UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 2, 1994

See Rpt.

Docket No. 50-389

Mr. J. H. Goldberg
President - Nuclear Division
Florida Power and Light Company
Post Office Box 14000
Juno Beach, Florida 33408-0420

Dear Mr. Goldberg:

SUBJECT: ST. LUCIE UNIT 2 - SECOND 10-YEAR INSERVICE TESTING PROGRAM RELIEF REQUESTS FOR PUMPS AND VALVES (TAC NO. M87207)

By letter dated August 4, 1993, Florida Power & Light Company submitted for approval the Second 10-year Inservice Testing Program (IST), including numerous requests for relief. The staff, with technical assistance from Brookhaven National Laboratory (BNL), has reviewed the submitted information. A previous Safety Evaluation (SE) for the St. Lucie Plant, Unit 2, IST Program was issued for the first ten-year interval in NRC's letter dated August 23, 1993, which granted interim relief for certain relief requests which, as noted in the attached Safety Evaluation, continued into the second interval. The second ten-year interval began August 8, 1993.

The staff adopts the evaluations and recommendations for granting relief or authorizing alternatives contained in the attached Technical Evaluation Report (TER) prepared by BNL, as reflected in the enclosed SE. Relief is granted from or alternatives are authorized to the testing requirements which have been determined to be impractical to perform, where compliance would result in a hardship without a compensating increase in safety, or where the proposed alternative testing provides an acceptable level of quality and safety. Certain relief requests have been approved pursuant to 10 CFR 50.55a (f)(4)(iv) where it has been determined that the proposed alternative is in accordance with the requirements of the 1989 Edition of ASME Section XI. A summary of the NRC actions is provided in Table 1 of the enclosed SE.

The IST program relief requests which are granted, authorized, or approved are acceptable for implementation provided the action items identified in Section 5 of the TER are addressed within one year of the date of the SE or by the end of the next refueling outage, whichever is later, including the items identified in the August 23, 1993, SE. Additionally, the granting of relief is based upon the fulfillment of any commitments made by FPL in the basis for each relief request and the alternatives proposed.

Program changes involving new or revised relief requests should be submitted to the NRC. Program changes that meet the positions in GL 89-04, Attachment 1, may be implemented provided the guidance in GL 89-04, Section D, is

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followed. Program changes that add or delete components from the IST program should be periodically provided to the NRC.

This requirement affects fewer than 10 respondents and, therefore, is not subject to Office of Management and Budget review under P.L. 96-511.

This letter completes our action on TAC No. M87207.

Sincerely,

(Original Signed By)

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As stated

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TECHNICAL EVALUATION REPORT

St. Lucie Unit 2
Florida Power and Light Company
Pump and Valve Inservice Testing Program
Revision 0, Second Ten-Year Interval

Docket Number: 50-389
TAC Number: M87207

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FIN L-2301, Task Assignment 7

January 20, 1994

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ABSTRACT

This report presents the results of Brookhaven National Laboratory's evaluation of the relief requests, cold shutdown justifications and, for selected systems, a review of the scope of the St. Lucie Plant Unit 2's ASME Section XI Pump and Valve Inservice Testing Program.

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1.0 INTRODUCTION

Contained herein is a technical evaluation of ASME Section XI pump and valve inservice testing (IST) program relief requests submitted by Florida Power and Light Company (FP&L) for its St. Lucie Plant, Unit 2. The St. Lucie Plant, Unit 2, is a Combustion Engineering Pressurized Water Reactor (PWR) that began commercial operation in August 1983.

FP&L submitted Revision 0 of the Second Ten-Year Interval Inservice Testing Program on August 3, 1993. This program revision supersedes all previous submittals. The second ten year interval extends from August 8, 1993 to August 8, 2003. The licensee states that this program is based on the requirements of the 1986 Edition of the ASME Section XI Code.

A Safety Evaluation on Revision 2 of the Initial Ten-Year Interval IST Program was issued by the NRC on August 23, 1993, following the submittal of the second interval program. Therefore, many of the required actions identified in the safety evaluation were not incorporated into the revised program. Additionally, interim relief was granted for a period of time that extends into the second ten-year interval.

Title 10 of the Code of Federal Regulations, §50.55a ¶(f) requires that inservice testing of ASME Code Class 1, 2, and 3 pumps and valves be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable addenda, except where specific relief has been requested by the licensee and granted by the commission pursuant to §50.55a ¶(a)(3)(i), (a)(3)(ii), or (f)(6)(i). Section 50.55a ¶(f)(4)(iv) provides that inservice testing of pumps and valves may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in paragraph (b) of §50.55a, subject to the limitations and modifications listed, and subject to Commission approval. In rulemaking to 10CFR50.55a, effective September 8, 1992 (see Federal Register, Vol. 57, No. 152, page 34666), the 1989 Edition of ASME Section XI was incorporated into paragraph (b) of § 50.55a. The 1989 Edition provides that the rules for inservice testing of pumps and valves are as specified in ASME/ANSI OMa-1988 Part 6 and 10, respectively. Relief is not required to utilize portions of OMa-1988 Parts 6 and 10, as modified in paragraph (b) of §50.55a, provided that all related requirements are met and subject to NRC approval. The implementation of related requirements is subject to NRC inspection.

The review of the relief requests was performed utilizing the Standard Review Plan, Section 3.9.6; Generic Letter No. 89-04, "Guidance on Developing Acceptable Inservice Testing Programs;" and the Minutes of the Public Meeting on Generic Letter 89-04, dated October 25, 1989. The IST Program requirements apply only to component (i.e., pumps and valves) testing and are not intended to provide a basis to change the licensee's current Technical Specifications for system test requirements.

Section 2 of this report presents the fourteen pump relief requests and Brookhaven National Laboratory's (BNL) evaluation. Similar information is presented in Section 3 for thirty-one relief requests for the valve testing program. Relief requests that are authorized by Generic

Letter 89-04 are not specifically evaluated in this Technical Evaluation Report. However, any anomalies associated with the relief requests are addressed in Section 5 of the report.

Section 4 contains the evaluation of FPL's justifications to defer valve testing to cold shutdowns. Section 5 summarizes the recommended actions for the licensee, resulting from the relief request and deferred testing justification evaluations, and the review of the IST Program scope for selected systems. BNL recommends that the licensee resolve these items in accordance with the evaluations, conclusions, and guidelines presented in this report.

2.0 PUMP IST PROGRAM RELIEF REQUESTS

In accordance with §50.55a, FP&L has submitted fourteen relief requests for pumps at the St. Lucie Plant, Unit 2 which are subject to inservice testing under the requirements of ASME Section XI. The relief requests have been reviewed to verify their technical basis and determine their acceptability. The relief requests, along with the technical evaluation by BNL, are summarized below.

2.1 <u>Generic Pump Relief Requests</u>

2.1.1 Pump Relief Request No. PR-1, All Pumps in the Inservice Test Program

Relief Request: The licensee requests relief from the requirements of the ASME Code, Section XI, ¶ IWP-3300 and IWP-4310, which state that the temperature of all centrifugal pump bearings outside the main flow path and of the main shaft bearings of reciprocating pumps shall be measured at points selected to be responsive to changes in the temperature of the bearings.

Proposed Alternate Testing: None.

Licensee's Basis for Relief: The licensee states that: "A yearly bearing temperature measurement does not contribute to the monitoring of pump operational readiness during its service life. Concerns regarding extended pump runs while on mini-flow recirculation and ALARA concerns outweigh any benefits obtained from one yearly temperature data point.

The data associated with bearing temperatures taken at one-year intervals provides little statistical basis for determining the incremental degradation of a bearing or any meaningful trending information or correlation. In many cases the pump bearings are water-cooled and thus, bearing temperature is a function of the temperature of the cooling medium, which can vary considerably. Vibration measurements are a significantly more reliable indication of pump bearing degradation than are temperature measurements. All pumps in the program are subjected to vibration measurements in accordance with IWP-4500. Although excessive bearing temperature is an indication of an imminent or existing bearing failure, it is highly unlikely that such a condition would go unnoticed during routine surveillance testing since it would manifest itself in other obvious indications such as audible noise, unusual vibration, increased motor current, etc. Any potential gain from taking bearing measurements, which in most cases would be done locally using portable instrumentation, cannot offset the cost in terms of dilution of operator effort, distraction of operators from other primary duties, excessive operating periods for standby pumps especially under minimum flow conditions, and

unnecessary personnel radiation exposure. Based on the reasons similar to those set forth above, the ASME deleted the requirement for bearing temperature measurement in ASME OM Code, Subsection ISTB, the revised version of the Code for pump testing."

Evaluation: Section 50.55a ¶(f)(4)(iv) provides that inservice tests of pumps may meet the requirements set forth in subsequent editions and addenda of Section XI that are incorporated by reference in paragraph (b) of § 50.55a, subject to the limitations and modifications listed, and subject to Commission approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions or addenda are met. The staff imposed no limitations to OMa-1988.Part 6.

Measurement of bearing temperatures is not required by ASME/ANSI OMa-1988, Part 6, for inservice testing of pumps. Therefore, relief is not required, and the alternative is recommended for approval pursuant to §50.55a ¶ (f)(4)(iv).

2.1.2 Pump Relief Request No. PR-2, Various Pumps

Relief Request: The licensee requests relief from the ASME Code, Section XI, ¶IWP-4120, which requires that the full-scale range of each instrument shall be three times the reference value or less. This relief request applies to only portable instruments used for speed measurement. Many of the portable instruments used have digital readouts with multiple scales.

Proposed Alternate Testing: Whenever portable instruments are used for measuring pump speed, the instruments will be such that the "reading" accuracy is at least ±2 percent.

Licensee's Basis for Relief: The licensee states: "Table IWP-4110-1 requires the accuracy of instruments used to measure speed to be equal to or better than ±2 percent for speed, based on the full scale reading of the instrument. This means that the accuracy of the measurement can vary as much as ±6 percent, assuming the range of the instruments extended to the allowed maximum. This IST pump parameter is often measured with portable test instruments where commercially available instruments do not necessarily conform to the Code requirements for range. In this case, high quality calibrated instruments will be used where the "reading" accuracy is at least equal to the Code-requirement for full-scale accuracy. This will ensure that the measurements are always more accurate than the accuracy as determined by combining the requirements of Table IWP-4110-1 and Paragraph IWP-4120."

Evaluation: Section XI, Table IWP-4110-1 requires that speed instrumentation have an accuracy of 2% of full scale and ¶ IWP-4120 requires that the full-scale range of each instrument be three times the reference value or less. This would result in an instrument reading accuracy of 6% of the reference value or better.

The NRC does not consider installation or replacement of instruments an undue burden, and compliance with later editions of the Code for instrumentation requirements is not a backfit. However, if instrumentation is available which meets the <u>intent</u> of the Code requirements for the actual reading, the use of such instrumentation provides an equivalent level of quality and safety for testing. When the range of an instrument is greater than 3 times the reference value, but has an accuracy more conservative than the Code, the combination of the range and accuracy provides a reading accuracy equivalent or better than the reading accuracy that would be achieved from instrumentation which meets the Code requirements.

Therefore, based on the reading accuracy of the speed instruments meeting the accuracy requirements of ¶IWP-4110, it is recommended that the licensee's alternative testing be authorized in accordance with 10 CFR 50.55a(a)(3)(i). When using temporary instruments, the licensee should ensure that the instruments are calibrated prior to use and are traceable to the inservice test records.

2.2 Charging System

2.2.1 Pump Relief Request PR-8, Boric Acid Makeup Pumps 2A, 2B

Relief Request: The licensee requests relief from the ASME Code, Section XI, ¶ IWP-3100, which requires that each inservice test shall include the measurement of suction and differential pressure, for the Boric Acid Makeup Pumps 2A and 2B.

Proposed Alternate Testing: The Boric Acid Makeup Pump suction pressures will be calculated based on the height of liquid in the associated tank once during each inservice test. Subsequently, these calculated values will be used to determine pump differential pressures for evaluation of pump parameters.

Licensee's Basis for Relief: The licensee states that: "The system installation does not provide any mechanism for measuring pump suction pressure, and thus, the requirement for measuring suction pressure and pump differential pressures cannot be satisfied. A measure of pump suction pressure can, however, be determined by a calculation using the height of liquid in the boric acid makeup tanks. Since there is essentially fixed resistances between the tanks and the pumps this will provide a consistent value for suction pressures.

Since the tank levels are not expected to vary significantly during the tests, tank level and associated calculations will only be taken once during each test instead of prior to pump operation and during operation, as required by Table IWP-3100-1."

Evaluation: A review of the licensee's drawing 2998-G-078, Sheet 121, "Flow Diagram - Chemical & Volume Control System (Sheet 2)," Revision 5, dated 10/20/89, indicates that there is no instrumentation to directly measure suction pressure of the Boric Acid Makeup pumps. Instead, the licensee proposes to use the height of liquid in the Boric Acid Makeup Tanks to determine pump suction pressure.

Lack of instrumentation is not sufficient justification for not complying with Code requirements, as discussed in response to question 105 of the Generic Letter 89-04 public meeting minutes. However, calculation of inlet pressure based on the measured tank level would provide an acceptable alternative method of determining inlet pressure, provided the calculation is properly proceduralized, and the accuracy is within the accuracy required by the Code using direct measurement.

Based on the alternative providing an acceptable level of quality and safety, it is recommended that the alternative be authorized in accordance with §50.55a ¶(a)(3)(i), provided that the

accuracy of the reading scale of the level measurement is within Code requirements and the calculation method is properly proceduralized.

2.2.2 Pump Relief Request PR-12, Reactor Coolant Charging Pumps 2A, 2B, and 2C

Relief Request: The licensee requests relief from the ASME Code, Section XI, ¶ IWP-4520(b), which requires that the frequency response range of the readout system (for instruments used to measure vibration amplitude) shall be from one-half minimum speed to at least maximum pump shaft rotational speed, for the Reactor Coolant Charging Pumps 2A, 2B and 2C.

Proposed Alternate Testing: Vibration will be measured as required by ¶ IWP-4510, except that the lower frequency response for the instruments will be 10 Hz, for an interim period (until March 1994).

Licensee's Basis for Relief: The licensee states that: "The reactor coolant charging pumps operate at approximately 210-215 RPM which equates to a rotational frequency of 3.5 Hz. In accordance with the ASME Code, the frequency response for the vibration instruments would have to be one half of this or 1.75 Hz. Following an extensive investigation of available and potentially suitable instrumentation, it has been determined that instruments satisfying this requirement for the charging pumps are commercially unavailable."

Evaluation: The charging pumps operate at very low speeds. Section XI, ¶ IWP-4520(b), requires that the frequency response range of the readout system (for instruments used to measure vibration amplitude) shall be from one-half minimum speed to at least maximum pump shaft rotational speed for all pumps. Additionally, OMa-1988 Part 6 now requires that the frequency response range of the vibration measuring transducers and their readout system to be from one-third minimum pump speed to at least 1000 Hz, in order to more adequately envelop all potential noise contributors. The lower limit of the range is to allow for detection of problems such as bearing oil whirl and looseness of bearings.

The licensee has proposed using vibration instrumentation that cannot measure subharmonic or the first or second harmonics. The licensee has stated that instrumentation that complies with the Code is commercially unavailable. However, equipment with a frequency response of less than 10 Hz is available. The licensee has requested an interim period of seven months to procure instruments that meet the Code requirements or provide justification for the continued use of existing instruments. A Safety Evaluation (SE) addressing Revision 2 of the First Ten-Year Interval IST Program was issued by the NRC on August 23, 1993. This SE granted relief to use the existing instruments for one year, or until the next refueling outage, whichever is later. Per the SE, the interim relief remains in effect into the Second Ten-Year Interval. Therefore, the licensee's current request is covered by the August 23, 1993 SE.

2.3 Intake Cooling Water System

2.3.1 Pump Relief Request PR-11, Intake Cooling Water Pumps 2A, 2B, 2C

Relief Request: The licensee requests relief from the ASME Code, Section XI, ¶ IWP-3100, which requires that each inservice test shall include the measurement and observation of suction and differential pressure, for the Intake Cooling Water Pumps 2A, 2B and 2C.

Proposed Alternate Testing: During testing of these pumps, one value of inlet pressure will be calculated based on water level at the inlet structure.

Licensee's Basis for Relief: The licensee states that: "The pumps listed above are vertical line shaft pumps submerged in the intake structure with no practical means of measuring pump inlet pressure. The inlet pressure, however, can be determined by calculation using, as input, the measured height of water above the pump inlet as measured at the intake.

During each inservice test, the water level in the intake pit remains relatively constant, thus only one measurement of level and the associated suction pressure calculation need be performed."

Evaluation: A review of the licensee's drawing 2998-G-082, "Flow Diagram - Circulating and Intake Cooling Water System," Revision 23, 10/20/89, indicates that there is no instrumentation to directly measure the inlet pressure of the intake cooling water pumps. Lack of instrumentation is not sufficient justification for not complying with Code requirements, as discussed in response to question 105 of the Generic Letter 89-04 meeting minutes. However, calculation of inlet pressure based on the measured inlet structure level would provide an acceptable alternative method of determining inlet pressure, provided the calculation is properly proceduralized, and the accuracy is within the accuracy required by the Code using direct measurement.

Based on the alternative providing an acceptable level of quality and safety, it is recommended that the alternative be authorized in accordance with §50.55a ¶(a)(3)(i), provided that the accuracy of the reading scale of the level measurement is within Code requirements and the calculation method is properly proceduralized.

2.3.2 Pump Relief Request PR-13, Intake Cooling Water Pumps 2A, 2B, 2C

Relief Request: The licensee requests relief from the ASME Code, Section XI, ¶ IWP-4520(b), which requires that the frequency response range of the readout system (for instruments used to measure vibration amplitude) shall be from one-half minimum speed to at least maximum pump shaft rotational speed, for the Intake Cooling Water Pumps 2A, 2B, and 2C.

Proposed Alternate Testing: For an interim period (until March 1994), vibration will be measured as required by Section XI, ¶ IWP-4510, except that the lower frequency response for the instruments will be 10 Hz.

Licensee's Basis for Relief: The licensee states that: "The St. Lucie Plant completed a major upgrade to its ASME pump vibration program in August 1991 to better comply with the Code. As part of the upgrade, new vibration instruments were purchased. The instruments were chosen for their ease of use and reliability; however, the instrument's lower frequency response does not comply with the Code when used on the Intake Cooling Water pumps. The intake cooling water pumps operate at a shaft speed of approximately 885 RPM. Based on this speed and the Code requirement, the instrumentation used to measure vibration (displacement) would require a response range down to 7.38 Hz. The new instruments are capable of a lower frequency response to 10 Hz, 2.62 Hz higher than the Code."

Evaluation: The intake cooling water pumps operate at very low speeds. The shaft rotational speed is 885 RPM. Section XI, ¶ IWP-4520(b), requires that the frequency response range of the readout system (for instruments used to measure vibration amplitude) shall be from one-half minimum speed to at least maximum pump shaft rotational speed for all pumps. Additionally, OMa-1988 Part 6 now requires that the frequency response range of the vibration measuring transducers and their readout system to be from one-third minimum pump speed to at least 1000 Hz, in order to more adequately envelop all potential noise contributors. The lower limit of the range is to allow for detection of problems such as bearing oil whirl and looseness of bearings.

The pump's shaft speed translates to a frequency of 14.75 Hz. Therefore, the code required frequency range is 7.38 Hz to 14.75 Hz. By measuring an actual frequency range of 10 Hz to 14.75 Hz, the licensee is measuring only 64.36% of the code required range. The licensee has requested an interim period of seven months to procure instruments that meet the Code requirements or provide justification for the continued use of existing instruments. A Safety Evaluation (SE) addressing Revision 2 of the First Ten-Year Interval IST Program was issued by the NRC on August 23, 1993. This SE granted relief to use the existing instruments for one year, or until the next refueling outage, whichever is later. Per the SE, the interim relief remains in effect into the Second Ten-Year Interval. Therefore, the licensee's current request is covered by the August 23, 1993 SE.

2.4 Containment Spray and Safety Injection Systems

2.4.1 Pump Relief Request PR-15, Containment Spray Pumps 2A and 2B; High Pressure Safety Injection Pumps 2A and 2B; and Low Pressure Safety Injection Pumps 2A and 2B

Relief Request: The licensee requests relief from the ASME Code, Section XI, ¶ IWP-3100, which requires that each inservice test shall include the measurement and observation of suction and differential pressure, for the 2A and 2B Containment Spray, High Pressure Safety Injection, and Low Pressure Safety Injection Pumps.

Proposed Alternate Testing: During the quarterly pump tests, the pumps' suction (inlet) pressures will be calculated based on the height of liquid in the associated tank. Subsequently, these calculated values will be used to determine pump differential pressures for evaluation of pump parameters.

During the cold shutdown or refueling substantial flow testing of these pumps, temporary suction gages will be installed to measure pump suction pressure.

Licensee's Basis for Relief: The licensee states that: "The system installation does not provide any installed suction gages. A measure of pump suction pressure can, however, be determined by calculation using the height of liquid in the refueling water tank (RWT). During the quarterly pump tests, the flow rate through the suction piping is very low, therefore, the amount of head loss is negligible. This is not the case during the substantial flow tests. The flow rates used during these tests would cause a noticeable head loss in the suction piping.

Since the RWT level is not expected to vary significantly during the quarterly tests, RWT level and associated calculations will only be taken once during each quarterly test instead of prior to pump operation and during operation as required by Table IWP-3100-1."

Evaluation: The licensee is requesting relief from measuring inlet pressure and differential pressure for the 2A and 2B Containment Spray, High Pressure Safety Injection, and Low Pressure Safety Injection pumps. Measurement of inlet pressure and differential pressure is a requirement of the ASME Code, Section XI, ¶ IWP-3100 (Table IWP-3100-1).

The licensee's drawing 2998-G-088, "Flow Diagram - Containment Spray and Refueling Water Systems," Revision 13, 10/20/89, denotes the presence of PX 07-1A, 2A and PX 07-1B, 2B at the suction of each Containment Spray pump, respectively. The licensee has indicated that these are locations where temporary pressure instrumentation may be attached, and that permanent pressure instrumentation is not provided.

Licensee drawing 2998-G-078, Sheet 130, "Flow Diagram - Safety Injection System (Sheet 1)," Revision 4, 10/20/89, indicates that there is no instrumentation to directly measure the inlet pressure of the High Pressure and Low Pressure Safety Injection pumps, except for differential pressure switches across the pump suction strainers.

Lack of instrumentation is not sufficient justification for not complying with Code requirements, as discussed in response to question 105 of the Generic Letter 89-04 meeting minutes. However, calculation of inlet pressure based on the measured tank level would provide an acceptable alternative method of determining inlet pressure, provided the calculation is properly proceduralized, and the accuracy is within the accuracy required by the Code using direct measurement.

Based on the alternative providing an acceptable level of quality and safety, it is recommended that the alternative be authorized in accordance with §50.55a ¶(a)(3)(i), provided that the accuracy of the reading scale of the level measurement is within Code requirements and the calculation method is properly proceduralized.

2.4.2 Pump Relief Request PR-14, Containment Spray System Hydrazine Pumps 2A and 2B

Relief Request: The licensee requests relief from the ASME Code, Section XI, ¶ IWP-4520(b), which requires that the frequency response range of the readout system (for instruments used to measure vibration amplitude) shall be from one-half minimum speed to at least maximum pump shaft rotational speed, for the Containment Spray System Hydrazine Pumps 2A and 2B.

Proposed Alternate Testing: For an interim period (until March 1994), vibration will be measured as required by ¶ IWP-4510, except that the lower frequency response for the instruments will be 10 Hz.

Licensee's Basis for Relief: The licensee states that: "The hydrazine pumps operate as low as 105 rpm. This equates to a rotational frequency of 1.75 Hz. In accordance with the ASME Code, the frequency response for the vibration instruments would have to be one half of this or 0.875

Hz. Following an extensive investigation of available and potentially suitable instrumentation, it has been determined that instruments satisfying this requirement for the hydrazine pumps are commercially unavailable."

Evaluation: The containment spray hydrazine pumps operate at very low speeds. Section XI, ¶ IWP-4520(b), requires that the frequency response range of the readout system (for instruments used to measure vibration amplitude) shall be from one-half minimum speed to at least maximum pump shaft rotational speed for all pumps. Additionally, OMa-1988 Part 6 now requires that the frequency response range of the vibration measuring transducers and their readout system to be from one-third minimum pump speed to at least 1000 Hz, in order to more adequately envelop all potential noise contributors. The lower limit of the range is to allow for detection of problems such as bearing oil whirl and looseness of bearings.

The licensee has proposed using vibration instrumentation that cannot measure subharmonic or the first to sixteenth harmonic. The licensee has stated that instrumentation that complies with the Code is commercially unavailable. However, equipment with a frequency response of less than 10 Hz is available. The licensee has requested an interim period of seven months to procure instruments that meet the Code requirements or provide justification for the continued use of existing instruments. A Safety Evaluation (SE) addressing Revision 2 of the First Ten-Year Interval IST Program was issued by the NRC on August 23, 1993. This SE granted relief to use the existing instruments for one year, or until the next refueling outage, whichever is later. Per the SE, the interim relief remains in effect into the Second Ten-Year Interval. Therefore, the licensee's current request is covered by the August 23, 1993 SE.

2.4.3 Pump Relief Request PR-17, Containment Spray System Hydrazine Pumps 2A and 2B

Relief Request: The licensee requests relief from the ASME Code, Section XI:

1. ¶ IWP-3200 and IWP-3300, which require evaluation of pump differential pressure and flow rate quarterly, and appropriate corrective actions, and

2. ¶ IWP-4150, which states that symmetrical damping devices or averaging techniques may be used to reduce instrument fluctuations to within 2% of the observed reading, for the Containment Spray System Hydrazine Pumps 2A and 2B.

Proposed Alternate Testing: During the quarterly pump tests, each pump's rpm will be measured to verify the required flow rate of 0.71 to 0.82 gpm. Pump flow will be recorded but not alert trended and vibration will be measured during the quarterly tests. During each refueling outage, at least one flow test will be performed for each pump to verify proper performance. Pump vibration will be measured during this flow test.

Licensee's Basis for Relief: The licensee states that: "The Hydrazine Pumps are positive displacement pumps with a variable speed drive. They operate at a very low rpm and flow rate (0.71 to 0.82 gpm). The flow instrument orifice is located in the pump's suction line. Its output signal pulsates sharply with each stroke and cannot readily be averaged. The flow recorder for the hydrazine pumps, FR-07-2- 2, displays a wide trace for flow rate. The only way to know the true flow rate of the pumps is to collect the pumps output in a container and measure it.

During the 1992 Unit 2 refueling outage, several flow tests per hydrazine pump were performed. The discharge of one pump was directed to a container of a known volume. The amount of time to fill the container was measured and then used to calculate an average flow rate for the pump. Each of the flow tests for each pump were performed at a different pump rpm. A correlation between pump rpm and average flow rate was developed and compared to the expected value. The measured and the expected correlations between rpm and flow-rate were in close agreement. The expected correlation was based upon piston diameter, piston stroke, and pump rpm. Based upon these results, hydrazine pump flow rate can be accurately set by selecting the proper pump rpm.

Frequent performance of the above mentioned flow testing can not be performed. Hydrazine is a highly flammable liquid with cumulative toxic effect when absorbed through the skin, inhaled, or ingested. It has also been identified as a known carcinogen."

Evaluation: The licensee has proposed recording flowrate quarterly, but flowrate will not be "alert trended." Section XI, ¶IWP-3200 requires flowrate to be measured and corrective actions taken, if necessary, by either increasing the test frequency or declaring the pump inoperative, if the measured value is in the alert or required action range, respectively. Referring to the licensee's request, it appears that the licensee will not take any corrective actions based on the flowrate measured quarterly exceeding the alert or required action values. The licensee should evaluate the establishment of required action ranges for quarterly testing.

The licensee has referenced Section XI ¶ IWP-4150 in the relief request, but has not discussed the possible use of a symmetrical damping device to provide for flow rate averaging. Additionally, the licensee has not discussed the impact or burden of installing flow instrumentation that could be used effectively for the quarterly test.

In Generic Letter 89-04, Position 9, the staff determined that in cases where flow can only be established through a non-instrumented minimum flow path during quarterly pump testing and a path exists at cold shutdowns or refueling outages to perform a test of the pump under full or substantial flow conditions, the increased interval is an acceptable alternative to the Code requirements. During the deferred test, pump differential pressure, flow rate, and bearing vibration measurements must be taken and during the quarterly testing at least pump differential pressure and vibration must be measured.

Reference to the licensee's Appendix A, Pump Program Table indicates that the licensee will not measure the pump inlet pressure or differential pressure. The ASME/ANSI Code OMa-1988, Part 6, Table 3b, requires that pump discharge pressure be measured for positive displacement pumps, in lieu of differential pressure. The licensee has not provided a basis for not measuring pump differential or discharge pressure.

Provided the licensee determines that there is no practical means of installing flow instrumentation that is adequate for inservice testing purposes, deferring flowrate measurement to refueling outages may be considered acceptable. The licensee should, however, evaluate the procurement of damping devices or new flow instrumentation, and measure and evaluate pump differential or discharge pressure, as well as vibration, quarterly.

Immediate imposition of the Code requirements is impractical due to lack of adequate installed flow instrumentation, and it would be an undue burden to require the plant to declare these pumps inoperable until the availability of new instrumentation could be reviewed. A Safety Evaluation (SE) addressing Revision 2 of the First Ten-Year Interval IST Program was issued by the NRC on August 23, 1993. This SE granted interim relief for one year, or until the next refueling outage, whichever is later. Per the SE, the interim relief remains in effect into the Second Ten-Year Interval. In the interim, the licensee should establish acceptanee criteria for the rpm/flow rate correlation, and take corrective actions if needed, and measure discharge pressure, if possible.

3.0 VALVE IST PROGRAM RELIEF REQUESTS

In accordance with §50.55a, FP&L has submitted thirty-one relief requests for specific and generic valves at the St. Lucie Plant, Unit 2 that are subject to inservice testing under the requirements of ASME Section XI. The relief requests have been reviewed to verify their technical basis and determine their acceptability. Each relief request that is not authorized by Generic Letter 89-04 is summarized below, along with the technical evaluation by BNL.

3.1 Generic Valve Relief Requests

3.1.1 Valve Relief Request VR-1, All Valves Tested During Cold Shutdown

Relief Request: The licensee requests relief from exercising all cold shutdown frequency valves every cold shutdown, as required by Section XI, ¶3412(a) and 3522.

Proposed Alternate Testing: "For those valves designated to be exercised or tested during cold shutdown, exercising shall commence as soon as practical after the plant reaches a stable cold shutdown condition, as defined by the applicable Technical Specification, but no later than 48 hours after reaching cold shutdown. If the outage is long enough to test all the cold shutdown valves, then the 48-hour requirement need not apply. If the 48-hour requirement is waived, then all cold shutdown valves must be tested during the outage.

Valve testing need not be performed more often than once every cold shutdown except as provided for in IWV-3417(a). Completion of all valve testing during a cold shutdown outage is not required if the length of the shutdown period is insufficient to complete all testing. Testing not completed prior to startup may be rescheduled for the next shutdown in a sequence such that the test schedule does not omit nor favor certain valves or groups of valves."

Licensee's Basis for Relief: The licensee states: "In many instances testing of all valves designated for testing during cold shutdown cannot be completed due to the brevity of an outage or the lack of plant conditions needed for testing specific valves. It has been the policy of the NRC that if testing commences in a reasonable time and reasonable efforts are made to test all valves, then outage extension is not required when the only reason is to provide the opportunity for completion of valve testing.

ASME/ANSI OMa-1987 (sic), Operation and Maintenance of Nuclear Power Plants, Part 10 (Paragraphs 4.2.1.2 and 4.3.2.2) recognizes this issue and allows deferred testing as set forth below" (i.e., in the description of the Proposed Alternate Testing).

Evaluation: Section 50.55a ¶(f)(4)(iv) provides that inservice tests of valves may meet the requirements set forth in subsequent editions and addenda of Section XI that are incorporated by reference in paragraph (b) of § 50.55a, subject to the limitations and modifications listed, and subject to Commission approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions or addenda are met. The staff imposed no limitations to OMa-1988 Part 10 related to cold shutdown testing.

The ASME recognized the burden of requiring licensees to complete all cold shutdown frequency inservice testing every cold shutdown. ASME/ANSI OMa-1988, Part 10 now allows plant startup without the completion of all cold shutdown frequency testing, provided the licensee commences testing within 48 hours. The licensee's request to utilize OMa-1988, Part 10, ¶4.2.1.2 and 4.3.2.2, is covered by the rulemaking effective September 8, 1992, therefore, relief is not required. Approval for implementation is recommended pursuant to 50.55a ¶ (f)(4)(iv). There are no related requirements.

The licensee states that valve testing need not be performed more often than once every cold shutdown, except as provided for in IWV-3417(a), which requires more frequent testing as a result of degraded stroke times. The ASME issued a Code interpretation (XI-1-92-41) which states that the intent of Section XI, IWV-3410 and 3520, is to require testing of valves every three months, including during extended shutdown periods, for valves other than those in a system declared inoperable or not required to be operable (IWV-3416). Therefore, during plant shutdown periods when the valves can be exercised, the licensee should exercise valves every three months in accordance with the Code or provide a relief request. Additionally, if specific valves cannot be tested during any cold shutdown (i.e., due to "the lack of plant conditions needed for testing"), specific approval is required to defer testing. The licensee should revise the cold shutdown justifications, as required, to discuss the conditions under which testing cannot be performed during any cold shutdowns.

3.2 Safety Injection System

3.2.1 Valve Relief Request VR-2, Safety Injection System Pressure Isolation Valve (PIV) Check Valves

Relief Request: The licensee requests relief from the requirements of ASME Section XI, ¶ IWV-3427(b), which requires leakage trending, and corrective actions based on the trend results, for the following pressure isolation check valves (PIVs) in the Safety Injection System:

V-3217	V-3227	V-3237	V-3247
V-3258	V-3259	V-3260	V-3261
V-3215	V-3225	V-3235	V-3245
V-3524	V-3525	V-3526	V-3527

Proposed Alternate Testing: The leakage rate acceptance criteria for these valves will be established per the St. Lucie Unit 2 Technical Specifications, Table 3.4-1. Leakage rates greater than 1.0 GPM are unacceptable.

Each Reactor Coolant System Pressure Isolation Valve check valve shall be demonstrated operable by verifying leakage to be within its limits:

1. At least once per 18 months.

2. Prior to entering MODE 2 whenever the plant has been in COLD SHUTDOWN for 72 hours or more and if leakage testing has not been performed in the previous 9 months.

3. Prior to returning the valve to service following maintenance, repair or replacement work on the valve.

4. Following flow through valve(s) while in MODES 1, 2, 3, or 4:
   A. Within 24 hours by verifying valve closure, and

   B. Within 31 days by verifying leakage rate.

Licensee's Basis for Relief: The licensee states that: "Leak testing of these valves is primarily for the purpose of confirming their capability of preventing overpressurization and catastrophic failure of the safety injection piping and components. In this regard, special leakage acceptance criteria is established and included in the St. Lucie 2 Technical Specifications (Table 3.4-1) that addresses the question of valve integrity in a more appropriate manner for these valves. Satisfying both the Technical Specification and the Code acceptance criteria is not warranted and implementation would be difficult and confusing. Specifically applying the trending requirements of IWV-3427 (b) would result in frequent and excessive maintenance of these valves. The continuation of a strict leak rate acceptance criteria and more frequent testing than specified by the Code gives a high degree of assurance that these valves will satisfactorily perform their safety function."

Evaluation: The ASME Code, Section XI, ¶ IWV-3427(b), states that for Category C valves NPS 6 and larger, if a leakage rate exceeds the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate by 50% or greater, the test frequency shall be doubled; the tests shall be scheduled to coincide with a cold shutdown until corrective action is taken, at which time the original test frequency shall be resumed. If tests show a leakage rate increasing with time, and a projection based on three or more tests indicates that the leakage rate of the next scheduled test will exceed the maximum permissible leakage rate by greater than 10%, the valve shall be replaced or repaired.

Several safety systems connected to the reactor coolant pressure boundary have design pressures below the RCS operating pressure. Redundant isolation valves within the Class 1 boundary forming the interface between these high and low pressure systems protect the low pressure systems from pressures that exceed their design limit. In this role, the valves perform a pressure isolation function. The NRC considers the redundant isolation provided by these valves to be important because it has been demonstrated that the failure of the boundary created by these valves is a dominant accident scenario if the valves are not tested. The NRC considers it necessary to assure that the condition of each of these valves is adequate to maintain this redundant isolation and system integrity.

Consequently, these pressure isolation valves are identified in the Plant Technical Specifications along with specific requirements to monitor their leakage rates periodically. Each of the check valves has a maximum allowable leak rate of 1.0 GPM.

Section 50.55a ¶(f)(4)(iv) provides that inservice tests of valves may meet the requirements set forth in subsequent editions and addenda of Section XI that are incorporated by reference in paragraph (b) of § 50.55a, subject to the limitations and modifications listed, and subject to Commission approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions or addenda are met. The staff imposed no limitations to OMa-1988 Part 10 concerning pressure isolation valves.

Increasing the frequency of testing for valves NPS 6 and larger whose leakage rate exceeds the criteria described in Section XI, ¶ IWV-3427(b) is not required by ASME/ANSI OMa-1988, Part 10, ¶ 4.2.2. Instead, ¶ 4.2.2.3(f) requires that valves or valve combinations with leakage rates exceeding the values specified by the Owner in ¶ 4.2.2.3(e) shall be declared inoperable and either repaired or replaced. A retest demonstrating acceptable operation shall be performed following any required corrective action before the valve is returned to service.

The licensee's proposed alternate testing, which includes limiting the acceptable leakage flow rate to 1.0 GPM, meets the requirements of Part 10, ¶ 4.2.2.3(e) and (f). OM-10, ¶ 4.2.2.3(e) requires leakage rates to be specified by the Owner. If not specified, 0.5 D or 5.0 GPM may be used. Therefore, approval to not trend leakage as required by ¶ IWV-3427(b) is recommended pursuant to 50.55a ¶ (f)(4)(iv). There are no related requirements for the deletion.

3.2.2 Valve Relief Request VR-13, Safety Injection Tank to Reactor Coolant System Check Valves V-3215, V-3225, V-3235, and V-3245

Relief Request: The licensee requests relief from full stroke exercising open and closed the 12 in. check valves, V-3215, V-3225, V-3235, and V-3245, in each of the discharge lines from the Safety Injection Tanks (SIT) to the Reactor Coolant System quarterly or at cold shutdowns in accordance with Section XI, ¶ IWV-3521 and IWV-3522.

Proposed Alternate Testing: At least once during each ISI (10 year) inspection interval each of these valves will be disassembled, inspected, and manually stroked to verify operability. Should a valve under inspection be found to be inoperable, then the remaining three valves will be inspected during the same outage. Assurance of proper reassembly will be provided by performing a leak test or partial-flow test prior to returning a valve to service following disassembly.

These valves will be verified closed in conjunction with PIV leak testing. Each Reactor Coolant System Pressure Isolation Valve check valve shall be demonstrated operable by verifying leakage to be within its limits:

1. At least once per 18 months.

2. Prior to entering MODE 2 whenever the plant has been in COLD SHUTDOWN for 72

hours or more <u>and</u> if leakage testing has not been performed in the previous 9 months.

3. Prior to returning the valve to service following maintenance, repair or replacement work on the valve.

4. Following flow through valve(s) while in MODES 1, 2, 3, or 4:

   A. Within 24 hours by verifying valve closure, and

   B. Within 31 days by verifying leakage rate.

Licensee's Basis for Relief: The licensee states: "Full stroke exercising of these valves would require injecting from a tank under nominal pressure into a de-pressurized reactor coolant system. At power operation this is not possible because the SI Tank pressure is insufficient to overcome reactor coolant system pressure.

Under a large break LOCA accident conditions, the maximum (peak) flow rate through these valves would be approximately 20,000 GPM. During cold shutdown or refueling the required test conditions for developing this full accident flow cannot be established.

The SIT discharge isolation valves are motor operated valves with a nominal stroke time of 52 seconds. Therefore, the isolation valve cannot be used to simulate the LOCA flow conditions by opening it with a full or partially pressurized SIT. The discharge flow rate would only increase gradually due to the long stroke time of the discharge isolation valve. The flow rate would not be anywhere near the expected peak blowdown rate of 20,000 GPM expected during a large break LOCA.

FP&L has reviewed the operating and maintenance history of these valves and similar valves used throughout the industry under comparable conditions. Based on these reviews, there is no evidence of valve degradation with respect to their ability to open and satisfactorily pass the required flow. It is apparent from the failure data that the primary mode of failure is related to valve leakage - both past the seat and external through the body-bonnet and hinge pin gasket joints. It should also be noted that these valves are not subjected to any significant flow during plant operation as well as maintenance periods; thus it is unlikely that these valves would experience any service-related damage or wear.

Although check valve disassembly is a valuable maintenance tool that can provide a great deal of information about a valve's internal condition, due to the difficulties associated with these maintenance activities, it should only be performed under the maintenance program at a frequency commensurate with the valve type and service. In this light, FP&L considers the frequency of inspection for these valves of once each 10-year inspection interval to be adequate to ensure the continued operability of these valves.

These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or back flow test. The back flow tests are performed as part of the pressure isolation testing per VR-2."

Evaluation: Section XI requires check valves to be exercised to the position(s) in which the valves perform their safety function(s). These 12 in. check valves open to provide a flow path from the safety injection tanks to the RCS and close to isolate the tanks from the high pressure of the reactor coolant system and the safety injection headers.

As discussed in Generic Letter 89-04, Position 1, the NRC considers passing the maximum required accident condition flowrate through the valve as an acceptable means of verifying that a check valve can full-stroke open. The NRC recognized that it may be impractical to perform full flow testing of certain check valves and noted that it may be possible to qualify other techniques to confirm that the valve is exercised to the position required to perform its safety function. When full-stroke exercising is impractical, disassembly and inspection is an acceptable alternative technique, as described in Position 2. However, the NRC considers disassembly and inspection a maintenance procedure and not a test equivalent to the exercising produced by fluid flow. This procedure has some risk, which makes its routine use as a substitute for testing undesirable when some other method of testing is practical. Check valve disassembly is a valuable maintenance tool that can provide significant information about a valve's internal condition and, as such, should be performed under the maintenance program at a frequency commensurate with the valve type and service.

Although, the licensee states that testing with the maximum required accident flowrate is not practical, as discussed in the August 23, 1993 SE, an analysis or test should be performed to show that the nominal 52 seconds stroke time for the SIT discharge isolation motor-operated valves to open is too long to permit sufficient flow to cause the check valves to reach their full-open position. If a full-open position can be reached, the licensee should perform the test with flow to confirm disk position.

The use of alternate techniques, such as non-intrusive techniques, to verify that the valves are fully open is acceptable, as discussed in Generic Letter 89-04, Position 1, when full-flow testing is impractical. Furthermore, the use of non-intrusive techniques has been demonstrated to be less costly and less risky than disassembly and inspection (Reference *The Nuclear Professional*, page 31, Vol. 7, No. 4, Fall 1992). To substantiate the acceptability of any alternative technique for meeting the ASME Code requirements, licensees must, as a minimum, address and document certain items in the IST program, as described in Position 1. The licensee should note that other C-E plants, such as Palisades and Fort Calhoun, have included in their IST Program full-stroke exercising the SI Tank check valves open at refueling outages (See Reference 20).

However, if the licensee determines that full-stroke exercising with flow is impractical, the licensee may, as discussed by the NRC in Generic Letter Position 2, perform valve disassembly and inspection as a positive means of determining that a valve's disk will full-stroke exercise open or of verifying closure capability.

The licensee is currently proposing to utilize Position 2. Assurance of proper reassembly will be provided by performing a leak test or partial-flow test prior to returning a valve to service following disassembly. However, the licensee intends to inspect each check valve only once in the 10 year Inservice Inspection program interval. As defined in Position 2 of the Generic Letter, in order to support extension of the valve disassembly/inspection intervals to longer than once every 6 years, i.e., in cases of "extreme hardship," licensees should develop the

following information:

a. Disassemble and inspect each valve in the valve grouping and document in detail the condition of each valve and the valve's capability to be full-stroked.

b. A review of industry experience, for example, as documented in NPRDS, regarding the same type of valve used in similar service.

c. A review of the installation of each valve addressing the "EPRI Applications Guidelines for Check Valves in Nuclear Power Plants" for problematic locations.

The licensee has documented parts a and b above, but has provided no discussion concerning the EPRI Guidelines in part c above or the extreme hardship. The licensee should discuss why non-intrusives cannot be utilized when evaluating hardship. Additionally, the licensee states that valve will be leak tested or partial-flow tested following disassembly. Position 2 requires that, if possible, partial valve stroking quarterly or during cold shutdowns, or after reassembly, must be performed.

In summary, relief is granted per Generic Letter 89-04, Position 1, to full-stroke exercise the valves open with less than the accident flow rate, provided all criteria in Position 1 are met. If the licensee determines that full-stroke exercising is impractical, relief is granted per Position 2 to disassemble/inspect these check valves, provided the licensee meets all the criteria in Position 2, including reviewing the installation of the valves, demonstrating extreme hardship, and partial-stroke exercising the valves following reassembly and at cold shutdown if practical.

With respect to exercising the valve closed, verification that a valve is in the closed position can be done by visual observation, by an electrical signal initiated by a position-indicating device, by observation of appropriate pressure indication in the system, by leak testing, or by other positive means.

These are simple check valves which are not provided with instrumentation, and the only means of testing these valves closed is by leak testing. Backflow leakage testing is performed under the licensee's program for Pressure Isolation Valves, as described in TER Section 3.2.1.

It is impractical to test these valves quarterly or during every cold shutdown because the valves and test connections are located inside containment. Access to testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. Leak testing these valves during every cold shutdown would be burdensome to the licensee due to the extensive test setup, which would require substantial man-hours and the potential for extending the shutdown.

Section 50.55a ¶ (f)(4)(iv) provides that inservice testing of valves may meet the requirements set forth in subsequent editions and addenda of Section XI that are incorporated by reference in paragraph (b) of §50.55a, subject to the limitations and modifications listed, and subject to NRC approval. Portions of editions and addenda may be used provided that all related requirements of the respective editions and addenda are met. The NRC staff imposed no limitations to OMa-1988 Part 10 associated with testing valves during refueling.

OMa-1988 Part 10, ¶4.3.2.2 allows full-stroke exercising that is not practicable during operation or cold shutdown to be deferred to refueling outages. Accordingly, the alternative testing proposed by the licensee in the closed direction is covered by the rulemaking, effective September 8, 1992, as described above. Relief is not required provided the licensee implements all related requirements, including Part 10, ¶4.3.2.2(h) and ¶6.2. Approval for deferring the verification of valve closure is recommended pursuant to §50.55a ¶(f)(4)(iv). Implementation of these related requirements is subject to NRC inspection.

3.2.3 Valve Relief Request VR-14, Safety Injection Headers to Reactor Coolant System Check Valves V-3217, V-3227, V-3237, and V-3247

Relief Request: The licensee requests relief from full-stroke exercising the 12 in. Safety Injection check valves V-3217, V-3227, V-3237, and V-3247, open and closed quarterly and at cold shutdowns as required by the ASME Code, Section XI, ¶ IWV-3522. These valves open to provide flow paths from the safety injection headers to the RCS and close to isolate the headers from the high pressure of the reactor coolant system.

Proposed Alternate Testing: During cold shutdown and refueling periods, each of these valves will be partial-stroke exercised with approximately 1,750 GPM (8 percent of maximum accident flow) using the LPSI pump per Relief Request VR-1.

At least once during each ISI (10 year) inspection interval, each of these valves will be disassembled, inspected, and manually stroked to verify operability. Should a valve under inspection be found to be inoperable, then the remaining three valves will be inspected during the same outage. Assurance of proper reassembly will be provided by performing a leak test or partial-flow test prior to returning a valve to service following disassembly.

These valves will be verified closed in conjunction with PIV leak testing."

Each Reactor Coolant System Pressure Isolation Valve check valve shall be demonstrated operable by verifying leakage to be within its limits:

1. At least once per 18 months.

2. Prior to entering MODE 2 whenever the plant has been in COLD SHUTDOWN for 72 hours or more <u>and</u> if leakage testing has not been performed in the previous 9 months.

3. Prior to returning the valve to service following maintenance, repair or replacement work on the valve.

4. Following flow through valve(s) while in MODES 1, 2, 3, or 4:

   A. Within 24 hours by verifying valve closure, and

   B. Within 31 days by verifying leakage rate.

Licensee's Basis for Relief: The licensee states: "Full stroke exercising of these valves would require injecting from a tank under nominal pressure into a de-pressurized reactor coolant system. At power operation this is not possible because the SI Tank pressure is insufficient to overcome reactor coolant system pressure.

Under a large break LOCA accident conditions, the maximum (peak) flow rate through these valves would be approximately 20,000 GPM. During cold shutdown or refueling the required test conditions for developing this full accident flow cannot be established. The SIT-discharge isolation valves are motor operated valves with a nominal stroke time of 52 seconds. Therefore, the isolation valve cannot be used to simulate the LOCA flow conditions by opening it with a fully or partially pressurized SIT. The discharge flow rate would only increase gradually due to the long stroke time of the discharge isolation valve. The flow rate would not be anywhere near the expected peak blowdown rate of 20,000 GPM expected during a large break LOCA.

FP&L has reviewed the operating and maintenance history of these valves and similar valves used throughout the industry under comparable conditions. These four valves have been in operation in Unit 2 since the plant startup in 1983. A total of 3 plant work orders have been initiated for work on these valves. Of the three work orders, one was to repair seat leakage identified by a seat leakage test and the other two were for disassembly and inspection per Generic Letter 89-04. A search of the Nuclear Plant Reliability Data System for problems with valves similar to these revealed 12 reports - 7 due to seat leakage and the remaining 5 were related to gasket leaks. Based on these reviews there is no evidence of valve degradation with respect to their ability to open and satisfactorily pass the required flow. It is apparent from the failure data that the primary mode of failure is related to valve leakage both past the seat and external through the body-bonnet and hinge pin gasket joints.

In order to disassemble and inspect these valves, the reactor coolant system must be placed in mid-loop or 'reduced inventory' condition for several days. In response to issues raised in NRC Generic Letter 88-17, FP&L is concerned about continued operations with the plant in a condition of reduced inventory. During these periods, the risk of over-heating the core is increased due to the higher probability of an incident where shutdown cooling is lost. This risk is compounded by the reduced volume of water available to act as a heat sink should cooling be lost. Since 1982 there have been at least six (6) reported events in the industry where cooling flow was lost while a plant was in a 'reduced inventory' condition.

Although check valve disassembly is a valuable maintenance tool that can provide a great deal of information about a valve's internal condition, due to the difficulties associated with these maintenance activities, it should only be performed under the maintenance program at a frequency commensurate with the valve type and service. Given the lack of evidence that these valves are experiencing significant failures with respect to their capability of passing the design flow rates and the apparent sensitivity of the valves to leak testing, a frequency of inspection for these valves of once each 10-year inspection interval is adequate to ensure the continued operability of these valves.

These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or back flow test. The back flow testing is performed as stated in VR-2. In addition to periodic leak testing, the upstream pressure of each valve is monitored by a pressure indicator and alarm. Should any of these valves begin to leak by, the upstream pressure alarm would alert plant personnel of the leakage."

Evaluation: Section XI requires check valves to be exercised to the position(s) in which the valves perform their safety function(s). These 12 in. check valves open to provide flow paths from the safety injection headers to the RCS and close to isolate the headers from the high pressure of the reactor coolant system.

As discussed in Generic Letter 89-04, Position 1, the NRC considers passing the maximum required accident condition flowrate through the valve as an acceptable means of verifying that a check valve can full-stroke open. The NRC recognized that it may be impractical to perform full flow testing of certain check valves and noted that it may be possible to qualify other techniques to confirm that the valve is exercised to the position required to perform its safety function. When full-stroke exercising is impractical, disassembly and inspection is an acceptable alternative technique, as described in Position 2. However, the NRC considers disassembly and inspection a maintenance procedure and not a test equivalent to the exercising produced by fluid flow. This procedure has some risk, which makes its routine use as a substitute for testing undesirable when some other method of testing is practical. Check valve disassembly is a valuable maintenance tool that can provide significant information about a valve's internal condition and, as such, should be performed under the maintenance program at a frequency commensurate with the valve type and service.

The licensee states that during cold shutdown and refueling periods, each of these valves will be partial-stroke exercised with approximately 1,750 GPM (8 percent of maximum accident flow) using the LPSI pump. As discussed in the August 23, 1993 SE, the licensee should evaluate if the valves will achieve a full-open position with this reduced flow rate. If a full-open position can be reached, the licensee should perform the testing with flow. The use of alternate techniques, such as non-intrusive techniques, to verify that valves will fully open is acceptable, as discussed in Generic Letter 89-04, Position 1.

If the valves cannot be full-stroke exercised, the NRC defined an acceptable alternative to the full-stroke exercising requirement in Generic Letter 89-04, Position 2, wherein it is stated that valve disassembly and inspection can be used as a positive means of determining that a valve's disk will full-stroke exercise open or of verifying closure capability, as permitted by ¶ IWV-3522.

The licensee is currently proposing to utilize Position 2. Assurance of proper reassembly will be provided by performing a leak test or partial-flow test prior to returning a valve to service following disassembly. However, the licensee intends to inspect each check valve only once in the 10 year Inservice Inspection program interval. As defined in Position 2 of the generic letter, in order to support extension of the valve disassembly/inspection intervals to longer than once every 6 years, i.e., in cases of "extreme hardship," licensees should develop the following information:

a. Disassemble and inspect each valve in the valve grouping and document in detail the condition of each valve and the valve's capability to be full-stroked.

b. A review of industry experience, for example, as documented in NPRDS, regarding the same type of valve used in similar service.

c. A review of the installation of each valve addressing the "EPRI Applications Guidelines for Check Valves in Nuclear Power Plants" for problematic locations.

The licensee has documented parts a and b above, but has provided no discussion concerning the EPRI Guidelines in part c above. The licensee should include a discussion of why non-intrusives cannot be utilized when proposing disassembly and inspection. Additionally, the licensee states that valve will be leak tested or partial-flow tested following disassembly. Position 2 requires that, if possible, partial valve stroking quarterly or during cold shutdowns, or after reassembly, must be performed.

In summary, relief is granted per Generic Letter 89-04, Position 1, to full-stroke exercise the valves open with less than the accident flow rate, provided all criteria in Position 1 are met. If the licensee determines that full-stroke exercising is impractical, relief is granted per Position 2 to disassemble/inspect these check valves, provided the licensee meets all the criteria in Position 2, including reviewing the installation of the valves, demonstrating extreme hardship, and partial-stroke exercising following reassembly and at cold shutdown if practical.

With respect to exercising the valves closed, verification that a valve is in the closed position can be done by visual observation, by an electrical signal initiated by a position-indicating device, by observation of appropriate pressure indication in the system, by leak testing, or by other positive means. The licensee does have instrumentation to continuously monitor upstream pressure. Based on the Technical Specifications, it appears that following the partial-stroke exercise at cold shutdowns, verification that the valves have closed will be performed and relief would not be required. The licensee should exercise these valves closed at cold shutdowns or revise the request accordingly.

3.2.4 Valve Relief Request VR-29, Safety Injection System Motor-Operated Valves V-3480, V-3481, V-3651, V-3652

Relief Request: The licensee requests relief from the requirements of ASME Section XI, ¶ IWV-3427(b), which requires leakage trending, and corrective actions based on the trend results, for the 10 in. Safety Injection System motor-operated valves V-3480, V-3481, V-3651, and V-3652.

Proposed Alternate Testing: The leakage rate acceptance criteria for these valves will be established per the St. Lucie Unit 2 Technical Specifications, Table 3.4-1, as applicable for motor-operated valves:

1. Leakage rates greater than 1.0 GPM but less than or equal to 5.0 GPM are acceptable if the latest measured rate has not exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.

2. Leakage rates greater than 1.0 GPM, but less than or equal to 5.0 GPM, are

unacceptable if the latest measured rate exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 GPM by 50% or greater.

3. Leakage rates greater than 5.0 GPM are unacceptable.

Each Reactor Coolant System Pressure Isolation Valve motor-operated valve shall be demonstrated operable by verifying leakage to be within its limits:

1. At least once per 18 months, and

2. Prior to returning the valve to service following maintenance, repair, or replacement work on the valve.

Licensee's Basis for Relief: The licensee states that: "Leak testing of these valves is primarily for the purpose of confirming their capability of preventing overpressurization and catastrophic failure of the safety injection piping and components. In this regard, special leakage acceptance criteria is established and included in the St. Lucie 2 Technical Specifications (Table 3.4-1) that addresses the question of valve integrity in a more appropriate manner for these valves. Satisfying both the Technical Specification and the Code acceptance criteria is not warranted and implementation would be difficult and confusing."

Evaluation: The licensee requests relief from the ASME Code, Section XI, ¶ IWV-3427(b), which requires that for Category A valves NPS 6 or larger, if a leakage rate exceeds the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible leakage rate by 50% or greater, the test frequency shall be doubled; the tests shall be scheduled to coincide with a cold shutdown until corrective action is taken, at which time the original test frequency shall be resumed. If tests show a leakage rate increasing with time, and a projection based on three or more tests indicates that the leakage rate of the next scheduled test will exceed the maximum permissible leakage rate by greater than 10%, the valve shall be replaced or repaired.

Several safety systems connected to the reactor coolant pressure boundary have design pressures below the RCS operating pressure. Redundant isolation valves within the Class 1 boundary forming the interface between these high and low pressure systems protect the low pressure systems from pressures that exceed their design limit. In this role, the valves perform a pressure isolation function. The NRC considers the redundant isolation provided by these valves to be important because it has been demonstrated that the failure of the boundary created by these valves is a dominant accident scenario if the valves are not tested. The NRC considers it necessary to assure that the condition of each of these valves is adequate to maintain this redundant isolation and system integrity. Consequently, these pressure isolation valves are identified in the Plant Technical Specifications along with specific requirements to monitor their leakage rates periodically.

The subject motor-operated valves open for residual heat removal recirculation during shutdown. Each of these valves is designated as a pressure isolation valve (PIV) and provides isolation of safeguard systems from the RCS.

Section 50.55a ¶(f)(4)(iv) provides that inservice tests of valves may meet the requirements set forth in subsequent editions and addenda of Section XI that are incorporated by reference in paragraph (b) of § 50.55a, subject to the limitations and modifications listed, and subject to Commission approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions or addenda are met. The staff imposed no limitations to OMa-1988 Part 10, concerning pressure isolation valves.

Increasing the frequency of testing for valves NPS 6 and larger whose leakage rate exceeds the criteria described in Section XI, ¶ IWV-3427(b) is not required by ASME/ANSI OMa-1988, Part 10, ¶ 4.2.2.3(f). Instead, ¶ 4.2.2.3(f) requires that valves or valve combinations with leakage rates exceeding the values specified by the Owner in ¶ 4.2.2.3(e) shall be declared inoperable and either repaired or replaced. A retest demonstrating acceptable operation shall be performed following any required corrective action before the valve is returned to service.

The licensee's proposed alternate to use the Technical Specification requirements, which includes limiting the acceptable leakage flow rate to 5.0 GPM, meets the requirements of Part 10, ¶ 4.2.2.3(e) and (f). Therefore, because the alternative meets later Code requirements, relief is not required. Approval is recommended pursuant to §50.55a ¶(f)(4)(iv). There are no related requirements for the deletion.

3.3 Containment Isolation Valves

3.3.1 Valve Relief Request VR-4, Primary Containment Isolation Valves

Relief Request: The licensee requests relief from ASME, Section XI, ¶ IWV-3426 and IWV-3427, which requires individual leak rates for Category A valves to be evaluated and corrected.

The subject valves are:

PENETRATION NO.	VALVES
10	FCV-25-4 and Blank Flange
11	FCV-25-2 and FCV-25-3
23	HCV-14-1 and HCV-14-7
24	HCV-14-2 and HCV-14-6
41	SE-03-2A and SE-03-2B
54	V-OO101 and Blank Flange
56	FCV-25-36 and FCV-25-26
57	FCV-25-20 and FCV-25-21

Proposed Alternate Testing: The above stated valves and blank flanges will be leak rate tested in pairs. Leakage measurement from tests of multiple valves or blank flanges will be evaluated in accordance with Section XI, ¶ IWV-3426 and ¶ IWV-3427.

Licensee's Basis for Relief: The licensee states that: "For several containment systems, individual leakage rate tests are impractical due to the configuration of the system's piping and components. In these cases it is customary to perform leakage tests with the test volume

between valves in series or behind valves in parallel paths.

In these cases where individual valve testing is impractical, the valves will be leak tested simultaneously in multiple valve arrangements. A maximum permissible leakage rate will be applied to each combination of valves or valve and blank flange. In each of the valve pairs, the two valves are equal in size and type, and the leakage limit is in proportion to their size. The blank flanges used in testing penetrations 10 and 54 have diameters similar in size to their associated valves FCV-25-4 and V-00101. The leakage limit assigned to each pair is such that excessive leakage through any valve, or flange, would be detectable and the appropriate corrective action taken."

Evaluation: The subject valves are Category A or A/C valves which are closed to provide containment isolation. Section XI, ¶ IWV-3426 requires that Category A or A/C valves be seat leak tested and that a maximum individual permissible leakage rate be specified for each valve. The licensee is proposing to leak rate test the subject containment isolation valves in pairs.

Section 50.55a ¶ (f)(4)(iv) provides that inservice testing of valves may meet the requirements set forth in subsequent editions and addenda of Section XI that are incorporated by reference in paragraph (b) of §50.55a, subject to the limitations and modifications listed, and subject to NRC approval. Portions of editions and addenda may be used provided that all related requirements of the respective editions and addenda are met. The NRC staff imposed limitations to OMa-1988 Part 10 associated with containment isolation valves (CIVs) to require the leakage rate analysis and corrective action requirements of OM-10, ¶ 4.2.2.3(e) and (f) to be applied to CIVs.

ASME/ANSI OMa-1988, Part 10, ¶ 4.2.2.3(e) and (f) allows valves to be tested in combinations or groups. Where two or more valves on a containment penetration are tested as a group, limiting leakage-rate values must be assigned to the group for the purpose of monitoring valve condition and taking corrective action. The limits should be established such that leakage of any valve in the group would be identified, based on the diameter of the smallest valve in the group or based on a conservative limit established to another criterion not related to the diameter of the valve. If the limiting values are exceeded, the licensee must take actions to determine the leakage path.

The licensee has adequately described the leakage rate limits by indicating that the valves will be tested in pairs and the leakage rate limit is proportional to size and is adequate to detect degradation. Additionally, the licensee will analyze and perform corrective actions in accordance with Section XI, ¶ IWV-3426 and ¶ IWV-3427. The Section XI, ¶ IWV-3426, 3427(a), and 3200 requirements are equivalent to OMa-1988, Part 10, ¶ 4.2.2.3(e) and (f). Accordingly, the alternative requested by the licensee is covered by the rulemaking, effective September 8, 1992, as described above, and relief, therefore, is not required. Approval is recommended pursuant to §50.55a ¶(f)(4)(iv). There are no related requirements.

3.4 Auxiliary Feedwater System

3.4.1 Valve Relief Request VR-33, Auxiliary Feedwater System Flow Control Solenoid-Operated Valves SE-09-2, SE-09-3, SE-09-4, and SE-09-5

Relief Request: The licensee requests relief from trending valve stroke times quarterly and increasing the test frequency to monthly based on an increase in stroke time relative to the previous test for 4 in. Auxiliary Feedwater System (AFWS) solenoid-operated valves SE-09-2, SE-09-3, SE-09-4, and SE-09-5, as required by the ASME Code, Section XI, ¶ IWV-3417(a). These solenoid valves cycle open and closed during an AFWS actuation to control auxiliary feedwater flow to the steam generators.

Proposed Alternate Testing: During quarterly testing, these valves will be exercised and fail-safe tested. During this exercising, stroke times will be recorded but the corrective action requirements of IWV-3417(a) will not be applied. If the maximum allowed stroke time is exceeded, then the valves will be placed out of service.

During cold shutdowns, the valves will be exercised and the requirements of IWV-3417(a) will be met.

Licensee's Basis for Relief: The licensee states that: "These four valves are pilot-operated normally closed, solenoid globe valves. When their solenoid coil is energized, the magnetic force lifts the pilot disk, opening the pilot orifice in the main disk. Any pressure in the chamber above the main disk can now vent off through the pilot orifice to the downstream side of the valve. With the pressure vented above the main disk, the upstream pressure acting on the lower side of the main disk lifts it off the main seat, opening the valve. In the absence of a pressure differential, no pressure force exists tending to seat the disc, therefore the magnetic force of the solenoid coil is sufficient, acting through the stem, pilot disc, and pin, to directly lift the main disc off the seat, opening the valve. Due to this arrangement, the stroke times measured without differential pressure are slower and vary significantly from test to test causing the valves to be subjected to increased testing per IWV-3417(a) frequently and unnecessarily.

In order to establish the appropriate pressure conditions needed for proper testing, the associated AFW pump must be in operation discharging into the steam generator. Pumping from the auxiliary feedwater into the steam generators during normal operation is impractical and undesirable. Injecting the relatively cold auxiliary feedwater into the main feedwater line while the plant is operating at power would cause a large temperature differential (approximately 375°F). Significant thermal shock and fatigue cycling of the feedwater piping and steam generator nozzles could result."

Evaluation: Section XI, ¶ IWV-3417(a) states that "If, for power operated valves, an increase in stroke time of 25% or more from the previous test for valves with full-stroke times greater than 10 sec. or 50% or more for valves with full-stroke time less than or equal to 10 sec is observed, test frequency shall be increased to once each month until corrective action is taken ..."

The valves in question, ASME Code Category B valves, which cycle open and close during an AFWS actuation to control auxiliary feedwater flow to the steam generators, are piloted, normally closed, solenoid globe valves made by the Target Rock Corporation. Because of the valve design, the stroke times must be measured without differential pressure. The licensee claims that the measured stroke times are not only slower, but they also vary significantly from test to test causing the valves to be placed into alert unnecessarily.

Section 50.55a ¶ (f)(4)(iv) provides that inservice testing of valves may meet the requirements set forth in subsequent editions and addenda of Section XI that are incorporated by reference in paragraph (b) of §50.55a, subject to the limitations and modifications listed, and subject to NRC approval. Portions of editions and addenda may be used provided that all related requirements of the respective editions and addenda are met. The NRC staff imposed no limitations to OMa-1988 Part 10 associated with stroke time measurements.

OMa-1988, Part 10, ¶ 3.3 requires that reference values shall be determined from the results of preservice testing or from the results of inservice testing. These tests shall be performed under conditions as near as practicable to those expected during subsequent inservice testing. Part 10, ¶ 3.5 permits the establishment of an additional set of reference values if it is necessary or desirable for some other reason, other than as stated in ¶ 3.4, i.e., when a valve or its control system has been replaced, repaired, or has undergone maintenance that could affect the valve's performance. Therefore, if test conditions for the quarterly tests are different from those at cold shutdown, an additional set of reference values can be established.

OMa-1988 Part 10 does not require alert trending. Part 10, ¶ 4.2.1.8 requires that stoke time test results shall be compared to the initial reference values or reference values established in accordance with paragraphs 3.4 and 3.5. For solenoid-operated valves with reference stroke times greater than 10 seconds, ¶ 4.2.1.8 states that they shall exhibit no more than a ±25% change in stroke time when compared to the reference value. For solenoid-operated valves with reference stroke times less than 10 seconds, ¶ 4.2.1.8 states that they shall exhibit no more than a ±50% change in stroke time when compared to the reference value. Part 10, ¶ 4.2.1.9 requires valves with stroke times that do not meet the acceptance criteria of ¶ 4.2.1.8 to be retested or declared inoperable. If the valve is retested and also does not meet the acceptance criteria of ¶ 4.2.1.8, the licensee may analyze the data to verify that the new stroke time represents acceptable valve operation. Otherwise the valve is required to be declared inoperable.

Therefore, provided the licensee uses OM-10, ¶4.2.1.8 and all related requirements including the corrective actions in ¶ 4.2.1.9, relief from trending valve stroke time is covered by the rulemaking, effective September 8, 1992, as described above, and relief is not required. Approval is recommended pursuant to §50.55a ¶(f)(4)(iv). Implementation of related requirements is subject to NRC inspection.

3.5 Intake Cooling Water System

3.5.1 Valve Relief Request VR-34, Intake Cooling Water to Component Cooling Water Heat Exchangers Butterfly Temperature Control Valves TCV-14-4A and TCV-14-4B

Relief Request: The licensee requests relief from trending valve stroke times quarterly and increasing the test frequency to monthly based on an increase in stroke time relative to the previous test for the intake cooling water 30 in. butterfly temperature control valves TCV-14-4A and TCV-14-4B to the component cooling water (CCW) heat exchangers, as required by the ASME Code, Section XI, ¶ IWV-3417(a). These control valves regulate the amount of intake cooling water flowing through the component cooling system heat exchangers. In the event of failure, these valves will fail open.

Proposed Alternate Testing: These valves will be exercised and fail-safe tested quarterly. However, the corrective action requirements of IWV-3417(a) will not be applied. If their stroke times exceed the maximum allowed stroke time, then the valves will be placed out of service.

Licensee's Basis for Relief: The licensee states that: "These two valves are operated via air signals from their temperature controllers. In the manual mode of operation the positioning air signal from the controllers is varied by manipulating a rheostat. Due to the slow response time of the controllers in the manual mode there is the potential for a large variation in valve stroke times from test to test. This inherent variability is sufficient to cause a valve to fall into the increased test frequency corrective action range without any significant physical change in mechanical condition of the valve. The valve can also be operated (opened) by closing the valve using the manual controller and then isolating and then venting the control air signal to the valves. The elapsed time required to isolate and then vent the control air is added to the time required to vent the air pressure from the valve operator to arrive at the measured valve stroke time. Thus the measured stroke time is as much a function of the capability of the individual operator to manipulate the valves as it is the mechanical condition of the valve. Typically successive stroke times vary sufficiently to cause the valves to be subjected to the increased testing per IWV-3417(a) frequently and unnecessarily."

Evaluation: Section XI, ¶ IWV-3417(a) states that "If, for power operated valves, an increase in stroke time of 25% or more from the previous test for valves with full-stroke times greater than 10 sec. or 50% or more for valve with full-stroke time less than or equal to 10 sec. is observed, test frequency shall be increased to once each month until corrective action is taken ..."

The valves in question, ASME Code Category B valves, regulate the amount of intake cooling water flowing through the CCW heat exchangers. Due to the response time of the controllers, the valve stroke times vary from test to test sufficiently to place the valves into alert occasionally. When testing is performed manually, the time to isolate and then vent the control air is dependent upon the operator performing the test. The licensee claims that these stroke times also vary from test to test sufficiently to place the valves into alert occasionally.

Section 50.55a ¶ (f)(4)(iv) provides that inservice testing of valves may meet the

requirements set forth in subsequent editions and addenda of Section XI that are incorporated by reference in paragraph (b) of §50.55a, subject to the limitations and modifications listed, and subject to NRC approval. Portions of editions and addenda may be used provided that all related requirements of the respective editions and addenda are met. The NRC staff imposed no limitations to OMa-1988 Part 10 associated with stroke time measurements.

OMa-1988, Part 10, ¶ 3.3 requires that reference values shall be determined from the results of preservice testing or from the results of inservice testing. These tests shall be performed under conditions as near as practicable to those expected during subsequent inservice testing. . Part 10, ¶ 3.5 permits the establishment of an additional set of reference values if it is necessary or desirable for some other reason, other than as stated in ¶ 3.4, i.e., when a valve or its control system has been replaced, repaired, or has undergone maintenance that could affect the valve's performance. Therefore, if test conditions for the quarterly tests are different from those at cold shutdown, an additional set of reference values can be established.

OMa-1988 Part 10 does not require alert trending. Part 10, ¶ 4.2.1.8 requires that stroke time test results shall be compared to the initial reference values or reference values established in accordance with paragraphs 3.4 and 3.5. For air-operated valves with reference stroke times greater than 10 seconds, ¶ 4.2.1.8 states that they shall exhibit no more than a ±25% change in stroke time when compared to the reference value. For air-operated valves with reference stroke times less than 10 seconds, ¶ 4.2.1.8 states that they shall exhibit no more than a ±50% change in stroke time when compared to the reference value. Part 10, ¶ 4.2.1.9 requires valves with stroke times that do not meet the acceptance criteria of ¶ 4.2.1.8 to be retested or declared inoperable. If the valve is retested and also does not meet the acceptance criteria of ¶ 4.2.1.8, the licensee may analyze the data to verify that the new stroke time represents acceptable valve operation. Otherwise the valve is required to be declared inoperable.

Therefore, provided the licensee uses OM-10, ¶4.2.1.8 and all related requirements including the corrective actions in ¶ 4.2.1.9, relief from trending valve stroke times is covered by the rulemaking, effective September 8, 1992, as described above, and based on meeting later Code requirements, relief is not required. Approval is recommended pursuant to §50.55a ¶(f)(4)(iv). Implementation of related requirements is subject to NRC inspection.

3.6 Check Valve Relief Requests -Deferral of Testing to Refueling

The ASME Code, Section XI, ¶IWV-3521 and ¶IWV-3522 specify that check valves shall be exercised at least once every 3 months to the position required to fulfill their function unless such operation is not practical during plant operation.

In rulemaking to 10 CFR 50.55a effective September 8, 1992, the 1989 Edition of ASME Section XI was incorporated in paragraph (b) of § 50.55a. The 1989 Edition provides that the rules for inservice testing of valves are as specified in OMa-1988 Part 10. The NRC staff imposed no limitations to OMa-1988 Part 10 associated with testing valves during cold shutdown or refueling. Section 50.55a ¶ (f)(4)(iv) provides that inservice testing of valves may meet the requirements set forth in subsequent editions and addenda of Section XI that are incorporated by reference in paragraph (b) of §50.55a, subject to the limitations and

modifications listed, and subject to NRC approval. Portions of editions and addenda may be used provided that all related requirements of the respective editions and addenda are met.

OMa-1988, Part 10, ¶ 4.3.2.1, requires that check valves shall be exercised nominally every 3 months, except as provided by ¶ 4.3.2.2. Specifically, ¶ 4.3.2.2(d) and (e) state that if exercising (to the position required to fulfill its function, i.e., open and/or closed) is not practicable during plant operation or cold shutdowns, it may be limited to full-stroke exercising during refueling outages. Relief to utilize ¶4.3.2.2(d) and (e) is not required provided all related requirements are implemented which includes ¶4.3.2.2(h) and 6.2. Implementation of related requirements is subject to NRC inspection.

3.6.1 Valve Relief Request VR-5, Chemical and Volume Control Check Valves V-2177, 2190, 2191, and 2526

Relief Request: The licensee requests relief from full-stroke exercising, to the open position quarterly, the 3 in. CVCS check valves V-2177, 2190, and 2191, and the 4 in. CVCS check valve, as required by the ASME Code, Section XI, ¶ IWV-3521 and 3522.

Proposed Alternate Testing: "Check valve V-2190 will be verified closed quarterly. Each of these valves will be part-stroke exercised once during each cold shutdown per VR-1 and full-stroke exercised during each reactor refueling outage. If exercising during the cooldown evolution is impractical, testing for that cold shutdown period may be deferred."

Licensee's Basis for Relief: The licensee states that: "Testing these valves in the open direction requires the introduction of highly concentrated boric acid solution from the boric acid makeup tanks to the suction of the charging pumps. This, in turn, would result in the addition of excess boron to the RCS. A rapid insertion of negative reactivity could result in a rapid RCS cooldown and depressurization and possibly a plant trip.

During cold shutdown, the introduction of excess quantities of boric acid into the RCS is undesirable from the aspect of maintaining proper plant chemistry and the inherent difficulties that may be encountered during the subsequent startup due to over-boration of the RCS. The waste management system would also be overburdened by the large amounts of RCS coolant that would require processing to decrease the boron concentration.

Typically, the boron concentration is increased for shutdown margin during cooldown prior to reaching cold shutdown conditions. This is the only practical time to perform the partial stroke exercise test since boration during shutdown and startup is undesirable. In the event that circumstances prohibit testing during cooldown, testing for that cold shutdown may be deferred to the next cooldown evolution."

Evaluation: The licensee states that "V-2177 and V-2526 open to provide a flow path for emergency boration from the boric acid makeup pumps to the suction of the charging pumps. Likewise, V-2190 opens to provide a flow path for emergency boration via gravity drain from the boric acid makeup tanks to the suction of the charging pumps. V-2190 closes to prevent recirculation to the boric acid makeup tanks when the boric acid makeup pumps are in operation. Valve V-2191 opens to provide a flow path from the refueling water tank (RWT) to the suction of the charging pumps as an alternate supply of borated water for boration."

It is impractical to full-stroke exercise these valves to the open position either quarterly or at cold shutdowns, or partial-stroke exercise them at every cold shutdown because highly concentrated boric acid would be introduced into the RCS which would impose an undue burden with respect to maintaining proper plant chemistry during startup and also with respect to overtaxing the waste management system to process large amounts of RCS coolant to reduce boron concentration.

Therefore, the licensee will part-stroke exercise these valves during plant cool downs when boron concentration in the RCS must be increased and full-stroke exercise these valves to the open position at refueling outages.

Accordingly, the relief requested by the licensee is covered by the rulemaking, effective September 8, 1992, and relief is not required, provided that all related requirements are implemented, as described above. Approval is recommended pursuant to 10 CFR 55.55a ¶ (f)(4)(iv).

3.6.2 Valve Relief Request VR-6, Chemical and Volume Control System Check Valves V-2443 and V-2444

Relief Request: The licensee requests relief from full-stroke exercising, to the open position quarterly, the 3 in. CVCS check valves V-2443 and 2444, as required by the ASME Code, Section XI, ¶ IWV-3521 and 3522.

Proposed Alternate Testing: "Each of these valves will be partial stroke exercised (open and closed) quarterly. During testing of the boric acid makeup pumps performed during each reactor refueling (See Relief Request PR-5), system flow rate will be measured to verify full stroke (open) of these valves."

Licensee's Basis for Relief: The licensee states that: "Full-stroke testing these valves requires operating the boric acid makeup pumps at or near rated flow and verifying full accident flow through each valve. Such testing would cause the introduction of highly concentrated boric acid solution from the boric acid makeup tanks to the suction of the charging pumps. This, in turn, would result in the addition of excess boron to the RCS. This rapid insertion of negative reactivity would result in a rapid RCS cooldown and depressurization. A large enough boron addition would result in an unscheduled plant trip and a possible initiation of Safety Injection Systems.

During cold shutdown, the introduction of excess quantities of boric acid into the RCS is undesirable from the aspect of maintaining proper plant chemistry and the inherent difficulties that may be encountered during the subsequent startup due to over-boration of the RCS. The waste management system would also be overburdened by the large amounts of RCS coolant that would require processing to decrease its boron concentration.

A second circuit that circulates water to the VCT has flow rate measuring instrumentation installed(;) however it is limited to approximately 30 gpm. During an accident, either pump's discharge check valve must be able to pass a minimum flow capable of matching the demand of the two running charging pumps (greater than 80 gpm.)."

Evaluation: The licensee states that: "These valves open to provide a flow path from the boric acid makeup pumps to the emergency boration header. They close to prevent recirculation flow through an idle pump."

It is impractical to full-stroke exercise these valves to the open position either quarterly or at cold shutdowns in order to prevent the introduction of highly concentrated boric acid into the RCS which would impose an undue burden with respect to maintaining proper plant chemistry during startup and also with respect to overtaxing the waste management system to process large amounts of RCS coolant to reduce boron concentration.

Therefore, the licensee will part-stroke exercise these valves open and closed quarterly and full-stroke exercise these valves to the open position at refueling outages during testing of the boric acid makeup pumps. The valves also are tested closed quarterly.

Accordingly, the relief requested by the licensee is covered by the rulemaking, effective September 8, 1992, and relief is not required, provided that all related requirements are implemented, as described above. Approval is recommended pursuant to 10 CFR 55.55a ¶ (f)(4)(iv).

3.6.3 Valve Relief Request VR-7: Safety Injection System Check Valves V-07000 and V-07001

Relief Request: The licensee requests relief from full-stroke exercising, to the open position quarterly, the 14 in. SIS Low Pressure Safety Injection (LPSI) pump suction check valves V-07000 and 07001, as required by the ASME Code, Section XI, ¶ IWV-3521 and 3522.

Proposed Alternate Testing: "These valves will be partial-flow exercised during quarterly testing of the LPSI pumps via the minimum flow circuit and full-flow exercised during each reactor refueling outage."

Licensee's Basis for Relief: The licensee states that: "Full stroke exercising these valves to the open position requires injection into the RCS via the LPSI pumps. During plant operation this is precluded because the LPSI pumps cannot develop sufficient discharge pressure to overcome primary system pressure. At cold shutdown, the shutdown cooling system cannot provide sufficient letdown flow to the RWT to accommodate full design flow from the RWT while maintaining the necessary core cooling function. Thus, the only practical opportunity for testing these valves is during refueling outages when water from the RWT is used to fill the refueling cavity. "

Evaluation: The licensee states that: "These valves open to provide flow paths from the RWT to the suction of the associated low-pressure safety injection pump."

It is impractical to full-stroke exercise these valves to the open position quarterly or during cold shutdowns because during plant operation, the LPSI pumps cannot develop sufficient discharge pressure to overcome primary system pressure, and during cold shutdowns, the shutdown cooling system cannot provide sufficient letdown flow to the RWT to accommodate full design flow from the RWT while maintaining the necessary core cooling function.

Therefore, the licensee will partial-stroke exercise these valves quarterly using partial flow developed during quarterly testing of the LPSI pumps via the minimum flow circuit, and will full-stroke exercise these valves using full flow during refueling outages when water from the RWT is used to fill the refueling cavity.

Accordingly, the relief requested by the licensee is covered by the rulemaking, effective September 8, 1992, and relief is not required, provided that all related requirements are implemented, as described above. Approval is recommended pursuant to 10 CFR 55.55a ¶ (f)(4)(iv).

3.6.4 Valve Relief Request VR-8: Safety Injection System Check Valves V-3401 and V-3410

Relief Request: The licensee requests relief from full-stroke exercising, to the open position quarterly, the 6 in. valve V-3401 and 8 in. valve V-3410, which are the SIS High Pressure Safety Injection (HPSI) pump suction check valves, as required by the ASME Code, Section XI, ¶ IWV-3521 and 3522.

Proposed Alternate Testing: "These valves will be partial-flow exercised during quarterly testing of the HPSI pumps via the minimum flow circuit and full-flow exercised during each reactor refueling outage. This alternate testing satisfies the requirement of Generic Letter 89-04, Position 1."

Licensee's Basis for Relief: The licensee states that: "Full stroke exercising these valves to the open position requires injection into the RCS via the HPSI pumps. During plant operation this is precluded because the HPSI pumps cannot develop sufficient discharge pressure to overcome primary system pressure. During cold shutdown conditions, operation of the HPSI pumps is restricted to preclude RCS system pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9."

Evaluation: The licensee states that: "These valves open to provide flow paths from the RWT and the containment sump to the suction of the associated high-pressure safety injection pumps (HPSI)."

It is impractical to full-stroke exercise these valves to the open position quarterly or during cold shutdowns because during plant operation, the HPSI pumps cannot develop sufficient discharge pressure to overcome primary system pressure and, during cold shutdowns, operation of the HPSI pumps is restricted to preclude RCS pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9.

Therefore, the licensee will partial-stroke exercise these valves quarterly using partial flow developed during quarterly testing of the HPSI pumps via the minimum flow circuit, and will full-stroke exercise these valves using full flow during refueling outages (when water from the RWT is used to fill the refueling cavity).

The relief requested by the licensee is covered by the rulemaking, effective September 8, 1992, and relief is not required, provided that all related requirements are implemented, as described above. Approval is recommended pursuant to 10 CFR 55.55a ¶ (f)(4)(iv).

The licensee states that this alternate testing satisfies the requirement of Generic Letter 89-04, Position 1. As discussed in Position 1, the NRC staff position is that passing the maximum required accident condition flowrate through the valve is an acceptable full-stroke. It is assumed that the full-flow exercise proposed by the licensee complies with this position. If other techniques are used, such as non-intrusive techniques at reduced flow rate, the licensee must comply with the six criteria required by Position 1. Therefore, the licensee should clarify this statement in the request.

3.6.5 Valve Relief Request VR-9: Safety Injection System Check Valves V-3414 and V-3427

Relief Request: The licensee requests relief from full-stroke exercising, to the open position quarterly, the 3 in. SIS HPSI pumps discharge check valves V-3414 and V-3427, as required by the ASME Code, Section XI, ¶ IWV-3521 and 3522.

Proposed Alternate Testing: "These valves will be verified closed quarterly and full-flow exercised to the open position during each reactor refueling outage. These valves will be part-stroked open during cold shutdown as per VR-1."

Licensee's Basis for Relief: The licensee states that: "Full stroke exercising these valves to the open position requires injection into the RCS via the HPSI pumps. During plant operation this is precluded because the HPSI pumps cannot develop sufficient discharge pressure to overcome primary system pressure. During cold shutdown conditions, operation of the HPSI pumps is restricted to preclude RCS system pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9.

Partial flow exercising of these valves can be performed by one of the two following methods: when the HPSI pump is used to refill a SIT or when a HPSI pump is recirculated back through the SIT to RWT drain line. Partial-stroke exercising the check valves by filling a SIT can not readily be used because the acceptable SIT level band, specified by the Technical Specifications, is very narrow. The SIT are only refilled on an as needed basis; therefore, the partial-flow test cannot readily be incorporated into a quarterly test.

Partial-stroke exercising of these check valves quarterly can not be performed by using the SIT to RWT drain line. This method requires that the containment isolation valves, one of them a manual valve, be opened to complete the flow path. This would constitute a breach of containment integrity, as defined in Technical Specifications 3.6.1.1, and therefore use of this flow path is precluded in Modes 1, 2, 3, and 4."

Evaluation: The licensee states that: "These valves open to provide flow paths from the respective HPSI pumps to the high-pressure safety injection headers. They close to prevent recirculation through an idle pump."

It is impractical to full-stroke exercise these valves to the open position quarterly or during cold shutdowns because during plant operation, the HPSI pumps cannot develop sufficient

discharge pressure to overcome primary system pressure and, during cold shutdowns, operation of the HPSI pumps is restricted to preclude RCS pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9.

It is impractical to part-stroke exercise to the open position quarterly these valves because this would require using a HPSI pump to either refill one of the Safety Injection Tanks (SIT), which are located inside containment and function as a passive source of SI flow to the RCS, or to recirculate the flow from a HPSI pump back through one of the SIT to RWT drain lines. It would be an undue burden without a compensating increase in the level of safety to require the licensee to deplete and refill a SIT or to breach containment integrity by using a SIT to RWT drain line simply to test these valves.

With respect to testing in the open position, the relief requested by the licensee is covered by the rulemaking and relief is not required, provided that all related requirements are implemented, as described above. Approval is recommended pursuant to 10 CFR 55.55a ¶ (f)(4)(iv).

The licensee should clarify why the Valve Program Table references VR-9, when the valves are to be tested closed quarterly. It appears that no relief is necessary for the closed direction.

3.6.6 Valve Relief Request VR-10: Safety Injection System Check Valves V-3522 and V-3547

Relief Request: The licensee requests relief from full-stroke exercising, to the open and closed positions quarterly, the 3 in. SIS HPSI hot-leg injection check valves V-3522 and V-3547, as required by the ASME Code, Section XI, ¶ IWV-3521 and 3522.

Proposed Alternate Testing: "At least once during each reactor refueling outage these valves will be full-stroke exercised to the open position. These check valves will be partial-stroke exercised to the open position and subsequently stroked closed during cold shutdowns per VR-1. This alternate testing satisfies the requirement of Generic Letter 89-04, Position 1."

Licensee's Basis for Relief: The licensee states that: "Full stroke exercising of these valves would require operating a high pressure safety injection (HPSI) pump and injecting into the reactor coolant system through the hot leg injection system. At power operation this is not possible because the HPSI pumps do not develop sufficient discharge pressure to overcome reactor coolant system pressure. During cold shutdown conditions, full flow operation of the HPSI pumps is restricted to preclude RCS system pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9.

Partial-stroke exercising of these check valves quarterly can not be performed by using the SIT to RWT drain line. This method requires that the containment isolation valves, one of them a manual valve, be opened to complete the flow path. This would constitute a breach of containment integrity, as defined in Technical Specifications 3.6.1.1, and therefore use of this flow path is precluded in Modes 1, 2, 3, and 4."

Evaluation: The licensee states that: "These valves open to provide flow paths from the high pressure safety injection pumps to the RCS for hot-leg injection. Should the normal charging header become disabled, these valves are required to close to direct charging flow to the RCS via the HPSI headers."

It is impractical to full-stroke exercise these valves to the open position quarterly or during cold shutdowns because during plant operation, the HPSI pumps cannot develop sufficient discharge pressure to overcome primary system pressure and, during cold shutdowns, operation of the HPSI pumps is restricted to preclude RCS pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9.

It is impractical to part-stroke exercise these valves to the open position quarterly because this would require using a HPSI pump to either refill one of the Safety Injection Tanks (SIT), which are located inside containment and function as a passive source of SI flow to the RCS, or to recirculate the flow from a HPSI pump back through one of the SIT to RWT drain lines. It would be an undue burden without a compensating increase in the level of safety to require the licensee to deplete and refill a SIT or to breach containment integrity by using a SIT to RWT drain line simply to test these valves.

The relief requested by the licensee is covered by the rulemaking, effective September 8, 1992, and relief is not required, provided that all related requirements are implemented, as described above. Approval is recommended pursuant to 10 CFR 55.55a ¶ (f)(4)(iv).

The licensee states that this alternate testing satisfies the requirement of Generic Letter 89-04, Position 1. As discussed in Position 1, the NRC staff position is that passing the maximum required accident condition flowrate through the valve is an acceptable full-stroke. It is assumed that the full-flow exercise proposed by the licensee complies with this position. If other techniques are used, such as non-intrusive techniques at reduced flow rate, the licensee must comply with the six criteria required by Position 1. Therefore, the licensee should clarify this statement in the request.

3.6.7 Valve Relief Request VR-11: Safety Injection System Check Valves V-3113, V-3133, V-3143, and V-3766

Relief Request: The licensee requests relief from full-stroke exercising, to the open position quarterly, the 2 in. SIS HPSI high-pressure injection header check valves V-3113, 3133, 3143, and 3766, as required by the ASME Code, Section XI, ¶ IWV-3521 and 3522.

Proposed Alternate Testing: "These valves will be partial flow exercised during cold shutdown periods per VR-1. At least once during each reactor refueling outage these valves will be full-stroke exercised to the open position."

Licensee's Basis for Relief: The licensee states that: "Full stroke exercising of these valves would require operating a high pressure safety injection (HPSI) pump at nominal accident flow rate and injecting into the reactor coolant system. At power operation this is not possible because the HPSI pumps do not develop sufficient discharge pressure to overcome reactor coolant system pressure. During cold shutdown conditions, full flow operation of the HPSI pumps is restricted to preclude RCS system pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9.

Partial flow exercising of these valves is performed whenever its associated SIT is refilled. The acceptable SIT level band specified by the Technical Specification is very narrow. The SITs are only refilled on an as needed basis; therefore, the partial flow test cannot readily be incorporated into a quarterly test.

Partial-stroke exercising of these check valves quarterly can not be performed by using the SIT to RWT drain line. This method requires that the containment isolation valves, one of them a manual valve, be opened to complete the flow path. This would constitute a breach of containment integrity, as defined in Technical Specifications 3.6.1.1, and therefore use of this flow path is precluded in Modes 1, 2, 3, and 4."

Evaluation: The licensee states that: "These valves open to provide flow paths from the high pressure safety injection headers to the RCS."

It is impractical to full-stroke exercise these valves to the open position quarterly or during cold shutdowns because during plant operation, the HPSI pumps cannot develop sufficient discharge pressure to overcome primary system pressure and, during cold shutdowns, operation of the HPSI pumps is restricted to preclude RCS pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9.

It is impractical to part-stroke exercise these valves to the open position quarterly because this would require using a HPSI pump to either refill one of the Safety Injection Tanks (SIT), which are located inside containment and function as a passive source of SI flow to the RCS, or to recirculate the flow from a HPSI pump back through one of the SIT to RWT drain lines. It would be an undue burden without a compensating increase in the level of safety to require the licensee to deplete and refill a SIT or to breach containment integrity by using a SIT to RWT drain line.

Accordingly, the relief requested by the licensee is covered by the rulemaking, effective September 8, 1992, and relief is not required, provided that all related requirements are implemented, as described above. Approval is recommended pursuant to 10 CFR 55.55a ¶ (f)(4)(iv).

3.6.8 Valve Relief Request VR-12: Safety Injection System Check Valves V-3524, V-3525, V-3526, and V-3527

Relief Request: The licensee requests relief from full-stroke exercising, to the open and closed positions quarterly, the 3 in. SIS HPSI hot-leg injection to RCS check valves V-3524, 3525, 3526, and 3527, as required by the ASME Code, Section XI, ¶ IWV-3521 and 3522.

Proposed Alternate Testing: "These check valves will be partial-stroke exercised to the open position and subsequently stroked closed during cold shutdowns per VR-1.

These valves will be full-stroke exercised to the open position at least once during each reactor refueling outage. This satisfies the requirements of Generic Letter 89-04, Position 1.

At least once every 18 months these valves will be verified to close in conjunction with PIV leak testing (see VR-2). In addition, V-3525 and V-3527 will be leak tested if the upstream pressure monitors indicate alarm during normal operation."

Licensee's Basis for Relief: The licensee states that: "Full stroke exercising of these valves would require operating a high pressure safety injection (HPSI) pump at nominal-accident flow rate and injecting into the reactor coolant system. At power operation this is not possible because the HPSI pumps do not develop sufficient discharge pressure to overcome reactor coolant system pressure. During cold shutdown conditions, full flow operation of the HPSI pumps is restricted to preclude RCS system pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9.

Partial-stroke exercising of check valves V-3524 and V-3526 quarterly can not be performed by using the SIT to RWT drain line. This method requires that the containment isolation valves, one of them a manual valve, be opened to complete the flow path. This would constitute a breach of containment integrity, as defined in Technical Specifications 3.6.1.1, and therefore use of this flow path is precluded in Modes 1, 2, 3, and 4.

These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or back flow test. Performing leak tests of V-3524 and V-3526 involves a considerable effort. The test connection(s) for these valves are located in a high radiation area in the pipe penetration room, and one of the two connections is located over 12 feet above the floor. Testing during operation would constitute an unreasonable burden on the plant staff.

The other check valves, V-3525 and V-3527, have upstream pressure alarms. Should either valve leak by, the pressure instruments would detect the increase and alarm in the control room when the alarm setpoint is exceeded."

Evaluation: The licensee states that: "These valves open to provide flow paths from the high-pressure safety injection pumps to the RCS for hot leg injection and close to isolate the safety injection headers from the high pressure of the reactor coolant system."

It is impractical to full-stroke exercise these valves to the open position quarterly or during cold shutdowns because during plant operation, the HPSI pumps cannot develop sufficient discharge pressure to overcome primary system pressure and, during cold shutdowns, operation of the HPSI pumps is restricted to preclude RCS pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9.

It is impractical to part-stroke exercise valves V-3524 and 3526 to the open position quarterly because this would require using a HPSI pump to recirculate the flow from a HPSI pump back through one of the Safety Injection Tanks (SITs), which are located inside containment and function as a passive source of SI flow to the RCS, to the Refueling Water Tank (RWT) drain lines. It would be an undue burden without a compensating increase in the level of safety to require the licensee to breach containment integrity by using a SIT to RWT drain line.

Additionally, it is impractical to partial-stroke exercise V-3525 and 3527 quarterly because the only path is into the RCS and as discussed above, the RCS pressure exceeds the HPSI pump discharge pressure.

All of these valves are simple check valves without position indication. The only practical method of verifying that the valves are capable of closure is by a leak test. It is impractical to verify closure of these valves quarterly because this requires performing a reverse flow test inside containment in a high radiation area. Based on the amount of time necessary to set-up and perform the testing and the hazards to personnel, testing is impractical. In addition, V-3525 and V-3527 have upstream pressure alarms which actuate in the control room in the event of excessive leakage.

The licensee has stated that "These valves will be partial-stroke exercised to the open position and subsequently stroked closed during cold shutdowns per VR-1" and the basis only discusses the impracticality of testing quarterly. However, the Valve Program Table identifies the test frequency as "SP" as per VR-12 and not "CS", and the licensee additionally states that the valves will be verified closed during the PIV leak tests. It is assumed that the valves are exercised to the closed position in accordance with the Code during cold shutdowns, in addition to the PIV leak test. The request's alternate testing should be clarified and, if exercising the valves closed at cold shutdowns is impractical, the basis must be revised to discuss the impracticality.

Therefore, the relief requested by the licensee is covered by the rulemaking, effective September 8, 1992, and relief is not required, provided that all related requirements are implemented, as described above. Approval is recommended pursuant to 10 CFR 55.55a ¶ (f)(4)(iv).

The licensee states that this alternate testing satisfies the requirement of Generic Letter 89-04, Position 1. As discussed in Position 1, the NRC staff position is that passing the maximum required accident condition flowrate through the valve is an acceptable full-stroke. It is assumed that the full-flow exercise proposed by the licensee complies with this position. If other techniques are used, such as non-intrusive techniques at reduced flow rate, the licensee must comply with the six criteria required by Position 1. Therefore, the licensee should clarify this statement in the request.

3.6.9 Valve Relief Request VR-15: Safety Injection System Check Valves V-3258, V-3259, V-3260, and V-3261

Relief Request: The licensee requests relief from full-stroke exercising, to the open and closed positions quarterly, the 6 in. SIS HPSI/LPSI injection headers to RCS check valves V-3258, 3259, 3260, and 3261, as required by the ASME Code, Section XI, ¶ IWV-3521 and 3522.

Proposed Alternate Testing: "These valves will be partial flow tested and then verified closed whenever its associated SIT is refilled.

These valves will be full-stroke exercised to the open position during cold shutdown periods per Relief Request VR-1."

These valves will be verified closed in conjunction with PIV leak testing. See VR-2 for PIV testing frequency."

Licensee's Basis for Relief: The licensee states that: "Since no full flow recirculation path exists, full stroke exercising of these valves would require operating a low pressure safety injection (LPSI) pump at nominal accident flow rate and injecting into the reactor coolant system. At power operation this is not possible because the LPSI pumps do not develop sufficient discharge pressure to overcome reactor coolant system pressure.

Partial flow exercising of these valves is performed whenever its associated SIT is refilled. These valves are Pressure Isolation Valves which requires that they are verified closed and leak tested within 24 hours following flow through them. The acceptable SIT level band specified by the Technical Specification is very narrow. The SITs are only refilled on an as needed basis: therefore, the partial flow test cannot readily be incorporated into a quarterly test.

These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or back flow test."

Evaluation: The licensee states that: "These valves open to provide flow paths from the high/low pressure safety injection headers to the RCS and close to isolate the headers from the high pressure of the reactor coolant system."

It is impractical to full-stroke exercise these valves to the open position quarterly because during plant operation, the LPSI pumps cannot develop sufficient discharge pressure to overcome primary system pressure.

It is impractical to part-stroke exercise these valves to the open position quarterly because such testing can only be performed when the associated SIT is refilled. The SIT level band specified by the Technical Specification is very narrow (from 1420 to 1556 cubic feet). The SITs are only refilled on an as needed basis. Therefore, the partial flow test cannot be incorporated readily into a quarterly test.

It is impractical to verify closure of these simple check valves quarterly or during cold shutdowns because they are not provided with remote position indication and performing a reverse flow test inside containment is the only practical method. This method is impractical to perform during operation or every cold shutdown due to the amount of time necessary to set-up and perform the test, personnel hazards, and radiation exposure. Therefore, the licensee's proposal to verify closure in accordance with the St. Lucie Unit 2 Technical Specifications for Pressure Isolation Valves, Table 3.4-1, at the frequencies defined in VR-2, is acceptable.

Accordingly, the relief requested by the licensee is covered by the rulemaking, effective September 8, 1992, and relief is not required, provided that all related requirements are implemented, as described above. Approval is recommended pursuant to 10 CFR 55.55a ¶ (f)(4)(iv).

3.6.10 Valve Relief Request VR-18, Primary Make-Up Water System Containment Isolation Check Valve V-15328

Relief Request: The licensee requests relief from exercising the 2 in. Primary Make-Up Water System containment isolation check valve V-15328 closed quarterly or at cold shutdowns, as required by the ASME Code, Section XI, ¶ IWV-3521 and 3522.

Proposed Alternate Testing: At least once every refueling outage, this valve will be verified to close in conjunction with the Appendix J leak testing program.

Licensee's Basis for Relief: The licensee states that: "This is a simple check valve with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or back flow test. Performing such a test demands that the makeup water supply line be isolated. This effectively isolates the sole supply of fire water to the containment which is unacceptable under any plant conditions. Thus, prior to leak testing in this manner an alternate firewater source must be established by rigging several temporary fire hoses through the maintenance hatch to the various fire fighting station in the containment building. This is not possible during normal operation when primary containment is required and would constitute an undue burden on plant personnel during cold shutdowns."

Evaluation: This ASME Section XI, Category A/C valve, is the containment isolation valve for the primary make-up water supply line to the containment. Section XI requires check valves to be exercised to the position(s) in which the valves perform their safety function. The only safety-related function of this valve is in the closed position. Confirmation that the valve is in the closed direction can be done by visual observation, by an electrical signal initiated by a position indicating device, by observation of appropriate pressure indications, by leak testing, or by other positive means.

The valve is not provided with position indication or pressure instrumentation. The only available method for testing this valve is by leak testing. It is impractical to test this valve quarterly or during cold shutdowns because the valve and test connections are located inside containment and the licensee has demonstrated that an undue burden would exist to leak test the valve in that an alternate source of fire fighting water to the containment building would have to be established.

OMa-1988 Part 10, ¶4.2.2.2 requires that Category A valves, which are containment isolation valves, shall be seat leak tested in accordance with Federal Regulation 10 CFR 50, Appendix J. Appendix J requires that such testing be performed during each refueling, but in no case at intervals greater than 2 years.

Part 10, ¶ 4.3.2.1, requires that check valves shall be exercised nominally every 3 months, except as provided by ¶ 4.3.2.2. Specifically, ¶ 4.3.2.2(e) states that if exercising (to the position required to fulfill its function, i.e., closed) is not practicable during plant operation or cold shutdowns, it may be limited to full-stroke during refueling outages.

Accordingly, the relief requested by the licensee is covered by the rulemaking, effective September 8, 1992, and relief is not required, provided that all related requirements are implemented, as described above. Approval is recommended pursuant to 55.55a ¶ (f)(4)(iv).

Implementation of related requirements is subject to NRC inspection.

3.6.11 Valve Relief Request VR-19, Instrument Air Header Containment Isolation Check Valve V-18195

Relief Request: The licensee requests relief from exercising the 2 in. Instrument Air header containment isolation check valve V-18195 closed quarterly and at cold shutdowns, as required by the ASME Code, Section XI, ¶ IWV-3521 and 3522.

Proposed Alternate Testing: At least once every refueling outage, this valve will be verified to close in conjunction with the Appendix J leak testing program.

Licensee's Basis for Relief: The licensee states that: "This is a simple check valve with no external mean of position indication, thus the only practical means of verifying closure is by performing a leak test or back flow test. This would require a considerable effort, including entry into the containment building and securing all instrument air inside the containment. There are over 50 valves, instruments, and controllers supplied by this one line. During a normal refueling outage, an alternate instrument air compressor must be connected to the isolated section of instrument air line in order to supply air to critical air-operated components. The supply hose from the air compressor to the instrument air line is typically routed through the containment maintenance hatch.

During normal plant operation this is not practical due to the many critical operational components supplied by the instrument air system, the requirement to maintain primary containment integrity, and the potential for unacceptable plant transients.

During cold shutdown, the activities associated with entry into the containment building, securing all instrument air inside the containment, and opening the maintenance hatch to provide the alternate air supply are extensive and would likely result in an extension of any interim outage (cold shutdown period). Thus testing this valve during cold shutdown periods is considered to be an unreasonable burden on the plant staff and not commensurate with the potential gain in plant safety afforded by performance of this test."

Evaluation: This is a 2" ASME Section XI Category A/C valve, which is the containment isolation valve for the Instrument Air header supply line to the containment at penetration 9. Section XI requires check valves to be exercised to the position(s) in which the valves perform their safety function. The only safety function of this valve is in the closed position. Confirmation that the valve is in the closed direction can be done by visual observation, by an electrical signal initiated by a position indicating device, by observation of appropriate pressure indications, by leak testing, or by other positive means. The valve in question is not provided with position indication or pressure instrumentation.

The only available method for testing this valve is by leak testing. It is impractical to test this valve quarterly or during cold shutdowns because the valve and/or test connections are located inside containment and the licensee has demonstrated that an undue burden would exist to leak test the valve in that it would be necessary to secure all instrument air inside containment and route a hose from an alternate instrument air compressor through the maintenance hatch, thus extending the time in cold shutdown.

OMa-1988 Part 10, ¶4.2.2.2 requires that Category A valves, which are containment isolation valves, shall be seat leak tested in accordance with Federal Regulation 10 CFR 50, Appendix J. Appendix J requires that such testing be performed during refueling, but in no case at intervals greater than 2 years.

Part 10, ¶ 4.3.2.1 requires that check valves shall be exercised nominally every 3 months, except as provided by ¶ 4.3.2.2. Specifically, ¶ 4.3.2.2(e) states that if exercising (to the position required to fulfill its function, i.e., closed) is not practicable during plant operation or cold shutdowns, it may be limited to full-stroke during refueling outages.

Accordingly, the relief requested by the licensee is covered by the rulemaking, effective September 8, 1992, and relief is not required, provided that all related requirements are implemented, as described above. Approval is recommended pursuant to §50.55a ¶(f)(4)(iv). Implementation of related requirements is subject to NRC inspection.

3.6.12 Valve Relief Request VR-21: Containment Spray System Check Valves V-07129 and V-07143

Relief Request: The licensee requests relief from full-stroke exercising ,to the open position quarterly, the 12 in. CS pump discharge check valves V-07129 and 07143, as required by the ASME Code, Section XI, ¶ IWV-3521 and 3522.

Proposed Alternate Testing: "Each of these valves will be partial-stroke exercised quarterly in conjunction with testing of the containment spray pumps via the minimum flow test line.

During each refueling outage, each valve will be exercised at least once to demonstrate full stroke capability."

Licensee's Basis for Relief: The licensee states that: "Full stroke exercising of these valves would require operating each containment spray pump at nominal accident flow rate. Exercising these valves via the normal containment spray flow path would result in spraying down the containment - an unacceptable option. The only other practical flow path available for such a test requires pumping water from the refueling water tank (RWT) to the reactor coolant system (RCS) via the shutdown cooling loops.

During plant operation, the containment spray pumps cannot develop sufficient discharge pressure to overcome RCS pressure.

At cold shutdown, the shutdown cooling system cannot provided sufficient letdown flow to the RWT to accommodate full design flow from the RWT while maintaining the necessary core cooling function."

Evaluation: The licensee states that: "These valves open to provide flow paths from the respective containment spray pump to the containment spray pump headers."

It is impractical to full-stroke exercise these valves quarterly to the open position because this would require operating each containment spray pump at the nominal accident flow rate.

This could only be done by either spraying down the containment or by injecting into the reactor coolant system through the shutdown cooling heat exchangers and low pressure headers. This is impractical because the containment spray pumps cannot develop sufficient discharge pressure to overcome RCS pressure and spraying down the containment could cause equipment damage and would be excessively burdensome.

It is impractical to full-stroke exercise these valves to the open position at cold shutdowns because the shutdown cooling system cannot provide sufficient letdown flow to the RWT to accommodate full design flow from the RWT while maintaining the necessary core cooling function.

Accordingly, the relief requested by the licensee is covered by the rulemaking, effective September 8, 1992, and relief is not required, provided that all related requirements are implemented, as described above. Approval is recommended pursuant to 10 CFR 55.55a ¶ (f)(4)(iv).

3.6.13 Valve Relief Request VR-24, Containment Spray System Hydrazine Pump Discharge Check Valves V-07256 and V-07258

Relief Request: The licensee requests relief from exercising the 1/2 in. Containment Spray System hydrazine pump discharge check valves quarterly or during cold shutdowns, as required by the ASME Code, Section XI, ¶ IWV-3521 and 3522. These valves open to allow flow from the hydrazine pumps to the respective containment spray pump suction header.

Proposed Alternate Testing: During each reactor refueling outage these valves will be full-stroke exercised.

Licensee's Basis for Relief: The licensee states that: "Testing these valves using the only flow path available (via the hydrazine pumps) would contaminate the containment spray system and refueling water tank with hydrazine. Each of the hydrazine pumps discharge through its check valve into the suction piping of its containment spray pump. The hydrazine would then be pumped to the RWT during the quarterly containment spray pump Code test using the mini-flow recirculation line. Continued testing would build up the concentration of hydrazine in the RWT and deplete the level in its storage tank."

Evaluation: A review of drawings 2998-G-088, "Flow Diagram Containment Spray and Refueling Water Systems," Rev. 19, dated 10/20/89 and 2998-G-078 Sh. 130, "Flow Diagram Safety Injection System (Sheet 1)," Rev. 4, dated 10/20/89, confirms that each of these hydrazine pump discharge check valves is located downstream of the hydrazine pump motor-operated discharge isolation valve in a 1/2 in. line leading to the suction header of the corresponding Containment Spray pump. To quarterly flow test the hydrazine pumps, flow is recirculated back to the Hydrazine Storage Tank (HST) through connections upstream of the pump motor-operated discharge isolation. No flow is passed through the pump discharge check valves during the quarterly pump tests.

Since each of the hydrazine pumps discharge through its check valve into the suction piping of its corresponding Containment Spray pump, the licensee states that to flow test the check valves, each Containment Spray pump must be operated and flow recirculated back to the

Refueling Water Tank (RWT). The licensee states that continued testing would build up concentration of hydrazine in the RWT and deplete the level in the HST. Due to the personnel hazards associated with handling the hazardous chemical hydrazine, testing quarterly or during cold shutdowns is impractical.

Accordingly, the relief requested by the licensee is covered by the rulemaking, effective September 8, 1992, and relief is not required, provided that all related requirements are implemented, as described above. Approval is recommended pursuant to 10 CFR 55.55a ¶ (f)(4)(iv). Implementation of the related requirements is subject to NRC inspection.

3.6.14 Valve Relief Request VR-28: Safety Injection System Check Valves V-3104 and V-3105

Relief Request: The licensee requests relief from full-stroke exercising, to the open position quarterly, the 2 in. SIS LPSI pump recirculation lines to the RWT check valves V-3104 and 3105, as required by the ASME Code, Section XI, ¶ IWV-3521 and 3522.

Proposed Alternate Testing: "During quarterly pump testing each of these valves will be partial-stroke exercised (open) via recirculation through the minimum flow test circuits with no flow measurements.

During each reactor refueling outage these two valves will be flow tested. The test will calculate the flow through the mini-flow line by draining the reactor coolant system through the line while observing the pressurizer level drop or refueling water tank level increase. The level change divided by the time can be used to verify the full flow exercise of the two check valves."

The Valve Program Table indicates that these normally closed valves are tested closed quarterly.

Licensee's Basis for Relief: The licensee states that: "There is no flow rate instrumentation available to verify valve full-stroke exercising as required by Generic Letter 89-04, Position 1."

Evaluation: The licensee states that: "These valves open to provide for mini-flow recirculation flow paths from the low pressure safety injection pumps to the refueling water tank. This minimum flow through the respective pumps removes pump heat in the event they are operating under low or no flow conditions. The valves close to prevent recirculation through the idle pump, and to prevent overpressurization of the LPSI piping from the discharge pressure of the HPSI pump."

From a review of the applicable flow diagrams, 2998-G-078, Sheet 130, Rev. 4, and the continuation on flow diagram 2998-G-088, Rev. 19, it appears that there is a flow element on each recirculation line, i.e., FE-03-1-1 and FE-03-2-1, which could be used to measure the recirculation line flow. The licensee should explain the statement that there is no flow instrumentation available to verify full-stroke exercising of these check valves.

Also, the licensee should explain why the quarterly LPSI pump flow test does not result in a recirculation flow sufficient to cause full-stroke exercising of these valves. Non-intrusive methods could be utilized to verify the valves' obturator full-stroke.

OMa-1988 Part 10, ¶4.3.2.2 allows full-stroke exercising that is not practicable during plant operation or cold shutdowns to be deferred to refueling outages. Therefore, provided the licensee furnishes information on why the installed flow elements or ncn-intrusives cannot be used to verify the valves' full-stroke cpen quarterly and implements the related requirements, as described above, the relief requested by the licensee is covered by the rulemaking and approval could be recommended. However, if quarterly full-stroke exercising is practical, the licensee must comply with the Code requirements.

3.6.15 Valve Relief Request VR-32: Safety Injection System Check Valve V-3101 (2998-G-078, Sheet 130)

Relief Request: The licensee requests relief from full-stroke exercising, to the open position quarterly, the 2 in. SIS supply line from the SITs to the VCT check valve V3101, as required by the ASME Code, Section XI, ¶ IWV-3521 and 3522.

Proposed Alternate Testing: "This valve will be partial flow tested during cold shutdowns per VR-1 and full-flow exercised once every refueling outage."

Licensee's Basis for Relief: The licensee states that: "Transferring the large quantity of water from a SIT to the VCR (sic) needed to verify full stroke would result in a significant increase of the boron concentration within the VCT and in the charging system makeup to the reactor coolant system (RCS) as well.

During normal plant operation, any increase of the VCT boron concentration could result in the excessive boron concentration in the RCS along with the insertion of negative reactivity. Ultimately, the RCS would experience cooldown and depressurization with the potential for a plant trip.

During cold shutdown, the introduction of excess quantities of boric acid into the RCS is undesirable from the aspect of maintaining proper plant chemistry and the inherent difficulties that may be encountered during the subsequent startup due to over-boration of the RCS. The waste management system could also be overburdened by the large amounts of RCS coolant that would require processing following dilution activities. During cold shutdown, transferring a limited quantity of water (less than that needed to confirm full stroke) from a SIT is practical."

Evaluation: The licensee states that: "This valve opens to provide to provide a flow path for borated water from the safety injection tanks (SIT's) to the volume control tank (VCT) to provide sufficient water inventory for plant cooldown should the refueling water tank (RWT) become unavailable."

It is impractical to full-stroke exercise this valve to the open position quarterly because this would significantly increase the boron concentration within the VCT and in the charging system makeup to the RCS. This could result in a cooldown and depressurization with the potential for a plant trip.

It is impractical to full-stroke exercise this valve to the open position during cold shutdowns because this could result in difficulties in maintaining proper plant chemistry and also delay plant startup due to over boration of the RCS. The resulting excessive quantities of RCS requiring dilution would also overburden the waste management system.

Accordingly, the relief requested by the licensee is covered by the rulemaking, effective September 8, 1992, and relief is not required, provided that all related requirements are implemented, as described above. Approval is recommended pursuant to 10 CFR 55.55a ¶ (f)(4)(iv).

4.0 VALVE TESTING DEFERRAL JUSTIFICATIONS

Florida Power & Light has submitted 31 justifications for deferring valve testing. These justifications document the impracticality of testing 85 valves in each unit quarterly, during power operation as required by Section XI. These justifications were reviewed to verify their technical basis.

As discussed in Generic Letter 91-18, it is not the intent of IST to cause unwarranted plant shutdowns or to unnecessarily challenge other safety systems. Generally, those tests involving the potential for a plant trip, or damage to a system or component, or excessive personnel hazards are not considered practical. Removing one train for testing or entering a Technical Specification limiting condition of operation is not sufficient basis for not performing the required tests, unless the testing renders systems inoperable for extended periods of time (Reference Generic Letter 87-09). Other factors, such as the effect on plant safety and the difficulty of the test, may be considered.

Valves, whose failure in a non-conservative position during exercising would cause a loss of system function, such as non-redundant valves in lines (e.g., a single line from the RWST or accumulator discharge), or the RHR pump discharge crossover valves for plants whose licensing bases assumes that all four cold legs are being supplied by water from at least one pump (Reference NRC Information Notice 87-01), should not be exercised during conditions when the system is required to be operable. Other valves may fall into this category under certain system configurations or plant operating modes, e.g., when one train of a redundant ECCS system is inoperable, non-redundant valves in the remaining train should not be cycled because their failure would cause a total loss of system function or when one valve in a containment penetration is open and inoperable, the redundant valve should not be exercised during this system configuration.

BNL's evaluation of each cold shutdown justification is provide in Table 4-1. Each justification is given an item number to aid with the discussions. The anomalies associated with the specific justifications are provided in Section 5.16 of this TER.

Table 4.1-St. Lucie Unit 2 Cold Shutdown Justification Evaluations

BNL Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
	Reactor Coolant System				
RC-1	V-1460 through V-1466, reactor vessel and pressurizer gas vents; 1 in. normally-closed, solenoid-operated globe valves.	2998-G-078, Sheet 107, "Reactor Coolant System (Sheet 1)", Rev. 1	"These valves are administratively controlled in the key-locked closed position with the power supply disconnected to prevent inadvertent operation. Since these are Class 1 isolation valves for the reactor coolant system, failure of a valve to close or significant leakage following closure could result in a loss of coolant in excess of the limits imposed by Technical Specification 3.1.3 leading to a plant shutdown. Furthermore, if a valve were to fail open or valve indication fail to show the valve returned to the fully closed position following exercising, prudent plant operation would probably likely result in a plant shutdown."	Per the Valve Program Tables, these valves are exercised open at cold shutdowns.	It is impractical to exercise these valves open quarterly because these valves are Class 1 isolation valves for the RCS and are administratively controlled to the key locked position with the breaker disconnected to prevent a loss of coolant in excess of the limits imposed by Technical Specification 3.1.3. The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with Section XI, ¶ IWV-3411.
RC-2	V-1474 and V-1475, Pressurizer Power-Operated Relief Valves; 3 in. solenoid-operated, normally closed globe valves	2998-G-078, Sheet 108, "Reactor Coolant System (Sheet 2)", Rev. 0	"Due to the potential impact of the resulting transient should one of these valves open prematurely or stick in the open position, it is considered imprudent to cycle them during plant operation with the reactor coolant system pressurized."	Per the Valve Program Tables, these valves are exercised open at cold shutdowns.	It is impractical to exercise these valves open quarterly because stroking of these valves at RCS pressure causes a small loss of RCS inventory and there is a significant possibility that the any of one of the valves may stick in the open position. The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with Section XI, ¶ IWV-3411.

Table 4.1 (Cont.)

BNL Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
	CVCS				
CV-1	V-2522, Letdown Line Containment Isolation Valve; 2 in. diaphragm-operated, normally open globe valve.	2998-G-078, Sheet 120, "Chemical & Volume Control System (Sheet 1)", Rev. 4	"Closing this valve during operation isolates the letdown line from the RCS and would result in undesirable pressurizer level transients with the potential for a plant trip. If a valve failed to reopen, then an unexpected plant shutdown would be required."	Per the Valve Program Tables, this valve is exercised to the closed position and also fail safe tested (to the closed position) at cold shutdowns.	It is impractical to part-stroke or full-stroke exercise these valves closed quarterly because of the resulting RCS transients. The alternative provides full-stroke exercising to the closed position during cold shutdowns in accordance with Section XI, ¶ IWV-3411.
CV-2.1	V-2501, Volume Control Tank Outlet Valve; 4 in. normally open, motor-operated gate valve.	2998-G-078, Sheet 121, "Chemical & Volume Control System (Sheet 2)", Rev. 5	"Cycling this valve during operation of a charging pump would isolate the VCT from the charging pump suction header damaging any operating charging pumps and interrupting the flow of charging water flow to the RCS with the potential of RCS transients and plant trip."	Per the Valve Program Tables, this valve is exercised to the open position and to the closed position at cold shutdowns.	It is impractical to exercise this valve to either the open or closed position quarterly because of possible damage to the charging pumps. The alternative provides full-stroke exercising to both the open and closed positions during cold shutdowns in accordance with Section XI, ¶ IWV-3411.
CV-2.2	V-2505 and V-2524, RCP Control Bleedoff Isolation Valves; 3/4" normally open, diaphragm-operated globe valves.	2998-G-078, Sheet 121, "Chemical & Volume Control System (Sheet 2)", Rev. 5	"Exercising either of these valves to the closed position when any of the reactor coolant pumps (RCP's) are in operation would interrupt flow from the RCP seals and result in damage to the pump(s)."	Per the Valve Program Tables, these valves are exercised to the closed position and fail safe tested (to the closed position) at cold shutdowns.	It is impractical to part-stroke or full-stroke exercise these valves to the closed position quarterly because this could result in damage to the RCP seals. The alternative provides for full-stroke exercising to the closed position at cold shutdowns in accordance with Section XI, ¶ IWV-3411.

Table 4.1 (Cont.)

BNL Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
CV-3.1	SE-02-03 and SE-02-04, Auxiliary Pressurizer Spray Valves; 2 in. locked closed, solenoid-operated globe valves	2998-G-078, Sheet 122, "Chemical & Volume Control System (Sheet 3)", Rev. 5	"Opening either of these valves (or failure in the open position) during plant operation would cause an RCS pressure transient that could potentially adversely affect plant safety and lead to a plant trip. In addition, the pressurizer spray piping would be subjected to undesirable thermal shock."	Per the Valve Program Tables, these valves are exercised to the open and closed positions and also fail safe tested (to the closed position) at cold shutdowns.	It is impractical to exercise these valves to the open or closed position quarterly because this could cause an RCS pressure transient that could affect plant safety and lead to a plant trip. The alternative provides full-stoke exercising to the open and closed positions at cold shutdowns in accordance with Section XI, ¶ IWV-3411.
CV-3.2	V-2431, Auxiliary Pressurizer Spray Check Valve; 2 in. normally closed check valve.	2998-G-078, Sheet 122, "Chemical & Volume Control System (Sheet 3)", Rev. 5	"In order to test this valve, either SE-02-03 or SE-02-04 must be opened. Opening either of these valves (or failure in the open position) during plant operation would cause an RCS pressure transient that could potentially adversely affect plant safety and lead to a plant trip. In addition, the pressurizer spray piping would be subjected to undesirable thermal shock."	Per the Valve Program Tables, this check valve is full-stroke exercised to the open position at cold shutdowns.	It is impractical to part-stroke or full-stroke exercise this valve to the open position quarterly because this would cause a pressure transient in the RCS from the spray of cold water into the pressurizer, which in turn might cause a plant trip and impose thermal stresses on the pressurizer spray piping. The alternative provides full-stroke exercising to the open position at cold shutdowns in accordance with Section XI, ¶ IWV-3521 and 3522.
CV-3.3	V-2440, Charging Pump Discharge Check Valve to Safety Injection; 2 in. normally closed check valve	2998-G-078, Sheet 122, "Chemical & Volume Control System (Sheet 3)", Rev. 5	"Opening this valve requires operating a charging pump and discharging into the RCS via the safety injection nozzles. Thermal cycling of the safety injection nozzles is undesirable and should be avoided."	Per the Valve Program Tables, this valve is full-stroke exercised to the open position at cold shutdowns.	It is impractical to part-stroke or full-stroke exercise this valve to the open position quarterly since this would result in undesirable thermal stress on the safety injection nozzles. The alternative provides full-stroke exercising to the open position at cold shutdowns in accordance with Section XI, ¶ IWV-3521 and 3522.

Table 4.1 (Cont.)

BNL Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
CV-3.4	V-2515 and V-2516, Letdown Line Isolation Valves; 2 in. diaphragm-operated, normally open globe valves	2998-G-078, Sheet 122, "Chemical & Volume Control System (Sheet 3)", Rev. 5	"Closing these valves during operation isolates the letdown line from the RCS and would result in undesirable pressurizer level transients with the potential for a plant trip. If a valve failed to reopen, then an unexpected plant shutdown would be required."	Per the Valve Program Tables, these valves are exercised to the closed position and fail safe tested (to the closed position) at cold shutdowns.	It is impractical to part-stroke or full-stroke exercise these valves to the closed position quarterly because this could cause a pressurizer level transient and possible plant trip. The alternative provides full-stroke exercising to the closed position at cold shutdowns in accordance with Section XI, ¶ IWV-3411.
CV-3.5	V-2523 and V-2598, Charging Line Isolation Valves; V-2523 2 in. diaphragm-operated, locked open globe valve, V-2598 2.5 in. normally open, motor-operated gate valve	2998-G-078, Sheet 122, "Chemical & Volume Control System (Sheet 3)", Rev. 5	"Closing these valves during operation isolates the charging pumps from the RCS and would result in undesirable pressurizer level transients with the potential for a plant trip and potential damage to the charging pumps. If a valve failed to reopen, then an unexpected plant shutdown would be required."	Per the Valve Program Tables, V-2523 is exercised to the closed position at cold shutdowns. V-2598 is exercised to the open position at cold shutdowns.	It is impractical to part-stroke or full-stroke exercise to the closed position quarterly V-2523 or exercise to the open or closed position quarterly V-2598 because this could cause a pressurizer level transient and possible plant trip. The alternative provides full-stroke exercising at cold shutdowns in accordance with Section XI, ¶ IWV-3410.
	Safety Injection/ Residual Heat Removal Systems				
SI-1.1	V-3106 and V-3107, LPSI Pump Discharge Check Valves; 10 in. normally closed check valves.	2998-G-078, Sheet 130, "Safety Injection System (Sheet 1)," Rev. 4.	"During normal plant operation, the LPSI Pumps cannot develop sufficient discharge pressure to pump through these valves to the RCS and exercise them in the open direction. These valves will be partial flow exercised quarterly and full flow exercised each cold shutdown."	Per the Valve Program Tables, these valves are part-stroke exercised open quarterly and full-stroke exercised open at cold shutdowns.	It is impractical to full-stroke exercise the valves open quarterly. The alternative provides part-stroke exercising to the open position quarterly and full-stroke exercising to the open position during cold shutdowns in accordance with Section XI, ¶ IWV-3521 and 3522.

Table 4.1 (Cont.)

BNL Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
SI-1.2	V-3463, Isolation Valve for SIT Test/RWT Return Header; 2 in. manually-operated, locked closed gate valve.	2998-G-078, Sheet 130, "Safety Injection System (Sheet 1)," Rev. 4.	"Cycling this manual valve would constitute a breach of containment integrity, as defined in Technical Specifications 3.6.1.1, and therefore opening this valve is precluded in Modes 1, 2, 3, and 4."	Per the Valve Program Tables, this valve is exercised at cold shutdowns to verify proper operation and stroking with no stroke time measurements. Requires observation of system parameters or local observation of valve operation.	According to the flow diagram, 2998-G-078, Sheet 130, the two outboard containment isolation valves for penetration 41, 2I-SE-03-2A and 2B, are normally closed and in parallel to each other and in series with V-3463. The Valve Program Tables indicate that both of the outboard valves are exercised opened quarterly. Furthermore, Technical Specification Table 3.6-2 for Containment Isolation Valves indicates that V-3463 is testable during plant operation. Therefore, the licensee should explain why V-3463 is not exercised open quarterly.
SI-2.1	V-3114, V-3124, V-3134, and V-3144, LPSI Cold Leg Injection Check Valves; 6 in. check valves, normally closed.	2998-G-078, Sheet 131, "Safety Injection System (Sheet 2)," Rev. 1	"During normal plant operation, the LPSI Pumps cannot develop sufficient discharge pressure to pump through these valves to the RCS and exercise then in the open direction."	Per the Valve Program Tables, these valves are full-stroke exercised to the closed position and full-stroke exercised to the open position at cold shutdowns.	It is impractical to quarterly full-stroke exercise these valves open quarterly because the LPSI pumps cannot develop sufficient discharge pressure to achieve full opening. However, the licensee has not provided a basis for exercising the valves closed at cold shutdowns. There appear to be drain or test connections available both immediately upstream and immediately downstream of each of these valves which may be able to be used for both a quarterly part-stroke open test and a quarterly test for closure. Therefore, the licensee should explain why such testing could not be performed quarterly.

Table 4.1 (Cont.)

BNL Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
SI-2.2	V-3480, V-3481, V-3651, and V-3652, Shutdown Cooling RCS Isolation Valves; 10 in. motor-operated, locked closed gate valves.	2998-G-078, Sheet 131, "Safety Injection System (Sheet 2)," Rev. 1	"These valves are provided with electrical interlocks that prevent opening whenever Reactor Coolant System pressure exceeds 275 psia. This precludes exercising these valves in any plant condition other than cold shutdown."	Per the Valve Program Tables, these valves are exercised open with stroke time measurement at cold shutdowns.	It is impractical to exercise these valves open quarterly because, to prevent an interfacing systems LOCA, these valves are provided with electrical interlocks that prevent opening whenever RCS pressure exceeds 275 psia. The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with Section XI, ¶ IWV-3411.
SI-2.3	V-3545, V-3664, and V-3665, Shutdown Cooling Isolation and Cross Connect Valves, 10 in. motor-operated, locked closed gate valves.	2998-G-078, Sheet 131, "Safety Injection System (Sheet 2)," Rev. 1	"The motor-operated valves V-3664 and V-3665 are isolation valves for shutdown cooling and V-3545 is the cross connect valve between the two trains of shutdown cooling. These valves are normally locked closed. A failure of these valves in any other position could jeopardize the integrity of the Low Pressure Safety Injection System."	Per the Valve Program Tables, these valves are exercised open with stroke time measurement at cold shutdowns.	The licensee should explain why a failure of V-3664 and V-3665 in the open position would jeopardize the integrity of the LPSI System since the Shutdown Cooling System valves V-3480, V-3481, V-3651 and V-3652 are immediately upstream and interlocked closed as described above for SI- 2.2 Similarly, the licensee should describe under what conditions the cross connect valve V-3545 is opened during the shutdown cooling mode of operation and also justify that its failure during normal plant operation would jeopardize the integrity of the LPSI System since the it appears that only shutdown cooling would be affected and that shutdown cooling could still be accomplished with the valve open.

Table 4.1 (Cont.)

BNL Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
SI-3.1	V-03002, V-03003, V-03004, and V-03005, Safety Injection Tank (SIT) Drain Line Check Valves; 1 in. normally closed check valves	2998-G-078, Sheet 132, "Safety Injection System (Sheet 3)," Rev. 0	"Exercising these valves requires draining each of the SITs. This is not considered appropriate nor prudent activity to perform during plant operation due to the obvious safety issues related to SIT inventory and chemistry control."	Per the Valve Program Tables, these valves are full-stroke exercised to the open position at cold shutdowns.	It is impractical to part-stroke or full-stroke exercise these valves open quarterly because this would require draining the SITs and restoring their level which is governed by the Technical Specifications. The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with Section XI, ¶ IWV-3521 and 3522.
SI-3.2	V-3614, V-3624, V-3634, and V-3644, SIT Discharge Isolation Valves; 12 in. motor-operated, locked open gate valves	2998-G-078, Sheet 132, "Safety Injection System (Sheet 3)," Rev. 0	"Stroke testing these valves in the closed direction during normal operation is not possible. The valves are normally locked open with their breaker opened. Also they are interlocked with pressurizer pressure to prevent these valves from closing with RCS pressure > 276 psia. Therefore, the valve's cannot be cycled except during cold shutdowns."	Per the Valve Program Tables, these valves are exercised to the closed position with stroke time measurement at cold shutdowns.	It is impractical to exercise these valves closed quarterly because they are locked open with their breakers removed, and they are only closed during a normal plant shutdown to prevent injection of the SIT inventory into the RCS. The alternative provides full-stroke exercising to the closed position at cold shutdowns in accordance with Section XI, ¶ IWV-3411.
SI-3.3	V-3733 through V-3740, SIT Vent Valves; 1 in. solenoid-operated, locked closed globe valves	2998-G-078, Sheet 132, "Safety Injection System (Sheet 3)," Rev. 0	"Cycling any of these valves during normal plant operation with the SITs pressurized is undesirable since if a valve were to fail to re-close the result would be a depressurization of the affect SIT."	Per the Valve Program Tables, these valves are exercised to both the open and closed positions with stroke time measurements at cold shutdowns and fail safe tested (to the closed position) at cold shutdowns.	It is impractical to exercise these valves open or closed quarterly since this would depressurize the SITs. The alternative provides full-stroke exercising to both the open and closed positions at cold shutdowns in accordance with Section XI, ¶ IWV-3411.

Table 4.1 (Cont.)

BNL Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
	Waste Management System				
WM-1	V-6792, Nitrogen Gas Supply Containment Isolation Check Valve; 1 in. normally closed check valve	2998-G-078, Sheet 163, "Waste Management (Sheet 4)," Rev. 5	"This is a simple check valve with no external means of position indication, thus the only practical means of verifying closure is to perform a backleakage test. Performing such a test requires entry into the containment building and thus is impractical to do during plant operations."	Per the Valve Program Tables, this valve is full-stroke exercised to the closed position at cold shutdowns.	It is impractical to part-stroke or full-stroke exercise this valve closed quarterly because this requires entry into the containment during plant operation to perform a backleakage test. The alternative provides full-stroke exercising to the closed position at cold shutdowns in accordance with Section XI, ¶ IWV-3521 and 3522.
	Main Steam System				
MS-1.1	HCV-08-1 A & B, Main Steam Isolation Valves; 34 in. normally open, piston-operated globe valves	2998-G-079, Sheet 1 of 6, "Main Steam System Sh. No. 1," Rev. 16	"During plant operation at power, full closure of either of these valves is not practical as it would require isolating a steam generator which could result in a severe transient on the steam and reactor systems and a possible plant trip."	Per the Valve Program Tables, these valves are partial closure exercised quarterly, and full-stroke exercised to the closed position with stroke time measurement at cold shutdowns.	It is impractical to full-stroke exercise these valves closed quarterly because this would cause a plant transient. The alternative provides part-stroke exercising to the closed position quarterly and full-stroke exercising to the closed position at cold shutdowns in accordance with Section XI, ¶ IWV-3411.

Table 4.1 (Cont.)

BNL Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
MS-1.2	V-08130 and V-08163, Steam-Driven AFW Pump Steam Supply Check Valves; 4 in. normally open check valves	2998-G-079, Sheet 1 of 6, "Main Steam System Sh. No. 1," Rev. 16	"Full stroke operation of these valves requires operating 2C AFW Pump and full accident flow rate which is not practical during plant operation at power. (See Relief Request PR-4)."	Per the Valve Program Tables, these check valves are part-stroke exercised to the open position **quarterly**, full-stroke exercised to the open position at **cold shutdowns** and disassembled and inspected at refueling outages under relief request VR-31 to demonstrate closure capability.	Valve relief request VR-31 called for part-stroke exercising to the open position **monthly** and full-stroke exercising **at cold shutdowns.** The licensee should clarify the apparent discrepancies in the testing frequencies. In any case, it is impractical to full-stroke exercise these valves open quarterly because this would require operating AFW Pump 2C at full accident flow rate while the plant is operating at power. The alternative provides part-stroke exercising to the open position quarterly and full-stroke exercising to the open position at cold shutdowns in accordance with Section XI, ¶ IWV-3520.
	Feedwater System				
FW-1.1	HCV-090-1 A & B and HCV-09-2 A & B, Main Feedwater Isolation Valves; 20 in. piston-operated, normally open, fail open gate valves.	2998-G-080, Sheet 2 of 2, "Feedwater & Condensate Systems," Rev. 18	"During plant operation at power, closure of any of these valves is not practical as it would require isolating a steam generator which would result in a severe transient on the steam and reactor systems and a plant trip."	Per the Valve Program Tables, these valves are partial closure exercised quarterly and exercised to the closed position with stroke time measurement and fail safe tested (to the **open** position) at cold shutdowns.	It is impractical to full-stroke exercise these valves to the closed position quarterly because this could cause a feedwater transient. The alternative provides full-stroke exercising to the closed position at cold shutdowns in accordance with Section XI, ¶ IWV-3411.

Table 4.1 (Cont.)

BNL Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
FW-1.2	V-09107, V-09123, and V-09139, Auxiliary Feedwater Pump Discharge Check Valves; 4 in. normally closed check valves.	2998-G-080, Sheet 2 of 2, "Feedwater & Condensate Systems," Rev. 18	"Full-stroke exercising of these valves would require operation of the related auxiliary feedwater pump and injection of cold water (85 deg-F) into the hot (450 deg-F) feedwater supply piping. This, in turn, would result in unacceptable thermal stress on the feedwater system piping components."	Per the Valve Program Tables, these check valves are full-stroke exercised, open at cold shutdowns.	These check valves are located downstream of the AFW pump test recirculation lines to the Condensate Storage Tank (CST). These valves do not open during the periodic AFW pump testing. Furthermore, the AFW flow lines to the steam generators are isolated by normally closed, motor-operated valves which are downstream of these check valves. To test these check valves would require opening the isolation valves and causing the cold AFW flow to enter the steam generators, resulting in stress on the piping and steam generator nozzle connections. Therefore, it is impractical to part-stroke or full-stroke open these valves quarterly. The alternative provides full-stroke exercising to the open position at cold shutdowns in accordance with Section XI, ¶ IWV-3521 and 3522.

Table 4.1 (Cont.)

BNL Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
FW-1.3	V-09119, V-09135, V-09151, and V-09157, Auxiliary Feedwater Supply Check Valves; 4 in. normally closed check valves.	2998-G-080, Sheet 2 of 2, "Feedwater & Condensate Systems," Rev. 18	"Full-stroke exercising of these valves would require operation of a related auxiliary feedwater pump and injection of cold water (85 deg-F) into the hot (450 deg-F) feedwater supply piping. This, in turn, would result in unacceptable thermal stress on the feedwater system piping components."	Per the Valve Program Tables, these check valves are full-stroke exercised open at cold shutdowns.	The AFW flow lines to the steam generators are isolated by normally closed, motor-operated valves which are upstream of these check valves. To test these check valves would require opening the isolation valves and causing the cold AFW flow to enter the steam generators, resulting in stress on the piping and steam generator nozzle connections. Therefore, it is impractical to part-stroke or full-stroke open these valves quarterly. The alternative provides full-stroke exercising to the open position at cold shutdowns in accordance with Section XI, ¶ IWV-3521 and 3522.
	Component Cooling System				
CC-1.1	HCV-14-1, 14-2, 14-6, and 14-7, RCP Cooling Water Supply/Return Isolation Valves; 8 in. piston-operated, normally open, fail closed butterfly valves	2998-G-083, "Component Cooling System," Rev. 18	"These valves are required to be open to ensure continued cooling of reactor coolant pump auxiliary components and the control rod drives. Closing any of these valves during plant operation would result in severe RCP and CRD damage leading to plant operation in a potentially unsafe mode and a subsequent plant shutdown."	Per the Valve Program Tables, these valves are exercised closed with stroke time measurement and also fail safe tested (to the closed position) at cold shutdowns.	It is impractical to part-stroke or full-stroke exercise these valves to the closed position quarterly because flow of Component Cooling Water to the Reactor Coolant pumps and motors and the Control Rod Drive air coolers would be interrupted. The alternative provides full-stroke exercising to the closed position during cold shutdowns in accordance with Section XI, ¶ IWV-3411.

Table 4.1 (Cont.)

BNL Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
CC-1.2	HCV-14-3 A & B, Shutdown Heat Exchanger Return Valves; 14 in. normally open, fail open, diaphragm-operated butterfly valves	2998-G-083, "Component Cooling System," Rev. 18	"Testing either of these valves during plant operation would result in an unbalanced flow condition in the affected CCW train and decreased flow to essential equipment. This could result in component damage or an undesirable plant transient."	Per the Valve Program Tables, these valves are exercised to the open position with stroke time measurement and fail safe tested (to the open position) at cold shutdowns.	These are 14 in. normally open valves through which a large percentage of the Component Cooling water flow would normally pass to the return header. It would appear likely that closure of these valves during plant operation would cause a transient in the CC system. Therefore, it is impractical to part-stroke or full-stroke exercise these valves to the closed position quarterly. The alternative provides full-stroke exercising to the open position at cold shutdowns in accordance with Section XI, ¶ IWV-3411.
	Service Air System				
SA-1	V-181270, Service Air Containment Isolation Check Valve; 2 in. normally closed check valve	2998-G-085, Sheet 1, "Service Air System," Rev. 16	"During normal power operation, the service air supply to the containment building is isolated. The containment isolation valves (sic), HCV-18-2, is a normally shut valve used to isolate the service air system inside containment. Testing a check valve in an isolated section of a system is not warranted. The check valve will be back flow tested during cold shutdowns when the section of the service air system inside the containment building is in service. This is a simple check valve with no external means of position indication, thus the only practical means of verifying closure is to perform a backleakage test. Performing such a test requires entry into the containment building and thus is impractical to do during plant operations."	Per the Valve Program Tables, this valve is full-stroke exercised to the closed position at cold shutdowns.	It is impractical to full-stroke exercise this valve to the closed position quarterly because the valve is located inside containment and a reverse leakage test and, correspondingly, an extensive test set-up would be required. The alternative provides full-stroke exercising to the closed position at cold shutdowns in accordance with Section XI, ¶ IWV-3521 and IWV-3522.

Table 4.1 (Cont.)

BNL Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
	Instrument Air System				
IA-1	HCV-18-1, Primary Containment Instrument Air Supply; 1 in. normally open, diaphragm-operated globe valve.	2998-G-085, Sheet 2, "Instrument Air System - Sheet 1," Rev. 21	"Closing this valve isolates operating air to critical components in the containment building including the pressurizer spray valves and CVCS letdown isolation valves and could cause severe plant transients and a plant trip. Failure in the closed position would cause a plant shutdown."	Per the Valve Program Tables, this valve is exercised to the closed position with stroke time measurement and fail safe tested (to the closed position) at cold shutdowns.	It is impractical to part-stroke or full-stroke exercise this valve to the closed position quarterly because this could cause a severe plant transient and a plant trip. The alternative provides full-stroke exercising to the closed position at cold shutdowns in accordance with Section XI, ¶ IWV-3521 and 3522.
	Miscellaneous Sampling				
SM-1	V-27101 and V-27102, Hydrogen Sampling Return Line Containment Isolation Check Valves; 3/4" normally closed check valves	2998-G-092, Sheet 1, "Miscellaneous Sampling Systems," Rev. 18	"This is a simple check valve with no external means of position indication, thus the only practical means of verifying closure is to perform a backleakage test. Performing such a test requires entry into the containment building and breaching of the system, thus it is impractical to do during plant operations."	Per the Valve Program Tables, these valves are full-stroke exercised to the open position quarterly and full-stroke exercised to the closed position at cold shutdowns.	It is impractical to part-stroke or full-stroke exercise these valves to the closed position quarterly because this requires entry into the containment building to perform a reverse flow test. The alternative provides full-stroke exercising to the closed position at cold shutdowns in accordance with Section XI, ¶ IWV-3521 and 3522.

Table 4.1 (Cont.)

BNL Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
	Heating, Ventilating, & Air Conditioning				
HV-1.1	FCV-25-1 through FCV-25-6, Primary Containment Purge and Vent Valves; 48 in. piston-operated, locked closed, fail closed butterfly valves.	2998-G-878, "HVAC - Control Diagrams - Sheet 1," Rev. 16	"These valves are required to remain closed at all times when the plant is operating in Modes 1 through 4, thus they are not required to operate (close) during operational periods. Due to the large size of these valves and the potential for damage as a result of frequent cycling, it is not prudent to operate then more than is absolutely necessary."	Per the Valve Program Tables, these valves are exercised to the closed position with stroke time measurement and fail safe tested (to the closed position) at cold shutdowns.	It is impractical to part-stroke or full-stroke exercise these valves to the closed position quarterly because of their large size, 48 in. diameter, and their locked closed, fail closed position during plant operation. Furthermore, Technical Specification Table 3.6-2 for Containment Isolation Valves indicates that valves FCV-25-2, 3, 4, and 5 are not testable during plant operation. The alternative provides full-stroke exercising to the closed position at cold shutdowns in accordance with Section XI, ¶ IWV-3411.
HV-1.2	V-25-20 and V-25-21, Containment Vacuum Breakers; 24 in. normally closed check valves	2998-G-878, "HVAC - Control Diagrams - Sheet 1," Rev. 16	"These valves can only be exercised manually requiring direct access to each valve. Since these valves are located within the containment building, access is limited and not routinely practical."	Per the Valve Program Tables, these valves are full-stroke exercised to the open position and to the closed position at cold shutdowns.	It is impractical to full-stroke exercise these valves either open or closed quarterly because they are located within the containment building. The alternative provides full-stroke exercising to the open and closed positions at cold shutdowns in accordance with Section XI, ¶ IWV-3521 and 3522.

5.0 IST PROGRAM RECOMMENDED ACTION ITEMS

Inconsistencies, omissions, and required licensee actions identified during the review of the licensee's second interval Inservice Testing Program are summarized below. The licensee should resolve these items in accordance with the evaluations presented in this report.

5.1 The IST Program does not include a description of: how the components were selected, how testing requirements were identified for each component, or the safety function of the valves. The review performed for this TER did not include verification that all pumps and valves within the scope of 10 CFR 50.55a and Section XI are contained in the IST Program, and did not ensure that all applicable testing requirements have been identified. The licensee is requested to include this information in the IST Program. The program should describe the development process, such as a listing of the documents used, the method of the basis for categorizing valves, and the method or process used for maintaining the program current with design modifications or other activities performed under 10 CFR 50.59. Additionally, for each interval, the licensee should maintain an accurate status of the relief requests including their revision and NRC approval.

The licensee has deleted the diesel air start and fuel oil, and instrument air systems from the IST Program. The licensee explains in the summary of changes between Revision 2 of the First Interval to Revision 0 of the Second Interval that these systems are not required to be built to ASME Class 1, 2, or 3 standards per Regulatory Guide 1.26, but "were built to Class standards at the option of FPL. In accordance with IWA-1300(e) (sic), including the pumps and valves in these systems in the IST program was at the option of FPL and not a requirement." Paragraph IWA-1320(e) states that "If systems safety criteria permit a system to be nonnuclear safety Class and an Owner optionally classifies and constructs that system, or a portion thereof, to Class 2 or 3 requirements, the application of the rules of (a) above is at the option of the Owner and is not a requirement of this Division." Section 3.2.2 of the FSAR, however, states that the diesel systems are safety-related Quality Group C components and are required to be built to Section III, Class 3 requirements. Components were classified per the FSAR in accordance with ANSI N18.2, as well as Regulatory Guide 1.26. The regulations require pumps and valves classified by the Owner as Class 1, 2, or 3 to be tested in accordance with Section XI. The regulations do not limit the scope of the IST program to only those systems discussed in Regulatory Guide 1.26. The IST program scope should be consistent with the classification of components in the safety analysis report. The IST Program or FSAR should be revised accordingly.

5.2 The IST Program's scope was reviewed for selected systems. The pumps and valves in the Auxiliary Feedwater System, Main Steam, Chemical and Volume Control System and Component Cooling Water System were reviewed against the requirements of Section XI and the regulations. The FSAR was used to determine if the specified valve categories and valve functions were consistent with the plant's safety analyses. The review results showed compliance with the Code, except for the following items. The licensee should review these items and make changes to the IST Program, where appropriate. Additionally, the licensee should verify that there are not similar problems with the IST Program for other systems.

A. Auxiliary Feedwater and Main Steam Systems

Since part of the Auxiliary Feedwater System is shown on the flow diagram for the Main Steam System, the results of the review for these two systems are presented jointly. The reference drawings are: 2998-G-080, Sheet 2 of 2, Rev. 18, "Flow Diagram - Feedwater & Condensate Systems," and 2998-G-079, Sheet 1 of 6, Rev. 16, "Flow Diagram - Main Steam System - Sheet No. 1."

The following items were identified:

1. The licensee should review the basis for including and excluding locked open manual valves in the Program. Specifically, the following locked open manual valves which are located on the AFW discharge lines upstream of the steam generators and downstream of normally closed motor operated valves are included in the program: 2I-V-09120, 2I-V-09152, 2I-V-09136, and 2I-V-09158 (The licensee should note that the drawing coordinates are incorrectly listed in the program table for the above valves), while the following valves located immediately upstream of the normally closed motor operated valves are not included in the program: 2I-V-09108, 2I-V-09124, and 2I-V-09140. (There are other locked open manual valves on the AFW pumps' recirculation lines to the Condensate Storage Tank and also on the pumps' suction lines which are not included in the program).

2. For the following check valves, the licensee should verify that the valves do not perform a safety function in the closed position:

2I-V-09252 and 09294, Steam Generator feedwater line check valves inside containment.

2I-V-09107, 09119, 09123, and 09135, AFW pumps' discharge line check valves downstream of normally closed motor operated valves.

2I-V-09139, 09151, and 09157, AFW pumps' discharge line check valves immediately adjacent to pump discharge.

B. Component Cooling System

The reference drawing for this system is 2998-G-083, Rev. 18, "Flow Diagram Component Cooling System."

The following items were identified:

1. For the Component Cooling Surge Tank, diaphragm-operated vent valve 2RCV-14-1, and its accompanying solenoid valve RSE-14-1, on top of the tank are shown as interlocked on a High Radiation signal, yet neither valve is listed in the Program Tables. The licensee should verify that these valves do not perform a safety function.

2. CC Pumps suction and discharge header inter-tie valves MV-14-1 and MV-14-3 are shown on the flow diagram as normally closed while the Program Tables indicate that the normal position is open. Similarly, Containment Cooling Units suction and discharge valves MV-14-9 to MV-14-16 are shown on the flow diagram as locked open while the Program Tables indicate only that the normal position is open. The licensee should revise either the drawing or the Program Tables as appropriate.

C. Chemical and Volume Control System (CVCS)

The reference drawings for this system were:

•2998-G-078, Sheet 120, Rev. 4, "Flow Diagram - Chemical & Volume Control System (Sheet 1)"
•2998-G-078, Sheet 121, Rev. 5, "Flow Diagram - Chemical & Volume Control System (Sheet 2)"
•2998-G-078, Sheet 122, Rev. 5, "Flow Diagram - Chemical & Volume Control System (Sheet 3)"

The following items were identified:

1. On Sheet 2, check valves V-2112 (G-3), on the nitrogen supply line to the Volume Control Tank (VCT), V-2188 (F-5), on the Boric Acid Makeup and Primary Water Makeup blending line to the VCT, and V-2308 (F-3), on the discharge of the Chemical Addition Metering Pump, form the boundary between safety class and non-safety class piping yet none of the three valves are in the IST Program for either an open or close test. The licensee should verify whether these valves should be included in the Program, and revise the program, as necessary.

2. In the FSAR, ¶ 9.3.4.3.2, reference is made to heat-traced piping relief valves which are provided for those portions of the boric acid system that are heat traced and can be isolated individually. The valves relieve the maximum fluid thermal expansion rate that would occur if maximum duplicate heat tracing power were inadvertently applied to the isolated line. These valves appear on Sheet 2 as V-2171, V-2631, V-2632, V-2634, V-2636, V-2639, V-2641 and V-2648. However, none of these valves is included in the IST Program. The licensee should verify whether these valves should be included in the Program, and revise the program, as necessary.

3. On Sheet 2, check valves V-2118 and V-2674 (both F-4) are on the outlet line of the VCT leading to the suction of the charging pumps and also upstream of the connection from the boric acid makeup pumps' discharge to the charging pumps' suction. Although both valves are included in the Program, they are only tested in the open position. The licensee should verify whether the valves perform a safety function in the closed position by preventing backflow into the VCT when the boric acid makeup pumps are in operation, and revise the program, as necessary.

4. On Sheet 2, check valve V-2191 (E-3) is on a line leading from the Refueling Water Tank (RWT) to outlet line of the VCT which in turn leads to the charging pump suction. It appears that this valve opens to allow the charging pumps to provide

boration of the RCS using the RWT to achieve shutdown cooling conditions. In such a case, the normally closed motor-operated valve V-2504 immediately upstream must be open so that it does not appear that V-2504 could be relied upon to prevent reverse flow. Although V-2191 is in the Program, it is only tested in the open position. The licensee should verify whether V-2191 performs a safety function in the closed position, by preventing reverse flow from other sources such as the chemical addition metering pump and the contents of the VCT, and revise the program, as necessary.

5. In the FSAR, ¶ 9.3.4.3.2, V-2435 is described as the Charging Line Thermal Relief Valve which is a spring loaded check valve downstream of the regenerative heat exchanger. The valve is sized to relieve the maximum fluid thermal expansion rate that occurs if hot letdown flow continued after charging flow was stopped by closing the charging line distribution valves. The valve appears on Sheet 3 (B-7). However, the valve is not included in the Program for either an open or close test. The licensee should verify whether this valve should be included in the Program, and revise the program, as necessary.

6. On Sheet 3, check valves V-2431 (D-8), on the pressurizer auxiliary spray line, and V-2432 (C-8) and V-3433 (B-8), on the charging line connections to the RCS, are all located inside containment and appear to form part of the reactor coolant pressure boundary (i.e., forming the boundary between Class 1 and Class 2 piping). Although the valves are included in the Program, they are only designated for testing in the open position. The licensee should verify whether the valves perform a safety function in the closed position, and revise the program, as necessary.

5.2 As discussed in the TER evaluation for numerous relief requests, specific portions of OMa-1988, Parts 6 and 10 may be utilized without relief, provided all related requirements are implemented. Approval is recommended pursuant to §50.55a ¶(f)(4)(iv). The use of specific portions of Part 6 or 10 and any refueling outage justifications should, however, be documented in the IST Program. Implementation of related requirements is subject to NRC inspection.

5.3 Section 4.2 of the IST Program states that the valve test frequency may be extended by 25%, as allowed by the Technical Specifications. The extension of test intervals should not be applied to safety and relief valves tested in accordance with the intervals defined in Section XI, because the Technical Specifications do not address these test intervals.

5.4 In Generic Pump Relief Request PR-2, the licensee has requested relief concerning portable instruments used for temperature and speed measurement. When using temporary instruments, the licensee should ensure that the instruments are calibrated prior to use and are traceable to the inservice test records. (TER Section 2.1.2)

5.5 In Pump Relief Requests PR-8, PR-11, and PR-15, the licensee is proposing to calculate pump suction pressure based on measuring tank or inlet structure levels. Calculation of inlet pressure based on the measured level provides an acceptable

alternative method of determining inlet pressure, provided the calculation is properly proceduralized, and the accuracy is within the accuracy required by the Code using direct measurement. This should be documented in the test records and be available for review. (TER Sections 2.2.1, 2.3.1, 2.4.1)

5.6 In Pump Relief Requests PR-12, PR-13, and PR-14, the licensee has requested relief from the ASME Code, Section XI, ¶ IWP-4520(b), which requires that the frequency response range of the readout system (for instruments used to measure vibration amplitude) shall be from one-half minimum speed to at least maximum pump shaft rotational speed. Specifically, in PR-12 for the Reactor Coolant Charging Pumps, the code-required frequency range is 1.75 Hz to 3.5 Hz. In PR-13 for the Intake Cooling Water Pumps, the code-required frequency range is 7.38 Hz to 14.75 Hz. In PR-14 for the Containment Spray System Hydrazine Pumps, the code-required frequency range is 0.875 Hz to 1.75 Hz.

The licensee claims that instruments satisfying these range requirements are commercially unavailable, and that the lowest available response frequency is 10 Hz. The Staff has, however, identified equipment with a frequency response range less than 10 Hz. The licensee should further investigate the procurement of instruments that comply with the Code requirements. Also, the licensee has not discussed the repeatability and accuracy of the instruments to be used. The licensee should additionally evaluate each pump to determine if the pumps are susceptible to degradation mechanisms that result in increased vibration levels at frequencies lower than 10 Hz. Immediate imposition of the Code requirements is impractical due to limitations in the current instrumentation and it would be an undue burden to require the plant to declare the pumps inoperable until the evaluation of subharmonic frequencies and/or available instrumentation could be reviewed. Relief was recommended for an interim period of one year or until the next refueling outage, whichever is later to perform the evaluations in the August 23, 1993 SE. The interim relief remains in effect into the second ten-year interval. (TER Sections 2.2.2, 2.3.2, 2.4.2)

5.7 In Pump Relief Request PR-17 for the Containment Spray Hydrazine Pumps, the licensee is proposing to measure pump flow rate and vibration quarterly but not alert trend the flow rate. At refueling, the pump flow rate and vibration will be measured.

Referring to the licensee's request, it appears that the licensee will not take any corrective actions based on the flow rate measured quarterly exceeding the alert or required action values. The licensee should evaluate the establishment of required action ranges for quarterly testing.

The licensee has referenced Section XI ¶ IWP-4150 in the relief request, however the licensee has not discussed the possible use of a symmetrical damping device to provide for flow rate averaging. Additionally, the licensee has not discussed the impact or burden of installing flow instrumentation that could be used effectively for the quarterly test.

Reference to the licensee's Appendix A, Pump Program Table indicates that the licensee will not measure the pump inlet pressure or differential pressure. The ASME/ANSI Code OMa-1988, Part 6, Table 3b, requires that pump discharge pressure be measured for positive displacement pumps. The licensee has not provided a basis for not measuring pump differential or discharge pressure.

Provided the licensee determines that there is no practical means of installing flow instrumentation that is adequate for inservice testing purposes, deferring flowrate measurement to refueling outages may be considered acceptable. The licensee should evaluate the procurement of damping devices or new flow instrumentation and measure and evaluate quarterly pump differential or discharge pressure as well as vibration. Immediate imposition of the Code requirements is impractical due to lack of adequate installed flow instrumentation, and it would be an undue burden to require the plant to declare these pumps inoperable until the availability of new instrumentation could be reviewed. Therefore, it is recommended that relief be granted for an interim period of one year, or until the next refueling outage, whichever is later. The interim relief remains in effect into the next ten-year interval due to begin August 9, 1993. In the interim, the licensee should establish acceptance criteria for RPM versus flow rate correlation and take corrective action if needed, and measure discharge pressure, if possible. (TER Section 2.4.3)

5.8 In Valve Relief Request VR-13, the licensee is proposing to disassemble and inspect every 10 years each of the four 12 in. discharge line check valves in the lines from the Safety Injection Tanks to the Reactor Coolant System. Exercising closed is to be in accordance with the Technical Specifications regarding pressure isolation valves (PIVs).

Disassembly and inspection should only be used if testing with flow is impractical. The licensee should provide an analysis or test results to show that the nominal 52 seconds stroke time for the SIT discharge isolation motor-operated valves to open is too long to permit sufficient flow to cause the check valves to reach their full-open position. If a full-open position can be reached, the licensee should perform the test with flow to confirm disk position. To substantiate the acceptability of any alternative technique for verifying that the valves are fully open, licensees must, as a minimum, address and document certain items in the IST program, as described in Position 1.

However, if the licensee determines that full-stroke exercising with flow is impractical, the licensee may, as discussed by the NRC in Generic Letter Position 2, perform valve disassembly and inspection as a positive means of determining that a valve's disk will full-stroke exercise open or of verifying closure capability.

The licensee is currently proposing to meet Position 2. Assurance of proper reassembly will be provided by performing a leak test or partial-flow test prior to returning a valve to service following disassembly. However, the licensee intends to inspect each check valve only once in the 10 year Inservice Inspection program interval. As defined in Position 2, in order to support extension of the valve disassembly/inspection intervals to longer than once every 6 years, i.e., in cases of "extreme hardship," licensees should perform a review of the installation of each valve addressing the "EPRI Applications Guidelines for Check Valves in Nuclear Power Plants" for problematic locations. The licensee should justify the extreme hardship, including a discussion on why non-intrusives cannot be used.

Additionally, the licensee states that valves will be leak tested or partial-flow tested following disassembly. If possible, partial valve stroking quarterly or during cold shutdowns, or after reassembly, must be performed.

Relief is granted per Generic Letter 89-04, Position 1, to full-stroke exercise the valves open with less than the accident flow rate, provided all criteria in Position 1 are met. If the licensee determines that full-stroke exercising is impractical, relief is granted per Position 2 to disassemble/inspect these check valves, provided the licensee meets all the criteria in Position 2, including reviewing the installation of the valves, demonstrating extreme hardship, and partial-stroke exercising following reassembly and at cold shutdown, if practical.

With respect to exercising the valve closed, OMa-1988 Part 10, ¶4.3.2.2 allows full-stroke exercising that is not practicable during operation or cold shutdown to be deferred to refueling outages. Relief to use the Technical Specification requirements is not required pursuant to §50.55a ¶(f)(4)(iv), provided the licensee implements ¶4.3.2.2 and all related requirements, including Part 10, ¶4.3.2.2(h) and ¶6.2. Implementation of these related requirements is subject to NRC inspection. (TER Section 3.2.2)

5.9 In Valve Relief Request VR-14, the licensee is proposing to partial-stroke exercise at cold shutdowns and refueling outages the four 12 in. Safety Injection check valves which open to provide flow paths from the safety injection headers to the RCS and close to isolate the headers from the high pressure of the reactor coolant system.

The licensee should evaluate if the valves will achieve a full-open position with the proposed reduced test flow rate of 3,000 GPM. If a full-open position can be reached, the licensee should perform the testing with flow. The use of alternate techniques, such as non-intrusive techniques, to verify that valves will fully open is acceptable, as discussed in Generic Letter 89-04, Position 1.

If the valves cannot be full-stroke exercised, the NRC defined an acceptable alternative to the full-stroke exercising requirement in Position 2, wherein it is stated that the NRC staff position is that valve disassembly and inspection can be used as a positive means of determining that a valve's disk will full-stroke exercise open or of verifying closure capability.

The licensee is currently proposing to meet Position 2. Assurance of proper reassembly will be provided by performing a leak test or partial-flow test prior to returning a valve to service following disassembly. However, the licensee intends to inspect each check valve only once in the 10 year Inservice Inspection program interval. As defined in Position 2, in order to support extension of the valve disassembly/inspection intervals to longer than once every 6 years, i.e., in cases of "extreme hardship," licensees should perform a review of the installation of each valve addressing the "EPRI Applications Guidelines for Check Valves in Nuclear Power Plants" for problematic locations. The licensee should also include a discussion on why non-intrusives cannot be used.

Additionally, the licensee states that the valve will be leak tested or partial-flow tested following disassembly. Position 2 requires that, if possible, partial valve stroking quarterly or during cold shutdowns, or after reassembly, must be performed.

Relief is granted per Generic Letter 89-04, Position 1, to full-stroke exercise the valves open with less than the accident flow rate, provided all criteria in Position 1 are met. If the licensee determines that full-stroke exercising is impractical, relief is granted per Position 2 to disassemble/inspect these check valves, provided the licensee meets all the criteria in Position 2, including reviewing the installation of the valves, demonstrating extreme hardship, and partial-stroke exercising following reassembly and at cold shutdown if practical.

With respect to exercising the valve closed, verification that a valve is in the closed position can be done by visual observation, by an electrical signal initiated by a position-indicating device, by observation of appropriate pressure indication in the system, by leak testing, or by other positive means. The licensee does have instrumentation to continuously monitor upstream pressure. Based on the Technical Specifications, it appears that following the partial-stroke exercise at cold shutdowns, verification that the valves have closed will be performed and relief would not be required. The licensee should exercise these valves closed at cold shutdowns or revise the request accordingly. (TER Section 3.2.3)

5.10 The licensee states in VR-1 that valve testing need not be performed more often than once every cold shutdown, except as provided for in IWV-3417(a), which requires more frequent testing as a result of degraded stroke times. The ASME issued a Code interpretation (XI-1-92-41) that states that it is the intent of Section XI, IWV-3410 and 3520, to require testing of valves every three months, including during extended shutdown periods, for valves other than those in systems declared inoperable or not required to be operable (IWV-3416). Therefore, during plant shutdown periods, when the valves can be exercised, the licensee should exercise valves every three months in accordance with the Code or provide a relief request. Additionally, if specific valves cannot be tested during any cold shutdown (i.e., due to "the lack of plant conditions needed for testing"), specific approval is required to defer testing. The licensee should revise the cold shutdown justifications, as required, to discuss the conditions under which testing cannot be performed during any cold shutdowns.

5.11 For the following check valves, the licensee has not identified any closed position testing requirement in the Valve Program Table. The licensee should review the safety functions of these valves and revise the program, if necessary:

VR-5: V-2177, 2190, 2191 and 2526

VR-7: V-07000 and V-07001
VR-8: V-3401 and V-3410

VR-11: V-3113, V-3133, V-3143 and V-3766

VR-21: V-07129 and V-07143

VR-32: V-3101

5.12 For relief requests VR-8, VR-10, VR-12, the licensee states that the alternate testing satisfies the requirement of Generic Letter 89-04, Position 1. As discussed in Position 1, the NRC staff position is that passing the maximum required accident condition flowrate through the valve is an acceptable full-stroke. It is assumed that the full-flow exercise proposed by the licensee complies with this position. If other techniques are used, such as non-intrusive techniques at reduced flow rate, the licensee must comply with the six criteria required by Position 1. The licensee should clarify this statement in each request.

5.13 The licensee should clarify why the Valve Program Table references VR-19 when it indicates that V-3414 and V-3427 will be tested closed quarterly.

5.14 The licensee has stated that the valves referenced in VR-12 "will be partial-stroke exercised to the open position and subsequently stroked closed during cold shutdowns per VR-1" and the basis only discusses the impracticality of testing quarterly. However, the Valve Program Table identifies the test frequency as "SP" as per VR-12 and not "CS", and the licensee additionally states that the valves will be verified closed during the PIV leak tests. It is assumed that the valves are exercised to the closed position in accordance with the Code during cold shutdowns, in addition to the PIV leak test. If exercising the valves closed at cold shutdowns is impractical, the request's basis must be revised to discuss the impracticality.

5.15 From a review of the applicable flow diagrams, 2998-G-078, Sheet 130, Rev. 4, and the continuation on flow diagram 2998-G-088, Rev. 19, for valves V-3104 and V-3105, it appears that there is a flow element on each recirculation line, i.e., FE-03-1-1 and FE-03-2-1, which could be used to measure the recirculation line flow. The licensee should clarify why these elements cannot be used in Relief Request VR-28. Additionally, the licensee should explain why the quarterly LPSI pump flow test does not result in a recirculation flow sufficient to cause full-stroke exercising of these valves.

OMa-1988 Part 10, ¶4.3.2.2 allows full-stroke exercising that is not practicable during plant operation or cold shutdowns to be deferred to refueling outages. Therefore, provided the licensee furnishes information on why the installed flow elements or non-intrusives cannot be used to verify the valves' full-stroke open quarterly, the relief requested by the licensee is covered by the rulemaking, effective September 8, 1992, as described above, and approval could be recommended. However, if quarterly full-stroke exercising is practical, the licensee must comply with the Code requirements. The licensee should revise the relief request.

5.16 Anomalies identified during the review of cold shutdown justifications are identified below:

• The following valves are not exercised closed. The licensee should verify that the valves do not perform a safety function in the closed position, or revise the program as appropriate:

RC-1: V-1460 through V-1466, reactor vessel and pressurizer gas vents; 1 in. normally-closed, solenoid-operated globe valves.

RC-2: V-1474 and V-1475, Pressurizer Power-Operated Relief Valves; 3 in. solenoid-operated, normally closed globe valves.

CV-3.2: V-2431, Auxiliary Pressurizer Spray Check Valve; 2 in. normally closed check valve.

CV-3.3: V-2440, Charging Pump Discharge Check Valve to Safety Injection; 2 in. normally closed check valve.

SI-1.1: V-3106 and V-3107, LPSI Pump Discharge Check Valves; 10 in. normally closed check valves.

SI-3.1: V-03002 through V-03005, Safety Injection Tank (SIT) Drain Line Check Valves; 1 in. normally closed check valves.

FW-1.2: V-09107, V-09123, and V-09139, Auxiliary Feedwater Pump Discharge Check Valves; 4 in. normally closed check valves.

FW-1.3: V-09119, V-09135, V-09151, and V-09157, Auxiliary Feedwater Supply Check Valves; 4 in. normally closed check valves.

CC-1.2: HCV-14-3 A & B, Shutdown Heat Exchanger Return Valves; 14 in. normally open, fail open, diaphragm-operated butterfly valves.

• CV-3.5: V-2523, Charging Line Isolation Valve; 2 in. diaphragm-operated, locked open globe valve.

For V-2523, the failure mode is the open position. Since the valve is only exercised to the closed position, the licensee should explain why no fail safe testing (to the open position) is indicated in the Valve Program Tables.

• SI-1.2: V-3463, Isolation Valve for SIT Test/RWT Return Header; 2 in. manually-operated, locked closed gate valve.

According to the flow diagram, 2998-G-078, Sheet 130, the two outboard

containment isolation valves for penetration 41, 2I-SE-03-2A and 2B, are normally closed and in parallel to each other and in series with V-3463. The Valve Program Tables indicate that both of the outboard valves are exercised opened quarterly.

Furthermore, Technical Specification Table 3.6-2 for Containment Isolation Valves indicates that V-3463 is testable during plant operation. Therefore, the licensee should explain why V-3463 cannot be exercised open quarterly.

• SI-2.1: V-3114, V-3124, V-3134, and V-3144, LPSI Cold Leg Injection Check Valves; 6 in. check valves, normally closed.

The licensee has not provided an explanation of why the valves cannot be verified closed quarterly. There appear to be drain or test connections available both immediately upstream and immediately downstream of each of these valves which may be able to be used for both a quarterly part-stroke open test and a quarterly test for closure. Therefore, the licensee should explain why such testing could not be performed quarterly.

• SI-2.3: V-3545, V-3664, and V-3665, Shutdown Cooling Isolation and Cross Connect Valves, 10 in. motor-operated, locked closed gate valves.

The licensee should explain why a failure of V-3664 and V-3665 in the open position would jeopardize the integrity of the LPSI System since the Shutdown Cooling System valves V-3480, V-3481, V-3651 and V-3652 are immediately upstream and interlocked closed as described for SI-2.2.

Similarly, the licensee should describe under what conditions the cross connect valve V-3545 is opened during the shutdown cooling mode of operation and also justify that its failure during normal plant operation would jeopardize the integrity of the LPSI System since the it appears that only shutdown cooling would be affected and that shutdown cooling could still be accomplished with the valve open.

• MS-1.1: HCV-08-1 A & B, Main Steam Isolation Valves; 34 in. normally open, piston-operated globe valves.
The licensee should indicate in the Tables what is the failure mode position of these valves.

• MS-1.2: V-08130 and V-08163, Steam-Driven AFW Pump Steam Supply Check Valves; 4 in. normally open check valves.

Per the Valve Program Tables, these check valves are part-stroke exercised to the open position **quarterly**, and full-stroke exercised to the open position at **cold shutdowns**. Valve relief request VR-31 called for part-stroke exercising to the open position **monthly** and full-stroke exercising **at cold shutdowns**. The licensee should clarify the apparent discrepancies in the testing frequencies.

6.0 REFERENCES

1. NRC Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," Revision 9, April 1992.

2. ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1980 Edition including Winter 1980 Addenda.

3. St. Lucie Unit 2 Technical Specifications.

4. ASME/ANSI OMa-1988, Part 6, "Inservice Testing of Pumps in Light-Water Reactor Power Plants."

5. ASME/ANSI OMa-1988, Part 10, "Inservice Testing of Valves in Light-Water Reactor Power Plants."

6. Title 10, Code of Federal Regulations, Section 50.55a, Codes and Standards.

7. Standard Review Plan, NUREG 0800, Section 3.9.6, Inservice Testing of Pumps and Valves, Rev. 2, July 1981.

8. NRC Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," April 3, 1989.

9. Minutes of the Public Meetings on Generic Letter 89-04, October 25, 1989.

10. Supplement to the Minutes of the Public Meetings on Generic Letter 89-04, September 26, 1991.

11. "Initial Ten-Year Inservice Inspection Interval Inservice Testing Program-Revision 2," D.A. Sager (FP&L) to USNRC, September 15, 1992 (L-92-247).

12. "Inservice Test Program Relief Requests VR-18 and VR-30-Check Valve Testing,"D.A. Sager (FP&L) to USNRC, January 13, 1993 (L-93-10).

13. "Inservice Testing (IST) Program Relief Request," D.A. Sager (FP&L) to USNRC, February 25, 1992 (L-92-38).

14. "Inservice Test Program Temporary Relief Request-Check Valve Inspection," D.A. Sager (FP&L) to USNRC, May 27, 1992 (L-92-160).

15. "Revision to the St. Lucie Unit 2 Pump and Valve Inservice Test Program Plan," W. F. Conway (FP&L) to USNRC, April 4, 1988 (L-88-158).

16. "Safety Evaluation - Inservice Testing (IST) Program, St. Lucie Unit 2, TAC No. M82931, USNRC to FP&L, April 16, 1992.

17. "Safety Evaluation - Inservice Testing (IST) Program, St. Lucie Unit 2, TAC No. 81282," USNRC to FP&L, December 5, 1991.

18. "St. Lucie Unit 2-Reliefs from Parts of ASME Code Section XI, TAC No. 67832," USNRC to FP&L, October 2, 1989.

19. "Relief from Parts of ASME Code Section XI, TAC No. 56707," USNRC to FP&L, January 13, 1986.

20. "Safety Evaluation of IST Program Relief Request for SIT Check Valves-Fort Calhoun Station (TAC No. M84503)," S. Bloom, USNRC, to T. L. Patterson, OPPD, October 1, 1993.

Appendix A: St. Lucie Plant
Unit 2 Flow Diagrams

Flow Diagram DWG. No.	Sheet No.	System	Revision
2998-G-078	107	Reactor Coolant	1
2998-G-078	108	Reactor Coolant	0
2998-G-078	109	Reactor Coolant	3
2998-G-078	110	Reactor Coolant	2
2998-G-078	111	Reactor Coolant Pump	1
2998-G-078	115	Reactor Coolant Pump	4
2998-G-078	120	Chemical & Volume Control	4
2998-G-078	121	Chemical & Volume Control	5
2998-G-078	122	Chemical & Volume Control	5
2998-G-078	130	Safety Injection	4
2998-G-078	131	Safety Injection	1
2998-G-078	132	Safety Injection	0
2998-G-078	140	Fuel Pool	2
2998-G-078	145	Refueling Equipment Valve Identification	0
2998-G-078	150	Sampling	1
2998-G-078	152	Sampling	1
2998-G-078	153	Sampling	1
2998-G-078	160	Waste Management	1
2998-G-078	161	Waste Management	4
2998-G-078	162	Waste Management	3
2998-G-078	163	Waste Management	5
2998-G-078	164	Waste Management	2
2998-G-078	165	Boric Acid Concentrator 2A Waste Management (Sheet 6)	1
2998-G-078	166	Boric Acid Concentrator 2B Waste Management (Sheet 7)	1
2998-G-078	167	Radioactive Waste Concentrator Waste Management (Sheet 8)	2

Appendix A: St. Lucie Plant
Unit 2 Flow Diagrams (Cont'd)

Flow Diagram DWG. No.	Sheet No.	System	Revision
2998-G-078	168	Waste Management	2
2998-G-078	169	Waste Management	3
2998-G-078	171	Waste Management	4
2998-G-078	172	Waste Management	1
2998-G-079	1	Main Steam	16
2998-G-079	2	Main Steam	19
2998-G-079	3	Extraction Steam	16
2998-G-079	4	Extraction Steam	18
2998-G-079	5	Auxiliary Steam	13
2998-G-079	6	Air Evacuation	17
2998-G-080	1	Feedwater & Condensate	24
2998-G-080	2	Feedwater & Condensate	18
2998-G-081	1	Heater Drain & Vent	12
2998-G-081	2	Heater Drain & Vent	12
2998-G-082		Circulating and Intake Cooling Water	23
2998-G-083		Component Cooling	18
2998-G-084		Domestic & Make-up Water	19
2998-G-085	1	Service Air	16
2998-G-085	2	Instrument Air	21
2998-G-085	3	Instrument Air	17
2998-G-086	1	Miscellaneous	18
2998-G-086	2	Turbine Lube Oil	18
2998-G-086	3	Turbine Lube Oil	0
2998-G-087		Miscellaneous	16
2998-G-088		Containment Spray and Refueling Water	19
2998-G-089	1	Turbine Cooling Water	15
2998-G-089	2	Turbine Cooling Water	13

Appendix A: St. Lucie Plant
Unit 2 Flow Diagrams (Cont'd)

Flow Diagram DWG. No.	Sheet No.	System	Revision
2998-G-090		Reactor Coolant Pressure Boundary Diagram	10
2998-G-091		Miscellaneous	14
2998-G-092		Miscellaneous Sampling	10
2998-G-093		Diesel Generator Lube Oil	1
2998-G-094	1	Secondary Side Wet Layup Sys. Feedwater Heaters Tube Side	0
2998-G-094	2	Secondary Side Wet Layup Sys. Feedwater Heaters Shell Side	0
2998-G-862		HVAC - Air flow	16
2998-G-874	1	HVAC - Miscellaneous Areas	9
2998-G-874	3	HVAC - Miscellaneous Areas	
2998-G-878	1	HVAC - Control Diagrams	16
2998-G-879	2	HVAC - Control Diagrams	11
2998-G-879	3	HVAC - Control Diagrams	16
2998-G-880	1	HVAC - Equipment Schedules & Details	8
2998-G-883	1	HVAC Air Flow Diagram Refrigerant and Control Diagram	3
2998-G-096	1	Emergency Diesel Generator System Diesel Generator 2A	4
2998-G-096	2	Emergency Diesel Generator System Diesel Generator 2B	4