ATTACHMENT 2

TECHNICAL EVALUATION REPORT

St. Lucie Plant
Units 1 and 2
Florida Power & Light Company
Unit 1 Third Ten-Year Interval Pump and Valve Inservice Testing Program
Unit 2 Second Ten-Year Interval Pump and Valve Inservice Testing Program

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ABSTRACT

This report presents the results of Brookhaven National Laboratory's evaluation of the relief requests, cold shutdown and refueling outage justifications and, for selected systems, a review of the scope of FP&L St. Lucie Plant, Unit 1 and 2, ASME Section XI Pump and Valve Inservice Testing Program.

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1.0 INTRODUCTION

Contained herein is a technical evaluation of American Society of Mechanical Engineers (ASME) Section XI pump and valve inservice testing (IST) program relief requests and deferral justifications submitted by Florida Power & Light Company (FP&L) for its St. Lucie Plant. Additionally, this technical evaluation report contains, for selected systems, a review of the scope of St. Lucie's ASME Section XI Pump and Valve Inservice Testing Program. St. Lucie is a Combustion Engineering Pressurized Water Reactor (PWR) that began commercial operation in December 1976 (Unit 1) and August 1983 (Unit 2).

Florida Power & Light submitted the Unit 1 Third and Unit 2 Second Ten-Year Interval Inservice Testing Program on January 12, 1998 (Ref. 1). One program document contains the IST program for both units (Ref. 2). The licensee states that this program is based on the requirements of the 1989 Edition of the ASME Section XI Code. This program revision supersedes all previous submittals. In response to a conference call held August 3, 1998, the licensee provided additional information via revised relief requests, deleted two relief requests, and submitted three additional relief requests (Ref. 3).

The licensee in Section 6.5 of the IST Program states that the Unit 1 third ten year interval extends from February 11, 1998 to February 10, 2008; and the Unit 2 third ten year interval extends from August 8, 1993 to August 7, 2003. Based on the date of commercial operation, the Unit 1 interval should extend from December 1996 to December 2006. ASME Section XI, ¶IWA-2430(c) allows each interval to be extended or decreased by as much as one year. Adjustments shall not cause successive intervals to be altered by more than one year from the original pattern of intervals. Section XI, ¶IWA-2430(e) also allows the interval to be extended for units that are out of service continuously for six months or more. The licensee should provide an explanation of the interval dates in the IST program. Additionally Unit 2 is in its second, not third interval; as stated in the submittal letter. The IST Program should be corrected.

Title 10 of the Code of Federal Regulations, §50.55a ¶(f) (Ref. 4) 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 (Ref. 5) and applicable addenda, except where specific relief has been requested by the licensee and granted by the Commission pursuant to §50.55a ¶(f)(6)(i), or where an alternate has been requested and authorized pursuant to §50.55a ¶(a)(3)(i) or (a)(3)(ii). 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, and OM-1987 Part 1 (Refs. 6-8). The voluntary update of Unit 2's IST Program to the requirements of the 1989 Edition of Section XI, in its entirety, provides an acceptance level of quality and safety and it is recommended that approval be granted in accordance with 10CFR50.55a (f)(4)(iv).

The review of the IST Program was performed utilizing the Standard Review Plan, Section 3.9.6; Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," the Minutes of the Public Meeting on Generic Letter 89-04, and Supplement to the Minutes; NUREG-1482; NUREG/CR-6396; and the recently published summary of the public workshops held in January and February 1997 on IST (References 9-15). The IST Program requirements apply only to component (i.e., pump and valve) 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 11 pump relief requests and Brookhaven National Laboratory's (BNL) evaluation. Similar information is presented in Section 3 for the 18 relief requests for the valve testing program. Section 4 and Appendix A contain the evaluation of 78 justifications to defer valve testing to cold shutdowns or refueling outages. Results of the IST scope review for selected systems is presented in Section 5. Section 6 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 11 relief requests for pumps at St. Lucie 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. No evaluation of relief request PR-10 was performed since it does not address Code Class pumps

2.1 Relief from Instrumentation Requirements

2.1.1 Relief Request No. PR-01, Auxiliary Feedwater and Hydrazine Pumps

Relief Request: The licensee has requested relief from the requirements of OMa-1988, Part 6, ¶4.6.1.2, which requires that the full-scale range of each analog instrument shall not be greater than three times the reference value, for the auxiliary feedwater pumps, 1C and 2C, and hydrazine pumps, 2A and 2B.

Licensee's Basis For Relief: "Part 6, Table 1, requires the accuracy of instruments used to measure rotational speed to be equal to or better than ±2 percent based on the full-scale reading of the instrument. This means that the accuracy of the actual measurement can vary as much as ±6 percent, assuming the range of the instrument is extended to the maximum allowed deviation (3 times the reference value).

Pump speed is often measured with portable test instruments where commercially available instruments do not necessarily conform to the Code requirements for range. In these cases, high quality calibrated instruments may 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 Part 6, Table 1, and Paragraph 4.6.1."

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

Although the licensee has not provided specific information regarding the range or accuracy, if the range is greater than 3 times the reference value, the accuracy of the instrument must be ±0.66 percent or better to achieve a reading accuracy of ±2 percent or better.

Evaluation: OMa-1988, Part 6, ¶4.6.1.2, requires that the full-scale range of each analog instrument shall not be greater than three times the reference value. Part 6, Table 1 specifies that speed instrumentation have an accuracy of 2% of full scale. The combination of paragraph 4.6.1.2 and Table 1 could result in a speed instrument reading accuracy of ±6% of the reference value.

As discussed in NUREG-1482, ¶5.5.1, when the range of a permanently installed analog instrument is greater than three times the reference value but the accuracy of the instrument is more conservative than the Code, the staff will grant relief when the combination of the range and accuracy yields a reading at least equivalent to the reading achieved from instruments that meet the Code requirements, i.e., up to ± 6%. The use of any available instruments that meet the intent of the Code requirements for the actual reading would yield an acceptable level of quality and safety for testing.

The licensee has proposed that whenever measuring pump speed with portable instruments, the instruments will have a reading accuracy of ± 2% or better. Therefore, the licensee's proposed method for measuring pump speed provides an acceptable level of quality and safety and it is recommended that the alternative be authorized in accordance with 10 CFR 50.55a(a)(3)(i).

As noted in NUREG-1482, ¶5.5.1, when using portable instruments, the staff recommends that the licensee include in the IST records an instrument number for tracing each instrument and a calibration data sheet for verifying that the instruments are accurately calibrated. If instrumentation becomes commercially available which meets the Code requirements that the full-scale range of each analog instrument shall not be greater than three times the reference value, and the licensee is procuring replacement instruments, the licensee should withdraw this relief request and procure instruments which meet the Code requirements.

2.1.2 Relief Request No. PR-07, Reactor Coolant Charging Pumps

Relief Request: The licensee has requested relief from the requirements of OMa-1988, Part 6, ¶4.6.1.6, which requires the frequency response range of the vibration measuring transducers and their readout system to be from one-third minimum pump shaft rotational speed to at least 1000 Hz, for the Reactor Coolant Charging Pumps 1A, 1B and 1C, and 2A, 2B, and 2C.

Licensee's Basis For Relief: "The reactor coolant charging pumps operate at approximately 205-210 rpm which equates to a rotational frequency of 3.41 Hz. The one-third minimum speed frequency response required for the vibration instrumentation correlates to 1.13 Hz (68 cpm).

The vibration instrumentation presently in use at St. Lucie is the Bentley Nevada model TK-81 with 270 cpm probes. The TK-81 integrator frequency response is essentially flat down to 120 cpm (cycles per minute) [equal to 2 Hz] where the displayed output of the instrument slightly increases to approximately +1dB at 100 cpm. The -3dB frequency response is reached at approximately 54 cpm. The velocity probes used with the TK-81 are a special low frequency probe nominally rated down to 270 cpm (-3 dB). This is only slightly higher than the expected rotational (1X) speed of the charging pump (205 - 210 cpm). The 1X (205 cpm) vibration frequency components will be somewhat attenuated by the probes, but not eliminated. Overall vibration levels would still show an increasing value if a problem developed whose characteristic frequency was 1X running speed.

There are virtually no mechanical degradation scenarios where only a sub-synchronous vibration component would develop on the charging pumps. For example:

1. Oil whirl (0.38X - 0.48X) is not applicable to a horizontal, triplex, reciprocating pump.

2. A light rub/impact could generate 0.5X (102.5 cpm) vibration components, but would also usually generate a sequence of integer and half integer running speed components. A heavy rub generates increased integer values of multiple running speed components, as well as processing the 1X phase measurement. In either case the overall vibration level would still show an increase from both the attenuated sub-synchronous and 1X vibration components as well as the higher harmonic vibration components.

3. Looseness in the power train would likely be indicated by increasing 1X and 2X vibration components. These signals would be slightly attenuated but again not completely eliminated.

Based on the above information, the use of the Bentley Nevada 270 cpm probes with the portable TK-81 instrument provides sufficiently reliable data to identify changes from baseline readings to indicate possible problems with the pumps."

Additionally, the licensee in their August 22, 1994 response to the open items for the previous Unit 2 IST interval states: "In 1991, St. Lucie purchased the Bentley Nevada model TK-81 vibration instrument with an additional set of low frequency probes (270 cpm). At that time, this instrument was evaluated as the best instrument available for all four requirements. However, even though this instrument had a low frequency response, it was still not low enough to meet the Code requirements...At the time of their purchase, the Bentley Nevada 270 cpm probes with the portable TK-81 instrument had one of the lowest frequency responses available. In the subsequent years following the purchase, improvements have been made in lowering the frequency cutoff of vibration instruments. However, St. Lucie cannot justify the expense of purchasing new vibration equipment each time some new instrument appears on the market with a lower frequency response. The amount of possible gain provided by new instruments is not justified. The present use of the Bentley Nevada 270 cpm probes with the portable TK-81 instrument is capable of collecting reliable data to identify changes from baseline readings to indicate possible problems with the pumps..."

Proposed Alternate Testing: During testing of these pumps, the vibration instrumentation used will be the Bentley Nevada model TK-81 with 270 cpm probes, or equivalent.

Evaluation: OMa-1988, Part 6, ¶4.6.1.6, requires that the frequency response range of the vibration measuring transducers and their readout system be from one-third minimum pump speed to at least 1000 Hz. Section XI previously required that the frequency response range of the readout system be from one-half minimum speed to at least maximum pump shaft rotational speed (IWP-4520(b)). This change was made by the ASME OM Code Committees in order to more adequately envelop all potential noise contributors that could indicate degradation. The lower limit of the range is to allow for detection of problems such as bearing oil whirl and looseness of bearings.

The charging pumps operate at very low speeds (i.e., at 3.48 Hz). The licensee has proposed to use vibration instrumentation with a lower frequency limit of 4.5 Hz. This instrumentation cannot measure subharmonic vibration or vibration at the running speed for the charging pumps.

To identify sources of noise and vibration, the peaks of the measured frequency spectra are correlated with data pertaining to the possible vibration source components in the machine. Vibrations at one-third of running speed may indicate "oil whip" in journal bearings, or looseness in other types of bearings. Though the relief request does not describe the type of bearings in the charging pumps, it does indicate that oil whip is not applicable to this type of pump. Rotor or seal rub is another type of problem found at subharmonic vibration levels. The licensee has stated that rubs may be detected by increases in overall vibration levels. Additionally, loose seals and bearings, bearing and coupling damage, poor shrink fit, torsional critical, and bearing-support resonance are also indicated in subharmonic levels. Problems such as misalignment, unbalance, loose impeller, bent shaft, bearings eccentric, case distortion, and shaft out of round may be detected at pump running speed (Ref. 16). The licensee has addressed looseness in the power train and has stated that although the signal at 1X would be attenuated, it would not be eliminated.

At the time the equipment was purchased, in 1991, the licensee stated that this instrumentation had one of the lowest frequency responses available. Since that time, the licensee has indicated that equipment with lower frequency response limits has come available. It would be burdensome to require the licensee to purchase new equipment each time more advanced equipment came available, as the licensee has stated, however, the need to adequately assess the health of the pumps is necessary. The licensee has not provided sufficient information on the hardship or unusual difficulty associated with complying with the Code, or at least obtaining equipment that could measure to the running speed of the pumps. The majority of pump problems are identified at 60% to 1X running speed, and this is often where the peak vibration levels are found. Numerous utilities have procured and utilize vibration measurement equipment that have frequency response ranges down to 1.5-2 hz. (e.g., Monticello).

The license has based much of the justification on the fact that the sub-synchronous and 1X vibration signal would be measured, although attenuated, and that the overall vibration level would show a relative increase. The Code requires reciprocating pump vibration to be measured on the bearing housing of the crankcase, approximately perpendicular to both the crankcase and the line of plunger travel. Peak vibration measurements are required to be taken. The Code acceptance criteria for vibration includes both relative limits based on the reference value and absolute limits. The licensee has not proposed compensatory actions, such as adjusting the acceptance criteria for the attenuated signals. Moreover, the frequency spectrum of complex signals generated by machines is characteristic of each machine or each pump, constituting a unique pattern, referred to as the "machine signature." Analysis of the signature, as opposed to the peak, allows identification of vibration sources, and monitoring the change over time permits evaluation of the mechanical condition of the pump. A commitment to perform spectral analysis and trending, and adjusting the Code acceptance criteria to account for the attenuated signal may provide reasonable assurance of the pumps' operational readiness.

In conclusion, it is recommended that long term relief as requested be denied. The licensee should procure new equipment that meets the Code requirements, or revise and resubmit the relief request to address the specific hardship and how the proposed alternative provides an acceptable level of safety. Immediate compliance would result in a hardship because of the time required to procure new instrumentation. Therefore, it is recommended that the alternate proposed by the licensee be authorized, in accordance with 10CFR50.55a(a)(3)(ii), for an interim period of one year to allow the licensee either to procure new equipment that meets the Code requirements or revise and resubmit the relief request. The proposed testing provides reasonable assurance of operational readiness of the charging pumps in the interim period because these normally operating pumps are tested quarterly and the majority of the modes of pump degradation could be detected with existing vibration instrumentation, except for the subharmonic and first harmonic modes.

2.1.3 Relief Request No. PR-08, Hydrazine Pumps

Relief Request: The licensee has requested relief from the requirements of OMa-1988, Part 6, ¶4.6.1.6, which requires the frequency response range of the vibration measuring transducers and their readout system to be from one-third minimum pump shaft rotational speed to at least 1000 Hz, for the Hydrazine Pumps 2A and 2B.

Licensee's Basis For Relief: "The hydrazine pumps are characterized as metering pumps operating at extremely slow speed (approximately 39 rpm). This equates to a rotational frequency of 0.65 Hz. In accordance with the Code, the required low limit of the frequency response for the vibration instruments would be one third of this or 0.21 Hz. Portable instruments satisfying this requirement are commercially unavailable. The low frequency vibration instrumentation presently in use at St. Lucie is the Bentley Nevada model TK-81 with a 270 cpm probe. The TK-81 integrator frequency response is essentially flat down to 120 cpm (cycles per minute) where the displayed output of the instrument slightly increases to approximately +1dB at 100 cpm. The -3dB frequency response is reached at approximately 54 cpm. The velocity probe used with the TK-81 is a special low frequency probe nominally rated down to 270 cpm (-3 dB). For this reason, vibration readings taken, even with the low frequency probe, are essentially meaningless and of no value in identifying degradation of these pumps. Furthermore, the classical analysis of rotating components upon which the Code is based is not readily adaptable to slow moving components such as are installed in these pumps.

These pumps are standby pumps and little degradation is expected with respect to vibration performance between testing periods. The mechanism of wear and degradation of rotating machinery are time and cycle dependant and, in this case, the number of repetitive wearing actions (cycles) is small both in frequency and absolute numbers. The pumps cycle approximately 2220 times per hour and operation is typically limited to 1-2 hours per year. Thus, the probability of any significant pump deterioration over the plant's lifetime is extremely small. Note that these pumps are designed and built for continuous operation."

Proposed Alternate Testing: The pumps will be maintained and inspected in accordance with the licensee's Preventative Maintenance Program, which reflects the recommendations of the pump's manufacturer. This includes, at a minimum, periodic changing of the crankcase oil and oil analysis to identify significant wearing of the internals.

Evaluation: The containment spray hydrazine pumps operate at very low speeds. OMa-1988, Part 6 requires that pump vibration be measured with 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. The lower limit of the range is to allow for detection of problems such as bearing oil whirl and looseness of bearings. The vibration instrumentation available to the licensee cannot measure subharmonic or the first to seventh harmonic. The pumps operate at 0.62 Hz and the vibration probe is rated to 4.5 Hz. Based on the lack of commercially available vibration instrumentation with an adequate frequency response range low enough to detect pump degradation, it is impractical to comply with the Code requirements. To require the licensee to replace the pump to allow vibration to be measured would impose a hardship without a compensating increase in the level of quality and safety.

The licensee has proposed that in lieu of measuring pump vibration, the pumps would be maintained and inspected in accordance with the licensee's preventative maintenance program and has committed to perform, at least, oil analysis. Additionally, the pump will be run quarterly, with speed and discharge pressure measured, and at refueling outages, flowrate will be determined in accordance with Relief Request PR-09. An effective preventative maintenance program could be adequate for determining bearing and pump degradation that could impact the pumps' operation readiness. In designing an effective preventative maintenance program, the licensee, in addition to incorporating manufacturer recommendations, should consider previous maintenance and failure histories for these components, as well as industry data. Industry techniques used for pump diagnostics include, in addition to vibration measurements, measurements of lube oil temperature/pressure, motor amp/current signature, lubricant analysis (properties, small wear particles, chemistry content), bearing temperatures, motor termination temperature and pattern, switch gear temperature and pattern, trending broken rotor bars, and periodic disassembly and inspection. The licensee has not specified in the request, however, the specific inspections and maintenance proposed (other than oil analysis), or their periodicity. The licensee would need to document these, as well as the acceptance criteria and the maintenance/inspection results. This documentation would be subject to NRC inspector review.

In conclusion, it is recommended that relief from the Code requirements be granted in accordance with 10CFR50.55a(f)(6)(i), based on the impracticality of complying with the Code vibration measurements requirements given the current commercially available instruments. The preventative maintenance program designed by the licensee must be adequately documented and corrective actions must be taken such that there is reasonable assurance that any degradation mechanism detected will not cause further degradation such that the pump would fail before the next pump test/maintenance or before repairs can be performed.

It should be noted that the licensee implied in the basis that since these pumps are designed and built for continuous operation, and they are only operated periodically, they are not prone to degradation. However, the periodic use of these pumps may result in additional or different failure modes highlighting the importance of a meaningful preventative maintenance program.

2.2 Relief from Hydraulic Requirements

2.2.1 Relief Request No. PR-02, Auxiliary Feedwater Pumps

Relief Request: The licensee has requested relief from the requirements of OMa-1988, Part 6, ¶5.1 and 5.2, which requires flowrate to be determined and compared to its reference value quarterly for the auxiliary feedwater (AFW) pumps 1A, 1B 1C, 2A , 2B, and 2C.

Licensee's Basis For Relief: "There are only two practical flowpaths available for performing inservice testing of the AFW Pumps. These include the primary flowpath from the Condensate Storage Tank (CST) to the main feed supply lines and thence to the steam generators, and the minimum-flow recirculation (mini-recirc and bypass test loop) which recirculates back to the CST. The former is provided with flowrate measuring instrumentation; however, the mini-recirc line is a fixed resistance circuit with no flow instrumentation.

Full or substantial flow testing of these pumps is not practical during plant operation for several reasons. During auxiliary feedwater injection via the main feedwater lines while the plant is operating at power, a large temperature differential (approximately 375 degrees F) could exist between the CST water and the normal steam generator makeup flowstream that would result in a significant thermal shock and fatigue cycling of the feedwater piping and steam generator nozzles. In addition, based on the expected duration of the testing and the flowrate of the pumps (325-600 gpm), it is expected that the cooldown of the steam generators would induce cooldown and contraction of the reactor coolant system resulting in potential undesirable reactivity variations and power fluctuations. Thus, during quarterly testing of the AFW pumps, flow is routed through the minimum flow recirculation line returning condensate to the Condensate Storage Tank. This recirculation flowpath is capable of passing a flowrate somewhat less than 20 percent of that at the pump design operating point. No flow instrumentation is installed in this recirculation piping and, furthermore, hydraulic pump test data at or near a pump's shutoff head provides little information as to the mechanical condition of a pump.

These pumps are standby pumps and little degradation is expected with respect to hydraulic performance during plant power operations when the pumps remain idle. Thus, the alternate testing will provide adequate monitoring of these pumps with respect to the applicable Code requirements to ensure continued operability and availability for accident mitigation.

NRC Generic Letter 89-04, Position 9, allows elimination of minimum flow test line flowrate measurements providing inservice tests are performed during cold shutdowns or refueling periods under full or substantial flow conditions where pump flowrate is recorded and evaluated. The proposed alternate testing is consistent with this philosophy and the intent of this position."

Proposed Alternate Testing: During quarterly testing of the AFW pumps, the fixed-resistance mini-flow test circuit will be used and pump differential pressure and vibration will be measured and compared to their respective reference values per ¶5.2(c). During testing performed at cold shutdown, pump differential pressure, flowrate, and vibration will be recorded and evaluated per ¶5.2(b).

Testing during cold shutdowns will be on a frequency determined by intervals between shutdowns as follows:

- For cold shutdown periods occurring at intervals of 3 months or longer - each shutdown.
- For cold shutdown periods occurring at intervals of less than 3 months - testing is not required unless 3 months have passed since the last cold shutdown test.

Cold shutdown pump and valve testing will normally commence within 48 hours of entering cold shutdown and continue until testing of all pumps and valves designated for cold shutdown testing during the outage is complete or the unit is ready to return to power. For extended outages, testing need not commence within 48 hours provided all testing of components requiring tests is completed prior to startup. If, for any reason, testing is not started within 48 hours of achieving cold shutdown, then all components requiring tests will be tested accordingly. For those cases where pumps can be tested during power ascension and where the Technical Specification requirements for the pumps or system determine when the pump is required to operable, tests may be performed during power ascension without regard to the foregoing. Where plant conditions or other circumstances arise that preclude testing of a pump and testing of other pumps or valves is commenced within 48 hours of achieving cold shutdown, the unit need not be retained in cold shutdown for the sole purpose of completing testing.

Evaluation: OMa-1988 Part 6, ¶5.1 and 5.2 require that pressure, flow rate, and vibration be determined and compared with corresponding reference values on a quarterly basis. 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.

For the auxiliary feedwater (AFW) pumps, the licensee states that there are only two practical flow paths available to perform inservice testing. One flow path is the primary flow path from the Condensate Storage Tank (CST) to the main feedwater supply lines and thence to the steam generators. This flow path is provided with flow rate measuring instrumentation. The other flow path is the minimum flow recirculation lines (mini-recirc and bypass test loop) from the discharge of each pump which join together in a common recirculation line back to the CST. The minimum flow recirculation lines are fixed resistance circuits with no flow instrumentation.

It is impractical to perform full or substantial flow testing of these pumps during plant operation. During AFW injection via the main feedwater supply lines at power operation, a large temperature differential could cause a significant thermal shock and fatigue cycling of the main feedwater piping and steam generator nozzles.

For the quarterly testing of the AFW pumps, the licensee proposes to route the pump discharge flow through the minimum flow recirculation lines which return flow back to the CST. No flow instrumentation is installed on these recirculation flow paths. Since these are fixed resistance flow paths, the pumps' differential pressure and vibration will be measured and compared to their respective reference values as required by Part 6, ¶5.2(c). During testing at cold shutdown, the full flow test paths to the steam generators will be used to record and evaluate AFW pump flow rate, differential pressure, and vibration in accordance with Part 6, ¶5.2(b). The licensee's proposed alternative testing is consistent with NRC Generic Letter 89-04, Position 9.

With respect to the frequency of testing, the licensee has proposed applying to pumps the requirements in the Code for valves tested on a cold shutdown frequency, i.e., such as is found in Part 10, ¶4.2.1.2. For intervals between cold shutdowns of 3 months or longer, testing will be performed at each shutdown. For intervals less than 3 months, testing will not be performed unless 3 months have passed since the last cold shutdown test.

In addition, cold shutdown pump and valve testing will normally commence within 48 hours of entering cold shutdown and continue until testing of all pumps and valves designated for cold shutdown testing during the outage is complete or the unit is ready to return to power. For outages lasting greater than 48 hours, the licensee will complete all testing of components requiring tests prior to startup, even though testing is not commenced within 48 hours of entering cold shutdown. If the technical specifications specify when the pumps or system are required to be operable, and the pumps can be tested during power ascension, the tests may be performed during power ascension and therefore not during the cold shutdown phase. Where plant conditions or other circumstances arise that preclude commencing testing of the AFW pumps and testing of other pumps or valves within 48 hours of achieving cold shutdown, the licensee will not necessarily retain the unit in cold shutdown for the sole purpose of completing testing.

The staff, in NUREG-1482, ¶3.1.1.1, has determined that, for inservice testing of valves, plant startup need not be delayed to complete the inservice testing because if the licensee were required to complete all cold shutdown testing before restarting the plant, this may impose an unnecessary burden by extending cold shutdown outages solely to complete surveillance testing. This argument can also be applied to testing of pumps during cold shutdowns. Additionally, it should be noted that in the 1994 Addenda of the OM Code, which is included in the current rulemaking without any limitation or modification (Ref. 17), the full flow test with vibration, differential pressure and flowrate measured is only required to be performed biennially for standby pumps. No cold shutdown pump testing is required. Therefore, it is recommended that relief be granted in accordance with 10 CFR 50.55a(f)(6)(i), based on the impracticality of performing the testing in accordance with the Code requirements and that the licensee's proposed alternative testing is consistent with NRC Generic Letter 89-04. The licensee should, however, make reasonable efforts in scheduling and performing the tests.

2.2.2 Relief Request No. PR-03, Boric Acid Makeup (BAM) Pumps

Relief Request: The licensee has requested relief from the requirements of OMa-1988, Part 6, ¶5.1 and 5.2, which requires flowrate to be determined and compared to its reference value quarterly for the boric acid makeup (BAM) pumps 1A and 1B, and 2A and 2B.

Licensee's Basis For Relief: "There are three available flowpaths for performing inservice testing of the BAM pumps. These include the primary flow path to the charging pump suction header, a recirculation line leading back to the Refueling Water Tank (RWT), and the BAM tank recirculation line. None of these flow paths is acceptable with respect to Code compliance for the following reasons:

1. Operating the BAM pumps discharging into the charging pump suction header requires the introduction of highly concentrated boric acid solution from the boric acid makeup tanks to the suction of the charging pumps. This would result in the addition of excess boron to the RCS. This rapid insertion of negative reactivity would result in RCS cooldown and de-pressurization. A large enough boron addition could result in an unscheduled plant trip and a possible safety injection system initiation. During cold shutdown, the introduction of excess quantities of boric acid into the RCS via this flowpath 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. In addition, the waste management system would be overburdened by the large amounts of RCS coolant that would require processing to reduce boron concentration.

2. The second circuit recirculates water to the Refueling Water Tank (RWT) or the Volume Control Tank (VCT). During normal plant power operation it is undesirable to pump to the RWT and deplete the BAM tank inventory. One of the two BAM tanks must be maintained at the Technical Specification level while the other is used as required for plant operation and boron shim. The Tech Spec limits provide only a narrow acceptable band (100-200 gallons), thus even a small reduction in tank inventory would be unacceptable. Also, the operational BAM tank's level typically varies from test to test by as much as 15 to 20 feet. This variance in pump suction pressure will have a direct effect on pump head and flow such that test repeatability would be questionable.

3. The BAM tank recirculation flowpath are fixed resistance circuits (one-inch NPS pipe) containing a flow limiting orifice. There is no flowrate measuring instrumentation installed in these lines. Pumping boric acid from tank to tank could be possible but flowrates would be small restricting pump operation to the high head portion of the pump curve. Also, as described above, one of the two BAM tanks must be maintained at Technical Specification level and the Technical Specification limits provide only a narrow acceptable band (100-200 gallons), thus a small

reduction in tank inventory is unacceptable. The other BAM tank's level will vary from test to test by as much as 15 to 20 feet. Similarly, this variance in pump suction pressure will have a direct effect on pump head and flow such that test repeatability would be questionable.

NRC Generic Letter 89-04, Position 9, allows elimination of minimum flow test line flowrate measurements providing inservice tests are performed during cold shutdowns or refueling periods under full or substantial flow conditions where pump flowrate is recorded and evaluated. The proposed alternate testing is consistent with this philosophy and the intent of Position 9."

Proposed Alternate Testing: During quarterly testing of the BAM pumps, the fixed-resistance BAM tank recirculation line will be used. Pump differential pressure and vibration will be measured and compared to their respective reference values per ¶5.2(c). During testing performed at refueling, pump differential pressure, flow rate, and vibration will be recorded and evaluated per ¶5.2(b).

Evaluation: OMa-1988 Part 6, ¶5.1 and 5.2 require that pressure, flow rate, and vibration be determined and compared with corresponding reference values on a quarterly basis. 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.

The BAM pumps normally take suction from the BAM tanks which contain highly concentrated boric acid. The licensee states that there are three available flow paths to test the BAM pumps. One is the primary flow path to the charging pump suction header. This flow path contains flow instrumentation. However, during normal plant operation, it is impractical to pump highly concentrated boric acid solution from the boric acid makeup tanks to the suction of the charging pumps since this would result in the addition of excess boron to the reactor coolant system. The rapid insertion of negative reactivity would cause RCS cooldown and depressurization. In sufficient quantities, boron addition could cause a reactor trip and a safety injection actuation. During cold shutdown, the introduction of excess quantities of boric acid into the RCS through this flow path could delay plant startup, which is impractical.

The second flow path takes suction from the BAM tanks and recirculates water from the discharge of the BAM pumps to the refueling water tank (RWT) or the volume control tank (VCT). According to flow diagrams 8770-G-078, Sheet 121A, and 2998-G-078, Sheet 121A, these flow paths do not contain flow instrumentation. The licensee states that during normal plant operation, one of the two BAM tanks must be maintained at the required technical specification level while the other is used as required for plant operation and boron shim. The technical specification limits the variation in the BAM tank levels to only 100 to 200 gallons, so that even a small reduction in tank inventory is unacceptable. Also, the level of the BAM tank which is in operation typically varies from test to test by as much as 15 to 20 feet. This variance in pump suction pressure will have a direct effect on pump head and flow such that test repeatability would be questionable. Therefore, using this test configuration to perform pump testing is impractical to perform quarterly or at cold shutdowns.

The third flow path is the BAM pump discharge recirculation flow path back to the BAM tank for each of the two trains. The licensee states that the BAM tank recirculation flow paths are fixed resistance circuits (one-inch NPS pipe) containing a flow limiting orifice. Referring to flow diagram 2998-G-078, Sheet 121B, it appears that the recirculation flow paths are two-inch lines (I-2-CH-561 and I-2-CH-942) which reduce down to one-inch pipe only at the interfaces with the control valves, V2650 and V2651, on each path. There do not appear to be any flow orifices. However, there is no flow rate instrumentation installed in these lines.

The licensee proposes to measure BAM pump differential pressure and vibration quarterly through the fixed-resistance BAM tank recirculation lines. The differential pressure and vibration will be measured and compared to their respective reference values per Part 6, ¶5.2(c). During testing performed at refueling, the primary flow path to the charging pump suction header will be used to record and evaluate BAM pump differential pressure, flow rate, and vibration per Part 6, ¶5.2(b).

The licensee's proposed alternative testing is consistent with NRC Generic Letter 89-04, Position 9. Generic Letter 89-04 authorizes the alternative testing delineated in Positions 1, 2, 6, 7, 9 and 10 pursuant to 10CFR50.55a (g, now f) (6)(i). However, based on subsequent NRC guidance provided in Ref. 11, Question Group 105, which states that the installation of instrumentation is not considered impractical, it is recommended that the proposed alternative be authorized in accordance with 10 CFR 50.55a(a)(3)(i).

2.2.3 Relief Request No. PR-04, Containment Spray (CS) Pumps

Relief Request: The licensee has requested relief from the requirements of OMa-1988, Part 6, ¶5.1 and 5.2, which requires flowrate to be determined and compared to its reference value quarterly for the containment spray (CS) pumps 1A and 1B, and 2A and 2B.

Licensee's Basis For Relief: "There are two practical flowpaths available for performing inservice testing of the containment spray pumps. These include one that directs borated water from the RWT to the RCS via the low-pressure injection header. The other is minimum flow recirculation (mini-recirc and bypass test loop) which recirculates to the Refueling Water Tank (RWT).

The first would require modifying the shutdown cooling lineup while in cold shutdown; however, even then 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 pumps via this flowpath is during refueling outages when water from the RWT is used to fill the refueling cavity.

The minimum-flow recirculation flowpath is a fixed resistance circuit containing a flow limiting orifice with no flowrate measuring instrumentation installed. Furthermore, hydraulic pump test data at or near a pump's shutoff head provides little information as to the mechanical condition of a pump.

These pumps are standby pumps that remain idle during most plant operation except for testing periods, thus, service-related degradation with respect to hydraulic performance between testing periods is unlikely. Consequently, the alternate testing will provide adequate monitoring of these pumps with respect to the applicable Code requirements to ensure continued operability and availability for accident mitigation.

NRC Generic Letter 89-04, Position 9, allows elimination of minimum flow test line flowrate measurements providing inservice tests are performed during cold shutdowns or refueling under full or substantial flow conditions where pump flowrate is recorded and evaluated. The proposed alternate testing is consistent with this philosophy and the intent of this position."

Proposed Alternate Testing: During quarterly testing of the containment spray pumps, the fixed-resistance mini-flow test circuit will be used and pump differential pressure and vibration will be measured and compared to their respective reference values per ¶5.2(c). During testing performed during reactor refueling, pump differential pressure, flowrate, and vibration will be recorded and evaluated per Part 6, ¶5.2(b).

Evaluation: OMa-1988 Part 6, ¶5.1 and 5.2 require that pressure, flow rate, and vibration be determined and compared with corresponding reference values on a quarterly basis. 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.

The licensee states that there are two flow paths for inservice testing of the containment spray pumps. In one flow path, borated water from the refueling water tank (RWT) is injected into the reactor coolant system (RCS) via the low-pressure injection header. Since during normal plant operation, the reactor coolant system pressure exceeds the shutoff head of the containment spray pumps, this flow path could only be used during cold shutdown by modifying the shutdown cooling lineup. The licensee states that even if the lineup is modified, it is impractical to use this flow path since the shutdown cooling system cannot provide sufficient letdown flow to the RWT to accommodate full design flow from the RWT while maintaining the shutdown core cooling function.

The other flow path is a minimum flow recirculation and bypass test loop which recirculates water from the containment spray pump discharge to the RWT. This flow path is a fixed resistance circuit containing a flow limiting orifice with no flow rate measuring instrumentation installed.

For quarterly testing of the containment spray pumps, the licensee proposes to route the pump discharge flow through the minimum flow recirculation line back to the RWT. Since these are fixed resistance flow paths, with no flow rate instrumentation installed, the pumps' differential pressure and vibration will be measured and compared to their respective reference values as required by Part 6, ¶5.2(c). During refueling outages, the flow path through which borated water from the refueling water tank (RWT) is injected into the reactor coolant system (RCS) via the low-pressure injection header will be used to measure containment spray pump flow rate, pump differential pressure and vibration. Pump flow rate, differential pressure, and vibration will be measured and compared to their respective reference values as required by OM 6, ¶5.2(b).

The licensee's proposed alternative testing is consistent with NRC Generic Letter 89-04, Position 9, and it is recommended that the alternative be authorized in accordance with 10 CFR 50.55a(a)(3)(i).

2.2.4 Relief Request No. PR-05, High Pressure Safety Injection (HPSI) Pumps

Relief Request: The licensee has requested relief from the requirements of OMa-1988, Part 6, ¶5.1 and 5.2, which requires flowrate to be determined and compared to its reference value quarterly for the high pressure safety injection (HPSI) pumps 1A and 1B, and 2A and 2B.

Licensee's Basis For Relief: "During quarterly testing of the HPSI pumps, the pumps cannot develop sufficient discharge pressure to overcome reactor coolant system (RCS) pressure and allow flow through the safety injection headers. Thus, during quarterly testing of the HPSI pumps, flow is routed through a minimum flow recirculation line returning boric acid solution to the refueling water tanks. The minimum-flow recirculation flowpath is a fixed resistance circuit containing a flow limiting orifice capable of passing a flowrate somewhat less than 10 percent of that at the pump design operating point with no flowrate measuring instrumentation installed. Note that hydraulic pump test data at or near a pump's shutoff head provides little information as to the mechanical condition of a pump.

During cold shutdown conditions, full flow operation of the HPSI pumps to the RCS is restricted to preclude RCS system pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications (LTOP).

These pumps are standby pumps and little degradation is expected with respect to hydraulic performance during operational periods when the pumps are idle. Thus, the alternate testing will provide adequate monitoring of these pumps with respect to the applicable Code requirements to ensure continued operability and availability for accident mitigation.

NRC Generic Letter 89-04, Position 9, allows elimination of minimum flow test line flowrate measurements provided that inservice tests are performed during cold shutdowns or refueling periods under full or substantial flow conditions where pump flowrate is recorded and evaluated. The proposed alternate testing is consistent with this philosophy and the intent of this position."

Proposed Alternate Testing: During quarterly testing of the HPSI pumps, the fixed-resistance (mini-flow) test circuit will be used and pump differential pressure and vibration will be measured. Pump differential pressure and vibration measurements will be compared to their respective reference values per ¶5.2(c). During testing performed during reactor refueling, pump differential pressure, flowrate, and vibration will be recorded and evaluated per Part 6, ¶5.2(b).

Evaluation: OMa-1988 Part 6, ¶5.1 and 5.2 require that pressure, flow rate, and vibration be determined and compared with corresponding reference values on a quarterly basis. 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.

The HPSI pumps cannot develop sufficient discharge pressure to overcome reactor coolant system (RCS) pressure and allow flow through the safety injection headers. Therefore, quarterly testing during normal plant operation through these flow paths is impractical.

It is impractical to cause full flow operation of the HPSI pumps to the RCS during cold shutdowns. RCS pressure transients could result in exceeding the pressure-temperature limits specified in the technical specifications for low temperature overpressure (LTOP).

For quarterly testing, HPSI pump flow is routed through a minimum flow recirculation line returning boric acid solution to the refueling water tanks (RWT). The minimum flow recirculation flow path is a fixed resistance circuit containing a flow limiting device capable of passing a flow rate somewhat less than 10 percent of that at the pump design operating point. Pump differential pressure and vibration measurements will be measured and compared to their respective reference values in accordance with Part 6, ¶5.2(c). During refueling outages, HPSI pump differential pressure, flow rate, and vibration will be recorded and evaluated in accordance with Part 6, ¶5.2(b).

The licensee's proposed alternative testing is consistent with NRC Generic Letter 89-04, Position 9, and it is recommended that the alternative be authorized in accordance with 10 CFR 50.55a(a)(3)(i).

2.2.5 Relief Request No. PR-06, Low Pressure Safety Injection (LPSI) Pumps

Relief Request: The licensee has requested relief from the requirements of OMa-1988, Part 6, ¶5.1 and 5.2, which requires flowrate to be determined and compared to its reference value quarterly for the low pressure safety injection (LPSI) pumps 1A and 1B, and 2A and 2B.

Licensee's Basis For Relief: "During quarterly testing of the LPSI pumps, the pumps cannot develop sufficient discharge pressure to overcome reactor coolant system (RCS) pressure and allow flow through the safety injection headers. Thus, during quarterly testing of the LPSI pumps, flow is routed through a minimum flow recirculation line returning boric acid solution to the refueling water tanks. The minimum-flow recirculation flowpath is a fixed resistance circuit containing a flow limiting orifice capable of passing a flowrate somewhat less than 10 percent of that at the pump design operating point with no flowrate measuring instrumentation installed. Note that hydraulic pump test data at or near a pump's shutoff head provides little information as to the mechanical condition of a pump.

Except for brief periods when these pumps are used for shutdown cooling, they are standby pumps and little degradation is expected with respect to hydraulic performance during operational periods when the pumps remain idle. Thus, the alternate testing will provide adequate monitoring of these pumps with respect to the applicable Code requirements to ensure continued operability and availability for accident mitigation.

NRC Generic Letter 89-04, Position 9, allows elimination of minimum flow test line flowrate measurements providing inservice tests are performed during cold shutdowns or refueling under full or substantial flow conditions where pump flowrate is recorded and evaluated. The proposed alternate testing is consistent with this philosophy and the intent of this position."

Proposed Alternate Testing: During quarterly testing of the LPSI pumps, the fixed-resistance mini-flow test circuit will be used and pump differential pressure and vibration will be measured. Pump differential pressure and vibration measurements taken during this testing will be compared to their respective reference values per Part 6, ¶5.2(c).

During testing performed at cold shutdown and refueling, pump differential pressure, flowrate, and vibration will be recorded and evaluated per Part 6, ¶5.2(b).

Testing during cold shutdowns will be on a frequency determined by intervals between shutdowns as follows:

- For cold shutdown periods occurring at intervals of 3 months or longer - each shutdown.

- For cold shutdown periods occurring at intervals of less than 3 months - testing is not required unless 3 months have passed since the last cold shutdown test.

Cold shutdown pump and valve testing will normally commence within 48 hours of entering cold shutdown and continue until testing of all pumps and valves designated for cold shutdown testing during the outage is complete or the unit is ready to return to power. For extended outages, testing need not commence within 48 hours provided all testing of components requiring tests is completed prior to startup. If, for any reason, testing is not started within 48 hours of achieving cold shutdown, then all components requiring tests will be tested accordingly. For those cases where pumps can be tested during power ascension and where the Technical Specification requirements for the pumps or system determine when the pump is required to be operable, tests may be performed during power ascension without regard to the foregoing. Where plant conditions or other circumstances arise that preclude testing of a pump and testing of other pumps or valves is commenced within 48 hours of achieving cold shutdown, the unit need not be retained in cold shutdown for the sole purpose of completing testing.

Evaluation: OMa-1988 Part 6, ¶5.1 and 5.2 require that pressure, flow rate, and vibration be determined and compared with corresponding reference values on a quarterly basis. 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.

The LPSI pumps cannot develop sufficient discharge pressure to overcome reactor coolant system (RCS) operating pressure and allow flow through the safety injection headers. Therefore, quarterly testing during normal plant operation through these flow paths is impractical.

During quarterly testing of the LPSI pumps, flow is routed through a minimum flow recirculation line returning boric acid solution to the refueling water tank (RWT). The minimum flow recirculation flow path is a fixed resistance circuit containing a flow limiting orifice capable of passing a flow rate somewhat less than 10 percent of that at the pump design operating point with no flow rate measuring instrumentation installed. LPSI pump differential pressure and vibration measurements will be measured and compared to their respective reference values in accordance with Part 6, ¶5.2(c).

During testing performed at cold shutdown and refueling, LPSI pump flow is directed to the RCS. Pump flow rate, differential pressure, and vibration will be measured and compared to reference values in accordance with Part 6, ¶5.2(b). The licensee's proposed alternative testing is consistent with NRC Generic Letter 89-04, Position 9.

With respect to the frequency of testing, the licensee has proposed applying to pumps the requirements in the Code for valves tested on a cold shutdown frequency, i.e., such as is found in Part 10, ¶4.2.1.2. For intervals between cold shutdowns of 3 months or longer, testing will be performed at each shutdown. For intervals less than 3 months, testing will not be performed unless 3 months have passed since the last cold shutdown test.

In addition, cold shutdown pump and valve testing will normally commence within 48 hours of entering cold shutdown and continue until testing of all pumps and valves designated for cold shutdown testing during the outage is complete or the unit is ready to return to power. For outages lasting greater than 48 hours, the licensee will complete all testing of components requiring tests prior to startup, even though testing is not commenced within 48 hours of entering cold shutdown. If the technical specifications specify when the pumps or system are required to be operable, and the pumps can be tested during power ascension, the tests may be performed during power ascension and therefore not during the cold shutdown phase. Where plant conditions or other circumstances arise that preclude commencing testing of the LPSI pumps and testing of other pumps or valves within 48 hours of achieving cold shutdown, the licensee will not necessarily retain the unit in cold shutdown for the sole purpose of completing testing.

The staff, in NUREG-1482, ¶3.1.1.1, has determined that, for inservice testing of valves, plant startup need not be delayed to complete the inservice testing because if the licensee were required to complete all cold shutdown testing before restarting the plant, this may impose an unnecessary burden by extending cold shutdown outages solely to complete surveillance testing. This argument can also be applied to testing of pumps during cold shutdowns. Additionally, it should be noted that in the 1994 Addenda of the OM code, which is included in the current rulemaking without any limitation or modification, the full flow test with vibration, differential pressure, and flowrate measured is only required to be performed biennially for standby pumps. No cold shutdown pump testing is required.

Therefore, it is recommended that relief be granted in accordance with 10 CFR 50.55a(f)(6)(i), based on the impracticality of performing the testing in accordance with the Code requirements and that the licensee's proposed alternative testing is consistent with NRC Generic Letter 89-04. However, the licensee should make reasonable efforts in scheduling and performing the tests.

2.2.6 Relief Request No. PR-09, Hydrazine Pumps

Relief Request:. The licensee has requested relief from the requirements of OMa-1988, Part 6, ¶5.1 and 5.2, which requires flowrate to be determined and compared to its reference value quarterly for the hydrazine pumps 2A and 2B.

Licensee's Basis For Relief: "The hydrazine pumps are reciprocating positive displacement pumps with variable speed control. They are classified as metering pumps and are designed to accurately displace a predetermined volume of liquid in a specific period of time. The pump has a single plunger and makes only one suction and one discharge stroke during each cycle (shaft rotation).

The pumps operate at a very slow speed (as low as 37 cpm) to supply the technical specification required hydrazine flowrate of 0.71 to 0.82 gpm. Due to this simplified design of these pumps, instantaneous flow is continuously accelerating and decelerating - following an oscillating waveform. Each cycle of the pump is approximately 1.6 seconds in duration with no flow produced during the pumps 0.8 second suction stroke. The installed flowrate instrumentation utilizes a differential pressure orifice located in the suction line common to both pumps. Due to the characteristic oscillating flowrate, flow through this orifice pulsates sharply with each pump stroke resulting in erratic flowrate readings. The flow orifice also senses pressure feedback during each pump stroke cycle as a result of echoes of the pressure pulsation produced by the pump stroke which are reflected back to the flow element by the system piping and valves. The characteristic oscillating flowrate also makes it impractical to dampen using standard dampening devices. These flow characteristics and the design limitation of the installed flow instrumentation make it impractical and inadequate for inservice testing purposes.

Previous testing has demonstrated that techniques for determining flowrate by averaging the indicated flowrate readings are inconsistent and inaccurate when compared to actual flow. For this reason, trending the flowrate using the installed instrumentation is impractical due to the inherent inaccuracies and instability in measuring the pump flow as described above.

These pumps are standby pumps that remain idle during most plant operation except for testing periods, thus, service-related degradation with respect to hydraulic performance between testing periods is unlikely. Consequently, the alternate testing will provide adequate monitoring of these pumps with respect to the applicable Code requirements to ensure continued operability and availability for accident mitigation.

The flowrates of the pumps can be determined by collecting the pumps' output in a container of known volume over a measured period of time and thereby calculating the flowrate. A correlation between pump speed and average flowrate has been developed and confirmed based on piston displacement.

Although not physically impractical, frequent performance of the above described flow testing is undesirable based on the personnel hazards associated with testing. Hydrazine is a hazardous, highly flammable liquid with cumulative toxic effects when absorbed through the skin, inhaled or ingested. It has also been identified as a known carcinogen. For this reason, it is proposed to perform this testing only during refueling outages. Measuring flowrate as described above during each refueling outage is appropriate and adequate for detecting any significant pump degradation and ensuring the continued operability and reliability of these pumps.

Note that this alternate testing plan is consistent with the intent of that provided in Generic Letter 89-04, Position 9."

Proposed Alternate Testing per the Request : During the quarterly pump tests, each pump will be operated at nominal rated speed and pump discharge pressure, speed, and vibration will be measured.

During each refueling outage at least one test will be performed for each pump measuring actual pump flowrate to verify proper performance. Pump discharge pressure, speed, and vibration will also be measured.

Evaluation: OMa-1988 Part 6, ¶5.1 and 5.2 require that pressure, flow rate, and vibration be determined and compared with corresponding reference values on a quarterly basis. 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.

The hydrazine pumps have installed instrumentation, however based on the oscillating flow rate of these positive displacement reciprocating pumps, the flow rate measurements are erratic. The licensee states that this oscillating flow rate makes it impractical to dampen using standard dampening devices. Therefore, it is impractical to use the installed flow instrumentation for inservice testing purposes. Compliance with the Code would require a major piping modification or pump replacement which is burdensome.

The licensee measures flow rate by collecting the pumps' output in a container of known volume over a measured period of time and calculating the flow rate. Since hydrazine is a hazardous, highly flammable, carcinogenic liquid, the licensee proposes to perform this flow rate testing only during refueling outages.

During the quarterly pump tests, the licensee proposes in the request to measure pump discharge pressure, speed, and vibration with each pump operated at nominal rated speed. During each refueling outage, at least one test will be performed for each pump and the actual pump flow rate will be measured as described above. The request states that pump discharge pressure, speed, and vibration will also be measured. Relief Request PR-08, concerning relief for these pumps from the Code vibration requirements, has been revised subsequent to the issuance of this request. Request PR-08 no longer proposes that vibration be measured, therefore the proposed alternate in this request is no longer consistent with the alternate discussed in Generic Letter 89-04, Position 9. Additionally, the licensee's Procedure ADM-29.01, Table 1 Unit 2 Pump Table, indicates that the licensee will not measure the pump differential pressure and references this relief request. OMa-1988, Part 6, Table 3b, requires that pump discharge pressure be measured for positive displacement pumps.

Testing using the installed instrumentation is impractical, as is physically collecting the hydrazine quarterly or at cold shutdowns. Assuming that the licensee is measuring pump discharge pressure quarterly and during each refueling outage, as stated in the Alternate Testing section of this relief request, and considering the Preventative Maintenance Program committed to in relief request PR-08, the increased test interval for the measurement of flowrate provides reasonable assurance of the pumps' operational readiness. Therefore, it is recommended that relief be granted in accordance with 10 CFR 50.55a(f)(6)(i), based on the impracticality of performing the testing in accordance with the Code requirements.

The licensee should revise Table 1-Unit 2 Pump Table to properly indicate that pump discharge pressure is being measured quarterly and during refueling outages, and revise this request to be consistent with the new PR-08.

2.3 Relief from Corrective Action Requirements

2.3.1 Relief Request No. PR-11, Use of Analysis in Lieu of Corrective Action

Relief Request: The licensee has requested generic relief from the requirements of OMa-1988, Part 6, ¶6.1, which requires if deviations fall within the alert range of Table 3, the frequency of testing specified in ¶5.1 be doubled until the cause of the deviation is determined and the condition corrected. If deviations fall within the required action range of Table 3, the pump is required to be declared inoperable until the cause of the deviation has been determined and the condition corrected.

Licensee's Basis For Relief: "The 1995 Edition of ASME OM-Code provides an alternate concept of corrective action should a pump's performance enter the action required range. Specifically, paragraph ISTB 6.2.2 permits an analysis of the pump and establishment of new reference values. This can avoid premature maintenance of a pump that is subject to expected continual and gradual deterioration over time while operating at a level where it is fully capable of reliably performing its designated safety function.

By using the test requirements of the 1995 Code edition, St. Lucie plant can reduce the frequency of unnecessary pump maintenance with essentially no adverse effect on plant safety since it can be assumed that the new Code requirements are equivalent to (or better than) the 1988 addenda.

In addition, by expanding this capability to pumps that are in the alert range, frequent and unnecessary testing can be avoided. Note that, in most cases, more frequent testing of pumps is itself a degrading mechanism. This also is required to avoid unnecessary plant shutdown for pumps that are tested at cold shutdown should a pump enter the alert range during such testing."

Proposed Alternate Testing: In cases where a pump's test parameters fall within either the alert or required action range and the pump's continued use at the changed values is supported by an analysis, a new set of reference values may be established. The accompanying analysis will include verification of the pump's operational readiness and an evaluation of test data that verifies that the subject pump is not expected to fall below the minimum required performance level in the periods between testing. The analysis will include both pump and system level operational readiness evaluations, description of the cause of the change in pump performance, and an evaluation of all trends indicated by the available test and maintenance data. The results of this analysis will be documented in the record of tests.

Evaluation: OMa-1988, Part 6, ¶6.1, "Acceptance Criteria," specifies actions required to be taken if any of the measured pump parameters fall within the alert or required action ranges. For test results in the alert range, the test frequency is required to be doubled until the cause of the deviation is determined and the condition is corrected. For test results in the required action range, the pump shall be declared inoperable until the cause of the deviation has been determined and the condition corrected.

In ASME OM Code-1995, which is not currently referenced in 10 CFR 50.55a, but is included in the current rulemaking without modification or limitation, ISTB 4.6, "New Reference Values," allows that "[i]n cases where the pump's test parameters are either within the alert or required action ranges of ISTB 5.2.1.1, Table ISTB 5.2.1-2, Table ISTB 5.2.2-1, or Table ISTB 5.2.3-1, and the pump's continued use at the changed values is supported by an analysis, a new set of reference values may be established." This paragraph clarifies that, if a pump can be shown to be capable of performing its safety function, it may be returned to service with adjusted reference values. This reflects that there are pumps that have a significant margin over the safety requirements that might degrade from their initial performance, but still are capable of meeting their safety function. Pumps which do not have margin would not be returned to service without repair or replacement. Paragraph ISTB 4.6 also states that the analysis shall include both a pump level and a system level verification of pump operational readiness, the cause of the change in pump performance, and an evaluation of all trends indicated by available data. Paragraph ISTB 6.2.1, which provides acceptance criteria for the alert range, does not currently allow an analysis for pumps, unlike ISTB 6.2.2, for pumps in the required action range, which does explicitly state that an analysis may be performed and directly references ISTB 4.6.

The ASME code committees are considering a change to ISTB 6.2.1 to include the option of an analysis and to reference ISTB 4.6. This proposal also states that for vibration in the alert range, the engineering evaluation shall include a comparison of the current vibration spectrum with the baseline spectrum (i.e., one developed when the pump was operating acceptably), an evaluation of the trend of available overall vibration amplitudes and spectra, and a determination of the need for corrective action (ASME Action Item ROM 98-05). This proposal has not been approved by the ASME consensus committee at this time and is subject to change.

In NRC Generic Letter 91-18 (Ref. 18), which concerns resolution of degraded and nonconforming conditions and operability, ¶6.11, "Technical Specification Operability vs. ASME Code, Section XI Operative Criteria," the NRC indicates that in cases where the required action range limit is more conservative than its corresponding technical specification limit, the corrective action may not be limited to replacement or repair. The corrective action may consist of an analysis to demonstrate that the specific pump performance degradation does not impair operability and that the pump or valve will still fulfill its function, such as delivering the required flow. A new required action range may be established after such an analysis which would then allow a new determination of operability. Approval has been authorized by the NRC to allow licensees to use the OM Code-1995, ¶6.2.2 for pumps in the required action range because licensees are already allowed to perform an analysis in accordance with Generic Letter 91-18.

With regards to pumps operating in the alert range, Generic Letter 91-18 does not address this situation, only that in which pumps are operating in the required action range. However, when pumps are in the alert range, the Code simply requires decreasing the test interval from quarterly to twice quarterly, allowing possible degradation to the required action range where an analysis is allowed. No evaluation of the cause of the degradation or trending is required. By performing a detailed engineering analysis when the pump enters the alert range an acceptable level of quality and safety would be achieved.

The analysis should at least include a comparison of the current measurements for the particular parameter, i.e., flow rate, vibration, discharge pressure or differential pressure, to the baseline measurements, an evaluation of the trend of available data for the parameter, and a determination of the cause and the need for corrective action. Alternate available methods, such as vibration spectral analysis, are expected to be used to support the analysis. Any analysis performed is subject to NRC inspection and must provide reasonable assurance that the degradation mechanism will not cause further degradation such that, before the next pump test or before repairs can be performed, the pump would fail. Additionally, it should be noted that changes to the vibration reference values would affect only the vibration relative alert and required action limits, and not the absolute limits specified by the Code. If the absolute limits are exceeded (i.e., 0.325 ips or 10.5 mils for the alert range and 0.7 ips or 22 mils for the required action range), the licensee would be required to increase the test frequency or declare the pump inoperable in accordance with the Code.

The use of this analysis is expected to be a rare occurrence. This analysis should be used cautiously, as it is not intended to be used regularly to evaluate the operability of all pumps that fall into the alert or required action range in order to declare the pump operable and define new reference values where significant degradation has occurred. Repeated application of analysis could lead to stair stepping the Code alert and required action range limits downward to the safety limits of the pump. The licensee should have an understanding of the margin of each pump above its design-basis requirements.

Therefore, given the licensee will perform an analysis in accordance with ¶ISTB 4.6 of the 1995 OM Code, it is recommended that the licensee's proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i), based on the acceptable level of quality and safety that will be provided by the proposed alternative for both the alert and required action range.

2.3.2 Relief Request No. PR-12, LPSI Pumps

Relief Request: The licensee has requested relief from the requirements of OMa-1988, Part 6, ¶6.1, which requires if deviations fall within the alert range of Table 3, the frequency of testing specified in ¶ 5.1 be doubled until the cause of the deviation is determined and the condition corrected, for the Unit 1 low pressure safety injection (LPSI) pumps during the quarterly test run through the mini-recirculation line.

Licensee's Basis For Relief: "These pumps are tested quarterly under minimum flow conditions (less than 2 percent of nominal flow) using the minimum flow recirculation piping and, during each refueling, at nominal design flowrate. Note, the flowrate experienced during quarterly testing is considerably less than that expected during accident or normal operational conditions. During the process of establishing new reference values for the quarterly tests related to implementation of the OM Code, it was discovered that the reference values for vibration for these pumps are near or exceed the absolute alert level of 0.325 in/sec. Set forth in Table 3. Using the IRD Model 810 w/Model 970 Accelerometer Probe, the vibration levels at the pump bearings range between 0.28 and 0.38 in/sec. Because of this, these pumps will perpetually remain in "alert" since when operating at low flow at least one of these readings typically exceeds the alert limit established by Table 3 (0.325 in/sec). During the cold shutdown testing (substantial flow), vibration measurements are expected to be acceptable and well below the absolute alert limits of Table 3.

Due to the inherent design of the pumps, at low flows increased levels of vibration are induced as a consequence of energy dissipation and internal recirculation. Spectral analyses and pump vibration signatures confirm that the increased levels of vibration experienced at low flows are in the frequency range of five times rotational frequency, and thus, are a function of impeller design. In addition, there are significant levels of broad band vibration that is attributable to hydraulic instability. For this reason, it is clear that the increased vibration levels observed during low flow operation are, for the most part, unrelated to pump condition (degradation).

ASME OM Code-1995 and later revisions allow the classification of pumps into two groups, A and B, where the Group B pumps are those used for standby service, of which these pumps qualify. Recognizing that pump degradation that would manifest itself in increased vibration levels are not expected while a pump is in a standby mode, the code committee discontinued the requirement for quarterly vibration monitoring. This also reflects the growing concern of regulators and the members of the code committee that extended operation of pumps under minimum flow conditions has a deleterious effect on pump components. Thus it is apparent that vibration monitoring in this case is insignificant and certainly does not warrant any increased frequency of testing as required by the Code.

The proposed alternate testing is adequate and appropriate, and is capable of properly monitoring pump operability as intended by the Code. It should be noted that more frequent testing of these pumps under minimum flow conditions for no justifiable reason does not add to plant safety and could have a significant negative impact on pump and system operability and reliability."

Additionally, the licensee in their October 9, 1998 letter (Ref. 19) provided this supporting information:

"As discussed in NUREG/CP-0152, *Code Absolute Vibration Requirements,* there are four key components that the staff considers in evaluating alternative requests: 1) vibration history, 2) consultation with pump manufacturer or vibration expert, 3) attempts to lower the vibration through modification, and 4) performance of spectral analysis of the pump-driver system.

<u>Vibration History</u>
These pumps are included in the plant "condition monitoring" program, therefore, several years of spectral analysis by the plant predictive maintenance group test results were available for review. From the spectral patterns it can be seen that, at minimum flow conditions, both pumps generate increased vibration levels. At low flow, vibration velocity levels at five and ten times running speed frequencies (5X/10X) are significantly increased due to elevated vane pass vibration since the velocity vector is not striking the volute at an optimal angle. The increased vibration at the 2X frequency is a result of an abnormal pressure distribution in the volute that acts to load the impeller asymmetrically. Also contributing [to] the overall vibration increase is hydraulic broadband "spectral floor" energy generated by shock energy due to increased turbulence and internal recirculation flow.

Note that an anomaly occurred on April 21, 1997, when relatively high vibration was experienced by the 1B LPSI pump at the 1X frequency in the horizontal direction. Based on a review of the data, it was determined that this resulted from a structural condition related to operation at elevated temperature. The most likely cause was postulated to be piping and support system stiffness and natural frequency changes resulting from elevated temperatures. Subsequent runs under similar conditions at non-elevated temperatures resulted in lower vibration.

<u>Expert Opinion</u>
The spectral vibration data of these pumps was collected by plant predictive maintenance personnel experienced and trained in the performance monitoring of pumps and other rotating equipment. The spectral data along with the historical pump displacement and velocity data obtained to comply with IST requirements has been reviewed and evaluated by our onsite equipment vibration specialist. In addition, operation of the pump in low flow conditions has been discussed with the original equipment manufacturer. The FPL predictive maintenance vibration specialist's conclusion based on the historical data, spectral analysis, and hands on data gathering, is that there is no evidence of pump deterioration or mechanical anomalies detrimental to pump performance and that the LPSI pumps are operating satisfactorily.

Corrective Action
As discussed above, the pump vibration history data has been reviewed to ensure that no maintenance related anomalies were evident that could be corrected to improve performance. The pump-piping configuration was also reviewed, however, changes to the pump/piping arrangement, including modification of pump internals and installation of a full flow test recirculation line, would be costly and generally impractical. Based on the data, the unacceptable levels of vibration experienced during low flow conditions are a result of flow noise and pump dynamics that are not a function of pump degradation. The elevated levels of vibration are not evident at design flows, and therefore do not detract from pump availability or reliability at design flows. Also, the LPSI pumps meet the ASME vibration criteria during outage conditions (substantial flow conditions). Accordingly, the need for [a] substantial plant modification to install full flow recirculation lines for quarterly surveillance is considered impractical.

Spectral Analysis
The results derived from spectral analysis are provided [as an attachment to the October 9, 1998 letter]."

Proposed Alternate Testing: In conjunction with the quarterly testing of these pumps, vibration data will be recorded per OM Code, Paragraphs 4.6.4 and 5.2. Test results will be evaluated, and the acceptance criteria of Table 3 applied with the exception that the minimum allowable vibration level defining the alert range will be 0.500 inches/second (ips). Should measured vibration exceed 0.500 ips or $2.5V_r$, the subject pump will be placed in "alert" status and the frequency of testing doubled until the cause of the deviation is determined and the condition corrected. Should measured vibration exceed 0.700 ips or $6V_r$, the subject pump will be declared inoperable until the cause of the deviation is determined and the condition corrected.

When these pumps are tested at substantial flow conditions (plant shutdown), the vibration acceptance criteria as shown in Table 3 will be applied unconditionally.

Evaluation: OMa-1988, Part 6, ¶6.1, "Acceptance Criteria," specifies actions required to be taken if any of the measured pump parameters fall within the alert or required action ranges. For test results in the alert range, the test frequency is required to be doubled until the cause of the deviation is determined and the condition is corrected. For test results in the required action range, the pump shall be declared inoperable until the cause of the deviation has been determined and the condition corrected. In Part 6, there are both absolute and relative vibration limits. In previous editions and addenda of Section XI, the vibration limits were based on additives or multipliers to the reference value established when the pump was known to be operating acceptably. No absolute limits existed.

As discussed in Mr. J. Colaccino's paper "Nuclear Power Plant Safety Related Pump Issues" in NUREG/CP-0152 (Ref. 20), when updating to the 1989 Edition of Section XI, pumps that were previously acceptable per the earlier Code, may now exceed the absolute limits, as is the case with the Unit 1 LPSI pumps at St. Lucie. Mr. Colaccino's paper provided guidance on four elements that are necessary when requesting relief, i.e., the request should contain the pump's vibration history, a determination by the pump manufacturer or vibration expert that pump operation at the higher level of vibration is acceptable, results of attempts to reduce the vibration levels through modifications, and results of spectral analysis. The licensee has addressed each of these elements. The vibration spectral history from August 1995 to March 1998 for each pump at five locations was reviewed by the licensee and the data was provided as an attachment to FP&L's October 9, 1998 letter. Data was taken on eleven occasions. Additionally, the licensee's vibration specialist reviewed the Code historic velocity and displacement data (which was not provided to the reviewer), as well as the spectral analysis and determined that the pumps are operating acceptably. Other than the anomaly noted by the licensee on April 27, 1997, the data appears consistent over the period the data was taken with no degrading trends. The licensee's analysis indicates that the cause of the increased vibration is operation at less than 2% nominal flow, and that it does not represent pump mechanical degradation. This analysis is consistent with the data, as the peaks are only reached during minimum flow operation. As discussed by the licensee, in order to reduce these vibration levels, installation of a full-flow test loop would be required, which is impractical.

The licensee has requested relief from only the alert range absolute vibration limits for the quarterly tests when the pump is operated using the mini-recirculation line. The licensee has proposed to expand the limit from 0.325 ips to 0.50 ips. During this quarterly test, the Code's alert range relative limits, and required action absolute (i.e., 0.70 ips) and relative limits will be complied with. Additionally, during the shutdown tests, with the pump operated at substantial flow, the Code's vibration limits will be used.

Compliance with the Code requirements would require either a major pump or system modification which would be impractical, or having the pumps perpetually in the alert range, possibly resulting in accelerated pump wear and degradation due to increased operation in a reduced flow lineup. Decreasing the test interval for a pump that is in good operating condition would be a hardship to the licensee without a compensating increase in the level of quality and safety. Increasing the absolute alert limit to 0.50 ips should be adequate to detect degradation that requires monitoring through the use of increased test frequencies. The proposed alternate provides reasonable assurance of the pumps' operational readiness considering that the licensee has determined that operation of the pump at the higher vibration levels during the quarterly test is acceptable, that the higher vibration does not represent pump degradation given the historical data, that the spectral analysis has not indicated pump degradation, and finally, that the Code required action limits will be complied with quarterly, and that during the shutdown substantial flow test, all the Code vibration limits will be complied with. Therefore, it is recommended that alternate be authorized in accordance with 10CFR50.55a(a)(3)(ii).

3.0 VALVE IST PROGRAM RELIEF REQUESTS

In accordance with §50.55a, Florida Power & Light has submitted 18 valve relief requests for specific and generic valves at St. Lucie Plant Unit 1 and 2 that are subject to inservice testing under the requirements of ASME Section XI. These relief requests have been reviewed to verify their technical basis and determine their acceptability. The relief requests are summarized below, along with the technical evaluation by BNL. In addition, the IST Program includes two valve relief requests (VR-13 and 18) for information only that address non-ASME Code Class valves. Relief Requests VR-08 and 09 were deleted per the licensee's September 21, 1998 submittal (Ref. 3). No evaluation of these requests was performed.

3.1 Relief Valves

3.1.1 Relief Request No. VR-01, Temperature Stability

Relief Request: The licensee requests generic relief from the requirements of the OM-1987, Part 1, ¶8.1.3.4 which requires that the test method be such that the temperature of the valve body be known and stabilized before commencing set pressure testing, with no change in measured temperature of more than 10 degree-F in 30 minutes.

Proposed Alternate Testing: The licensee has proposed not to perform verification of thermal equilibrium for valves that are tested at ambient conditions using a test medium at ambient conditions. The valve body temperature will be measured and recorded prior to each series of tests (which may consist of multiple lifts).

Licensee's Basis for Relief: "For valves tested under normal prevailing ambient (shop) conditions with the test medium at approximately the same temperature, the requirement for verifying temperature stability is inappropriate and of no value. There is little or no consequence of minor variations in ambient temperature.

This has been identified by the OM-1 Code Working Group and the ASME Code Committees and is reflected in the latest version of the Code (OM Code-1996) paragraphs I 8.1.2(d) and I 8.1.3(d)."

Evaluation: As discussed in NUREG-1482, Section 4.3.9, the clarification provided in the 1994 Addenda to the 1990 OM Code concerning the requirement for thermal equilibrium for valves tested at ambient temperature using a test medium at ambient temperature, may be used without NRC approval; relief is not required. The 1996 Code, as referenced by the licensee, contains the same wording in ¶I 8.1.2(d) and I 8.1.3(d), as the 1994 Addenda. Although relief is not required, the licensee should, however, continue to reference the use of this position (i.e., NUREG-1482, Section 4.3.9) in the IST Program.

3.1.2 Relief Request No. VR-02, Alternate Ambient Temperature

Relief Request: The licensee requests generic relief from the requirements of the OM-1987, Part 1, ¶8.1.1.5, 8.1.2.5 and 8.1.3.5, which require safety and relief valves to be tested with the ambient temperature of the operating environment simulated during the test. Alternate ambient temperatures may be used provided the requirements of ¶8.3 are met.

Proposed Alternate Testing: The licensee has proposed to test these valves "in accordance with Part 1 with the exception that where temperature correlations and correction factors are appropriate, the manufacturer's published correction factors will be used. The results of the tests performed to verify the adequacy of the alternate media correlation may not be documented."

Licensee's Basis for Relief: "The pertinent valve manufacturers have stated that test results supporting their published temperature correlation guidance is not available.

There are no testing facilities at the St. Lucie plant site that are capable of performing the tests necessary for developing correlation data for each valve installed at the St. Lucie plant and development of such a facility would be an unreasonable burden on the plant staff.

Since, in the case of Class 2 and 3 non-steam service valves, the temperature differences are not large (typically 200-250 deg-F), the temperature correlation data provided by the manufacturers is considered to be adequate. Note also that, for these systems and temperatures, the margin of safety from the safety/relief valve setpoint to the pressure retaining capability of the system components is considerably greater than the potential error associated with the manufactures published correction factors."

Evaluation: The licensee has requested generic relief for valves that are "tested under ambient conditions using a test medium at ambient conditions." OM-1987, Part 1, ¶8.1.1.5, 8.1.2.5 and 8.1.3.5, require the ambient temperature of the operating environment surrounding the valve at its installed plant location during the phase of plant operation for which the device is required for overpressure protection be simulated during the set pressure test. Alternate ambient temperatures may be used, but the requirements of ¶8.3.2 and 8.3.3 must be met. Part 1, ¶8.1.1.1 require steam valves to be tested with steam. Alternate compressible fluids may be used provided the requirements of ¶8.3 are met. ¶8.1.2.1 and 8.1.3.1 require valves to be tested with their normal system operating fluid and temperature for which they are designed. Alternate media may be used, provided the requirements of ¶8.3 are met. Part 1, ¶8.3 requires the establishment of a correlation and certification of the correlation procedure. The certification requires actual test data. It would appear that the licensee is requesting relief from ¶8.1.1.1, 8.1.2.1 and 8.1.3.1, as well as ¶8.1.1.5, 8.1.2.5 and 8.1.3.5 identified in the request.

This issue has been subject of a recent Code interpretation that was published with the 1998 addenda (Interpretation 98-9). The code committee determined that the requirements of ANSI/ASME OM-1987 Part 1 ¶4.3 (or 8.3), Alternate Test Media, are not met if the cold differential test pressure, as marked on the nameplate provided by the manufacturer, is used as an alternate test pressure as permitted by ¶4.1 (or 8.1), and no other qualification exists. Additionally, the committee clarified that the requirements of ANSI/ASME OM-1987 Part 1 ¶4.3 (or 8.3), Alternate Test Media, are met if the documentation required by ¶4.3.2 (8.3.2) and the written procedure required by ¶4.3.3 (8.3.3) are prepared by the valve manufacturer and accepted/certified by the Owner.

The licensee's basis for requesting relief is that the manufacturers test results supporting their published correlation criteria is not available. However, without certification and documentation of the correlation procedure including specific requirements for instrumentation, assist equipment (if any), test operating conditions, test parameters and a description of the test setup, and the tests required to support the correlation; the correlation previously performed may not be valid.

The NRC has provided some guidance on this issue in their minutes to the 1997 IST workshops (Ref. 15) and in J. Colaccino's paper, "General Inservice Testing Issues," in NUREG/CP-0152, Volume 2 (Ref. 21). As discussed in the reply to Question 2.4.7 in the workshop minutes, if the licensee does not have a correlation performed in accordance with the Code, the licensee should contact the valve vendor to determine if a correlation is available. As discussed in the basis, the licensee has contacted the vendor and the correlation is unavailable. As an alternative, the response suggests that the licensee develop the correlation or evaluate sending valves to a test lab in order to comply with the Code. The basis states that the licensee is unable to perform the testing, however, it does not discuss the option of using an outside test lab to develop the correlation. If the licensee has determined that testing in accordance with the Code is impracticable, the licensee should revise the relief request to include, as a minimum, a discussion of the safety significance of the valves, the test and design process and ambient temperatures, the valve specific margin of safety, discussions with the valve vendor, and why the valve cannot be bench tested at design conditions or why a correlation cannot be developed by the licensee or outside test lab. Generic relief from these requirements would not be appropriate.

In conclusion, relief cannot be recommended. The licensee should comply with the Code requirements or resubmit the request providing specific information discussed above for each valve.

3.1.3 Relief Request No. VR-03, Test Accumulators

Relief Request: The licensee requests generic relief from the requirements of the OM-1987, Part 1, ¶8.1.2.2 which requires that a minimum accumulator volume be used for set pressure testing various safety and relief valves used for compressible fluid service, other than steam, and specifies the formula to calculate this minimum volume for Class 2 and 3 valves.

Proposed Alternate Testing: The licensee has proposed to use the requirements in the 1996 Addenda of the OM Code, ¶I 8.1.2(b) which requires the volume of the accumulator drum and the pressure source flow rate be sufficient to determine the valve set pressure.

Licensee's Basis for Relief: The accumulator volume requirement is not required for simple determination of the valve set pressure. This was recognized by the Code Committee and corrected in more recent versions of the OM Code."

Evaluation: OM-1987, Part 1, ¶8.1.2.2 requires the set point test accumulator have a minimum volume equal to the valve capacity (cubic feet/second) multiplied by the time open (seconds), divided by 10. Unlike ASME Section III, the OM Code and Part 1 do not require the verification of valve capacity, only the set pressure. Based on an interpretation submitted to the ASME OM Committee concerning the requirements of Part 1, the committee reviewed the requirements of ¶8.1.2.2 and its basis. The Code Committee considered the requirements to be overly conservative and unnecessarily prescriptive. The Code was revised in the 1994 Addenda (OMc) to delete the prescriptive requirements and to require that the volume and the pressure source flow rate be sufficient to determine the valve set-pressure. This change in the 1994 Addenda is also contained in the 1996 Addenda, as requested by the licensee. Although, not currently referenced in 10CFR50.55a(b), the 1996 OM Code is part of the current rule change. The NRC has not imposed any limitations or modifications regarding Appendix I. Compliance with the Part 1 requirements would require a calculation for each valve and possibly requiring resizing the accumulator drum. The use of the OM Code, 1996 Addenda, ¶I8.1.2(b) provides an acceptable means of performing set pressure tests. There are no related requirements. Therefore, it is recommended that the licensee's alternative be authorized in accordance with 10CFR50.55a(a)(3)(i).

3.1.4 Relief Request No. VR-19, Containment Vacuum Breakers

Relief Request: The licensee has requested relief from the requirements of OM-1987 Part 1, ¶1.3.4.3, which requires within every 6 month period, operability tests of primary containment vacuum relief valves be performed unless historical data indicates a requirement for more frequent testing. Additionally, leak tests shall be performed every 2 years unless historical data indicates a requirement for more frequent testing. This request applies to containment vacuum breakers V-25-20 and 21.

Licensee's Basis for Relief: "These check valves are tested in such a way that immediate access to each valve is required. Since these valves are located inside the primary containment building, routine access during power operation is considered to be impractical. Thus operational testing can only be performed during cold shutdown conditions.

Leakrate testing of these valves is performed in accordance with the St. Lucie Containment Leakage Rate Testing Program (Technical Specification, Paragraph 6.8.4 h.). This Program allows extension of leakrate testing beyond the 2-year interval based on 10 CFR 50 Appendix J, Option B. There is no overriding justification nor engineering issue that demands more frequent testing than that required by Appendix J and the St. Lucie Containment Leakrate Testing Program."

Proposed Alternate Testing: "Each of these valves will be subjected to an operability test (opened and closed) during plant cold shutdown periods. Testing during cold shutdowns will be on a frequency determined by intervals between shutdowns as follows:

> For cold shutdown periods occurring at intervals of 6 months or longer - each shutdown:
>
> For cold shutdown periods occurring at intervals of less than 6 months testing is not required unless 6 months have passed since the last cold shutdown test.

Cold shutdown testing of pumps and valves will commence within 48 hours of entering cold shutdown and continue until testing of all pumps and valves designated for cold shutdown testing during the outage is complete or the unit is ready to return to power. For extended outages, testing need not be commenced within 48 hours provided all required testing is completed prior to startup. If pump and valve testing is not begun within the 48-hour period then both of these valves will be tested prior to startup. Where plant conditions or other circumstances arise that preclude testing of a valve, a unit will not be retained in Mode 3 for the sole purpose of completing testing.

Leakrate testing will be performed on a schedule as set forth in the St. Lucie Containment Isolation Valve Leakrate Testing Program."

Evaluation: These valves open as required to limit containment internal vacuum and close for containment isolation. Although the licensee refers to these valves as check valves, valves that are capacity certified, as are most containment vacuum relief valves, are required to be tested in accordance with OM-1987 Part 1. OM-1987, Part 1, ¶1.3.4.3, requires within every 6 month period, operability tests of primary containment vacuum relief valves be performed unless historical data indicates a requirement for more frequent testing. Additionally, leak tests shall be performed every 2 years unless historical data indicates a requirement for more frequent testing.

The ASME Code Committee recently approved an action to revise paragraph I 1.3.7 (b) of the OM Code to clarify that leak test frequency is in accordance with Table 1 (i.e., leakage test requirements for Category A valves are in accordance with ¶4.2.2)(ROM 97-10). Paragraph 4.2.2 requires containment isolation valves to be tested in accordance with Appendix J. No additional leak tests are required, since these valves are not reactor coolant system pressure isolation valves, nor have a leakage requirement based on other functions. There are no other related requirements. This change will be included in the 1999 Addenda of the OM Code. The guidance in NUREG-1482, Section 4.3.9, states that the use of code clarifications may be used without further NRC approval if they are determined to be clarifications only and are documented in the IST program. Therefore, the proposal to test in accordance with Appendix J is acceptable. The licensee should continue to document the use of this clarification in the IST Program.

The OM Code was also revised, in OMc-1994, to require the primary containment vacuum relief valve operability tests at each RFO or every 2 years whichever is sooner, unless historic data requires more frequent testing. Although NUREG-1482, Section 4.3.9, allows the use of code clarifications without relief, this is a technical change which requires NRC approval to use. The 1994 Addenda has not yet been referenced for use in the regulations, i.e., 10CFR50.55a(b). The current Code requires an operability test within every six months. The licensee states that it is impractical to test these valves during power operation based on their location inside containment and the need for local access. There is not sufficient information to support the basis of impracticality. The licensee should provide additional information on why entering the containment and gaining local access to the valves is impractical and resubmit the request.

3.1.5 Relief Request No. VR-20, Sodium Hydroxide and Hydrazine Storage Tanks' Vacuum Breakers

Relief Request: The licensee has requested relief from the requirements of OMa-1988 Part 10, ¶4.3.1, which requires safety and relief valves to meet the inservice test requirements of Part 1, for the sodium hydroxide and hydrazine storage tanks' vacuum breakers, V07231 and V07232.

Licensee's Basis for Relief: "These are standard check valves use to displace the liquid volume in the associated tank with air as the tank contents are pumped to the associated system. In so doing, they ensure the tanks' contents can be removed by the pumps and provide vacuum relief protection thus protecting the tank from collapse due to a reversed differential pressure on the shell.

The design of the valves is such that the normal operation of the seat moving from the disc causes air to enter the tank. The simplicity of the design does not allow for adjustment of the differential pressure needed for valve opening.

The context of Part 1 is directed toward testing conventional pressure relief devices and not simple check valves, and therefore the requirements set forth therein are not applicable to testing of simple check valves.

The functional requirement of a vacuum breaker is only relevant in the open direction. The closure characteristics including seat leakage are irrelevant so long as the valve remains closed under operating conditions to satisfy operational concerns. Thus, there is no concern related to premature opening or seat leakage (e.g., inventory loss).

The proposed alternative testing will ensure that these valves are fully operational with respect to their capability of performing their safety functions."

Proposed Alternate Testing: Each of these valves will be exercised quarterly per Part 10, ¶4.3.2. During this quarterly testing the valve discs will be verified to move from the seat below a maximum differential pressure related to the function of the valves to protect the tank integrity and to provide vacuum relief for system operation. No additional testing per Part 1 will be performed.

Evaluation: OMa-1988 Part 10, Table 1 identifies two subcategories for Category C (i.e., Category C (safety and relief) and Category C (check)). Note 2 of that table states that "When more than one distinguishing category characteristic is applicable all requirements of each of the individual categories are applicable although duplication or repetition of common testing is not necessary." Simple check valves that serve an "overpressure protection" function (e.g., some vacuum relief valves) could be categorized as both Category C (safety and relief) and Category C (check), and therefore would be required to be tested in accordance with Part 10, 4.3.1 (which references Part 1) and 4.3.2. This issue is discussed in NUREG-1482, Section 4.3.8. As discussed in the 1997 NRC IST Workshop Meeting Minutes (Ref. 15), the code committees are considering a proposal to clarify that these valves are not required to be tested in accordance with both the check valve and relief valve requirements. In this proposal: if the check valve is a capacity certified valve, then it shall be classified as a pressure or vacuum relief device and tested in accordance with Appendix I; if the check valve is not a capacity certified valve, it shall be classified as a check valve and tested in accordance with ISTC. This proposal is currently under consideration and has not been approved by the Code committees (ROM 96-18). However, use of this clarification is acceptable as stated in Question 2.4.11 of the IST Workshop Minutes (Ref. 15).

The licensee has stated that the subject valves are "simple" check valves. Provided that they are not capacity certified in accordance with Section III or the construction code, as discussed above, use of the clarification provided in the code committee's proposal is acceptable and relief is not required. The licensee should continue to document this approach in the IST program.

3.1.6 Relief Request No. VR-22, CVCS Regenerative Heat Exchanger Thermal Relief Valve

Relief Request: The licensee requests relief from the requirements of the OM-1987, Part 1 for the CVCS regenerative heat exchanger thermal relief valve, V2435.

Proposed Alternate Testing: The licensee has proposed to exercise the valve quarterly to demonstrate that the valve will open with a differential pressure not to exceed 500 psig.

Licensee's Basis For Relief: "These are spring-loaded check valves that are designed to open with a differential pressure of 250 psid while the "lifting" differential needed to protect the charging injection piping is 500 psid. The opening set point (differential pressure) of these valves is a function of the valve design and construction, and is not readily adjustable, thus they are not considered true relief valves even though they serve that purpose. Furthermore, they are welded in place in the system and cannot be removed for bench testing.

Performing the inspections and leakage testing, as described in Part 1, is not practical while the valves remain installed in the system. Also, since these valves are not adjustable and accessible, the lift pressure cannot be accurately verified or set per Part 1 - only functional adequacy can be confirmed. The proposed functional adequacy test will provide assurance the valves will satisfactory perform their intended function."

Evaluation: OMa-1988 Part 10, Table 1 identifies two subcategories for Category C (i.e., Category C (safety and relief) and Category C (check)). Note 2 of that table states that "When more than one distinguishing category characteristic is applicable all requirements of each of the individual categories are applicable although duplication or repetition of common testing is not necessary." Simple check valves that serve an "overpressure protection" function (e.g., some vacuum relief valves) could be categorized as both Category C (safety and relief) and Category C (check), and therefore would be required to be tested in accordance with Part 10, 4.3.1 (which references Part 1) and 4.3.2. This issue is discussed in NUREG-1482, Section 4.3.8. As discussed in the 1997 NRC IST Workshop Meeting Minutes (Ref. 15), the code committees are considering a proposal to clarify that these valves are not required to be tested in accordance with both the check valve and relief valve requirements. In this proposal: if the check valve is a capacity certified valve, then it shall be classified as a pressure or vacuum relief device and tested in accordance with Appendix I; if the check valve is not a capacity certified valve, it shall be classified as a check valve and tested in accordance with ISTC. This proposal is currently under consideration and has not been approved by the Code committees (ROM 96-18). However, use of this clarification is acceptable as stated in Question 2.1.11 of the IST Workshop Minutes (Ref. 15).

Per a October 6, 1998 teleconference with the licensee, these check valves are not "capacity certified," therefore, exercising the valves quarterly is in compliance with the Code requirements for check valves, and relief is not required. The licensee should continue to document this approach in the IST Program.

3.2 Safety Injection System

3.2.1 Relief Request No. VR-04, PIV Test Frequency

Relief Request: The licensee has requested relief from OMa-1988 Part 10, ¶4.3.2 which requires check valves to be exercised nominally every 3 months, except as provided by ¶4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5. Valves full-stroke exercised at shutdowns shall be exercised during each shutdown, except as specified in ¶4.3.2.2(g). Such exercise is not required if the time period since the previous full-stroke exercise is less than 3 months. This request applies to the following safety injection pressure isolation valves (PIVs) in the closed direction:

Unit 1: V3113, V3123, V3133, V3143 (HPSI Header), V3114, V3124, V3134, V3144 (LPSI Header), V3215, V3225, V3235, V3245 (SIT Discharge), V3217, V3227, V3237, V3247 (SIT and LPSI Discharge).

Unit 2: V3215, V3225, V3235, V3245 (SIT discharge), V3217, V3227, V3237, V3247 (SIT and LPSI Discharge), V3258, V3259, V3260, V3261 (LPSI Header), V3524, V3525, V3526, V3527 (HPSI to hot leg).

Licensee's Basis For Relief: "These are simple check valves with no external means of exercising nor for determining disc position, thus the only practical means of verifying closure is by performing a leakage or backflow test.

Performing backflow or leakage tests of these valves typically involves a considerable effort with the test connections and valves required for the test alignment in radiation areas with inconvenient access provisions.

All associated lines connected to the reactor coolant system are provided with high pressure alarms that would alert operation's personnel to any significant failure of the inboard valves that could endanger low pressure systems.

Leak testing to verify the closure capability of these valves is primarily for the purpose of confirming their capability of preventing over-pressurization and catastrophic failure of the safety injection piping and components. In this regard, The St. Lucie Technical Specification 4.4.6.2 addresses the valve test frequency in the manner appropriate for these valves. Performing the leak testing as prescribed in the Technical Specifications is adequate to ensure proper and reliable operation of these valves.

Note that, in Unit 1, SIT Outlet Check Valves V3215, V3225, V3235, and V3245 are not specifically listed in the Technical Specifications as pressure isolation valves; however, as a result of a plant commitment, they are treated as pressure isolation valves with administrative testing requirements equivalent to those of the Technical Specifications."

Proposed Alternate Testing: "The closure capability of these check valves shall be demonstrated per the applicable Technical Specification by verifying leakage to be within its limits during cold shutdown outages only when any of the following conditions are met:

1. At least once per 18 months (Unit 2 only).

2. Prior to entering MODE 2 after refueling (Unit 1 only).

3. Prior to entering MODE 2 whenever the plant has been in COLD SHUTDOWN for 7 days or more and if leakage testing has not been performed in the previous 9 months.

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

5. Following valve actuation due to flow through a valve (Unit 2 only).".

Evaluation: The Code requires check valves to be exercised to the position(s) in which the valves perform their safety function(s). These check valves open to provide a flow path from the safety injection tanks, LPSI, and HPSI headers to the RCS, and close to isolate the systems from the high pressure of the reactor coolant system. These valves are partially exercised open at cold shutdown and full-stroke exercised at refueling, except for the LPSI discharge check valves, which are full-stroke exercised at cold shutdowns.

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 above. The valves are all exercised with flow at cold shutdowns (either partial- or full-stroke exercised), except for the Unit 1 HPSI header check valves that are exercised open only when the SITs are filled per RFJ-8. Per the Technical Specifications, the Unit 2 valves will all be verified closed at every cold shutdown, following the partial- or full-stroke exercise. The Unit 1 valves will be verified closed only during some cold shutdowns, subject to the technical specifications.

As discussed in NUREG-1482, Section 4.1.4, if no other practical means is available, it is acceptable to verify that check valves are capable of closing by performing leak-rate testing at each refueling outage. The NRC has determined that the need to set up test equipment is adequate justification to defer testing. The licensee has determined that 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. Leak testing the Unit 1 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.

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, testing the Unit 1 valves during some cold shutdowns and Unit 2 valves every cold shutdown, in accordance with the Technical Specifications, is allowed by the Code and relief is not required. This could be described in a cold shutdown justification.

3.2.2 Relief Request No. VR-05, PIV Test Frequency

Relief Request: The license has requested relief from the requirements of OMa-1988 Part 10, ¶4.3.2 which requires check valves to be exercised nominally every 3 months, except as provided by ¶4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5 for the safety injection tanks (SITs) to the reactor coolant system (RCS) pressure isolation valves, V3215, V3225, V3235, and V3245 in the open direction.

Licensee's Basis For Relief: "These are simple check valves with no external means of exercising or for determining disc position. Consequently, the only practical method for stroke testing of the SIT discharge check valves is to discharge the contents of the SIT's to the RCS. Performing a full flow test of the SIT discharge check valves during any plant operating mode is impractical because the maximum flowrates attained by discharging the contents of the SIT's to the RCS can not meet the valves' maximum required accident condition flowrate as required by Generic Letter 89-04, Position 1. The maximum flowrate achievable during a SIT discharge test is restricted by the long stroke time of the SIT discharge isolation valves' motor-operated valves with a nominal stroke time of 52 seconds and limitations on SIT pressure during testing. Under large break LOCA accident conditions, the maximum (peak) flowrate through these valves would be approximately 20,000 gpm. as compared to typical test values of approximately 8,000 gpm.

Although the flowrate attained during these SIT discharge tests does not qualify as "full flow", it is sufficient to fully stroke the check valve discs to their fully open position and verification of this is possible using non-intrusive testing techniques. Due to system configuration, however, full-stroke exercising of the SIT discharge check valves cannot be performed in any plant operating mode other than refueling when the reactor vessel head is removed.

The SIT discharge check valves are identical with respect to size and design and they are installed in essentially identical orientations exposed to the similar operating conditions. Each has been disassembled and inspected several times during previous refueling outages. Additionally, FP&L has reviewed the operating and maintenance history of similar valves used throughout the industry under comparable conditions. Based on these reviews and inspections, there has been no evidence of valve degradation with respect to their ability to open and satisfactorily pass the required flow needed to fulfill their safety function. This along with the observation that the SIT flowrate and pressure drop traces obtained during the 1994 refueling outage testing are nearly identical, indicate that this baseline data was taken when each valve was in good working condition.

Since these valves are subjected to other testing and inspection requirements (other than flow testing) and related maintenance, there may be, from time to time, reason to disassemble a valve that is also scheduled for non-intrusive testing. At such times there is no added gain in performing a flow test prior to the disassembly since the disassembly and visual inspection is adequate and in some respects superior to non-intrusive testing to confirm valve operability.

Thus, the additional cost and radiation exposure associated with performing the redundant non-intrusive testing cannot be justified. Note also that Generic Letter 89-04, OM-Code, Part 10, Paragraph 4.3.2.4(c), and NUREG-1482 state that disassembly and inspection is equivalent to and an acceptable alternative to flow testing.

Partial-stroke (open) of these valves requires discharging from the SIT's to either the reactor coolant system (RCS) or the SIT drain header and RWT. Flow directed to the reactor coolant system during normal plant operation is impossible since the pressure in the SIT cannot overcome RCS pressure to establish flow. Verification of flow via the drain line to the RWT requires opening two manual containment isolation valves for Unit 1 and an outside manual containment isolation valve and an inside solenoid-operated containment isolation valve for Unit 2. In both cases the potential risk of the loss of containment integrity in the event of an accident due to single active failure or dependence on operator action makes this unacceptable and impractical (Reference NUREG-1482, Paragraph 3.1.1).

In addition to flow testing, each valve is confirmed to be closed under cold shutdown conditions and is subjected to periodic leakage tests. Note that, for this type of valve, the leakage testing is especially sensitive to internal valve degradation."

Proposed Alternate Testing: Each SIT discharge check valve will be partial-stroke exercised at cold shutdown and full-stroked in the open direction during refueling outage by discharging all four SIT's to the reactor vessel. During each refueling outage, under a sampling program on a rotating schedule, at least one of the check valves, will be non-intrusively tested to verify its disc fully strokes to its backstop, or if scheduled for disassembly for another reason (e.g., preventative maintenance) disassembled, inspected, and manually stroked to verify operability.

Should a valve under testing or inspection be found to be inoperable and incapable of performing its function to open, then the remaining three valves will be inspected or non-intrusively tested during the same outage, after which the rotational inspection schedule will be reinitiated. Following any valve reassembly, forward flow operation of the valves (partial stroke open test) will be observed.

Each SIT discharge check valve will be verified closed and leakrate tested in accordance with Relief Request No. VR-O4.

Evaluation: OMa-1988 Part 10, ¶4.3.2 requires check valves to be exercised quarterly. If full-stroke exercising during plant operation or cold shutdowns is impractical, it may be limited to full-stroke during refueling outages.

The licensee has discussed why full-stroke exercising during power operation or cold shutdowns is impractical because in order to achieve the flowrates necessary to fully-open the valve, the reactor head must be removed. Additionally, partial-stroke exercising using the SIT to RCS line is impractical because the system pressure is insufficient to overcome the RCS pressure. The licensee states that partial-stroke exercising using the SIT drain header is impractical during operation due to the need to manually open SIT drain header containment isolation valves, that operator action is required to isolate the containment penetration, and given the potential risk of the loss of containment makes testing impractical. The standard technical specifications allow normally locked closed containment isolation valves to be opened intermittently under administrative controls. Based on a review of the P&ID and SAR Table 6.2-52, it appears that penetration 41 in Unit 2 has two solenoid operated valves located inside containment that automatically close on a containment isolation signal, therefore the containment risk argument does not appear valid. However, as discussed in Relief Request VR-04, if these Unit 2 pressure isolation valves were exercised open, a leak test would be required by the Technical Specifications, which would be impractical to perform quarterly. Additionally, the Unit 1 pressure isolation valves have the potential not to reseat following the partial-flow test, creating the potential for equipment damage due to overpressurization. Therefore, partial-stroke exercising during operation is impractical. Relief is not required in order to defer full-stroke exercising to refueling outages and partial-stroke exercising to cold shutdowns based on the impracticality of performing the test at power operation and cold shutdowns.

The NRC's position is that check valves should be tested with flow, if practical (See discussion in Ref. 15, Question 2.3.23). As discussed in NUREG-1482, Appendix A, Question Groups 11 and 15, disassembly and inspection is an option only where full stroke exercising cannot practically be performed by flow or by other positive means, and is not considered an equivalent method. The ASME Code committees clarified in the OM Code, OMc-1994 Addenda that disassembly can be used only if exercising with flow or a mechanical exerciser is impractical.

The licensee has proposed using non-intrusive testing (NIT). Relief is not required because this test method is considered an acceptable "other positive means," in accordance with Part 10, ¶4.3.2.4(a). The NIT must be repeatable and qualified, as discussed in Generic Letter 89-04, Position 1. As discussed in NUREG-1482, Section 4.1.2, check valves may be tested using NIT on a sampling basis, without relief. All the valves are exercised with less than the accident flow rate, and non-intrusives may be used to verify that the system pressures and flow conditions specified in the test procedures cause the check valves to fully stroke. A sample plan is allowed since if the system conditions are repeatable, each valve would be typically stroked. The use of non-intrusives on at least one valve each outage is required for reverifying the test method and test conditions (including flow) have not changed.

The licensee has proposed the use of either sample disassembly and inspection or sample verification using NIT. It appears from the request that all four valves will be exercised with flow each refueling outage, however, at outages where maintenance is scheduled, no non-intrusive reverification will be performed. The use of disassembly and inspection interchangeably with NIT is not acceptable. Although the single disassembled valve's operational readiness can be assessed, without non-intrusive techniques, the partial flowrate cannot be reverified to fully open the remaining valves. This issue is discussed in J. Colaccino's paper, "General Inservice Testing Issues," in NUREG/CP-0152, Volume 2. The licensee's request to utilize sample disassembly and inspection is not authorized in accordance with Generic Letter 89-04, Position 2, unless testing with flow using non-intrusives is impractical. The licensee would need to document the basis for the determination that using flow or other practical means is impractical. As discussed in NUREG-1482, Section 4.1.2, the use of non-intrusives is not mandated. However, the NRC encourages the use of these techniques, where practical.

In conclusion, relief is not required to defer exercising to refueling based on impracticality. Additionally, the use of NIT may be used without relief. The use of NIT interchangeably with disassembly and inspection, however, is not acceptable. The licensee should continue to use NIT on one valve every outage or provide additional information to justify its impracticality.

The licensee should note that the ASME recently approved Appendix II to the OM Code on check valve condition monitoring. This appendix allows licensees flexibility in selecting test, examination, and preventative monitoring activities, and may allow the use of both non-intrusives techniques and disassembly and inspection. The use of this appendix is discussed in NUREG/CP-0152, Volume 2. The NRC has recently approved this alternate method for testing check valves at the Wolf Creek Generating Station in a safety evaluation dated November 26, 1997. In the safety evaluation, the staff allows the use of Appendix II, Check Valve Condition Monitoring Program, included in ASME OM Code-1996 Addenda to the ASME OM Code-1995 Edition. Appendix II was authorized for use with a number of conditions and limitations including: (1) where the most frequently performed appropriate measure (test, examination, or preventive maintenance) extends beyond 60 months, performance, examination, maintenance history, and test experience from previous tests shall be evaluated to justify the periodic verification interval; (2) the test or examination interval shall not exceed 120 months; (3) risk insights from other activities may be used when reviewed and approved by the staff to ensure that the testing, examination, or preventive measures taken are commensurate with each valve's safety significance; (4) check valve obturator movement will be tested or examined in both the open and closed direction to ensure unambiguous detection of functionality degraded check valves; (5) extensions of IST intervals will consider plant safety impact and be supported and justified by applicable methods of trending to provide assurance that the valve is capable of performing its intended function over the entire interval; (6) initial IST interval extensions of any valve must be limited to two fuel cycles or 3 years, and subsequent extended intervals must be limited to one fuel cycle per extension, up to 10 years; and (7) if the Condition Monitoring Program is discontinued, the testing and examination will revert back to the original ASME Code requirements. The staff considers that a number of check valve issues can be addressed by adoption of a check valve condition monitoring program as provided in Appendix II of the 1995 ASME OM Code. The licensee should consider this approach in evaluating its Code check valve testing program.

request to utilize sample disassembly and inspection is not authorized in accordance with Generic Letter 89-04, Position 2, unless testing with flow is impractical. The licensee would need to document the basis for the determination that using flow or other practical means is impractical. As discussed in NUREG-1482, Section 4.1.2, the use of non-intrusives is not mandated. However, the NRC encourages the use of these techniques, where practical.

In conclusion, relief is not required to defer exercising to refueling based on impracticality. Additionally, the use of NIT may be used without relief. The use of NIT interchangeably with disassembly and inspection, however, is not acceptable. The licensee should continue to use NIT on one valve every outage or provide additional information to justify its impracticality.

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3.2.3 Relief Request No. VR-06, PIV Test Frequency

Relief Request: The license has requested relief from the requirements of OMa-1988 Part 10, ¶4.3.2 which requires check valves to be exercised nominally every 3 months, except as provided by ¶4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5 for the safety injection headers to the reactor coolant system (RCS) pressure isolation valves, V3217, V3227, V3237, and V3247 in the open direction.

Licensee's Basis For Relief: "These are simple check valves with no external means of exercising nor for determining disc position. Consequently, the only practical method for stroke testing of these check valves is by injection via the safety injection pumps or discharging the contents of the safety injection tank (SIT) to the RCS.

During plant operations at power, partial flow exercising these valves is not practical because neither the SIT's nor the safety injection pumps are capable of overcoming reactor coolant system pressure.

Performing a full-flow test of these check valves by SIT discharge is impractical because the maximum flowrates attained by discharging the contents of the SIT's to the RCS do not meet the valves' maximum required accident condition flow as required by Generic Letter 89-04, Position 1. The maximum flowrate achievable during a SIT discharge test is restricted by the long stroke time of the SIT discharge isolation valves' - motor-operated valves with a nominal stroke time of 52 seconds and limitations on SIT pressure during testing.

Under large break LOCA accident conditions, the maximum (peak) flowrate through these valves would be approximately 20,000 gpm. as compared to test values of approximately 8,000 gpm. Note also that normal shutdown cooling system flow is incapable of full stroking these valves based on the requirements of Generic Letter 89-04.

Although the flowrate attained during these SIT discharge tests does not qualify as "full flow," it is sufficient to fully stroke the check valve discs to the fully open position and verification of this is practical using non-intrusive testing techniques. Due to system configuration, however, full-stroke exercising of the SIT discharge check valves cannot be performed in any plant mode other than refueling shutdown when the reactor vessel head is removed.

The safety injection header check valves are identical with respect to size and design and they are installed in essentially identical orientations exposed to the similar operating conditions. Each has been disassembled and inspected several times during previous refueling outages. FP&L has additionally reviewed the operating and maintenance history of similar valves used throughout the industry under comparable conditions. Based on these reviews and inspections, there has been no evidence of valve degradation with respect to their ability to open and satisfactorily pass the required flow needed to fulfill their safety function. This along with the observation that the SIT flowrate and pressure drop traces obtained during the 1994 refueling outage testing are nearly identical, indicate that this baseline data was taken when each valve was in similar good working condition.

Since these valves are subjected to other testing and inspection requirements (other than flow testing) and related maintenance, there may be, from time to time, reason to disassemble a valve that is also scheduled for non-intrusive testing. At such times there is no added gain in performing a flow test prior to the disassembly since the disassembly and visual inspection is adequate and in some respects superior to non-intrusive testing to confirm valve operability. Thus, the additional cost and radiation exposure associated with performing the redundant non-intrusive testing cannot be justified. Note also that Generic Letter 89-04, OM-Code, Part 10, Paragraph 4.3.2.4(c), and NUREG-1482 state that disassembly and inspection is equivalent to and an acceptable alternative to flow testing.

In addition to flow testing, each valve is confirmed to be closed under cold shutdown conditions and is subjected to periodic leakage tests. Note that, for this type of valve, leakage testing is especially sensitive to internal valve degradation."

Proposed Alternate Testing: Each safety injection header check valve will be partial-stroke exercised at cold shutdown and full-stroked in the open direction during refueling outages by discharging all four SITs to the reactor vessel. During each refueling outage, under a sampling program on a rotating schedule, at least one of the check valves, will be non-intrusively tested to verify its disc fully strokes to its backstop, or if scheduled for disassembly for another reason (e.g., preventative maintenance) disassembled, inspected, and manually stroked to verify operability.

Should a valve under testing or inspection be found to be inoperable and incapable of performing its function to open, then the remaining three valves will be inspected or non-intrusive. Following any valve reassembly, forward flow operation of the valves (partial stroke open test) will be observed

Each safety injection header check valve be verified closed and leakrate tested in accordance with Relief Request No. VR-04.

Evaluation: OMa-1988 Part 10, ¶4.3.2 requires check valves to be exercised quarterly. If full-stroke exercising during plant operation or cold shutdowns is impractical, it may be limited to full-stroke exercising during refueling outages. The licensee has discussed why exercising during power operation or cold shutdowns is impractical because in order to achieve the flowrates necessary to fully-open the valve, the reactor head must be removed. Additionally, partial-stroke exercising during operations is impractical due to the system pressure being insufficient to overcome the RCS pressure. Relief is not required in order to defer testing to refueling outages based on the impracticality of performing the test at power operation and cold shutdowns.

The NRC's position is that check valves should be tested with flow, if practical (See discussion in Ref. 15, Question 2.3.23). As discussed in NUREG-1482, Appendix A, Question Groups 11 and 15, disassembly and inspection is an option only where full stroke exercising cannot practically be performed by flow or by other positive means, and is not considered an equivalent method. The ASME Code committees clarified in the OMc-1994 Addenda that disassembly can be used only if exercising with flow or a mechanical exerciser is impractical.

The licensee has proposed using non-intrusive testing (NIT). Relief is not required because this test method is considered an acceptable "other positive means," in accordance with Part 10, ¶4.3.2.4(a). The NIT must be repeatable and qualified, as discussed in Generic Letter 89-04, Position 1. As discussed in NUREG-1482, Section 4.1.2, check valves may be tested using NIT on a sampling basis, without relief. All the valves are exercised with less than the accident flow rate, and non-intrusives may be used to verify that the system pressures and flow conditions specified in the test procedures cause the check valves to fully stroke. A sample plan is allowed since if the system conditions are repeatable, each valve would be typically stroked. The use of non-intrusives on at least one valve each outage is required for reverifying the test method and test conditions (including flow) have not changed.

The licensee has proposed the use of either sample disassembly and inspection or sample verification using NIT. It appears from the request that all four valves will be exercised with flow each refueling outage, however, at outages where maintenance is scheduled, no non-intrusive reverification will be performed. The use of disassembly and inspection interchangeably with NIT is not acceptable, although the single disassembled valve's operational readiness can be assessed, without non-intrusive techniques the partial-flowrate cannot be reverified to fully open the valves. This issue is discussed in J. Colaccino's paper, "General Inservice Testing Issues," in NUREG/CP-0152, Volume 2. The licensee's request to utilize sample disassembly and inspection is not authorized in accordance with Generic Letter 89-04, Position 2, unless testing with flow using non-intrusives is impractical. The licensee would need to document the basis for the determination that using flow or other practical means is impractical. As discussed in NUREG-1482, Section 4.1.2, the use of non-intrusives is not mandated. However, the NRC encourages the use of these techniques, where practical.

In conclusion, relief is not required to defer exercising to refueling based on impracticality. Additionally, the use of NIT may be used in that relief. The use of NIT interchangeably with disassembly and inspection, however, is not acceptable. The licensee should continue to use NIT on one valve every outage or provide additional information to justify its impracticality.

The licensee is referred to TER Section 3.2.2 for guidance on the use of the recently approved Appendix II to the OM Code on check valve condition monitoring.

3.2.4 Relief Request No. VR-21, HPSI to RWT Check Valves' Test Frequency

Relief Request: The license has requested relief from the requirements of OMa-1988 Part 10, ¶4.3.2 which requires check valves to be exercised nominally every 3 months, except as provided by ¶4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5 for the high pressure safety injection (HPSI) pumps minimum flow to the refueling water tank (RWT) check valves, V3102 and V3103 in the open direction.

Licensee's Basis For Relief: "These are simple check valves with no external means of exercising nor determining obturator position. Consequently, the only practical method for determining disk position (open) is by performing a pump flowrate test. Full stroke capability must be verified, per Generic Letter 89-04, Position 1, by attaining the maximum accident flow through each valve. There is no installed flow measuring instrument available with which this determination can be made.

Non-intrusive verification of full-stroke operation is not practical since the system is provided with permanently installed orifices that restrict flow to a quantity less than that required to fully open the valves.

The associated high pressure safety injection pumps are normally idle in standby status and are operated only during test periods, thus these valves see little service and service-related failures are unlikely.

These valves are identical with the same manufacturer, size, model designation, orientation, and service conditions."

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

During each reactor refueling outage, at least one 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 other valve will be inspected during the same outage, after which the rotational inspection schedule will be reinitiated. Following reassembly, each valve will be partial-flow exercised open and tested closed to verify operability.

Evaluation: The Code requires valves to be exercised to the position required to fulfill the valve's safety function. With respect to exercising the valves to the full-stroke open position, verification that the valve can pass the maximum required accident flowrate is acceptable. Where full flow testing is impractical, other qualified techniques, such as non-intrusive testing, may be used to confirm the valve is exercised to the position required to fulfill the valve's safety function. Additionally, the Code allows the use of a mechanical exerciser or disassembly every refueling outage. Disassembly and inspection using a sampling program is an acceptable alternative, as discussed in Generic Letter 89-04, Position 2.

These valves open to provide flowpaths from the high pressure safety injection pump's discharge to the refueling water tank to ensure adequate pump cooling during low flow conditions. These are simple check valves with no external means for determining obturator position. Additionally, there are no permanently installed flow instruments to verify the flowrate through the valves and the maximum required flowrate is insufficient to fully open the valves, thereby making the use of non-intrusives impractical. Therefore, while open during the quarterly HPSI pump test, this test is considered a partial-stroke exercise. The only practical means available to verify the full-stroke open capability of these valves is by disassembly and inspection. To require disassembly and inspection of both valves each refueling would be a hardship without a compensating increase in the level of quality and safety. The licensee's proposal complies with the guidance provided in Generic Letter 89-04, Position 2, for a sample disassembly and inspection program. Therefore, it is recommended that the alternative be authorized in accordance with 10CFR50.55a(a)(3)(ii).

3.3 Main Steam System

3.3.1 Relief Request No. VR-07, SGs to Turbine Check Valves

Relief Request: The licensee has requested relief from the requirements of OMa-1988 Part 10, ¶4.3.2 which requires check valves to be exercised nominally every 3 months, except as provided by ¶4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5 for the Unit 1 steam generator to main turbine check valves, V08117 and V08148, in the closed direction.

Licensee's Basis For Relief: "These are simple check valves with no external means of exercising nor for determining obturator position. Due to the high operational temperature of the valves, non-obtrusive testing is impractical. Furthermore, there is no practical means or provision for pressurizing the piping downstream of these valves in order to conclusively verify closure of these valves via back leakage tests.

These are large valves (34-inch NPS) where disassembly is difficult and consumes a considerable amount of plant resources, thus disassembly of both of these valves during each reactor refueling would pose a significant hardship and, based on plant safety considerations, is not warranted. These valves are identical with the same manufacturer, size, model designation, orientation, and service conditions."

Proposed Alternate Testing: During each reactor refueling outage at least one 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 other valve will be inspected during the same outage, after which the rotational inspection schedule will be reinitiated. Following valve re-assembly forward flow operation of the valves will be observed during the ensuing startup.

Evaluation: The Code requires valves to be exercised to the position required to fulfill the valve's safety function. 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. Additionally, the Code allows the use of a mechanical exerciser or disassembly every refueling outage. Disassembly and inspection using a sampling program is an acceptable alternative, as discussed in Generic Letter 89-04, Position 2.

These valves only have a safety function in the closed direction to prevent unrestricted release of steam from an unaffected steam generator in the event of a steam line rupture upstream of an MSIV. It is impractical to verify the safety function of these valves to close using flow since these are simple check valves with no external means for determining obturator position. The licensee states that due to the high operational temperature of the valves, non-intrusive testing is impractical. Additionally, there is no practical means or provision for pressurizing the piping downstream of these valves in order to verify closure of these valves via leak testing. The only practical means available to verify the closure capability of these valves is by disassembly and inspection. To require disassembly and inspection of both valves each refueling outage would be a hardship without a compensating increase in the level of quality and safety. The licensee's proposal complies with the guidance provided in Generic Letter 89-04, Position 2, for a sample disassembly and inspection program. Therefore, it is recommended the alternative be authorized in accordance with 10CFR50.55a(a)(3)(ii).

3.4 Feedwater System

3.4.1 Relief Request No. VR-10, Feedwater to Steam Generator Check Valves

Relief Request: The licensee has requested relief from the requirements of OMa-1988 Part 10, ¶4.3.2, which requires check valves to be exercised nominally every 3 months, except as provided by ¶4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5 for the Unit 1 feedwater to steam generator check valves, V09248 and V09280, in the closed direction.

Licensee's Basis for Relief: "These are simple check valves with no external means of exercising nor for determining disk position. Consequently, the only practical method for determining disk position (close) is by performing a differential pressure back leakage test. Due to system configuration, there is no practical way of reliably performing such a test during any plant operational mode. Under steaming conditions at power, isolation of the feedwater supply piping is not possible without causing a severe plant transient. Under shutdown conditions, backflow testing would require draining a significant portion of the upstream feedwater piping and attempting to seat the subject valves by injection of water through the associated 1-inch downstream drain valves. It is unlikely that such a test could be performed successively and conclusively."

Proposed Alternate Testing: During each reactor refueling outage at least one of these valves will be disassembled, inspected, and manually stroked to verify closure capability. Should a valve under inspection be found to be inoperable, then the other valve will be inspected during the same outage, after which the rotational inspection schedule will be reinitiated.

Evaluation: The Code requires valves to be exercised to the position required to fulfill the valve's safety function. 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. Additionally, the code allows the use of a mechanical exerciser or disassembly every refueling outage. Disassembly and inspection using a sampling program is an acceptable alternative, as discussed in Generic Letter 89-04, Position 2.

These 20-inch valves close to isolate the respective steam generator to ensure adequate inventory of condensate for auxiliary feedwater pump operation. These are simple check valves with no external means for determining obturator position. Performance of a back leakage test is impractical since isolating feedwater during operation would result in steam generator level transients and potential for plant trip. Although there are test connections available both downstream and upstream, the size of the test connections versus the size of the valves (i.e., 1-inch versus 20-inch), would make backflow testing impractical. The only practical means available to verify the closure capability of these valves is by disassembly and inspection. To require disassembly and inspection of both valves each refueling outage would be a hardship without a compensating increase in the level of quality and safety. The licensee's proposal complies with the guidance provided in Generic Letter 89-04, Position 2, for a sample disassembly and inspection program. Therefore, it is recommended that the alternative be authorized in accordance with 10CFR50.55a(a)(3)(ii).

3.4.2 Relief Request No. VR-11, AFW Pump Min-Flow Check Valves

Relief Request: The licensee has requested relief from the requirements of OMa-1988 Part 10, ¶4.3.2, which requires check valves to be exercised nominally every 3 months, except as provided by ¶4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5 for the AFW pump min-flow check valves, V09303 (Unit 2 only), V09304, and V09305, in the open direction.

Licensee's Basis for Relief: "These are simple check valves with no external means of exercising nor for determining disk position. Consequently, the only practical method for determining disk position (open) is by performing a pump flowrate test. Full stroke capability must then be verified, per Generic Letter 89-04, Position 1, by attaining the maximum accident flowrate through each valve. There is no flowrate instrumentation available to verify valve full-stroke exercising of these valves as required by the Generic Letter.

The lines in which these valves are installed are provided with permanent orifices that restrict the flowrate such that the maximum flow possible is insufficient to fully open these valves. For this reason, non-intrusive testing would be ineffective and inconclusive and thus is not practical.

The associated auxiliary feedwater pumps are normally idle in standby status operated only during test periods, thus these valves see little service and service related failures are unlikely."

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

During each reactor refueling outage at least one of these valves will be disassembled, inspected, and manually stroked to verify operability. Should a valve or valves under inspection be found to be inoperable, then the other valve or valves in that unit will be inspected during the same outage, after which the rotational inspection schedule will be reinitiated. Following re-assembly, each valve will be partial-flow exercised to verify operability.

Evaluation: The Code requires valves to be exercised to the position required to fulfill the valve's safety function. With respect to exercising the valves to the full-stroke open position, verification that the valve can pass the maximum required accident flowrate is acceptable. Where full flow testing is impractical, other qualified techniques, such as non-intrusive testing, may be used to confirm the valve is exercised to the position required to fulfill the valve's safety function. Additionally, the Code allows the use of a mechanical exerciser or disassembly every refueling outage. Disassembly and inspection using a sampling program is an acceptable alternative, as discussed in Generic Letter 89-04, Position 2.

These valves open to provide flowpaths from each auxiliary feedwater pump's discharge to the condensate storage tank to ensure adequate pump cooling during low flow conditions. They are opened quarterly during the AFW pump tests. These are simple check valves with no external means for determining obturator position. Additionally, there are no permanently installed flow instruments to verify the flowrate through the valves, and the maximum required flowrate is insufficient to fully open the valves, thereby making the use of non-intrusives impractical. The only practical means available to verify the full-stroke open capability of these valves is by disassembly and inspection, as proposed by the licensee. To require disassembly and inspection of both valves each refueling outage would be a hardship without a compensating increase in the level of quality and safety. The licensee's proposal complies with the guidance provided in Generic Letter 89-04, Position 2, for a sample disassembly and inspection program. Therefore, it is recommended that the alternative be authorized in accordance with 10CFR50.55a(a)(3)(ii).

3.5 Instrument Air System

3.5.1 Relief Request No. VR-12, Vacuum Breaker and MSIV Accumulator Supply Check Valves

Relief Request: The licensee has requested relief from the requirements of OMa-1988 Part 10, ¶4.3.2.2(a), which requires each check valve to be exercised or examined in a manner which verifies obturator travel to the closed, full-open or partially open position required to fulfill its function for the vacuum breaker supply check valves in Unit 1 and 2: V18290, V18294, V18291, and V18295; and MSIV accumulator supply check valves in Unit 1 only: V18695, V18699, V18696, and V18099.

Licensee's Basis for Relief: "These are simple check valves with no external means of exercising nor for determining disk position. Consequently, the only practical method for determining disk position is by performing a back-leakage test, however, these check valves are installed with each pair in series with no provision for verification that each individual valve is closed.

For these applications only one valve need close. Both valves are designated as ISI Class 2 (Class 3 for MSIV accumulators) and, as such, both valves in each line will be treated with the same quality assurance requirements."

Proposed Alternate Testing: Either of these valves will be verified to close by performing a back-leakage on the series combination of valves. In the event that both valves fail to close, the combination will be declared inoperable and both valves will be repaired or replaced, as appropriate.

Evaluation: These valves close to isolate the air in the accumulators supplying the primary containment vacuum breaker valves and, for Unit 1, the MSIVs, in the event of a loss of pressure in the plant main instrument air headers. The Code requires that each valve performing a safety function be stroked to the position required to perform that function. There is no practical means of verifying the ability of each valve in the series to close, based on the lack of position indication and test connections between the valves. As discussed in NUREG-1482, Section 4.1.1, verification that a pair of valves is closed is acceptable if only one valve of the two valves is credited in the plant safety analysis, both valves are subject to equivalent quality assurance criteria and are included in the IST program, and if the closure capability of the pair is questionable, both valves are declared inoperable and corrective actions are taken on both valves, as necessary, before being returned to service. The licensee's proposed testing complies with the guidance in the NUREG, and it is recommended that relief be granted in accordance with 10CFR50.55a(f)(6)(i).

3.6 Containment Spray System

3.6.1 Relief Request No. VR-14, RWT Discharge Check Valves

Relief Request: The licensee has requested relief from the requirements of OMa-1988 Part 10, ¶4.3.2, which requires check valves to be exercised nominally every 3 months, except as provided by ¶4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5 for the RWT discharge check valves, V07119 and V07120 in the open direction.

Licensee's Basis for Relief: "These are simple check valves with no external means of exercising nor determining obturator position. Full stroke exercising (open) of these valves would require the simultaneous operation of one high pressure safety injection (HPSI) pump, one low pressure safety injection (LPSI) pump, and one containment spray pump to verify that each valve can pass the maximum design accident flow. Such a test is not practical during any plant operational mode. Non-intrusive testing (NIT) of these valves necessarily requires that each valve undergo a full stroke cycle induced by flow through the associated piping. In this case, the maximum flowrate possible in the line is approximately 4,500 gpm-the nominal design flowrate of the LPSI pumps. At this flowrate, taking into consideration that these 24-inch NPS valves are on the suction side of the pumps and not subjected to a starting pressure surge at the pump discharge, they will not travel to the full-open position with a backstop impact when the associated LPSI pump is started or running. This precludes any meaningful, reliable, and conclusive non-intrusive testing.

These are large valves (24-inch NPS) where disassembly is difficult and consumes a considerable amount of plant resources, thus disassembly of both of these valves during each reactor refueling would pose a significant hardship and, based on plant safety considerations, is not warranted. In addition, access for disassembly requires draining a significant portion of the safety injection system piping creating a sizable load on the plant's radwaste systems.

These valves are identical with the same manufacturer, size, model designation, orientation, and service conditions."

Proposed Alternate Testing: During quarterly pump testing each of these valves will be partial-stroke exercised via recirculation through the minimum flow test circuits of the various safety injection systems.

During each reactor refueling outage at least one 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 other valve will be inspected during the same outage, after which the rotational inspection schedule will be reinitiated. Following reassembly, each valve will be partial-flow exercised open and tested closed to verify operability.

Evaluation: The Code requires valves to be exercised to the position required to fulfill the valve's safety function. With respect to exercising the valves to the full-stroke open position, verification that the valve can pass the maximum required accident flowrate is acceptable. Additionally, the Code allows the use of a mechanical exerciser or disassembly every refueling outage. Disassembly and inspection using a sampling program is an acceptable alternative, as discussed in Generic Letter 89-04, Position 2.

These valves open to provide flowpaths from the refueling water tanks (RWT's) to the containment spray and safety injection suction headers. They close to prevent the transfer of containment sump water back to the associated RWT after a recirculation actuation signal (RAS). These are simple check valves with no external means for determining obturator position. As stated by the licensee, non-intrusive testing is also impractical since the maximum flow obtainable is not sufficient to fully open the valve resulting in a backstop impact discernable by non-intrusive techniques. It appears that the licensee has considered using acoustical monitoring to determine full-opening of the valve. While this is the most common technique, other non-intrusive techniques methods have been used to provide indications of obturator position, including radiography, magnetic flux, and ultrasonic testing (Ref. 22). The licensee may wish to evaluate these techniques and remain cognizant of developments with these techniques as a possible future alternative to valve disassembly and inspection.

As discussed in Generic Letter 89-04, Position 2, sample disassembly and inspection is an acceptable alternate to full-flow testing. The only practical means available to verify full-stroke open capability of these valves is by disassembly and inspection. To require disassembly and inspection of both valves each refueling outage would be a hardship without a compensating increase in the level of quality and safety. The licensee's proposal complies with the guidance provided in Generic Letter 89-04, Position 2, for a sample disassembly and inspection program. Therefore, it is recommended that the alternative authorized in accordance with 10CFR50.55a(a)(3)(ii).

3.6.2 Relief Request No. VR-15, CS to Eductors Check Valves

Relief Request: The licensee has requested relief from the requirements of OMa-1988 Part 10, ¶4.3.2, which requires check valves to be exercised nominally every 3 months, except as provided by ¶4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5, for the Unit 1 containment spray to spray additive eductors check valves, V07269 and V07270 in the open direction.

Licensee's Basis for Relief: "These are simple check valves with no external means of exercising or determining obturator position. They cannot be full flow exercised during normal operation since there is no flowrate instrumentation available to verify valve full-stroke exercising as required by the Generic Letter 89-04, Position 1.

Note that these valves remain closed in a benign medium under all but testing and accident conditions and see little actual operation, thus service related failure is unlikely.

Each of these valves has been disassembled and inspected in the past and they have not displayed any indication of degradation that would impede their capability to perform their safety function to open. These valves are identical with the same manufacturer, size, model designation, orientation, and service conditions.

The St. Lucie on-site staff does not have the resources required to perform non-intrusive testing on these valves, thus whenever non-intrusive testing is required, contract services must be procured. For this reason, testing more frequently than once per refueling outage or two years is not practical."

Proposed Alternate Testing: During each reactor refueling outage at least one every two years, each of these valves will be verified to fully open using non-intrusives or other positive

Evaluation: The Code requires valves to be exercised to the position required to fulfill the valve's safety function. With respect to exercising the valves to the full-stroke open position, verification that the valve can pass the maximum required accident flowrate is acceptable. Where full flow testing is impractical, other qualified techniques, such as non-intrusive testing, may be used to confirm the valve is exercised to the position required to fulfill the valve's safety function. The Code requires exercising quarterly or, if impracticable, at cold shutdowns or refueling outages.

These valves open to provide flowpaths from the respective containment spray discharge headers to the spray additive eductors. This flow through the eductors provides the motive force needed to inject the sodium hydroxide solution into the suction of the containment spray pumps. These are simple check valves with no external means for determining obturator position. Additionally, there are no permanently installed flow instruments to verify the flowrate through the valves.

The licensee is proposing to verify that each valve will fully-open each refueling outage using non-intrusive techniques. The licensee has stated in the Basis that it is impractical to test these valves at a frequency other than refueling outages due to the need to acquire outside contractor services. As discussed in NUREG-1482, Section 4.1.4 and the response to Question 2.3.19 contained in the Summary of Public Workshops Held in NRC Regions on Inspection Procedure 73756 (Ref. 15), the need to set up test equipment is adequate justification to defer check valve testing to a refueling outage frequency. Verifying the ability of each valve to fully open each refueling outage using non-intrusive techniques provides reasonable assurance of the valves operational readiness. Because the Code allows deferrals to refueling outages, relief is not required. The licensee should continue, however, to document the deferral justification in the IST Program.

In the previous submittal of this relief request, the licensee stated that each of these valves would be partial-stroke exercised quarterly in conjunction with the testing of the containment spray pumps without measuring flowrate through the valves. This partial stroke exercising is not addressed in the revised relief request. The licensee should ensure that this testing is still performed, and revise the request accordingly.

3.6.3 Relief Request No. VR-16, Containment Sump Discharge Check Valves

Relief Request: The licensee has requested relief from the requirements of OMa-1988 Part 10, ¶4.3.2, which requires check valves to be exercised nominally every 3 months, except as provided by ¶4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5, for the containment sump discharge check valves, V07172 and V07174 in the open direction.

Licensee's Basis for Relief: "These are simple check valves with no external means of exercising or determining obturator position. Exercising with system flow is not practical since there is no water inventory available in the containment sump and flooding the sump for such a test is undesirable and impractical since it would have the potential for upsetting the chemistry of the RCS by introducing contaminants into the safety injection system.

These are large valves (24-inch NPS) where disassembly is difficult and consumes a considerable amount of plant resources, thus disassembly of both of these valves during each reactor refueling would pose a significant hardship and, based on plant safety considerations, is not warranted. In addition, access for disassembly requires draining a significant portion of the safety injection system piping creating a sizable load on the plant's radwaste systems.

Each of these valves has been disassembled and inspected in the past and they have not displayed any indication of degradation that would impede their capability to perform their safety function to open. These valves are identical with the same manufacturer, size, model designation, orientation, and service conditions.

Note that these valves remain closed in a benign medium under all but accident conditions and see no actual operation, thus service related failure is unlikely."

Proposed Alternate Testing: During each reactor refueling outage at least one of these valves will be disassembled, inspected, and manually exercised on a sequential and rotating schedule. If, in the course of this inspection, a valve is found to be inoperable with respect to its function to fully open, then the other valve will be inspected during the same outage.

Evaluation: The Code requires valves to be exercised to the position required to fulfill the valve's safety function. With respect to exercising the valves to the full-stroke open position, verification that the valve can pass the maximum required accident flowrate is acceptable. Additionally, the Code allows the use of a mechanical exerciser or disassembly every refueling outage. Sample disassembly and inspection is an acceptable alternate, as discussed in Generic Letter 89-04, Position 2.

These check valves open to provide flowpaths from the containment sumps to the containment spray and safety injection pumps during post-accident recirculation cooling. It is impractical to exercise these 24 inch valves with flow during any mode of operation based on the lack of sump inventory and the potential for contaminating the RCS if the sump was flooded for the sole purpose of testing.

As discussed in Generic Letter 89-04, Position 2, sample disassembly and inspection is an acceptable alternate to full-flow testing. The only practical means available to verify the full-stroke open capability of these valves is by disassembly and inspections. To require disassembly and inspection of both valves each refueling outage could be a hardship without a compensating increase in the level of quality and safety. The licensee's proposal complies with the guidance provided in Generic Letter 89-04, Position 2, for a sample disassembly and inspection program. Therefore, it is recommended that the alternative be authorized in accordance with 10CFR50.55a(a)(3)(ii).

3.6.4 Relief Request No. VR-17, CS Pump Discharge Check Valves

Relief Request: The licensee has requested relief from the requirements of OMa-1988 Part 10, ¶4.3.2, which requires check valves to be exercised nominally every 3 months, except as provided by ¶4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5, for the containment spray pump discharge check valves, V07192 and V07193 in the open direction.

Licensee's Basis for Relief: "These are simple check valves with no external means of exercising or determining obturator position. Exercising with system flow to the open position would require operating each containment spray pump at nominal accident flowrate. Since no recirculation flowpath exists downstream of these valves, the only flowpath available for such a test would result in injecting radioactive contaminated borated water into the containment spray headers and thence into the containment building via the spray nozzles. Dousing personnel and equipment in this manner is obviously undesirable.

Partial-flow testing using compressed air is possible, but requires draining the entire containment spray discharge header and supplying air via the 3-inch test connections. The amount of air necessary for a meaningful test would require the temporary installation of an additional air compressor solely for this purpose. The value of a partial-stroke air flow test for determining valve operability under these conditions is at best marginal and has little or no merit; thus the burden of performing such a test is not warranted based on the limited value and benefit derived.

Each of these valves has been disassembled and inspected in the past and they have not displayed any indication of degradation that would impede their capability to perform their safety function to open. These valves are identical with the same manufacturer, size, model designation, orientation, and service conditions.

Note that these valves remain closed in a benign medium under all but accident conditions and see no actual operation, thus service related failure is unlikely."

Proposed Alternate Testing: During each reactor refueling outage at least one of these valves will be disassembled, inspected, and manually exercised on a sequential and rotating schedule. If, in the course of this inspection a valve is found to be inoperable with respect to its function to fully open, then the other valve will be inspected during the same outage.

Evaluation: The Code requires valves to be exercised to the position required to fulfill the valve's safety function. With respect to exercising the valves to the full-stroke open position, verification that the valve can pass the maximum required accident flowrate is acceptable. Additionally, the Code allows the use of a mechanical exerciser or disassembly every refueling outage. Sample disassembly and inspection is the acceptable alternate as discussed in Generic Letter 89-04, Position 2.

These check valves open to provide flowpaths from the containment spray pumps to the containment spray headers in containment. It is impractical to full-stroke exercise these valves with flow during any mode of operation, due to the potential of equipment damage and the extensive cleanup.

As discussed in Generic Letter 89-04, Position 2, sample disassembly and inspection is an acceptable alternate to full-flow testing. The only practical means available to verify the full-stroke open capability of these valves is by disassembly and inspection. As discussed in the Generic Letter, however, partial stroke exercising quarterly or during cold shutdowns, or after reassembly must be performed, if possible. The licensee has discussed the impracticality of performing a partial-flow test using compressed air quarterly or during cold shutdowns. However, the licensee has not demonstrated the impracticality of performing a partial-flow test with air following valve disassembly and inspection. It appears that the containment spray discharge header must be drained to perform the disassembly and inspection. The value of performing a partial-stroke test following valve disassembly and inspection it that it provides assurance of proper reassembly and operation of the valve.

To require disassembly and inspection of both valves each refueling outage as required by the Code would be a hardship without a compensating increase in the level of quality and safety. The licensee's proposal complies with the guidance provided in Generic Letter 89-04, Position 2, for a sample disassembly and inspection program. Therefore, it is recommended that the alternative be authorized in accordance with 10CFR50.55a(a)(3)(ii). The licensee should partial-stroke exercise the valve following disassembly and inspection or include in the basis for requesting relief additional information supporting the determination of the impracticality. The revised request need not be resubmitted, but is subject to NRC inspection.

4.0 VALVE TESTING DEFERRAL JUSTIFICATIONS

Florida Power & Light has submitted seventy-eight justifications for deferring valve testing to cold shutdowns and nine justifications for deferring testing to refueling outages. These justifications document the impracticality of testing 240 valves quarterly, during power operation. These justifications were reviewed to verify their technical basis.

As discussed in Generic Letter 91-18 (Ref. 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 NUREG-1482, Section 3.1.1). 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 basis assumes that all four cold legs are being supplied by water from at least one pump, 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 deferral justification is provided in Appendix A. The anomalies associated with the specific justifications are provided in Section 6.0 of this TER.

5.0 IST SYSTEM SCOPE REVIEW

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 IST Program's scope was, however, reviewed for selected systems. The pumps and valves in the containment spray, component cooling water, and safety injection systems were reviewed against the requirements of Section XI and the regulations. The UFSAR 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 items discussed in Section 6.0. 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.

6.0 IST PROGRAM RECOMMENDED ACTION ITEMS

Inconsistencies, omissions, and required licensee actions identified during the review of the licensee's third interval for Unit 1 and second interval for Unit 2 Inservice Testing Program are summarized below. The licensee should resolve these items in accordance with the evaluations presented in this report.

A. General Recommended Actions

1. The Unit 1 third interval dates do not correspond to the date of commercial operation. The basis for the interval dates should be provided in future IST program revisions and may be subject to NRC inspector reviews.

2. Page 18 of 225 of ADM 29.01 states that the combined IST program will be in effect through the end of each units' third 10 year interval. This program is for the second interval for Unit 2. The procedure should be corrected.

3. Valves V-1402 and 1404 in the Reactor Coolant System are fail closed solenoid valves. There is no fail-safe (FS) test specified in Table 2. The licensee should review the function of the valves and correct the table as necessary.

B. Recommended Actions for Relief Requests

1. As noted in NUREG-1482, ¶5.5.1, when using portable instruments as proposed in PR-01, the staff recommends that the licensee include in the IST records an instrument number for tracing each instrument and a calibration data sheet for verifying that the instruments are accurately calibrated. Additionally, if instrumentation becomes commercially available which meets the Code requirements that the full-scale range of each analog instrument shall not be greater than three times the reference value, and the licensee is procuring replacement speed instruments, the licensee should withdraw Relief Request PR-01 and procure instruments which meet the Code requirements.

2. It is recommended that long term relief of PR-07 be denied. An interim period of one year has been allowed to allow the licensee either to procure new equipment that meets the Code requirements or revise and resubmit the relief request. If the relief request is revised, it should address the specific hardship of complying with the Code and how the proposed alternative provides an acceptable level of safety. The licensee is referred to TER Section 2.1.2.

3. The licensee has not specified in Relief Request PR-08 the specific inspections and maintenance proposed (other than oil analysis) for the hydrazine pumps, or their periodicity. The licensee would need to document these, as well as the acceptance

criteria and the maintenance/inspection results. This documentation would be subject to NRC inspector review.

4. The licensee should revise Table 1-Unit 2 Pump Table to properly indicate that pump discharge pressure is being measured quarterly and during refueling outages for the hydrazine pumps, and revise Relief Request PR-09 to be consistent with the new PR-08.

5. The licensee should review the guidance on the contents of an analysis provided in TER Section 2.3.1.

6. It is recommended that Relief Request VR-02 be denied. See TER Section 3.1.2 for the evaluation.

7. The use of non-intrusive techniques interchangeably with disassembly and inspection has not been recommended, as requested in VR-05 and VR-06. See TER Section 3.2.2 and 3.2.3 for the evaluation.

8. It appears that the licensee has considered using acoustical monitoring to determine full-opening of the RWT discharge check valves (VR-14). While this is the most common technique, other non-intrusive techniques methods have been used to provide indications of obturator position, including radiography, magnetic flux, and ultrasonic testing (Ref. 19). The licensee may wish to evaluate these techniques and remain cognizant of developments with these techniques as a possible future alternative to valve disassembly and inspection.

9. In the previous submittal of Relief Request VR-16, the licensee stated that each of the valves would be partial-stroke exercised quarterly in conjunction with the testing of the containment spray pumps without measuring flowrate through the valves. This partial stroke exercising is not addressed in the revised relief request. The licensee should ensure that this testing is still performed, and revise the request accordingly. In addition, if at a later time, the licensee determines that quarterly testing using non-intrusives becomes less difficult (e.g., through the use of permanently installed equipment), the licensee should reevaluate and resubmit this request.

10. The licensee has not demonstrated in Relief Request VR-17 the impracticality of performing a partial-flow test with air following valve disassembly and inspection. It appears that the containment spray discharge header must be drained to perform the disassembly and inspection. The value of performing a partial-stroke test following valve disassembly and inspection is that it provides assurance of proper reassembly and operation of the valve. The licensee should, therefore, perform a partial-stroke exercise after reassembly or revise the request to include in the basis additional information supporting the determination of impracticality. The revised request need not be resubmitted, but is subject to NRC inspection.

11. The licensee has stated in VR-20 that the subject valves are "simple" check valves. Provided that they are not capacity certified in accordance with Section III or the construction code, use of the clarification provided in the code committee's proposal is acceptable and relief is not required. The licensee should continue to document this approach in the IST program. The licensee should revise and resubmit the request if the valves are capacity certified.

12. The licensee states that it is impractical to test the containment vacuum breaker valves during power operation based on their location inside containment and the need for local access in VR-19. There is not sufficient information to support the basis of impracticality. The licensee should provide additional information on why entering the containment and gaining local access to the valves is impractical and resubmit the request.

C. Recommended Actions for Deferral Justifications

1. In RFJ-01 and RFJ-20, the licensee should consider establishing a schedule to account for extended cold shutdown outages when the RCPs are stopped for a sufficient length of time to allow for testing of the RCP seal leakoff CIVs and the RCP suction check valves.

2. The licensee has proposed to use RWT level changes to determine flowrate for the HPSI minimum flow check valves (RFJ-03) and the LPSI minimum flow check valves (RFJ-07). The instrument accuracy must be adequate to demonstrate that the valves are open to the position necessary for the check valves to fulfill their safety function.

3. RFJ-04 refers to the HPSI pump suction check valves. However, the justification refers to the LPSI pumps. The licensee should review this and modify the justification as needed.

4. In RFJ-05 and 09, the licensee proposes to partial-stroke exercise the HPSI pump discharge valves during cold shutdowns. However, the justification provided for each discusses issues which make exercising during cold shutdowns impractical. The licensee should review this and revise the justifications as necessary.

5. In RFJ-10, the licensee has discussed the impracticality of partial-stroking HPSI pump PIVs V3524 and V3526. The licensee should also include an explanation for valves V3523 and V3527.

6. In RFJ-13, the licensee discusses the impracticality of full-stroke exercising the AFW pump bearing cooling water discharge valves during operation. However, as discussed in PR-02, the turbine driven AFW pump is minimum flow tested quarterly, and full-flow

tested during cold shutdowns. The licensee should investigate why partial-stroking is not possible during the quarterly and cold shutdown testing.

7. In RFJ-17, the licensee has not provided a justification for deferring verification of closure for the normally closed containment spray pump suction header check valves.

8. The licensee should review Table 3 (Unit 2 Valve Table) and correct the following:
- Table 3, Page 4 of 44, the RFJ-02 entry for V2191 applies to the partial-stroke exercising at cold shutdowns, not the closure testing performed during operation as indicated.

9. The cold shutdown deferral for the Unit 1 LPSI pump discharge minimum flow/recirculation line isolation valves V3659 and V3660 is based upon the potential of LPSI pump damage which could occur if the valves were exercised quarterly. The licensee should ensure that the same justification is not applicable to Unit 2 as well. Per the Unit 2 Valve Table, these valves are exercised quarterly.

10. The cold shutdown deferral for the Unit 2 Nitrogen gas supply CIV (valve V6792) is based upon the impracticality of entering the containment to perform a leakage test. The licensee should include in the deferral additional information on why it is impractical to exercise this valve quarterly. The licensee should also correct the drawing reference for this deferral request in the Unit 2 Valve Table to correctly indicate drawing number 2998-G-078, Sheet 163B.

D. Recommended Actions for System Review

1. The Unit 2 containment fan coolers' component cooling water motor-operated containment isolation valves are identified in the IST Program as passive. As containment isolation valves per Table 6.2-52 in the SAR, they would appear to have an active safety function to close. The licensee should review the safety function and classification of these valves.

2. Check valves V07267, 7266 (Unit 1); and V29431 and 29432 (Unit 2) in the containment spray nitrogen supply to the hydrazine storage tanks are not included in the IST program. These valves isolate the non-safety related nitrogen supply to the hydrazine tanks. Their failure may compromise the tanks' integrity. The licensee should review the safety function of these valves.

3. Check valves V07133 and 7141 are the containment spray min-flow valves back to the RWT. These valves are not included in the IST Program. The licensee should ensure that these valves do not have a safety function in the event that the containment spray valves are inadvertently isolated following the start of the pumps.

4. The Unit 2 containment isolation valve table in the SAR (Table 6.2-52) identified valve I-V-07-1553 as the inboard containment isolation valve for penetrations 34 and 35. Based on a review of drawing 2998-G-088, Sheet 2, it would appear that the inboard containment isolation valves are V0192 and V0193. These valves are discussed in relief request VR-14 and are only identified with an open safety function. If these are containment isolation valves, the licensee should review their closed safety function.

5. The HPSI pump suction and min-flow line discharge check valves and LPSI pump discharge and suction check valves are not exercised closed. Additionally, the sump discharge check valves are only exercised open. The licensee should evaluate whether these valves have a safety function to close in order to prevent draining the RWT to the sump.

7.0 REFERENCES

1. J. Stall, FPL, to USNRC, "Third Ten-Year Interval In-Service-Test Program, Revision 0," L-98-5, January 12, 1998.

2. Administrative Procedure ADM-29.01, Revision 0, "Inservice Testing (IST Program for Pumps and Valves," December 12, 1997.

3. J. Stall, FPL, to USNRC, "Inservice Testing Program, Request for Additional Information," L-98-243, September 21, 1998.

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

5. ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1989 Edition.

6. ASME/ANSI OM-1987, Part 1, "Requirements for Inservice Performance Testing of Nuclear Power Plant Pressure Relief Devices."

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

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

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

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

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

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

13. NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," April 1995.

14. NUREG/CR-6396, "Examples, Clarifications, and Guidance on Preparing Requests for Relief from Pump and Valve Inservice Testing Requirements," February 1996.

15. Memo to File, "Summary of Public Workshops held in NRC Regions on Inspection Procedure 73756, 'Inservice Testing of Pumps and Valves,' and Answers to Panel Questions on Inservice Testing Issues," from J. Colaccino, NRC, July 18, 1997.

16. *Pump Handbook*, I.J. Karassik, McGraw Hill Book Company, 1976.

17. Federal Register, Volume 62, Number 232, Page 63892, "Proposed Rule on Industry Codes and Standards," December 3, 1997.

18. NRC Generic Letter 91-18, "Information to Licensees Regarding Two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions and on Operability," November 7, 1991.

19. J. Stall, FPL, to USNRC, "Inservice Test Program, Relief Request PR-12 Supplement," L-98-264, October 9, 1998.

20. NUREG/CP-0152, Volume 1, "Proceedings of the Fourth NRC/ASME Symposium on Valve and Pump Testing," June 1996.

21. NUREG/CP-0152, Volume 2, "Proceedings of the Fifth NRC/ASME Symposium on Valve and Pump Testing," July 1998.

22. NUREG/CP-0123, "Proceeding of the Second NRC/ASME Symposium on Pump and Valve Testing," June 1992.

Appendix A-Evaluation of St. Lucie's Valve Testing Deferral Justifications

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
RFJ-01	Unit 1: SE-01-01 V2505 Unit 2: V2505 V2524 RCP Seal Leakoff CIVs	2998-G-078 Sh 21A 8770-G-078 Sh 121A Chemical and Volume Control System	"Closing either of these valves 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 pumps' seals. Thus testing these valves would require the unnecessary shutdown of all of the reactor coolant pumps or installation of elaborate means to ensure seal leakage is maintained while these valves are closed."	During each refueling outage these valves will be exercised and fail-safe tested closed.	It is impractical to exercise these valves closed quarterly during operation due to the possibility of damaging the RCP seals. It is also impractical to test these valves during cold shutdowns because it would require shutting off the RCPs which could extend the cold shutdown period. The alternative provides for exercising the valves closed and fail-safe testing during refueling outages in accordance with OM Part 10 ¶4.2.1.2(e). The licensee should consider establishing a schedule to account for extended cold shutdowns when the RCPs are stopped for a sufficient length of time as discussed in NUREG-1482 Section 3.1.1.4.

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
RFJ-02	Units 1 & 2: V2177 V2190 V2191 V2443 V2444 Unit 2 only: V2526 Boric Acid Makeup Pump Discharge Check Valves (V2177, V2443, and V2444) Boric Acid Makeup Tank Discharge Check Valve(V2190 and V2526) RWT Discharge Check Valve (V2191)	8770-G-078 Sh. 121 A & B 2998-G-078 Sh. 121A & 121 B Chemical & Volume Control System	"These are simple check valves with no external means of exercising or for determining obturator position. Thus, testing these valves in the open direction requires system flow. Since there is no convenient recirculation flowpath capable of full-flow (120 gpm) the only practical flowpath is into the RCS via three charging pumps. Injection into the RCS results in the introduction of highly concentrated boric acid solution from the boric acid makeup tanks to the suction of the charging pumps and thence to the RCS. This would result in the addition of excess boron to the RCS. The rapid insertion of negative reactivity would result in a RCS cooldown and de-pressurization which, given a large enough boron addition, could result in an unscheduled plant trip and a possible safety injection system initiation. Except for BAM Pump Discharge Check Valves, V2443 and V2444, partial-stroke exercising presents the same problems with respect to boron injection as does full-stroke exercising. V2443 and V2444 can be exercised by recirculating to the BAM tanks, however, there is no flow instrumentation available to verify full-stroking of these valves. 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 at startup. Since the boron concentration is normally increased to a limited extent for shutdown margin prior to reaching cold shutdown, a part stroke exercise of these valves could be performed at that time."	Each of these check valves, except for V2443 and V2444, will be partial stroke exercised during each cold shutdown. Valves V2443 and V2444 will be partial stroke exercised quarterly. Each of these check valves will be full-stroke exercised during each refueling outage.	It is impractical to full-stroke exercise these check valves (or partial-stroke exercise valves V2177, 2190, 2191 and 2526) open quarterly during operation because it would result in the addition of highly concentrated boric acid solution to the RCS which could result in a reactor shutdown and a safety injection actuation. It is also impractical to full-stroke these valves during cold shutdowns because the addition of boric acid to the RCS could delay plant startup. The alternative provides for partial-stroke exercising quarterly (valves V2443 and V2444) and during cold shutdowns (valves V2177, V2190, V2191, and V2526) and full-stroke exercising all the valves during refueling outages in accordance with OM Part 10 ¶4.3.2.2(d).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
RFJ-03	Unit 1 only: V3101 Unit 2 only: V3102 Units 1 & 2: V3103 HPSI Pumps to RWT Minimum Flow Check Valves	8770-G-078 Sh 130A 2998-G-078 Sh 130A Safety Injection System	"These are simple check valves with no external means of exercising or for determining obturator position. Thus, testing these valves in the open direction requires system flow. There is no flowrate instrumentation available in the respective lines to verify valve full stroke exercising as defined by the Generic Letter 89-04, Position 1. During refueling, these valves can be full flow tested and the flowrates determined. The flowpath for this test is from the refueling cavity to the RWT via the HPSI pump mini-flow recirculation line. The flowrate can be calculated by determining the increase in RWT volume over a measured period of time. Since this test procedure reduces RCS inventory it can only be performed during refueling outages with the reactor head removed, permitting refueling cavity water inventory to be pumped to the RWT."	During quarterly pump testing each of these valves will be partial-stroke exercised via recirculation through the minimum flow test circuits with no flow measurements. During each refueling outage each of these valves will be full-flow tested.	It is impractical to full-stroke exercise these valves quarterly because they are installed in the minimum flow line from the HPSI pumps to the RWTs. There is no flow instrumentation installed on these lines. These check valves are partial stroked open quarterly during HPSI pump operation. The alternative provides for partial-stroke open quarterly and full-flow tested during refueling outages in accordance with OM Part 10 ¶4.3.2.2(e). The use of level changes over a period of time is acceptable, as discussed in NUREG-1482, Section 4.1.2. The instrument adequacy must be adequate to demonstrate the valve is open to the position necessary to fulfill its safety function. The test method will be subject to NRC inspectors' reviews.

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
RFJ-04	Units 1 & 2: V3401 V3410 HPSI Pump Suction Check Valves	2998-G-078 Sh 130A 8770-G-078 Sh 130A Safety Injection System	"These are simple check valves with no external means of exercising or for determining obturator position. Thus, testing these valves in the open direction requires system flow. The only flowpath available during normal power operation is recirculating RWT water via the LPSI mini-flow line that results in only partial stroke exercising. Full stroke exercising of 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, there are several issues that make exercising impractical, including: 1. There is no available reservoir in the reactor coolant system to accept the injected water and the shutdown cooling system cannot provide sufficient letdown flow back to the RWT to accommodate full design flow from the RWT while maintaining the necessary core cooling function; 2. The excessive quantities of boric acid injected during such testing would seriously hamper the ensuing startup; and 3. 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 St. Lucie Technical Specifications, Section 3.4.9. Therefore, the only practical opportunity for full-flow testing these valves is during refueling outages when water from the RWT is used to fill the refueling cavity."	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 refueling outage.	It is impractical to full-stroke exercise these valves to the open position during operation because this would necessitate operation of the HPSI pumps which cannot overcome the primary system pressure to operate. Operation during cold shutdowns is also impractical because it would result in the addition of high quantities of boric acid into the RCS delaying restart. The alternative provides for partial stroke exercising quarterly, and full-flow exercising during refueling outages in accordance with OM Part 10 ¶ 4.3.2.2(d). The subject valves are associated with the HPSI pumps. However, the justification refers to the LPSI pumps. The licensee should review the justification, and revise it as needed.

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
RFJ-05	Units 1 & 2: V3414 V3427 HPSI Pump Discharge Check Valves	2998-G-078 Sh 130A 8770-G-078 Sh 130A Safety Injection System	"These are simple check valves with no external means of exercising or for determining obturator position. Thus, testing these valves in the open direction requires system flow. Full stroke exercising of 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. At cold shutdown, there are several issues that make exercising impractical, including: 1.There is no available reservoir in the reactor coolant system to accept the injected water and the shutdown cooling system cannot provide sufficient letdown flow back to the RWT to accommodate full design flow from the RWT while maintaining the necessary core cooling function; 2.The excessive quantities of boric acid injected during such testing would seriously hamper the ensuing startup; and 3.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 (LTOP) specified in the St. Lucie Technical Specifications, Section 3.4.9. Partial flow exercising of these valves is performed whenever its associated HPSI pump is used to refill a SIT. The acceptable SIT level and pressure bands specified by the Technical Specifications are very narrow and the SIT's are only refilled on an as-needed basis; therefore, the partial flow test cannot readily be incorporated into a periodic test. Alternate flowpaths for partial flow tests are limited by the design pressure of the associated piping."	These valves will be part-stroke exercised open while refilling a SIT. The SIT tanks will only be refilled as required to maintain them within the Technical Specification limits. A SIT will not necessarily be filled for the sole purpose of part-stroke exercising any one of these check valves. Each of these valves will be verified closed quarterly, part-stroke exercised during cold shutdowns and full-stroke exercised open during each refueling outage.	It is impractical to exercise these valves quarterly during operation because it would require operation of the HPSI pumps which cannot overcome the primary system pressure. Exercising during cold shutdowns is also impractical because operation of the HPSI pumps would result in the injection of concentrated boric acid to the RCS which could delay plant operation. In addition the operation of the HPSI pumps are restricted to preclude plant LTOP limits. The licensee states in the Alternate Testing Section of the justification, however, that the valves will be partial-stroke exercised each cold shutdown. In addition, these valves are also partial-stroked open during refilling a safety injection tank as needed during operation. The licensee should review the Justification which states that exercising these valves is impractical during cold shutdowns and the proposed alternate testing to partial stroke these valves during cold shutdowns, and revise as necessary.

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
RFJ-06	Units 1 & 2: V07000 V07001 LPSI Pumps Suction Check Valves	2998-G-078 Sh 130B 8770-G-078 Sh 130B Safety Injection System	"These are simple check valves with no external means of exercising or for determining obturator position. Thus, testing these valves in the open direction requires system flow. The only flowpath available during normal power operation is recirculating RWT water via the LPSI mini-flow line that results in only partial stroke exercising. Full stroke exercising of 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, there is no available reservoir in the reactor coolant system to accept the injected water and the shutdown cooling system cannot provide sufficient letdown flow back to the RWT to accommodate full design flow from the RWT. while maintaining the necessary core cooling function. Also, the excessive quantities of boric acid injected during such testing would seriously hamper the ensuing startup. Therefore, the only practical opportunity for full-flow testing these valves is during refueling outages when water from the RWT is used to fill the refueling cavity."	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 refueling outage.	It is impractical to full-stroke exercise these valves open during operation because it would require the operation of the LPSI pumps and injection into the RCS. During plant operation the LPSI pumps cannot develop sufficient discharge pressure required to discharge to the RCS. Operation during cold shutdowns is also impractical since it would result in the injection of concentrated boric acid into the RCS which could delay plant startup. The alternative provides for partial stroke exercising quarterly and full-stroke open testing during refueling outages in accordance with OM Part 10 ¶4.3.2.2(d).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
RFJ-07	Units 1 & 2: V3104 V3105 LPSI Pumps Discharge Minimum Flow Check Valves	2998-G-078 Sh 130B 8770-G-078 Sh 130B Safety Injection System	"These are simple check valves with no external means of exercising or for determining obturator position. Thus, testing these valves in the open direction requires system flow. There is no flowrate instrumentation available in the respective minimum flow lines to verify valve full stroke exercising as defined by the Generic Letter 89-04, Position 1. Due to the installation of flow orifices in these lines, the maximum flow velocity achievable is approximately 10 ft/sec. which is considerably less than the 32.8 ft/sec. needed to fully open the valves. For this reason the use of non-intrusive techniques for verifying valve operability is impractical. During refueling these valves can be full-flow tested and the flowrates determined. The flowpath for this test is from the refueling cavity to the RWT via the LPSI pump mini-flow recirculation line. The flowrate can be calculated by determining the increase in RWT volume over a measured period of time. Since this test procedure reduces RCS inventory it can only be performed during refueling outages - with the reactor head removed, permitting refueling cavity water inventory to be pumped to the RWT."	During quarterly pump testing each of these valves will be partial-stroke exercised via recirculation through the minimum flow test circuits with no flow measurements. During each refueling outage each of these valves will be full-flow tested.	It is impractical to full-stroke exercise these valves open quarterly during both operation and cold shutdowns because there is no flow instrumentation installed on these minimum flow lines from the LPSI pumps to the RWTs. The alternative provides for partial-stroking these valves open quarterly during LPSI minimum flow testing and full-stroke testing during refueling outages in accordance with OM Part 10 ¶4.3.2.2(d). The use of level changes over a period of time is acceptable as discussed in NUREG-1482, Section 4.1.2. The instrument accuracy must be adequate to demonstrate the valve is open to the position necessary for the check valve to fulfill its safety function. The test method will be subject to NRC inspectors' reviews.

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
RFJ-08	Units 1 &2: V3113 V3133 V3143 Unit 1 only: V3123 Unit 2 only: V3766 Pressure Isolation Check Valves	2998-G-078 Sh 131 8770-G-078 Sh 131A Safety Injection System	"These are simple check valves with no external means of exercising or for determining obturator position, thus, testing these valves in the open direction requires system flow. Full stroke exercising of 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. At cold shutdown, there are several issues that make exercising impractical, including: 1. There is no available reservoir in the reactor coolant system to accept the injected water and the shutdown cooling system cannot provide sufficient letdown flow back to the RWT to accommodate full design flow from the RWT while maintaining the necessary core cooling function; 2. The excessive quantities of boric acid injected during such testing would seriously hamper the ensuing startup; and 3. 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 (LTOP) specified in the St. Lucie Technical Specifications, Section 3.4-9. Partial flow exercising of these valves is performed whenever its associated HPSI pump is used to refill a SIT. The acceptable SIT level and pressure bands specified by the Technical Specifications are very narrow and the SIT's are only refilled on an as- needed basis; therefore, the partial flow test cannot readily be incorporated into a periodic test. Alternate flow paths for partial flow tests are limited by the design pressure of the associated piping."	These valves will be part-stroke exercised open while refilling a SIT. The SIT tanks will only be refilled as required to maintain them within the Technical Specification limits. No SIT will be filled for the sole purpose of part-stroke exercising any one of these check valves. Each of these valves will be full-stroke exercised (open) during each refueling outage.	It is impractical to full-stroke exercise these valves open quarterly because it would require the operation of the HPSI pumps, which can not overcome system pressure to operate. Full-stroke exercising during cold shutdowns is also impractical because it would result in the addition of concentrated boric acid to the RCS, possible delaying plant restart. The alternative provides for partial-stroke exercising the valves open when the SITs are refilled, and full-stroke exercising during refueling outages in accordances with OM Part 10 ¶4.3.2.2(e).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
RFJ-09	Unit 2 only: V3522 V3547 HPSI Pumps Discharge Check Valves	2998-G-078 Sh 130A Safety Injection system	"These are simple check valves with no external means of exercising or for determining obturator position. Thus, testing these valves in the open direction requires system flow. Full stroke exercising of 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 can develop sufficient discharge pressure to overcome primary system pressure. At cold shutdown, there are several issues that make exercising impractical, including: 1. There is no available reservoir in the reactor coolant system to accept the injected water and the shutdown cooling system cannot provide sufficient letdown flow back to the RWT to accommodate full design flow from the RWT while maintaining the necessary core cooling function; 2. The excessive quantities of boric acid injected during such testing would seriously hamper the ensuing startup; and 3. 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 (LTOP) specified in the St. Lucie Technical Specifications, Section 3.4-9."	Each of these check valves will be partial-stroke exercised during each cold shutdown and full-stroke exercised during each refueling outage.	It is impractical to full-stroke and partial-stroke exercise these valves open during operation because it would require flow from HPSI pumps 2A and B, which cannot develop sufficient discharge pressure to overcome system pressure. The licensee has stated that full-stroke exercising during cold shutdowns is also impractical because it would result in the addition of concentrated boric acid to the RCS possibly delaying restart. The licensee has stated in the Alternate Testing Section of the justification, however, that these valves will be partial stroke exercised during each cold shutdown. The licensee should review the Deferral Justification which describes several issues which make cold shutdown exercising impractical, and revise as necessary.

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
RFJ-10	Unit 2 only: V3524 V3525 V3526 V3527 HPSI Pump PIVs	2998-G-078 Sh 131 Safety injection System	"These are simple check valves with no external means of exercising or for determining obturator position, thus, testing these valves in the open direction requires system flow. Full stroke exercising of these valves would require operating a high pressure safety injection (HPSI) pump at nominal accident flowrate and injecting into the reactor coolant system. At power operation this is not possible because the HPSI pumps cannot 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 V3524 and V3526 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 flowpath. This would constitute a breach of containment integrity, as defined in Technical Specifications 3.6.1 - 1, and therefore use of this flowpath is precluded in Modes 1, 2, 3 and 4."	Each of these check valves will be partial-stroke exercised during each cold shutdown and full-stroke exercised during each refueling outage.	It is impractical to full-stroke exercise these valves open quarterly because it would require operation of the HPSI pumps which cannot develop sufficient discharge pressure to overcome the RCS pressure. It is also impractical to exercise these valves during cold shutdowns due to the possibility of pressure transients which could exceed plant LTOP limits and result in equipment damage. The alternative to partial stroke open these valves during cold shutdowns, and to full-stroke open during refueling outages is in accordance with OM Part 10 ¶ 4.3.2.2(d). The licensee has explained why valves V3524 and V3526 cannot be partial stroked open quarterly. The licensee should also include an explanation for valves V3525 and V3527.
RFJ-11	Unit 1 only: V09303 AFW Pump Discharge Check Valve	8770-G-080 Sh 4 Condensate and Feedwater System	"This is a simple check valve with no external means of exercising or for determining obturator position, thus, testing it in the open direction requires system flow. There is no flowrate instrumentation available to verify valve full-stroke exercising of this valve as required by the Generic Letter 89-04, Position 1. Note that this valve is significantly different from the other two pump recirculation valves and, thus, it is called out for individual inspection and not included in the other group of valves."	During each refueling outage this valve will be disassembled, inspected, and manually stroked to verify operability.	It is impractical to exercise this valve open with flow because it is installed on the steam driven AFW pump 1C minimum flow line with no flow instrumentation or position indication. The alternative is in accordance with OM Part 10 ¶ 4.3.2.4(c).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
RFJ-12	Unit 2 only: VI2806 Unit 1 AFW Pump Suction Check Valve	2998-G-080 Sh 2B Feedwater and Condensate Systems	"This is a simple check valve with no external means of exercising or for determining obturator position, thus, testing it in the open direction requires system flow. Cycling this valve is unacceptable during plant operation as it would jeopardize the Unit 1 and Unit 2 Auxiliary Feedwater Pumps when performing a flow test. To pass flow through this valve requires aligning the pumps' suction piping to the non-classed and non-seismic cross connect piping and components. Thus, a credible single failure of the non-classed piping could disable all (both units) auxiliary feedwater pumps. Cycling of this valve during Unit 2 shutdowns is not practicable since it would require Unit 1 also be shutdown to perform the testing."	During each Unit 1 refueling outage this valve will be full-stroke exercised.	It is impractical to full-stroke or partial-stroke exercise this valve open quarterly during operation because it would interrupt flow to both units' AFW pumps. The alternative provides for full-stroke exercising the valve open during Unit 1 refueling outages in accordance with OM Part 10 ¶ 4.3.2.2(e).
RFJ-13	Unit 1 only: V12507 AFW Pump Bearing Cooling Water Discharge Check Valve	8770-G-080 Sh 4 Feedwater and Condensate Systems	"This is a simple check valves with no external means of exercising or for determining obturator position, thus, testing it in the open direction requires system flow. There is no flowrate instrumentation available to verify valve full-stroke exercising of this valve as required by the Generic Letter 89-04, Position 1."	During each refueling outage this valve will be disassembled, inspected, and manually stroked to verify operability.	It is impractical to full-stroke exercise this valve open with flow because there is no instrumentation installed. The alternative is in accordance with OM Part 10 ¶ 4.3.2.4(c). However, as discussed in PR-02, the turbine driven AFW pump is minimum flow tested quarterly and full flow tested during cold shutdowns. The licensee should investigate why partial stroking is not possible during the quarterly and cold shutdown testing.
RFJ-14	Units 1 & 2: V15328 Primary Water Supply CIV	2998-G-084 Sh 1 8770-G-084 Sh 1C Domestic and Make-Up Water Systems	"This is a simple check valve with no external means of exercising or for determining obturator position, thus the only practical means of verifying closure is by performing a leaktest or backflow test. This would require a considerable effort, including entry into the containment building. Due to access this is impractical during plant operation and would be an unreasonable burden on the plant staff to perform during cold shutdowns."	During each refueling outage this valve will be verified to close.	It is impractical to exercise these valves closed quarterly or during cold shutdowns due to the need to set up test equipment. The alternative is in accordance with OM Part 10 ¶ 4.3.2.2(c).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
RFJ-15	Units 1 & 2: VI8195 Instrument Air CIV	2998-G-085 Sh 2A 8770-G-085 Sh 2A Instrument Air System	"This is a simple check valve with no external means of exercising or for determining obturator position, thus the only practical means of verifying closure is by performing a leaktest or backflow test. This would require a considerable effort, including entry into the containment building and securing all instrument air to the containment. Due to access limitations and the undesirability of isolating the air supply for critical equipment, this is impractical during plant operation and would be an unreasonable burden on the plant staff to perform during cold shutdowns."	During each refueling outage this valve will be verified to close.	It is impractical to exercise these valves closed quarterly or during cold shutdowns due to the need to set up test equipment. The alternative is in accordance with OM Part 10 ¶ 4.3.2.2(e).
RFJ-16	Units 1 & 2: V07129 V07143 Containment Spray Pump Discharge Check Valves	2998-G-088 Sh 1 8770-G-088 Sh 1 Contain-ment Spray System	"These are simple check valves with no external means of exercising or for determining obturator position. Thus, testing these valves in the open direction requires system flow. Full-stroke exercising of these valves would require operating each containment spray pump at nominal accident flowrate. Since exercising these valves through the normal containment spray flowpath would result in spraying down the containment, the only practical flowpath available for such a test requires pumping water from the refueling water tank (RWT) to the RCS via the shutdown cooling loops. 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."	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 demonstrated full-stroke capability.	It is impractical to full-stroke exercise these valves open quarterly or during cold shutdowns because it would result in spraying the containment building resulting in equipment damage and operational transients. The alternative provides for partial stroking quarterly and full-stroke exercising during refueling outages in accordance with OM Part 10 ¶ 4.3.2.2(d).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
RFJ-17	Unit 1 only: V07256 V07258 Containment Spray Pump Suction Header Check Valves	8770-G-088 Sh 1 Contain-ment Spray	"These are simple check valves with no external means of exercising or for determining obturator position, thus, testing these valves in the open direction requires system flow. Testing these valves during normal plant operation in conjunction with testing of the containment spray pumps would contaminate the containment spray piping with sodium hydroxide. The only practical means of testing these valves requires connection of a source of demineralized water at the tank discharge then directing water into the containment spray piping. This places both containment spray trains out of service and would entail a somewhat complex procedure and system re-alignment that is considered outside the scope of work that is typically performed during operations or a routine cold shutdown period, thus, such a test is impractical during periods other than reactor refueling outages."	During each refueling outage both of these valves will be full-stroke exercised (open and closed).	It is impractical to exercise these valves open quarterly during operation or at cold shutdowns since it would require pumping NaOH through the containment spray piping thereby contaminating the system. It is also impractical to use demineralized water due to the required test set up. The alternative to full-stroke these valves to the open position during refueling outages is in accordance with OM Part 10 ¶ 4.3.2.2(e). The licensee has not, however, provided a justification for deferring verification of closure for these normally closed valves.
RFJ-18	Unit 2 Only: V07256 V07258 Hydrazine Pumps Discharge Check Valves	2998-G-088 Sh 1 Contain-ment Spray	"These are simple check valves with no external means of exercising or for determining obturator position, thus, testing these valves in the open direction requires system flow. Testing these valves during normal plant power operation in conjunction with testing of the hydrazine pumps would contaminate the containment spray piping with hydrazine. In addition, any mode of testing requires draining significant portions of the containment spray system. This entails a somewhat complex procedure and system re-alignment that is considered outside the scope of work that is typically performed during operations or a routine cold shutdown period, thus, such a test is impractical during periods other than reactor refueling outages. In addition to the physical system constraints, frequent performance of the above mentioned testing is undesirable based on the personnel hazards associated with testing. Hydrazine is a dangerous, highly flammable liquid with cumulative toxic effects when absorbed through the skin, inhaled or ingested. It has also been identified as a known carcinogen. For this reason, it is proposed to perform this testing only during refuel outages."	During each refueling outage both of these valves will be full-stroke exercised (open).	It is impractical to exercise these valves open quarterly during operation because it would require pumping hydrazine through the containment spray piping. It is also impractical to test these valves during cold shutdowns because of the need to drain the containment spray piping and system realignment which could delay plant operation. The alternative to exercise the valves open during refueling outages is in accordance with OM Part 10 ¶ 4.3.2.2(e).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
RFJ-19	Units 1 & 2: V271 01 V27102 Sampling System CIVs	2998-G-092 Sh 1 8770-G-092 Sh 1 Miscellane-ous Sampling System	"These are simple check valves with no external means of exercising or for determining obturator position, thus the only practical means of verifying closure is by performing a leaktest or backflow test. This would require a considerable effort, including entry into the containment building and breaking the sampling line connections. This is impractical during plant operation and would be an unreasonable burden on the plant staff to perform at cold shutdown."	During each refueling outage these valves will be verified to close.	It is impractical to exercise these valves closed quarterly or during cold shutdowns due to the need to set up test equipment. The alternative is in accordance with OM Part 10 ¶ 4.3.2.2(e).
RFJ-20	Units 1 & 2 V2118 VCT to Reactor Coolant Pump Suction Check Valve	2998-G-078 Sh 121A 8770-G-078 Sh 121A Chemical and Volume Control System	"These are simple check valves with no external means of verifying closure, thus closure testing of these valves requires a backflow test. Performance of such test involves isolation of the normal charging flowpath and pressurization of the charging pump suction header using the boric acid pumps. Valve closure is verified by confirming no significant transfer of water from the BAM tank(s) to the VCT. To make this test meaningful and conclusive all sources of water into the VCT must be isolated, including the RCP seal leakoff line. This, in turn, requires securing the RCP's or providing extraordinary means of accommodating seal leakoff which must be maintained whenever a reactor coolant pump is in operation."	During each refueling outage these valves will be exercised closed.	It is impractical to exercise these valves closed quarterly during operation due to the possibility of damaging the RCP seals. It is also impractical to test these valves during cold shutdowns because it would require shutting off the RCPs which could extend the cold shutdown period. The alternative provides for exercising the valves closed during refueling outages in accordance with OM Part 10 ¶4.3.2.2(e). The licensee should consider establishing a schedule to account for extended cold shutdown outages when the RCPs are stopped for a sufficient length of time as discussed in NUREG-1482 Section 3.1.1.4.

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
COLD SHUTDOWN JUSTIFICATIONS					
REACTOR COOLANT SYSTEM					
CSJ-U1- RC-01	Unit 1 only: PCV-1100E PCV-1100F- Pressurizer Spray Control Valves	8770-G-078 Sh 110A Reactor Coolant System	"During normal power operations, these two valves are used to control RCS pressure by automatically throttling the spray flow into the pressurizer. Fully opening these valves, in preparation for timing the stroke closed test, would have an immediate negative effect on RCS pressure. The increased spray flow would condense part of the steam bubble inside the pressurizer, causing pressurizer pressure, and therefore RCS pressure, to drop rapidly."	Per the Unit 1 Valve Table, these valves are exercised closed and tested to their fail-safe position during cold shutdowns.	It is impractical to partial-stroke or full-stroke exercise these valves open or test the valves to the fail-closed position quarterly because of the resulting RCS transients. The alternative provides full-stroke exercising to the closed position in accordance with OM Part 10, ¶ 4.2.1.2(c).
CSJ-U1-RC-02 (CSJ-U2-RC-01)	Unit 1: V1402 and V1404 Unit 2: V-1474 and V-1475 PORVs	8770-G-078, Sh 110A 2998-G-078 Sh 108 Reactor Coolant System	"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 at full operating pressure."	Per the Unit 1 and Unit 2 Valve Tables, these valves are exercised open during cold shutdowns.	As discussed in Generic Letter 90-06, testing of the PORVs should not be performed during power operation due to the risk associated with challenging these valves in this condition. Therefore, it is impractical to exercise these valves open quarterly. The alternative provides full-stroke exercising during cold shutdowns in accordance with OM Part 10 ¶ 4.2.1.2(c).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
CSJ-U1-RC-03 (CSJ-U2-RC-02)	Unit 1: V1441 thru V1446 and V1449 Unit 2: V-1460 thru V-1466 Reactor Coolant System Vents	8770-G-078 Sh 110 A 2998-G-078 Sh 107 Reactor Coolant System	Units 1 and 2: "These valves are administratively controlled in the keylocked closed position with the power supply disconnected to prevent inadvertent operation. Since these are reactor coolant system boundary valves, failure of a valve to close or significant leakage following closure can result in loss of coolant in excess of the limits imposed by the Technical Specification leading to a plant shutdown. Furthermore, if a valve were to fail open or valve indication to fail to show the valve returned to the fully closed position following exercising, prudent plant operation would likely result in a plant shutdown." Unit 1 only: "Note also that Technical Specification 3.4.10 requires these valves to be closed during operation. This justification agrees with the guidelines provided in NUREG-1482, Paragraph 3.1.1."	Per the Unit 1 and 2 Valve Tables, these valves are exercised open during cold shutdowns.	It is impractical to exercise these valves open quarterly because testing during power operation could jeopardize the integrity of the RCS pressure boundary. The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(c).
CHEMICAL AND VOLUME CONTROL SYSTEM					
CSJ-U1-CH-01 (CSJ-U2-CH-01)	Unit 1: V2515 and V2516 Unit 2: V2522 Letdown Line Containment Isolation Valves	8770-G-078 Sh 120B 2998-G-078 Sh 120 Chemical & Volume Control System	"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 expedited plant shutdown would be required."	Per the Unit 1 and Unit 2 Valve Tables, these valves are exercised closed and tested to the fail-safe position during cold shutdowns.	It is impractical to partial-stroke or full-stroke exercise these valves closed or test to the fail-closed position quarterly because of the resulting RCS transients and potential for a plant trip. The alternative provides full-stroke exercising to the closed position during cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(c).
CSJ-U1-CH-02 (CSJ-U2-CH-02)	Units 1 and 2: SE-02-03 and SE-02-04 Auxiliary Pressurizer Spray Valves	8770-G-078 Sh 120B 2998-G-078 Sh 122 Chemical & Volume Control System	"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 and nozzle would be subjected to undesirable thermal shock."	Per the Unit 1 and Unit 2 Valve Tables, these valves are exercised open and closed and tested to their fail-safe position during cold shutdowns.	It is impractical to exercise these valves quarterly because of the resulting RCS pressure transient and the potential for a plant trip. The alternative provides full-stoke exercising to the open and closed positions at cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(c).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
CSJ-U1-CH-03 (CSJ-U2-CH-03)	Units 1 and 2: V2431 Auxiliary Pressurizer Spray Check Valve	8770-G-078 Sh 120B 2998-G-078, Sh 122, Rev. 16 Chemical & Volume Control System	"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 and nozzle would be subjected to undesirable thermal shock."	Per the Unit 1 and Unit 2 Valve Tables, this check valve is full-stroke exercised open during cold shutdowns.	It is impractical to partial-stroke or full-stroke exercise this valve to the open position quarterly because of the resulting RCS pressure transient and the potential for a plant trip. The alternative provides full-stroke exercising to the open position at cold shutdowns in accordance with OM Part 10, ¶ 4.3.2.2(c).
CSJ-U1-CH-04 (CSJ-U2-CH-04)	Units 1 and 2: V2501 Volume Control Tank Outlet Valve	8770-G-078 Sh 121A 2998-G-078 Sh 121A Chemical & Volume Control System	"Closing this valve during operation of a charging pump would isolate the VCT from the charging pump suction header with the potential for damaging any operating charging pump. This would effectively interrupt the flow of charging water flow to the RCS with the potential of an RCS transient and plant trip."	Per the Unit 1 and Unit 2 Valve Tables, this valve is exercised open and closed during cold shutdowns.	It is impractical to exercise this valve quarterly because of potential damage to the charging pumps. The alternative provides full-stroke exercising to both the open and closed positions during cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(c).
CSJ-U2-CH-05	Unit 2 only: V2523 Charging Line Isolation Valve	2998-G-078 Sh 122 Chemical & Volume Control System	"Closing this valve 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 the valve failed to reopen, then an expedited plant shutdown would be required."	Per the Unit 2 Valve Table, this valve is exercised closed during cold shutdowns.	It is impractical to exercise this valve quarterly because of the resulting pressurizer transients and the potential for a plant trip and damage to the charging pumps. The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(c).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
SAFETY INJECTION/ RESIDUAL HEAT REMOVAL SYSTEM					
CSJ-U2-SI-01	Unit 2 only: V3101 Safety Injection Supply to Volume Control Tank Check Valve	2998-G-078 Sh 130B Safety Injection	This is a simple check valve with no external means of exercising nor for determining disc position, thus the only practical way of verifying opening is by means of a forward flow test. Such a test requires partial draining of a SIT to the VCT. During such a test, if the isolation valves were to fail open for any reason, the SIT would be drained below the Technical Specification limits and the reactor coolant system over-borated to the extent that a plant shutdown would result."	Per the Unit 2 Valve Table, this valve is exercised to the open position during cold shutdowns.	It is impractical to partial-stroke or full-stroke exercise this valve open quarterly because of a possible plant shutdown if the isolation valves were to fail open during such a test. The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OM Part 10 ¶ 4.3.2.2(c).
CSJ-U1-SI-01 (CSJ-U2-SI-02)	Units 1 and 2: V3106 and V3107 LPSI Pump Discharge Check Valves	8770-G-078 Sh 130B 2998-G-078 Sh 130B Safety Injection	"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." Additionally for Unit 1: " The only other test flowpath available is through the shutdown cooling line recirculating to the RWT. This would require opening valves HCV-3657, V3460, and V3459. With these valves open, both trains of the LPSI subsystem would be considered to be inoperable, therefore this testing scheme is unacceptable."	Per the Unit 1 and Unit 2 Valve Tables, these check valves are exercised open during cold shutdowns.	It is impractical to full-stroke exercise the valves open quarterly due to insufficient pump discharge head. The alternative provides for full-stroke exercising to the open position during cold shutdowns in accordance with OM Part 10, ¶ 4.3.2.2(b).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
CSJ-U1-SI-02	Unit 1 only: V3659 and V3660 LPSI Pump Discharge Minimum Flow/Recirc-ulation Line Isolation Valves	8770-G-078 Sh 130B Safety Injection	"Failure of either of these valves in the closed position during testing will render all safety injection pumps inoperable due to the high probability of damage should these pumps be started and operated without sufficient flow for cooling of pump internal components."	Per the Unit 1 Valve Table, these valves are exercised closed during cold shutdowns.	It is impractical to exercise these valves closed quarterly due to potential damage to the LPSI pumps should the LPSI pumps be required to operate. The alternative provides full-stroke exercising to the closed position during cold shutdowns in accordance OM Part 10 ¶ 4.2.1.2(c). Per PR-6, the LPSI pumps are full-flow tested during cold shutdowns. It is unclear how valves V3659 and V3660 can be exercised quarterly as specified in the Unit 2 Valve table. The licensee should review this and submit a cold shutdown justification for Unit 2 if needed.

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
CSJ-U1-SI-03 (CSJ-U2-SI-03)	Units 1 and 2: V3114, V3124, V3134, and V3144 LPSI Cold Leg Injection Check Valves	8770-G-078 Sh 131 A 2998-G-078 Sh 130B Safety Injection System	"These are simple check valves with no external means of exercising or for determining obturator position. Thus, testing these valves in the open direction requires system flow. 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 flowrate 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 testing is similarly not practical since it would require isolating the associated safety injection tank which is not permitted during plant operation." In addition, for Unit 2: "Verification of closure can be done by operating a HPSI pump with the associated HPSI header isolation valve open and determining check valve backflow. This, however, would unseat the associated downstream header check valve and require leakage testing of this valve per St. Lucie Technical Specification 4.4.6.2. Although not impractical, such quarterly leakage testing would be an undue burden on the plant staff. Note that valves V3114, V3124, V3134, and V3144 remain closed during power operation."	Per the Unit 1 and Unit 2 valve tables, these valves are exercised open during cold shutdowns. Per the Unit 1 Valve Table, these valves are exercised closed per VR-04, while the Unit 2 valves are exercised closed during cold shutdowns.	It is impractical to full-stroke exercise these valves open quarterly because the LPSI pumps cannot develop sufficient discharge pressure to achieve full opening. It is impractical to partial-stroke exercise these valves open quarterly because this requires the associated SI Tank to be isolated during plant operation. For Unit 2, it is impractical to exercise the valves closed quarterly. Technical Specification 4.4.6.2 requires additional leakage testing following PIV operation. As discussed in NUREG-1482, Section 4.1.4, the need to set-up test equipment during operation is adequate justification for deferral of testing to cold shutdowns. The alternative provides full-stroke exercising to the open position (and closed position for the Unit 2 valves) during cold shutdowns in accordance with OM Part 10, ¶ 4.3.2.2(c).
CSJ-U1-SI-04 (CSJ-U2-SI-04)	Units 1 and 2: V3480, V3481, V3651, and V3652 Shutdown Cooling RCS Isolation Valves	8770-G-078 Sh 131A 2998-G-078 Sh 131 Safety Injection System	"These valves are provided with electrical interlocks that prevent opening during reactor power operation. In addition, during operation it is likely that these valves will experience a large pressure differential (in excess of 2000 psid). At this differential pressure the valve operators are incapable of opening the valves. Furthermore, if they could be opened operation at high differential pressure could result in damage to their seating surfaces. For these reasons exercising these valves in any plant condition other than cold shutdown is impractical."	Per the Unit 1 and Unit 2 Valve Tables, these valves are exercised open and closed during 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 during operation. The alternative provides full-stroke exercising during cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(c).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
CSJ-U2-SI-05	Unit 2 only: V03002, V3003, V3004 and V03005 Safety Injection Tank (SIT) Drain Line Check Valves	2998-G-078 Sh 132 Safety Injection System	"Exercising these valves requires draining of each of the SIT's. This is not considered to be an appropriate nor prudent activity to perform during plant operation due to the obvious safety issues related to SIT inventory and chemistry control."	Per the Unit 2 Valve Table, these valves are exercised open during cold shutdowns.	It is impractical to partial-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 OM Part 10, ¶ 4.3.2.2(c).
CSJ-U2-SI-06	Unit 2 only: V3258, V3259, V3260 and V3261 Safety Injection Header Check Valves	(2998-G-078 Sh 132 Safety Injection	"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. 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 flowrate 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 when ever its associated SIT is refilled. The acceptable SIT level band specified by the Technical Specification is very narrow. The SIT's are only refilled on an as needed basis; therefore, the partial flow test cannot readily be incorporated into a quarterly test."	Per the Unit 2 Valve Table, these valves are exercised open during cold shutdowns.	It is impractical to full-stroke exercise these valves open quarterly because the LPSI pumps cannot develop sufficient discharge pressure to achieve full opening. The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OM Part 10 ¶ 4.3.2.2(c). In addition, these valves are also partial-stroked open during the refilling of the safety injection tank as needed during operation.

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
CSJ-U1-SI-05 (CSJ-U2-SI-07)	Units 1 and 2: V3614, V3624, V3634, and V3644 SIT Discharge Isolation Valves	8770-G-078 Sh 131 B 2998-G-078 Sh 132 Safety Injection System	"During normal plant operation, these valves are administratively controlled to be locked open with their breakers racked out to ensure they remain in the open position with no chance of misalignment. These valves are also interlocked such that they will automatically go open if RCS pressure is greater then 350 psia (500 psia for Unit 2). Therefore, the valves can only be cycled closed during Modes 4 (<350 psia or <500 psia for Unit 2)), 5 and 6."	Per the Unit 1 and Unit 2 Valve Tables, these valves are exercised closed during 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 OM Part 10, ¶ 4.2.1.2(c).
CSJ-U2-SI-08	Unit 2 only: V3733, V3734, V3735, V3736, V3738, V3739 and V3740 SIT Vent Valves	2998-G-078 Sh 132 Safety Injection System	"Cycling any of these valves during normal plant operation with the SIT's pressurized is undesirable since if a valve were to fail to re-close the result would be a de-pressurization of the affected SIT and a plant shutdown. Even controlled venting could reduce SIT pressure below the Technical Specification limits requiring unnecessary recharging of the SIT."	Per the Unit 2 Valve Table, these valves are exercised closed and exercised open and tested to their fail-safe closed position during cold shutdowns.	It is impractical to exercise these valves quarterly because they are locked closed during normal plant operation to maintain pressurization of the SIT and a failure during testing would require a plant shutdown. The alternative provides full-stroke exercising to the open and closed position and testing to the fail-safe position during cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(c).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
WASTE MANAGEMENT SYSTEM					
CSJ-U1-WM-01	Unit 1 only: V6779 Nitrogen Header Containment Isolation Check Valve	8770-G-078 Sh 163B Waste Manage-ment	"This is a simple check valve with no external means of exercising nor for determining disc position, thus the only practical way of verifying closure is by means of a backflow test. Backflow testing of this valve requires that the downstream side of the valve be pressurized and the upstream side vented. To vent the upstream side of the valve, a blank flange must be removed and the drain valve, V6340, opened. With the drain valve open, check valve V6779 becomes the sole containment isolation valve for this penetration. In this configuration, containment integrity requirements could unknowingly be violated. Note that the test connection valve is not leak tested and manual closure of V6340 under accident conditions is questionable. Therefore, backflow testing should only be performed when containment integrity is not required (Modes 5 or 6)."	Per the Unit 1 Valve Table, this valve is exercised closed during cold shutdowns.	It is impractical to partial-stoke or full-stroke exercise this valve closed quarterly because failure of this valve to close during the test would result in a loss of containment integrity. The alternative provides full-stroke exercising to the closed position in accordance with OM Part 10 ¶ 4.3.2.2(c).
CSJ-U2-WM-01	Unit 2 only: V6792 Nitrogen Gas Supply Containment Isolation Check Valve	2998-G-078 Sh 163B Waste Manage-ment	"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 back leakage test. Performing such a test requires entry into the containment building and thus is impractical to do during plant power operation."	Per the Unit 2 Valve Table, this valve is exercised closed during cold shutdowns.	The licensee states that it is impractical to exercise this valve closed quarterly because this requires entry into the containment during plant operation to perform a backleakage test. This is not an adequate justification for deferring the testing. NUREG-1482, Section 4.1.4 provides additional information on impracticality of testing check valves during operation. The licensee should provide additional information on why it is impractical to test during operation (e.g., need to set up test equipment), and revise this deferral request. The licensee should also correct the drawing reference for this deferral to correctly indicate drawing number 2998-G-078, Sh 163B.

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
MAIN STEAM SYSTEM					
CSJ-U1-MS-01 (CSJ-U2-MS-01)	Units 1 and 2: HCV-08-1 A&B Main Steam Isolation Valves	8770-G-079 Sh 1 2998-G-079 Sh 1 Main Steam System	"Closing either of these valves isolates the associated steam header. During power operation isolation of a header would require a significant power reduction and could result in unacceptable steam generator level and reactor power transients with the potential for a plant trip." Additionally, for Unit 2: "NUREG-1432, Vol 1, Rev. 1, "STANDARD TECHNICAL SPECIFICATIONS Combustion Engineering Plants Specifications", states that MSIV's should not be tested (full or partial stroke) at power and they are exempt from the requirements of the ASME Code, Section XI while operating in Modes 1 or 2."	Per the Unit 1 Valve Table, these air-operated stop check valves are partially exercised closed quarterly and full-stroke exercised closed during cold shutdowns. Per the Unit 2 Valve Table, these piston-operated globe valves are full-stroke exercised closed and tested to their fail safe position during cold shutdowns.	For Unit 1, it is impractical to full-stroke exercise these valves closed quarterly because this would cause a plant transient. The alternative provides partial-stroke exercising to the closed position quarterly and full-stroke exercising to the closed position at cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(b). For Unit 2, it is impractical to partial-stroke or full-stroke exercise these valves closed quarterly due to the risk of valve closure as discussed in NUREG-1432, Vol. 1, Rev. 1, "Standard Technical Specifications - Combustion Engineering Plants." The alternative provides full-stroke exercising and fail-safe testing to the as-is position during cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(c).
CSJ-U1-MS-02 (CSJ-U2-MS-02)	Units 1 and 2: V08130 and V08163 Steam-Driven AFW Pump Steam Supply Check Valves	8770-G-079 Sh 1 2998-G-079 Sh 1 Main Steam System	"Full-stroke exercising of these valves would require operation of Auxiliary Feedwater Pump 1C (2C (Unit 2)) and injection of cold water (85 deg F) into hot (450 deg F) feedwater supply piping. This, in turn, would result in unacceptable thermal stress on the feedwater system piping components. These valves will be partial stroke tested during quarterly testing via the minimum flow recirculation lines."	Per the Unit 1 and Unit 2 Valve Tables, these valves are partially exercised open quarterly and after disassembly and inspection, and full-stroke exercised open during cold shutdowns.	It is impractical to full-stroke exercise these valves open quarterly because of the potential of equipment damage due to thermal stress. The alternative provides partial-stroke exercising to the open position quarterly and full-stroke exercising to the open position at cold shutdowns in accordance with OM Part 10, ¶ 4.3.2.2(b).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
CSJ-U1-MS-03 (CSJ-U2-MS-03)	Unit 1: SE-08-1A1, through 1A4, and SE-08-1B1 through 1B4 Unit 2: V2A through V5A, V19A, V20A, V2B through V5B, V19B and V20B Main Steam Isolation Valve (MSIV) Air Pilot Valves	8770-G-079 Sh 7 2998-1014 Main Steam System Unit 2: MSIV Pneumatic Control System	"The pneumatic control systems for each of the MSIV's are designed such that the operation of these pilot valves can be verified and tested while the plant is operating at power and the associated MSIV is open; however, there is concern that a failure of a blocking valve or procedural mishap could inadvertently cause an MSIV to close. Closure of one of these valves at power would subject the plant to a significant and traumatic transient with a plant trip likely."	Per the Unit 1 Valve Table, the 1A1, 1A2, 1B1 and 1B2 valves are exercised closed during cold shutdowns. The 1A3, 1A4, 1B3 and 1B4 valves are exercised open during cold shutdowns. Per the Unit 2 Valve Table, these valves are exercised closed and tested to their fail-safe position during cold shutdowns.	Per the Unit 1 and Unit 2 Valve Tables, these valves are not ASME Code Class. No evaluation was performed.
FEEDWATER AND CONDENSATE SYSTEM (INCLUDES AUXILIARY FEEDWATER SYSTEM)					
CSJ-U1-BF-01	Unit 1 only: MV-09-01 MV-09-02 Main Feedwater Pump Isolation Valves.	8770-G-080 Sh 3 Feedwater & Condensate Systems	"During plant power operation, closure of either of these valves is not practical as it would require a significant decrease of plant power and possibly securing a main feedwater pump in addition to upsetting the steam plant static operating condition. NUREG-1432, Vol 1, Rev. 1, "STANDARD TECHNICAL SPECIFICATIONS Combustion Engineering Plants Specifications", states that MFIV's should not be tested (full or partial stroke) at power and they are exempt from the requirements of the ASME Code, Section XI while operating in Modes 1 or 2. Based on this recommendation, these valves should not be partial stroke tested."	Per the Unit 1 Valve Table, these valves are exercised closed during cold shutdowns.	Per the Unit 1 Valve Table, these valves are not ASME Code Class. No evaluation was performed.

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
CSJ-U2-BF-01	Unit 2 only: CHKVLV-1 A&B and CHKVLV-2 A&B Main Feedwater Air Supply Check Valves	2998-G-080 Sh 2A Feedwater & Condensate Systems	"These are simple check valves with no external means of determining disc position; therefore, verification of closure can only be accomplished by performing a backflow or back-leakage test. Since the system was not provided with a convenient testing means, this test requires isolation of the air supply to the subject MFIV and disassembly of portions of the air supply piping. It is not practical to perform such activities routinely on a quarterly basis with the plant operating at power. The risks associated with the degree of undesirability of system disassembly and the potential of introducing foreign materials into the pneumatic operating system outweigh any benefits gained from quarterly testing."	Per the Unit 2 Valve Table, these valves are full-stroke exercised to the closed position during cold shutdowns.	The subject valves are not shown on the referenced drawing. Per the Unit 2 Valve Table, these valves are not ASME Code Class. No evaluation was performed.
CSJ-U1-BF-02 (CSJ-U2-BF-02)	Unit 1: MV-09-07 MV-09-08 Unit 2: HCV-09-1 A&B and HCV-09-2 A&B Main Feedwater Isolation Valves	8770-G-080 Sh 3 2998-G-080 Sh 2A Feedwater & Condensate Systems	"During plant power operation, closure of either 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 possible plant trip. NUREG-1432, Vol 1, Rev. 1, "STANDARD TECHNICAL SPECIFICATIONS Combustion Engineering Plants Specifications", states that MFIV's should not be tested (full or partial stroke) at power and they are exempt from the requirements of the ASME Code, Section XI while operating in Modes 1 or 2. Based on this recommendation, these valves should not be partial stroke tested as well."	Per the Unit 1 and Unit 2 Valve Tables, these valves are exercised closed during cold shutdowns.	It is impractical to exercise these valves to the closed position quarterly because this could cause a transient and plant trip. The alternative provides full-stroke exercising to the closed position at cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(c).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
CSJ-U1-BF-03 (CSJ-U2-BF-03)	Unit 1: V09107, 09123, and 09139 Unit 2: V09107, V09123, and V09139 Auxiliary Feedwater Pump Discharge Check Valves	8770-G-080 Sh 4 2998-G-080 Sh 2B "Feedwater & Condensate Systems	"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 Unit 1 and Unit 2 Valve Tables, these check valves are exercised open during 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. It is impractical to partial-stroke or full-stroke open these valves quarterly due to the potential for equipment damage due to thermal stresses. The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OM Part 10, ¶ 4.3.2.2(c).
CSJ-U1-BF-04 (CSJ-U2-BF-04)	Units 1 and 2: V09119, 09135, 09151, and 09157 Auxiliary Feedwater Header and Supply Check Valves	8770-G-080 Sh 4 2998-G-080 Sh 2B Feedwater & Condensate Systems	"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 stresses on the feedwater system piping components."	Per the Unit 1 and Unit 2 Valve Tables, these valves are exercised open during cold shutdowns.	It is impractical to partial-stroke or full-stroke exercise these valves open quarterly due to the potential for equipment damage due to thermal stresses. The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OM Part 10, ¶ 4.3.2.2(c).
CSJ-U1-BF-05	Unit 1 only: V12174 and V12176 Auxiliary Feedwater Pump Suction Check Valves	8770-G-080 Sh 4 Feedwater & Condensate Systems	"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 would result in unacceptable thermal stresses on the feedwater system piping components. These valves will be partial stroke tested during quarterly testing via the minimum flow recirculation lines."	Per the Unit 1 Valve Table, these check valves are full-stroke exercised open during cold shutdowns and partial-stroke exercised open quarterly.	It is impractical to full-stroke exercise these valves open quarterly due to the potential for equipment damage due to thermal stresses. The alternative provides partial-stroke exercising quarterly and full-stroke exercising open during cold shutdowns in accordance with OM Part 10, ¶ 4.3.2.2(b).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
CSJ-U1-BF-06	Unit 1 only: V12177 Unit 2 Condensate Storage Tank to 1A and 1B Auxiliary Feedwater Pump Suction Isolation Valve	8770-G-080 Sh 4 Feedwater & Condensate Systems	"This manual valve is opened when cross connecting the 1A and 1B Auxiliary Feedwater Pump suction to the Unit 2 CST. This function is required in the event that a missile ruptures the Unit 1 CST which is not missile-protected vertically. Opening this valve during plant power operation is unacceptable as it would jeopardize the operability of 1A and 1B Auxiliary Feedwater Pumps by connecting their common suction piping to non-classed and non-seismic piping. Thus a credible single failure of the non-classed piping without timely operator action could disable both auxiliary feedwater pumps."	Per the Unit 1 Valve Table, this manual valve is exercised during cold shutdowns to verify proper operation and stroking with no stroke time measurements.	It is impractical to exercise this valve open quarterly as this would require connecting both of the Unit 1 motor-driven AFW pumps 1A and 1B to non-code class and non-seismic piping. The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(c).
CSJ-U1-BF-07	Unit 1 only: V12497 Unit 1 Condensate Storage Tank Outlet to 1A/1B Auxiliary Feedwater Pump Suction Isolation Valve	8770-G-080 Sh 4 Feedwater & Condensate Systems	"This manual valve is closed to isolate the Unit 1 CST when cross connecting the 1A and 1B Auxiliary Feedwater pump suction to the Unit 2 CST. This is required if a missile ruptures the Unit 1 CST which is not missile-protected vertically. Closing this valve during plant operation is unacceptable as it would render both the 1A and 1B Auxiliary Feedwater Pumps inoperable."	Per the Unit 1 Valve Table, this manual valve is exercised during cold shutdowns to verify proper operation and stroking with no stroke time measurements.	It is impractical to exercise this valve closed quarterly as this would render both of the motor-driven AFW pumps inoperable. The alternative provides full-stroke exercising to the closed position during cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(c).
CSJ-U2-BF-05	Unit 2 only: V12802 and V12803 Unit 2 Condensate Storage Tank to Unit 1 Auxiliary Feedwater Pump Suction Isolation Valves	2998-G-080 Sh 2B Feedwater & Condensate System	These manual valves are opened when cross tieing the Unit 2 CST to the Unit 1 CST. This is required if a missile ruptures the Unit 1 CST which is not protected from vertical missiles. Opening these valves during plant operation is unacceptable as it would jeopardize the Unit 2 Auxiliary Feedwater Pumps by connecting their suction piping to non-classed and non-seismic piping. Thus, a credible single failure of the non-classed piping could disable all the auxiliary feedwater pumps."	Per the Unit 2 Valve Table, these valves are exercised during cold shutdowns to verify proper operation and stroking with no stroke time measurements.	It is impractical to exercise these valves open quarterly as this would require connecting both of the Unit 2 motor-driven AFW pumps 2A and 2B to non-code class and non-seismic piping. The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(c).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
COMPONENT COOLING WATER SYSTEM					
CSJ-U1-CC-01 (CSJ-U2-CC-01)	Units 1 and 2: HCV-14-1, 2, 6 & 7 RCP Cooling Water Supply/ Return Isolation Valves	8770-G-083 Sh 1 B 2998-G-083 Sh 2 Component Cooling System	"These valves are required to be open during plant operations to ensure continued cooling of reactor coolant pump components. Closing any of these valves during plant operation could result in severe RCP (and CRD for Unit 2) damage leading to plant operation in a potentially unsafe mode and a subsequent plant shutdown."	Per the Unit 1 and Unit 2 Valve Tables, these valves are exercised closed and tested to their fail-safe position during cold shutdowns.	It is impractical to partial-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 CRD air coolers for Unit 2) would be interrupted resulting in equipment damage. The alternative provides full-stroke exercising to the closed position during cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(c).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
INSTRUMENT AIR SYSTEM					
CSJ-U1-IA-01 (CSJ-U2-IA-01)	Units 1 and 2: V18279 and V18283 Instrument Air Supply to Maintenance Hatch Door in Annulus Check Valves Units 1 and 2: V18290, V18291, V18294 and V18295 Instrument Air to Containment Vacuum Breakers Check Valves	8770-G-085 Sh 2A 2998-G-085 Sh 2A Instrument Air	"These (are) simple check valves with no external means of exercising nor for determining disc position, thus the only practical way of verifying closure is by means of a backflow test. Testing of these valves by any method requires isolation of a common instrument air header to the shield building annulus so that a vent path may be created on the upstream side of the check valves to determine closure. This test removes one maintenance hatch seal and/or containment vacuum relief from service and potentially renders both trains inoperable due to the time that instrument air would be isolated from the common header and the use of the opposing train component as the requisite vent path. Although isolation of instrument air and subsequent testing of a single train should not keep at least one train from functioning, it requires that both trains of the shield building ventilation system (Technical Specification 3.6.6.1) and containment vacuum relief (Technical Specification 3.6.5) be considered out of service. This would require entry into technical specification applicability statements as non-compliance for containment vacuum relief applicable in Modes 1 through 4 (and require plant shutdown)(Unit 1). Testing of these valves requires entry into the shield building annulus for valve lineup and monitoring purposes - neutron radiation area during Modes 1 and 2. Due to ALARA considerations and the aforementioned dual train operability concerns with components credited for accident mitigation, these valves should only be tested at cold shutdown intervals. (This is consistent with the guidelines presented in NUREG-1482, Paragraph 3.1.1(1)(Unit 1)."	Per the Unit 1 and Unit 2 Valve Tables, these check valves are exercised closed during cold shutdowns. (The instrument air to containment vacuum breaker valves are tested in series per VR-12).	It is impractical to partial-stroke or full-stroke exercise these valves closed quarterly because of entry into multiple LCO. The alternative provides full-stroke exercising to the closed position during cold shutdowns in accordance with OM Part 10, ¶ 4.3.2.2(c).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
CSJ-U1-IA-02	Unit 1 only: V18099, V18695, V18696 and V18699 MSIV Accumulator Instrument Air Supply Check Valves	8770-G-085 Sh 3 Instrument Air System	"Testing of these valves (closed) is not practical during plant operation because it isolates the instrument air supply to the main steam isolation valves (MSIV's) and the atmospheric dump valves (ADV's) and could lead to an inadvertent MSIV closure. Closure of an MSIV would isolate steam from the respective steam generator which would result in a severe transient on the steam and reactor systems and a possible plant trip. Isolation of air to the ADV's would cause them to be inoperable and incapable of opening. Although these valves are not "safety-related" they are operationally important in minimizing plant transients and shutting down the plant if necessary."	Per the Unit 1 Valve Table, these valves are exercised closed during cold shutdowns. (These valves are tested in series per VR-12).	It is impractical to exercise these valves closed quarterly because the testing could lead to an inadvertent MSIV closure and plant transient. The alternative provides full-stroke exercising to the closed position during cold shutdowns in accordance with OM Part 10, ¶ 4.3.2.2(c).
CSJ-U2-IA-02	Unit 2 only: HCV-18-1 Primary Containment Instrument Air Supply Valve.	2998-G-085 Sh 2C Instrument Air System	"Closing this valve isolates operating air to critical components in the containment building including the pressurizer spray, RCP cooling water supply and return, and CVCS letdown isolation valves and could cause severe plant transients, RCP damage and a plant trip. Failure in the closed position would cause a plant shutdown and RCP damage."	Per the Unit 2 Valve Table, this valve is exercised closed and tested to the fail-safe position during cold shutdowns.	It is impractical to exercise this valve to the closed position quarterly because this could result in a plant transient and trip. The alternative provides full-stroke exercising to the closed position at cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(c).
CONTAINMENT SPRAY SYSTEM					
CSJ-U1-CS-01 (CSJ-U2-CS-01)	Units 1 and 2: V07119 and V07120 RWT Outlet Check Valves	8770-G-088 Sh 1 8770-G-088 Sh 1 Contain-ment Spray	"These are simple check valves with no external means of exercising or for determining obturator position. Thus, testing these valves in the closed direction requires a back-leakage test. Such a test requires realignment of the associated safety injection and containment spray train that would render the complete train (LPSI, HPSI, and containment spray) inoperable for an extended period of time and entry into a multiple LCO. During plant power operation this is considered to be imprudent. This justification agrees with the guidelines provided in NUREG-1482, Paragraphs 3.1.1 and 3.1.2."	Per the Unit 1 and Unit 2 Valve Tables, these check valves are exercised closed during cold shutdowns. They are partially exercised open quarterly and disassembled and inspected in accordance with VR-14.	It is impractical to exercise these valves closed quarterly because this requires entry into multiple LCOs. In accordance with NUREG-1482, ¶ 3.1.2, entry into multiple LCOs is to be avoided. The alternative provides exercising to the closed position during cold shutdowns in accordance with OM Part 10, ¶ 4.3.2.2(c).

Item Number	Valve Identification	Drawing No.	Licensee's Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
HEATING, AIR CONDITIONING AND VENTILATION AND AIR CONDITIONING					
CSJ-U1-HVAC-01 (CSJ-U2-HVAC-01)	Units 1 and 2: FCV-25-1 through FCV-25-6 Primary Containment Purge and Vent Valves	8770-G-878 2998-G-878 Heating, Ventilation, and Air Conditioning	For Unit 1, "These valves are administratively maintained in the closed position at all times when the plant is operating in Modes 1, 2 or 3 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 them more than is absolutely necessary." For Unit 2, "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 them more than is absolutely necessary."	Per the Unit 1 and Unit 2 Valve Tables, these valves are exercised closed and tested to their fail safe position during cold shutdowns.	It is impractical to exercise these locked closed valves quarterly because of their large size, 48 in. diameter, and the potential for a gross breach of containment. The alternative provides full-stroke exercising to the closed position at cold shutdowns in accordance with OM Part 10, ¶ 4.2.1.2(c).