technical justification for extending the verification of the valve position indicators to 5 years for reactor building spray sump isolation valves XVG-3004A and XVG-3004B. These valves should be observed at least once every two years to verify that valve position is properly indicated. (Refer to Section 3.6.1.1.)

14. The licensee did not provide justification for not verifying position indication for containment isolation valves XVX-6050A and XVX-6054 in the hydrogen removal system. Proper valve position indication should be verified as required by the Code. (Refer to Section 3.7.1.1.)

15. The licensee did not provide justification for not verifying position indication for sample-system containment isolation valves XVX-9339, XVX-9341, XVX-9356A, XVX-9356B, XVX-9357, XVX-9364B, XVX-9364C, XVX-9365B, XVX-9365C, XVX-9387, XVX-9398A, XVX-9398B,

and XVX-9398C. Proper valve position indication should be verified as required by the Code. The prefix on the sample system valve numbers in this relief request is different than the prefix on valves identified in the IST program valve list in GTP-002, Attachment 1, Pages 43 through 45. The reviewer assumed these are the same valves. (Refer to Section 3.8.1.1.)

16. The licensee submitted 28 similar relief requests that requested relief from the stroke timing requirements of Section XI for a number of valves in various system (Refer to Section 3.9.1.1). The requested relief was not adequately defined or justified. The valves should be stroke-timed to the requirements of Section XI. Relief may be granted from the trending requirements of IWV-3417(a) for rapid acting valves as explained in Section 3.9.1.1 of this report.

17. The reviewers assumed that the licensee's relief request A.3 for Category A/C valve XVC-9600 in the component cooling water system contains a typographical error. We could not locate this valve in either the licensee's valve list or P&ID. We assumed that the relief request intended to identify Category A valve XVG-9600 which we located in the licensee's valve list and P&ID. This valve is addressed in Appendix A, Section 1.1, of this report.

18. The reviewer believes that the LHSI discharge cross-connect isolation valves 8887A and 8887B perform a safety-related function and should be included in the IST program. The licensee is reviewing these valves to determine if they should be included in the IST program, but has not voluntarily agreed to include them in the program at the time that this TER was written.

19. Because the emergency diesel generators perform a safety related function the reviewer determined that the applicable pumps and valves in the diesel generator air start system and diesel cooling water system (if these systems are used on the emergency diesel

generators at the Summer Nuclear Station) are safety-related and should be included in the IST program and tested in accordance with the Code except where specific relief is requested by the licensee and approved by the NRC.

20. The utility has stated that the following valves will be tested as per Appendix J requirements.

System	Valve
Chemical and Volume Control	XVT-8102A XVT-8102B XVT-8102C XVC-8368A XVC-8368B XVC-8368C
Nuclear Sampling	XVT-9386A XVT-9386B XVT-9386C

These valves should be included in the IST program as Category A or A/C valves and leak tested to the requirements of Appendix J and IWV-3426 and 3427.

21. The licensee submitted one relief request for valves IFV-478-FW, IFV-488-FW and IFV-498-FW that control feedwater flow from the main feedwater pumps to the steam generators and another relief request for valves IFV-3321-FW, IFV-3331-FW and IFV-3341-FW that control feedwater flow to the steam generators at power levels less than 25%. None of these valves are included in the licensee's IST program valve list in GTP-002, Attachment 1. These valves do not appear to perform a safety function. The licensee will have to resolve this inconsistency.

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