ATTACHMENT

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TECHNICAL EVALUATION REPORT
PUMP AND VALVE INSERVICE TESTING PROGRAM
TURKEY POINT, UNITS 3 AND 4

Docket Nos. 50-250 and 251

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ABSTRACT

This report presents the results of our evaluation of relief requests for the Turkey Point, Units 3 and 4, inservice testing program for safety-related pumps and valves.

PREFACE

This report is supplied as part of the "Review of Pump and Valve Inservice Testing Programs for Operating Reactors (III)" program conducted for the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Mechanical Engineering Branch, by EG&G Idaho, Inc., Regulatory and Technical Assistance Unit.

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1. INTRODUCTION

Contained herein is a technical evaluation of certain relief requests from the pump and valve inservice testing (IST) program submitted by Florida Power and Light Company (FP&L) for Turkey Point, Units 3 and 4.

The licensee submitted these relief requests in revision 2 of the IST program for Turkey Point, Units 3 and 4, dated September 19, 1989. This program covers the second ten-year IST interval for both units. The interval for Unit 3 runs from February 1984 to February 1994 and for Unit 4 from April 1984 to April 1994. Relief requests for safety-related pumps and valves are evaluated with respect to requirements of the ASME Boiler and Pressure Vessel Code (the Code), Section XI, 1983 Edition through Summer 1983 Addenda, 10 CFR 50.55a, and applicable NRC positions and guidelines. This technical evaluation report supersedes the interim relief that was granted per the NRC Safety Evaluation Report, "Turkey Point Units 3 and 4 - Interim Relief from the Inservice Testing Program for Pumps and Valves (TAC Nos. 76702 and 76703," dated August 20, 1990, for relief requests evaluated therein.

In their submittal, FP&L requested relief from the ASME Code testing requirements for specific pumps and valves. These requests were reviewed using the acceptance criteria of the Standard Review Plan, Section 3.9.6, the draft regulatory guide and value/impact statement titled "Identification of Valves for Inclusion in Inservice Testing Programs," and NRC Generic Letter No. 89-04 (GL 89-04), "Guidance on Developing Acceptable Inservice Testing Programs."

Section 1 of this report identifies the licensee's IST program and review method.

Section 2 presents the FP&L bases for requesting relief from the Section XI requirements for pumps and gives EG&G's evaluations and conclusions. Section 3 presents similar information for valves.

Appendix A lists program inconsistencies and omissions and identifies needed program changes.

2. PUMP TESTING PROGRAM

The following FP&L pump relief requests were evaluated against the requirements of the ASME Code, Section XI, 10 CFR 50.55a, and applicable NRC positions and guidelines. A summary and the licensee's basis for each relief request is presented. The reviewer's evaluation and recommendation follow. The requests are grouped according to topic or system.

2.1 General Pump Relief Requests

2.1.1 Bearing Temperature Measurement

2.1.1.1 Relief Request. The licensee has requested relief in PR-4 from measuring pump bearing temperature annually according to the requirements of Section XI, Paragraph IWP-3300 and -4310, for all centrifugal pumps in the IST program.

2.1.1.1.1 Licensee's Basis for Requesting Relief. The data associated with bearing temperatures taken at one-year intervals provides little statistical basis for determining the incremental degradation of a bearing or any meaningful trending information or correlation. In many cases the pump bearings are water-cooled and thus, bearing temperature is a function of the temperature of the cooling medium, which can vary considerably.

Vibration measurements are a significantly more reliable indication of pump bearing degradation than are temperature measurements. All pumps in the program are subjected to vibration measurements in accordance with IWP-4500. Although excessive bearing temperature is an indication of an imminent or existing bearing failure, it is highly unlikely that such a condition would go unnoticed during routine surveillance testing since it would manifest itself in other obvious indications such as audible noise, unusual vibration, increased motor current, etc.

Any potential gain from taking bearing measurements, which in most cases would be done locally using portable instrumentation, cannot offset

the cost in terms of dilution of operator effort, distraction of operators from other primary duties, excessive operating periods for standby pumps especially under minimum flow conditions, and unnecessary personnel radiation exposure.

Alternate Testing: None

2.1.1.1.2 Evaluation--The licensee has requested relief from the Code requirements for annual bearing temperature measurement for all centrifugal pumps in their IST program. It is recognized that annual measurement of pump bearing temperature does not aid in the detection of bearing degradation since it shows bearing degradation only in severe cases. The licensee is measuring pump vibration quarterly, which is more likely to show bearing degradation. Annual measurement of pump bearing temperature presents a hardship to the licensee without a compensating increase in the level of quality and safety. The licensee's proposal provides a reasonable alternative to the Code requirements.

Based on the determination that the licensee's proposal provides a reasonable alternative to the Code requirements and since the hardship of compliance would not be offset by a compensating increase in safety, relief should be granted as requested.

2.1.2 Portable Instrument Ranges and Accuracy

2.1.2.1 Relief Request. The licensee has requested relief in PR-5 from measuring pump temperature and speed according to the requirements of Section XI, Paragraph IWP-4120 and Table IWP-4110-1, for various pumps in the IST program and proposed to use portable instruments that meet the Code accuracy requirements.

2.1.2.1.1 Licensee's Basis for Requesting Relief. Table IWP-4110-1 requires the accuracy of instruments used to measure temperature and speed to be equal to or better than ±5 percent for temperature and ±2 percent for speed, both based on the full-scale reading of the instrument. This means that the accuracy of the measurement can vary as much as ±15

percent and ±6 percent, respectively, assuming the range of the instruments extended to the allowed maximum.

These IST pump parameters are 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 will be used where the "reading" accuracy is at least equal to the Code requirement for full-scale accuracy. This will ensure that the measurements are always more accurate than the accuracy as determined by combining the requirements of Table IWP-4110-1 and Paragraph IWP-4120.

Alternate Testing: Whenever portable instruments are used for measuring pump speed or bearing temperatures, the instruments will be such that the "reading" accuracy is as follows:

Temperature	±5 percent
Speed	±2 percent

2.1.2.1.2 Evaluation--The licensee has proposed to use portable instruments, in some cases, to measure pump speed and bearing temperature. These instruments are at least as accurate as the combination of Code requirements for instrument accuracy and range with a "reading" accuracy as stated above. Use of portable instruments with the described accuracy at the reference value allows an adequate assessment of operational readiness and provides information essentially equivalent to that provided by the Code.

Based on the determination that the licensee's proposal provides an acceptable level of quality and safety, relief should be granted as requested.

2.1.3 Measure Inlet Pressure Prior to Pump Start

2.1.3.1 Relief Request. The licensee has requested relief in PR-7 from measuring pump inlet pressure prior to pump start according to the

requirements of Section XI, Paragraph IWP-3300, for all pumps in the IST program that are in operation prior to test start and proposed to measure inlet pressure only during pump operation.

2.1.3.1.1 Licensee's Basis for Requesting Relief. If the pumps being tested are in operation as a result of plant or system needs, it is unreasonable to reconfigure system lineups simply to provide for measurement of static inlet pressure. Inlet pressure prior to pump startup is not a significant parameter needed for evaluating pump performance or its material condition.

Alternate Testing: When performing a test on a pump that is already in operation due to system or plant requirements, inlet pressure will only be measured during pump operation.

2.1.3.1.2 Evaluation--The licensee has proposed to measure pump inlet pressure only during pump operation for pumps in operation prior to the start of Section XI testing. There are no acceptance criteria for pump inlet pressure. To require the licensee to stop a running pump solely to obtain static inlet pressure would impose a hardship on the licensee. This would not be offset by a compensating increase in the level of plant safety. Therefore, the licensee's proposal should allow an adequate assessment of operational readiness and provides a reasonable alternative to the Code requirements.

Based on the determination that the licensee's proposal provides a reasonable alternative to the Code requirements and that the hardship of compliance would not be offset by a compensating increase in the level of quality or safety, relief should be granted as requested.

2.2 Diesel Fuel Oil Transfer System

2.2.1 Relief Request

The licensee has requested relief in PR-2 from the flow rate measurement and run time requirements of Section XI, Paragraphs IWP-3500(a)

and -4600, for the emergency diesel generator fuel oil transfer pumps, *-P10A and -P10B, and proposed to calculate the flow rate based on the rate of change of day tank level.

2.2.1.1 Licensee's Basis for Requesting Relief. The only available test circuit for these pumps consists of the normal day tank fill lines from the diesel oil storage tanks. There are no recirculation lines nor is any flow instrumentation installed. Therefore, the only practical method of determining pump flow rate is by calculating the fill rate of the day tanks. Furthermore, due to the capacity of the fuel oil pumps and the available volume of oil from the low-level pump start point to the high-level setpoint, the run time for a pump is limited, precluding the Code required 5-minute minimum runtime before taking readings.

Alternate Testing: When testing these pumps, the flow rate will be calculated based on the measured change in the diesel fuel oil day tank level over an elapsed period of pump run time. The starting point for taking measurements will be when the system conditions have stabilized.

2.2.1.2 Evaluation--It is impractical to measure diesel generator fuel oil transfer pump flow directly during tests as there are no flow instruments installed in the test flow path. Installation of instruments to measure flow rate directly would require system redesign and modifications, which would be costly and burdensome to the licensee. Yet, pump flow rate can be readily obtained by timing the rate of day tank level change, which the licensee has proposed. This alternate method would allow an adequate assessment of pump operational readiness and provide a reasonable alternative to the Code provided the determination is at least as accurate as required for flow rate measurement.

Due to the small volume of the day tank it is impractical to run the pump for the Code required five minutes. Installation of a test line or larger day tank to allow a longer test would be costly and burdensome to the

licensee. The licensee's proposal to start taking measurements when system conditions have stabilized will help to get repeatable test results. This should allow an adequate assessment of operational readiness and provides a reasonable alternative to the Code requirements.

Based on the impracticality of complying with the Code, the burden on the licensee if the requirements are imposed, and considering the licensee's proposal, relief should be granted provided the flow rate calculations meet the accuracy requirements of Table IWP-4110-1 for measured values.

2.3 Containment Spray System

2.3.1 Relief Request

The licensee has requested relief in PR-8 from measuring pump flow rate according to the requirements of Section XI, Paragraph IWP-3300 and Table IWP-3100-1, for the containment spray pumps, 4-P214A and -P214B, and proposed to measure and analyze pump vibration and differential pressure quarterly during power operations and to modify or replace the installed flow rate instruments to comply with the Code requirements by April 3, 1991.

2.3.1.1 Licensee's Basis for Requesting Relief. There is no practical method of testing the Containment Spray Pumps at full or substantial flow. During quarterly testing of these pumps, flow is routed through a minimum flow test line leading to the RWST. The flow instrument is installed in this line such that the flow rate measurements are unreliable and thus, not usable for IST purposes.

NRC Generic Letter 89-04, Position 9, requires the installation of flow instrumentation meeting the Code requirements (IWP-4110 and IWP-4120) if no flow rate instrumentation is provided. The Generic Letter also allows a grace period of 18 months for completing any modifications needed for conformance.

Alternate Testing: During quarterly testing of the RHR pumps, pump differential pressure and vibration will be recorded per IWP-3200 and IWP-6000. Prior to April 3, 1991 the existing instrumentation in the Containment Spray Test line will be replaced or modified to allow accurate and reliable flow rate measurements to be recorded during quarterly testing of the Containment Spray Pumps 4-P214 A&B. Following that, measurements of flow rate will be recorded and evaluated per IWP-3200.

2.3.1.2 Evaluation--The flow paths used for periodic testing of the containment spray pumps are not instrumented for accurate measurement of pump flow rate. The licensee has committed to measure pump differential pressure and vibration quarterly and to replace the existing instrumentation prior to April 3, 1991. Measurement of pump differential pressure and vibration provides information regarding pump performance and should allow an adequate assessment of pump operational readiness during the interim period. Once the licensee has replaced the instruments flow rate measurements will be made according to the Code requirements. Therefore, the proposal provides a reasonable alternative to the Code. Requiring immediate replacement of these instruments would pose an unreasonable hardship on the licensee without a compensating increase in the level of safety.

Based on the determination that the licensee's proposal provides a reasonable alternative and the hardship associated with immediate compliance would not be offset by a compensating increase in the level of quality and safety, relief should be granted from the Code requirements as requested.

2.4 Chemical and Volume Control System

2.4.1 Relief Request

The licensee has requested relief in PR-10 from measuring pump inlet and differential pressure according to the requirements of Section XI, Paragraph IWP-3300 and Table IWP-3100-1, for the chemical and volume control

system (CVCS) charging pumps, *-P201A thru -P201C, and proposed to measure and evaluate pump discharge pressure.

2.4.1.1 Licensee's Basis for Requesting Relief. The CVCS configuration is such that there is no installed instrumentation provided for measuring charging pump suction or differential pressures. Installation of temporary instrumentation is burdensome and there is little value in measuring these parameters.

The Charging Pumps are multiple plunger, positive-displacement reciprocating pumps where the pump discharge pressure is purely a function of pump design and is independent of suction pressure. This is reflected in ASME/ANSI OM-1987, Operation and Maintenance of Nuclear Power Plants, Part 6 (Table 3b) where this new standard requires measurement and evaluation of pump discharge pressure vs. differential pressure and suction pressure measurements are not required.

Alternate Testing: During inservice testing of the Charging Pumps, suction and differential pressures will not be measured nor recorded. In lieu of this, pump discharge pressure will be measured and evaluated per IWP-3200 and IWP-6000.

2.4.1.2 Evaluation--Direct measurement of inlet pressure cannot be made for these CVCS charging pumps since they do not have installed instruments. The discharge pressure of positive displacement pumps depends on the pressure of the system into which they are pumping. It is not significantly affected by either flow rate or inlet pressure if adequate net positive suction head (NPSH) exists. Inlet and differential pressure are not meaningful parameters in determining if hydraulic degradation is occurring. For positive displacement pumps, measurement of pump discharge pressure allows an assessment of operational readiness that is essentially equivalent to that of the Code.

Based on the determination that the proposal provides an acceptable level of quality and safety, relief should be granted as requested.

2.5 Residual Heat Removal System

2.5.1 Relief Request

The licensee has requested relief in PR-11 from the instrument full-scale range requirements of Section XI, Paragraph IWP-4120, for the residual heat removal (RHR) pumps, *-P210A and -P210B, and proposed to use suction pressure instruments with a range of 0-600 psig (or less) accurate to ±0.25% of full-scale (or better).

2.5.1.1 Licensee's Basis for Requesting Relief. The installed suction pressure test gauges of the RHR pumps are sized to accommodate the pressure range of 4 to 450 psig expected under standby and cold shutdown testing conditions (instrument range is 0-600 psig). As a result, the instrument range exceeds the Code requirement since, under test conditions, the pump suction pressure can be considerably less than 200 psig or 1/3 times the pressure gauge range.

Suction pressure measurements typically serve two functions. First, they provide assurance that the subject pump has adequate suction head for proper operation. Secondly, the suction pressure measurement is used to derive the pump differential pressure through calculation. For the determination of suction head, the accuracy and range requirement as set forth in the Code is overly restrictive. When used in determining pump differential pressure, the accuracy of the suction pressure measurement normally has little or no effect on the results of the calculation since, generally, the pump discharge pressure exceeds the suction pressure by 2 or 3 orders of magnitude.

In this case, the gauge range and accuracy are 0-600 psig and ±0.25 percent of full-scale, respectively. This results in an absolute accuracy of ±1.5 psig. This is clearly adequate for determining that the pump has met the NPSH requirements. When determining pump differential pressure, assuming the most limiting condition where RHR pump dP is approximately 150 psig, the maximum effect of this is a reduced accuracy of 1 percent of

the calculated dP. This is considered insignificant when compared to the maximum allowable accuracy (per Code) of the discharge pressure gauge of 2 percent of 450 psig or 9 psig.

Alternate Testing: When measuring the suction pressure of the RHR pumps, in lieu of satisfying the specified instrument range requirement of IWP-4120, the instruments used for measuring suction pressure will meet the following specifications:

Accuracy	±0.25 percent of full-scale (or better)
Range	0-600 psig. (or less)

2.5.1.2 Evaluation--The licensee has proposed to use inlet pressure instruments for the RHR pumps with a maximum range of 0-600 psig accurate to at least ±0.25% of full-scale. The full-scale range of this instrument exceeds three times the test reference value for dynamic inlet pressure when inlet pressure is low. This prevents over-ranging and damage to the instrument when the inlet pressure is much higher, such as during cold shutdown pump operation. The proposed gage reading accuracy is ±1.5 psig. It is conservative when compared to the lowest differential pressure expected across the pump (150 psig). The reading is more accurate than would be required of a gage with the upper range limit equal to the reference value. Therefore, the licensee's proposal is essentially equivalent to the Code requirement and provides sufficiently accurate data for assessing pump degradation and provides an acceptable level of quality.

Based on the determination that the licensee's proposal provides an acceptable level of quality and safety, relief should be granted as requested.

2.5.2 Relief Request

The licensee has requested relief in PR-9 from the quarterly pump flow rate measurement requirements of Section XI, Table IWP-3100-1, for the residual heat removal (RHR) pumps, *-P210A and -P210B, and proposed to

measure pump differential pressure and vibration quarterly and all required parameters during cold shutdowns as required.

2.5.2.1 Licensee's Basis for Requesting Relief. During quarterly testing of the RHR Pumps, flow is routed through a minimum flow test line leading to the suction of the pump being tested. The main line flow instrument is sized such that flow rate readings taken under minimum flow conditions are inaccurate to the extent of being meaningless. An additional flow instrument is installed in the test loop, however, its maximum reading is less than the normal minimum flow test value. Thus, with the current system configuration recording flow rate measurements during quarterly testing is not practical or useful.

NRC Generic Letter 89-04, Position 9, allows elimination of minimum flow test line flow rate measurements providing inservice tests are performed during cold shutdowns or refueling under full or substantial flow conditions where pump flow rate is recorded and evaluated.

Alternate Testing: During quarterly testing of the RHR pumps, pump differential pressure and vibration will be recorded per IWP-3200 and IWP-6000.

During testing performed at cold shutdown, pump differential pressure, flow rate, and vibration will be recorded per IWP-3200 and IWP-6000. Testing during cold shutdowns will be on a frequency determined by intervals between shutdowns as follows:

For intervals of 3 months or longer - each shutdown.

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

2.5.2.2 Evaluation--The licensee has proposed to measure only pump differential pressure and vibration during quarterly testing using the pump miniflow line and to measure all required parameters during cold shutdowns as required. The proposal follows GL 89-04, position 9, and provides a

reasonable alternative to the Code requirements with an acceptable level of quality and safety.

Based on the determination that the licensee's proposal provides an acceptable level of quality and safety, relief should be granted as requested.

3. VALVE TESTING PROGRAM

The following FP&L valve relief requests were evaluated against the requirements of the ASME Code, Section XI, 10 CFR 50.55a, and applicable NRC positions and guidelines. Each relief request is summarized and the licensee's basis for requesting relief is presented. The reviewer's evaluation and recommendation follow. The requests are grouped according to topic or system and valve Category.

3.1 General Valve Relief Requests

3.1.1 Valves Tested During Cold Shutdowns

3.1.1.1 Relief Request. The licensee has requested relief in VR-7 from the test frequency requirements for valves that can be tested only during cold shutdowns according to the requirements of Section XI, Paragraph IWV-3412 and -3522, and proposed to test these valves during cold shutdowns at the frequency described below.

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

ASME/ANSI OM-1987, Operation and Maintenance of Nuclear Power Plants, Part 10 (Paragraphs 4.2.1.2 and 4.3.2.2) recognizes this issue and allows deferred testing as set forth below.

Alternate Testing: For those valves designated to be exercised or tested during cold shutdown, exercising shall commence as soon as practical after the plant reaches a stable cold shutdown condition as defined by the

applicable Technical Specification but no later than 48 hours after reaching cold shutdown. If an outage is sufficiently long enough to provide for testing all valves required to be tested during the cold shutdown period, then the 48-hour requirement need not apply if all valves are tested during the outage.

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

It should be noted that there are two conditions of cold shutdown identified in the program tables (Appendices D and E), namely pressurized and vented. For the purpose of this requirement, the term 'cold shutdown' refers to the respective condition as noted in the tables. The program tables identify those valves to which cold shutdown testing applies. Refer to Appendix G for discussion of the reasons and justification for allowing cold shutdown vs. quarterly testing.

3.1.1.1.2 Evaluation--Due to the hardship that delaying plant startup places on a licensee, the NRC does not require completion of all testing identified to be performed during cold shutdown prior to startup from each cold shutdown. Requiring completion of all testing prior to startup could delay the return to power, which would be costly. The proposed alternate test frequency, as stated above (with the exception discussed below), agrees with previously approved alternatives for valves that can be tested during any cold shutdown. For these valves this should not have an adverse effect on the assessment of operational readiness. Therefore, the licensee's proposal provides a reasonable alternative to the Code test frequency requirements for these valves.

However, the licensee has included the following statement in their request "Completion of all valve testing during a cold shutdown outage is

not required if plant conditions preclude testing of specific valves. . ." For any specific valve, or class of valves, that cannot be tested during each cold shutdown of sufficient duration to complete all testing, a relief request must be submitted and approved by NRC prior to implementation since the test interval for these valves could exceed that allowed by Section XI.

Based on the determination that the licensee's proposal provides a reasonable alternative to the Code test frequency requirements and considering the hardship on the licensee without a compensating increase in safety, relief should be granted for valves that can be tested during any cold shutdown. Relief should be denied for valves that cannot be tested during any cold shutdown of sufficient duration to complete cold shutdown testing.

3.1.2 Leak Rate Testing of Pressure Isolation Valves

3.1.2.1 Relief Request. The licensee has requested relief in VR-21 from the acceptance criteria requirements of Section XI, Paragraph IWV-3427, for the reactor coolant system (RCS) pressure isolation valves (PIVs) listed below and proposed to test these valves per plant Technical Specifications as described below.

Valve No.	Code Category	Function
*-873A thru C	A/C	BIT injection check valves to RCS cold legs
*-874A and B	A/C	SI injection check valves to RCS hot legs
*-875A thru C	A/C	combined SI injection check valves to RCS cold legs
*-876A thru E	A/C	combined LPSI/RHR injection check valves to RCS cold legs
MOV-*-750 & -751	A	RHR pumps suction from RCS hot leg C

3.1.2.1.1 Licensee's Basis for Requesting Relief--Leak testing of these valves is primarily for the purpose of confirming their capability of preventing overpressurization and catastrophic failure of the safety injection/RHR piping and components. In this regard, special leakage acceptance criteria is established and included into the Turkey Point Technical Specifications (Table 3.16.1) (and Interim Technical Specifications - ADM-021, Table 3.4-1) that addresses the question of valve integrity in a more appropriate manner for these valves. Satisfying both

the technical specification and the Code acceptance criteria is not warranted and implementation would be difficult and confusing.

Alternate Testing: The leakage rate acceptance criteria for these valves will be 3.16-1 (ADM-021, Table 3.4-1), namely,

1. Leakage rates less than or equal to 1.0 gpm are considered acceptable.

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

3. Leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are considered unacceptable if the latest measured rate exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.

4. Leakage rates greater than 5.0 gpm are considered unacceptable.

3.1.2.1.2 Evaluation--Turkey Point plant Technical Specifications identifies PIVs that must be leak tested and establishes maximum permissible leakage rates for these valves. The NRC has reviewed and approved the leakage rate acceptance criteria. Therefore, this proposal allows an adequate assessment of operational readiness and provides an acceptable level of quality and a reasonable alternative to the Code requirements.

Based on the determination that the licensee's proposal provides an acceptable level of quality and safety, relief should be granted as requested.

3.1.3 Containment Isolation Valves

3.1.3.1 Relief Request. The licensee has requested relief in VR-25 from individually leak rate testing the containment isolation valves (CIVs) listed in IST program Table VR-25-1 according to the requirements of Section XI, Paragraph IWV-3420. The licensee has proposed to test these valves in groups and evaluate the measured group leakage rates against assigned group leakage rate limits.

3.1.3.1.1 Licensee's Basis for Requesting Relief--Due to the configuration of the system piping and components, in many cases individual leakage rate tests are impractical. In these cases it is customary to perform tests with the test volume between valves in series or behind valves in parallel paths.

. Alternate Testing: In those cases where individual valve testing is impractical, valves will be leak tested simultaneously in multiple valve arrangements and a maximum permissible leakage rate will be applied to each combination of valves. Test results from tests of multiple valves will be evaluated in accordance with IWV-3426 and -3427.

3.1.3.1.2 Evaluation--The licensee has proposed to leak test identified CIVs in groups and to evaluate the leakage per IWV-3426 and -3427. Where it is impractical to leak rate test valves individually, due to the absence of test connections or isolation valves, the licensee has proposed to test valves in groups. System redesign and modification, such as installation of test taps or isolation valves, would be needed to allow individual tests of some of these valves. This would be costly and burdensome to the licensee.

The tests required by Section XI monitor changes in the condition of individual components for assessing their operational readiness. Where practicable, valves should be individually leak rate tested and evaluated as required, even if these valves are in groups with others that cannot be tested individually. In cases where it is impracticable to test individual valves, testing in groups can be acceptable. This is provided the group leakage limits are set such that excessive leakage through any valve in the group is detected. The valve must then be declared inoperable and corrective action taken prior to its return to service.

Compliance with the Code test method requirements is impractical for CIVs that can be tested only in groups. Considering the licensee's proposal and the burden on the licensee, relief should be granted from individually testing valves that can be practically tested only in groups. The licensee

should leak rate test these valves in groups. Maximum group leakage rate limits should be assigned conservatively based on the smallest valve in the group so that corrective action will be taken whenever the leak tight integrity of any of the group tested valves is in question. Relief should be denied for valves that can be tested individually.

3.2 Breathing Air System

3.2.1 Category A/C Valves

3.2.1.1 Relief Request. The licensee has requested relief in VR-1 from the test frequency requirements of Section XI, Paragraph IWV-3522, for the isolation valves in the breathing air supply to containment, 3-BA-0201 and 4-BA-0201, and proposed to exercise these valves and verify their closure at least every two years during Appendix J leak testing.

3.2.1.1.1 Licensee's Basis for Requesting Relief--These are simple check valves with no external position indication, thus the only practical means of verifying closure is by performing a leak test or backflow test. The valves are normally closed with the outside isolation valves, CV-*-6165 locked closed, thus, in effect, they are passive and exercising is not required per IWV-3700. The primary reason for requiring exercising is to verify that the valves are cycled open then closed prior to leak testing to ensure they are indeed operable and capable of closing following periods of use during outages. Performing leak tests of these valves at each cold shutdown outage would constitute an unreasonable burden on the plant staff.

Alternate Testing: These valves will be exercised and verified to close at least once every two (2) years in conjunction with Appendix J leak testing activities.

3.2.1.1.2 Evaluation--These check valves are in the breathing air supply lines to containment. They are simple check valves, not equipped with external position indication or an operator. It is impractical to verify them closed during power operation or during cold shutdowns. System reconfiguration and hooking up and disconnecting leak testing equipment

during cold shutdowns would likely delay the return to power. System redesign and modification would be necessary to allow testing these valves closed quarterly, which also would be costly and burdensome to the licensee.

The only practical means available for determining their capability to restrict seat leakage is by leak rate testing, which requires establishing a reverse differential pressure across the valves and measuring the rate of leakage past their seats. The licensee proposed to verify these valves' closure capability during Appendix J local leak rate testing at least once every two years. This allows an adequate assessment of operational readiness and provides a reasonable alternative to the Code requirements.

Based on the determination that compliance with the Code test frequency is impracticable and burdensome, and considering the proposed testing frequency, relief should be granted as requested.

3.3 Auxiliary Feedwater System

3.3.1 Category B Valves

3.3.1.1 Relief Request. The licensee has requested relief in VR-2 from the valve stroke timing requirements of Section XI, Paragraph IWV-3413(b), for the auxiliary feedwater (AFW) to steam generator supply valves, CV-*-2816 thru -2818 and CV-*-2831 thru -2833, and proposed to verify these valves operate in response to AFW system demands during integrated system testing.

3.3.1.1.1 Licensee's Basis for Requesting Relief--These valves are flow control modulating valves, therefore, valve stroke measurements are not practical nor are they significant in evaluating their capability of performing their required safety functions. The routine AFW system performance tests provide adequate assurance that the valves function properly to the open position and provide adequate flow to the respective steam generators.

Alternate Testing: The valves will be tested in conjunction with the integrated AFW system surveillance testing to ensure proper operation. The satisfactory response and operation of the AFW system will suffice to demonstrate valve operability but no valve stroke times will be measured.

3.3.1.1.2 Evaluation--These are modulating flow control valves in the AFW to steam generator supply lines that operate in response to control signals. The licensee has proposed to determine valve operational readiness during the integrated AFW system test without measuring and evaluating stroke times of these valves as required. It is difficult to accurately measure the stroke time of valves not equipped with control switches or individual position indicating devices. Yet, a method of detecting degradation and assessing operational readiness is essential. An appropriate test method and acceptance criteria are needed so that a severely degraded valve is declared inoperable and repaired or replaced prior to return to service. Stroke timing or otherwise equivalently evaluating these valves is vital to assessing their operational readiness.

The licensee's proposal gets some information about valve condition and should provide an adequate alternative to the Code requirements for an interim period of one year or until the next refueling outage, whichever is longer. Yet, it does not provide a reasonable long-term alternative to the Code test method requirements. During the interim period the licensee should consider methods, such as ultrasonics, magnetics, and acoustics for stroke timing or otherwise monitoring these valves. Appropriate acceptance criteria should be assigned so that a severely degraded valve is identified for corrective action.

Based on the determination that the licensee's proposal provides a reasonable short but not a long term alternative to the Code requirements, and considering the licensee's proposal, interim relief should be granted for one year or until the next refueling outage, whichever is longer. This relief request (VR-2) as well as VR-6, VR-9, VR-11 thru -15, and VR-22 were evaluated and interim relief was granted by a letter dated August 20, 1990, to Mr. J. H. Goldberg of FP&L Company from NRC. Therefore, the starting date for interim approval for these relief requests is August 20, 1990.

3.4 Reactor Coolant System

3.4.1 Category A/C Valves

3.4.1.1 Relief Request. The licensee has requested relief in VR-3 from the test frequency requirements of Section XI, Paragraph IWV-3522, for the isolation valves in the nitrogen supply to the pressurizer relief tank, 3-0518 and 4-0518, and proposed to exercise these valves and verify their closure at least every two years during Appendix J leak testing.

3.4.1.1.1 Licensee's Basis for Requesting Relief--These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or backflow test. The valves are normally closed with the outside isolation valves, *-550 closed. Performing leak tests of these valves at each cold shutdown outage would constitute an unreasonable burden on the plant staff.

Alternate Testing: These valves will be exercised and verified to close at least once every two (2) years in conjunction with Appendix J leak testing activities.

3.4.1.1.2 Evaluation--These check valves are in the nitrogen supply lines to the pressurizer relief tank in containment. They are simple check valves, not equipped with external position indication or operators. It is impractical to verify them closed during power operation or during cold shutdowns. System reconfiguration and hooking up and disconnecting leak testing equipment during cold shutdowns would likely delay the return to power. This would be costly and burdensome to the licensee. System redesign and modification would be necessary to allow testing these valves closed quarterly, which would also be costly and burdensome.

A practical means available for determining seat integrity is by leak rate testing, which requires establishing a reverse differential pressure across the valves and measuring the rate of leakage past the seat. The licensee's proposal to test these valves during Appendix J local leak

testing at least every two years gives adequate assurance of operational readiness and provides a reasonable alternative to the Code test frequency requirements.

Based on the determination that compliance with the Code test frequency is impracticable and burdensome, and considering the proposed testing frequency, relief should be granted as requested.

3.5 Chemical and Volume Control System

3.5.1 Category A Valves

3.5.1.1 Relief Request. The licensee has requested relief in VR-6 from the valve stroke timing requirements of Section XI, Paragraph IWV-3413(b), for the charging pumps to reactor coolant system emergency boration valve, HCV-*-0121, and proposed to verify these valves open and close by local observation without measuring stroke time.

3.5.1.1.1 Licensee's Basis for Requesting Relief--These valves are flow control modulating valves; therefore, measurement of valve stroke time is not practical nor is significant in evaluating their capability of performing their required safety functions.

Alternate Testing: The valves will be exercised to the open and closed positions with local observation to ensure proper valve operation; however stroke times will not be measured.

3.5.1.1.2 Evaluation--It is difficult to accurately measure the stroke time of these flow control valves due to their design. The licensee has proposed to determine operational readiness by verifying these valves open and close by local observation. It is difficult to accurately measure the stroke time of valves not equipped with control switches or individual position indicating devices. Yet, a method of detecting degradation and assessing operational readiness is essential. An appropriate test method and acceptance criteria are needed so that a severely degraded valve is

declared inoperable and repaired or replaced prior to return to service. Stroke timing or otherwise equivalently evaluating these valves is vital to assessing their operational readiness.

The licensee's proposal gets some information about valve condition and should provide an adequate alternative to the Code requirements for an interim period of one year or until the next refueling outage, whichever is longer. Yet, it does not provide a reasonable long-term alternative to the Code test method requirements. During the interim period the licensee should consider methods, such as ultrasonics, magnetics, and acoustics for stroke timing or otherwise monitoring these valves. Appropriate acceptance criteria should be assigned so that a severely degraded valve is identified for corrective action.

Based on the determination that the licensee's proposal provides a reasonable short but not a long term alternative to the Code requirements, interim relief should be granted for one year or until the next refueling outage, whichever is longer. This interim interval starts on August 20, 1990.

3.6 Safety Injection System

3.6.1 Category A/C Valves

3.6.1.1 Relief Request. The licensee has requested relief in VR-27 from the test frequency requirements of Section XI, Paragraph IWV-3522, for the containment isolation valve in the safety injection system (SIS) accumulator supply line, 4-0945E, and proposed to exercise this valve at least every two years during Appendix J leak testing.

3.6.1.1.1 Licensee's Basis for Requesting Relief--This is a simple check valve with no external position indication, thus the only practical means of verifying closure is by performing a leak test or backflow test. The valve is normally closed with the outside isolation valve, CV-4-855 closed. Performing leak test of this valve at each cold shutdown outage would constitute an unreasonable burden on the plant staff.

Alternate Testing: This valve will be exercised and verified to close at least once every two (2) years in conjunction with Appendix J leak testing activities.

3.6.1.1.2 Evaluation--This check valve is in the breathing air supply line to containment. It is a simple check valve, not equipped with an external position indicator or an operator. It is impractical to verify it closed during power operation or during cold shutdowns. System reconfiguration and hooking up and disconnecting leak testing equipment during cold shutdowns would likely delay the return to power. This would be costly and burdensome to the licensee. System redesign and modification would be necessary to allow testing this valve closed quarterly, which also would be costly and burdensome.

The only practical means available for determining this valve's capability to restrict seat leakage is by leak rate testing, which requires establishing a reverse differential pressure across the valve and measuring the rate of leakage past the seat. The licensee has proposed to test this valve during Appendix J local leak testing at least once every two years. This allows an adequate assessment of operational readiness and provides a reasonable alternative to the Code test frequency requirements.

Based on the determination that compliance with the Code test frequency is impracticable and burdensome, and considering the licensee's proposed testing frequency, relief should be granted as requested.

3.6.1.2 Relief Request. The licensee has requested relief in VR-11 from the exercising method and frequency requirements of Section XI, Paragraph IWV-3520, for 3(4)-0874A and -0874B, the safety injection (SI) hot leg injection check valves, and proposed to part-stroke exercise these valves open during refueling outages. The licensee will also leak rate test these valves at least once every 2 years in conjunction with Appendix J testing.

3.6.1.2.1 Licensee's Basis for Requesting Relief--Exercising these valves requires operating a safety injection pump and injecting into the reactor coolant system since no recirculation path exists. At power operation this is not possible because the SIS pumps cannot develop sufficient discharge pressure to overcome reactor coolant system pressure. During normal cold shutdown conditions, injection via the SIS pumps is precluded by restrictions related to Low-Temperature Overpressurization Protection concerns and Technical Specification Section 3.15.

During refueling outages the valves can be exercised, however since they are installed such that the only lineup available causes them to form a parallel path, full accident flow through each valve cannot be confirmed as required by Reference 2.8, Position 1.

These valves are of a design that requires seal welding to ensure their leak tight integrity. Subjecting the valves to frequent disassembly and internal inspection will require untimely valve replacement due to metallurgical limitations as to the number of instances seal welds are removed and replaced (Estimated to be 3 times). A measure of the structural integrity and proper functioning of valve internals is gained by the leak testing done during each reactor refueling.

These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or backflow test. During plant operation, access is limited to the system since most of the components needed for leak testing are located within the containment building. Performing leak tests of these valves involves a considerable effort such that testing at each cold shutdown outage would constitute an unreasonable burden on the plant staff.

Alternate Testing: During each reactor refueling outage, each of these valves will be partial- stroke exercised to the open position and at least once every two years they are verified closed by performing a leak rate test.

3.6.1.2.2 Evaluation--IWV-3520 requires that check valves be exercised to their safety function position(s) quarterly or, if justified, during cold shutdowns. It is impractical to full- or part-stroke exercise valves 3(4)-0874A and -0874B during power operations as the only flow path through these valves is from the SI pumps into the RCS. The SI pumps do not develop sufficient head to establish flow into the RCS at normal operating pressures. To allow a full-stroke exercise of these valves quarterly during power operations, extensive system modifications would have to be performed, such as installing full flow test loops. It would be costly and burdensome for the licensee to make such modifications. Additionally, reduced system reliability could result from failures that could divert the injection flow away from the RCS.

These check valves cannot be full-stroke exercised by establishing SI pump flow into the RCS during cold shutdowns because there is not an adequate expansion volume. Injecting into the RCS could cause or contribute to a low-temperature overpressurization of the RCS. Because of this concern it is impractical to full- or part-stroke exercise valves 3(4)-0874A and -0874B during cold shutdowns.

Verifying maximum required accident flow through each of these valves during refueling outages when the vessel head is removed to provide an adequate expansion volume cannot be performed using conventional methods. There are no flow instruments in the parallel flow paths of these valves. Yet, the licensee's proposed alternate testing provides no assurance that these individual valves will open sufficiently to pass maximum accident flow and that they are not in a degraded condition.

The use of valve diagnostics to determine that a check valve opens fully or sufficiently to pass maximum required accident flow during flow testing is considered an acceptable alternative to full flow testing. A non-intrusive method of testing these valves might, however, be practical. Therefore, an interim period should be provided to permit the licensee time to investigate whether non-intrusive methods can be used to evaluate these valves. At the end of this interim period the licensee should implement testing with non-intrusive flow instruments or valve diagnostics to

show the valves full-stroke open or show the impracticality of this alternative.

These are simple check valves without remote position indication to determine valve disk position. The only practical method of verifying valve closure is to perform a leak test. It is impractical to leak test these valves quarterly or during cold shutdowns because many of the test connections are inside containment. Access for testing presents a personnel safety hazard due to high radiation levels and proximity to high energy systems. These valves will be verified closed at least once every 2 years in conjunction with Appendix J leak rate testing.

While the licensee's proposed testing is not acceptable on a long term basis, the part-stroke exercise during refueling outages and leak rate test every 2 years provides reasonable assurance of valve operational readiness during the interim period of 12 months or until the end of the next refueling outage (for each unit), whichever is longer.

Based on the determination that compliance with the Code requirements is impracticable and burdensome, and considering the licensee's proposed alternate testing, interim relief should be granted from the Code test method and frequency for 12 months or until the end of the next refueling outage (for each unit), whichever is longer. This interim interval starts on August 20, 1990. The licensee should investigate the use of non-intrusive flow instruments or valve diagnostic techniques to verify that valves 3(4)-0874A and -0874B full-stroke exercise open when subjected to flow during refueling outages.

3.6.1.3 Relief Request. The licensee has requested relief in VR-12 from the exercising method and frequency requirements of Section XI, Paragraph IWV-3520, for 3(4)-0875A, -0875B, and -0875C, the combined SI injection header to RCS cold leg check valves, and proposed to part-stroke exercise these valves during cold shutdowns and to disassemble, inspect, and manually exercise them at least once every 10-year inspection interval. The licensee will also leak rate test these valves at least once every 2 years in conjunction with pressure isolation valve (PIV) leak rate testing.

3.6.1.3.1 Licensee's Basis for Requesting Relief--Full-stroke exercising of these valves to the open position, based on the maximum accident flow rate resulting from SIS accumulator injection to a depressurized RCS loop, is not practical due to limitations associated with the effects of such a test on system components. The maximum flow rate achievable would be that developed using two RHR pumps injecting into a depressurized reactor coolant system is approximately 7500 gpm - a value somewhat less than the peak flow rate expected during accumulator injection. Due to system configuration, this maximum flow can be directed through *-875A but would be split between valves *-875B and *-875C. In any event, based on current knowledge, the valves cannot be full-stroke exercised as defined by Paragraph 4.4.

Partial-flow testing of these valves requires injecting into the RCS since no downstream recirculation path exists. At power operation this is not possible because neither the RHR or the SIS pumps can develop sufficient discharge pressure to overcome reactor coolant system pressure. During normal cold shutdown conditions, however, injection via the RHR pumps can be accomplished.

These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or backflow test. During plant operation, access is limited to the system since most of the components needed for leak testing are located within the containment building. Performing leak tests of these valves involves a considerable effort such that testing at each cold shutdown outage would constitute an unreasonable burden on the plant staff.

Alternate Testing: Each of these valves will be part stroke tested to the open position during cold shutdown. At least once every two (2) years, each of these valves will be verified to close in conjunction with PIV leak testing. At least once during each 10-year inspection interval all six valves will be disassembled, inspected, and manually exercised per Reference 2.8, Position 2.

3.6.1.3.2 Evaluation--IWV-3520 requires that check valves be exercised to their safety function position(s) quarterly or, if justified, during cold shutdowns. It is impractical to full or part-stroke exercise valves 3(4)-0875A, -0875B, and -0875C during power operations because the only flow path through these valves is from the RHR pumps, the SI pumps, and the SI accumulators into the RCS. These pumps and accumulators produce insufficient outlet pressure to establish flow into the RCS at normal operating pressures. To allow a full-stroke exercise of these valves quarterly during power operations, extensive system modifications would have to be performed, such as installing full flow test loops. It would be costly and burdensome for the licensee to make such modifications. Additionally, reduced system reliability could result from failures that could divert the injection flow away from the RCS.

These check valves are part-stroke exercised with RHR flow during cold shutdowns. They cannot be full-stroke exercised by establishing full SI pump and accumulator flow into the RCS during cold shutdowns because there is not an adequate expansion volume. Injecting into the RCS could cause or contribute to a low-temperature overpressurization of the RCS. Because of this, it is impractical to full-stroke exercise valves 3(4)-0875A, -0875B, and -0875C during cold shutdowns.

Verifying maximum required accident flow through each of these valves during refueling outages, when the vessel head is removed to provide an adequate expansion volume is not practical. It would involve discharging the SI accumulators into the RCS, which could result in possible damage to reactor and core components and radioactive contamination of equipment inside containment. A substantial flow rate of 7500 gpm can be established by injecting into a depressurized RCS using the RHR pumps. Yet, this flow rate is not the maximum accident condition flow rate. Further, a part-stroke exercise of valves 3(4)-0875B and -0875C cannot be verified using conventional methods as they are in a parallel configuration and there are no flow instruments in the parallel flow paths. The licensee's proposal to disassemble and inspect these valves appears to be the only practical method to full-stroke exercise them open and verify that they are not in a degraded condition.

Disassembly and inspection, to verify the full-stroke capability of check valves is an option only where full-stroke exercising cannot practically be performed by flow or by other positive means. The NRC considers valve disassembly and inspection to be a maintenance procedure and not a test equivalent to exercising produced by fluid flow. This procedure has some risk, which might make its routine use as a substitute for testing undesirable when some method of testing is possible. Check valve disassembly is a valuable maintenance tool that can provide much information about a valve's internal condition and as such should be performed under the plant maintenance program at a frequency commensurate with the valve type and service.

The minutes of the public meeting on GL 89-04 state that part-stroke exercise testing with flow should be performed after valve disassembly and inspection is completed but before returning the valve to service. This testing provides a degree of confidence that the disassembled valve has been re-assembled properly and that the disk moves freely.

The licensee proposed to disassemble each of these six valves on a sampling basis over the 10-year inspection interval. The grouping and inspection interval is not in accordance with GL 89-04, Attachment 1, position 2. There are more than 4 valves in the group and the valve service conditions are different (i.e., they are in different units and valves 3(4)-0875A receive a greater flow rate than valves 3(4)-0875B and -0875C during part-stroke testing at cold shutdowns and refueling outages). The licensee has not provided a justification for expanding the valve grouping or extending the disassembly interval.

The use of valve diagnostics to determine that a check valve opens fully or sufficiently to pass maximum required accident flow is considered an acceptable alternative to full flow testing. A non-intrusive method of testing might, however, be practical. Therefore, an interim period should be provided to permit the licensee time to investigate whether non-intrusive methods can be used. After interim period the licensee should implement testing with diagnostics to show the valves full-stroke open or provide the results of a study that demonstrates that this alternative is impractical.

These valves are simple check valves without remote position indication to determine valve disk position. The only practical method of verifying valve closure is to perform a leak test. It is impractical to leak test these valves quarterly or during cold shutdowns because many of the test connections used to perform this testing are inside containment. Access for testing would present a personnel safety hazard due to high radiation levels and the presence of high energy systems. These valves will be verified closed at least once every 2 years in conjunction with PIV leak rate testing.

While the licensee's proposed testing is not acceptable on a long term basis, the part-stroke exercise during cold shutdowns and refueling outages and leak rate test every 2 years provides reasonable assurance of valve operational readiness during the interim period of 12 months or until the end of the next refueling outage (for each unit), whichever is longer.

Based on the determination that compliance with the Code requirements is impracticable and burdensome, and considering the proposed alternate testing and frequency, interim relief should be granted for 12 months or until the end of the next refueling outage (for each unit), whichever is longer. This interim interval starts on August 20, 1990. Valves disassembled in lieu of testing should have a post maintenance part-stroke exercise performed prior to their return to service. The licensee should investigate the use of non-intrusive diagnostic techniques to verify that valves 3(4)-0875A, 3(4)-0875B, and -0875C full-stroke exercise open when subjected to flow either during cold shutdowns or at refueling outages.

3.6.1.4 Relief Request. The licensee has requested relief in VR-13 from the exercising method and frequency requirements of Section XI, Paragraph IWV-3520, for 3(4)-0875D, -0875E, and -0875F, the SI accumulator outlet check valves, and proposed to disassemble, inspect, and manually exercise these valves with each of the six valves being disassembled and inspected at least once every 10-year inspection interval. The licensee also will leak rate test these valves at least once every 2 years to verify their reverse flow closure.

3.6.1.4.1 Licensee's Basis for Requesting Relief--Full-stroke exercising of these valves to the open position as defined by Paragraph 4.5, based on the maximum accident flow rate resulting from SIS accumulator injection to a depressurized RCS loop, is not practical due to limitations associated with the effects of such a test on system components.

These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or backflow test. During plant operation, access is limited to the system since most of the components needed for leak testing are in the containment building. Performing leak tests of these valves involves a considerable effort such that testing at each cold shutdown outage would constitute an unreasonable burden on the plant staff.

Alternate Testing: At least once every two (2) years, each of these valves will be verified to close in conjunction with leak testing. At least once each 10-year inspection interval all six valves will be disassembled, inspected, and manually exercised per Reference 2.8, Position 2.

3.6.1.4.2 Evaluation--IWV-3520 requires that check valves be exercised to their safety function position(s) quarterly or, if justified, during cold shutdowns. It is impractical to full- or part-stroke exercise valves 3(4)-0875D, -0875E, and -0875F during power operations as the only flow path through these valves is from the SI accumulators into the RCS. The accumulators are at a pressure below normal operating RCS pressure and cannot establish flow into the RCS. To allow a full-stroke exercise of these valves quarterly during power operations, extensive system modifications would have to be performed, such as installing full flow test loops. It would be costly and burdensome for the licensee to make such modifications. Additionally, reduced system reliability could result from failures that could divert injection flow away from the RCS.

It is impractical to full-stroke exercise these check valves during cold shutdowns by establishing full SI accumulator flow into the RCS because there is not an adequate expansion volume. Injecting into the RCS could

cause or contribute to a low-temperature overpressurization of the RCS. Because of this concern, it is impractical to full-stroke exercise valves 3(4)-0875D, -0875E, and -0875F during cold shutdowns.

Verifying maximum required accident flow through each of these valves during refueling outages, when the vessel head is removed to provide an adequate expansion volume, is not practical. It would involve discharging the SI accumulators into the RCS, which could result in possible damage to reactor and core components and radioactive contamination of equipment inside containment. The licensee's proposal to disassemble and inspect these valves appears to be the only practical method to full-stroke exercise them open and verify that they are not in a degraded condition.

Disassembly and inspection, to verify the full-stroke capability of check valves is an option only where full-stroke exercising cannot practically be performed by flow or by other positive means. The NRC considers valve disassembly and inspection to be a maintenance procedure and not a test equivalent to the exercising produced by fluid flow. This procedure has some risk, which might make its routine use as a substitute for testing undesirable when some method of testing is possible. Check valve disassembly is a valuable maintenance tool that can provide much information about a valve's internal condition and as such should be performed under the plant maintenance program at a frequency commensurate with the valve type and service.

The minutes of the public meeting on GL 89-04 states that part-stroke exercise testing with flow should be performed after disassembly and inspection is completed but before returning the valve to service. This testing provides a degree of confidence that the disassembled valve has been re-assembled properly and that the disk moves freely.

The licensee proposed to disassemble each of these six valves on a sampling basis over the 10-year inspection interval. This grouping and inspection interval is not in accordance with GL 89-04, Attachment 1, position 2. There are more than 4 valves in the group and the valve service conditions are different (i.e., they are in different units). The licensee

has not provided a justification for expanding the valve grouping or extending the disassembly interval.

The use of valve diagnostics to determine that a check valve opens fully or sufficiently to pass maximum required accident flow is considered an acceptable alternative to full flow testing. A non-intrusive method of testing these valves might, however, be practical. Therefore, an interim period should be provided to permit the licensee time to investigate whether non-intrusive methods can be used. After this interim period the licensee should implement testing with diagnostics to show the valves full-stroke open or provide the results of a study that demonstrates the impracticality of this alternative.

These are simple check valves without remote position indication to determine disk position. The only practical method of verifying valve closure is to perform a leak test. It is impractical to leak test these valves quarterly or during cold shutdowns because many of the test connections used to perform this testing are inside containment. Access for testing would present a personnel safety hazard due to high radiation levels and the presence of high energy systems. These valves will be verified closed at least once every 2 years by performing a leak rate test.

While the licensee's proposed testing is not acceptable on a long term basis, a sample disassembly and inspection at refueling outages and leak rate test every 2 years should provide reasonable assurance of valve operational readiness during the interim period of 12 months or until the end of the next refueling outage (for each unit), whichever is longer.

Based on the determination that compliance with the Code requirements is impracticable and burdensome, and considering the proposed alternate testing and frequency, interim relief should be granted for 12 months or until the end of the next refueling outage (for each unit), whichever is longer, provided the licensee disassembles at least one of these valves from each unit every refueling outage during the interim period. Valves that are disassembled in lieu of testing should have a post maintenance part-stroke exercise performed prior to their return to service. This interim interval

starts on August 20, 1990. The licensee should investigate the use of non-intrusive diagnostic techniques to verify that valves 3(4)-0875D, 3(4)-0875E, and -0875F full-stroke exercise open when subjected to flow from source, such as a reduced pressure accumulator, during refueling outages.

3.6.1.5 Relief Request. The licensee has requested relief in VR-14 from the exercising method and frequency requirements of Section XI, Paragraph IWV-3520, for 3(4)-0876B and -0876C, the RHR injection check valves to the RCS cold legs, and proposed to part-stroke exercise them during cold shutdowns and to disassemble, inspect, and manually exercise them during refueling outages with each of the four valves being disassembled and inspected at least once every 10-year inspection interval. The licensee also will leak rate test these valves at least once each refueling outage in conjunction with PIV leak testing.

3.6.1.5.1 Licensee's Basis for Requesting Relief--Exercising these valves requires operating an RHR pump and injecting into the reactor coolant system since no recirculation path exists. At power operation this is not possible because the RHR pumps cannot develop sufficient discharge pressure to overcome reactor coolant system pressure. During normal cold shutdown conditions, injection via the RHR pumps is practical.

During refueling outages the valves can be exercised, however, since they are installed such that the only lineup available causes them to form a parallel path, full accident flow through each valve cannot be confirmed as required by Reference 2.8, Position 1.

These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or backflow test. During plant operation, access is limited to the system since most of the components needed for leak testing are in the containment building. Performing leak tests of these valves involves a considerable effort such that testing at each cold shutdown outage would constitute an unreasonable burden on the plant staff.

Alternate Testing: Each of these valves will be part stroke tested to the open position during cold shutdown. At least once during each reactor refueling outage, each of these valves will be verified to close in conjunction with PIV leak testing. At least once during each 10-year inspection interval these valves will be disassembled, inspected, and manually exercised per Reference 2.8, Position 2.

3.6.1.5.2 Evaluation--IWV-3520 requires that check valves be exercised to their safety function position(s) quarterly or, if justified, during cold shutdowns. It is impractical to full- or part-stroke exercise valves 3(4)-0876B and -0876C during power operations because the only flow path through these valves is from the RHR pumps into the RCS. The RHR pumps do not produce sufficient head to establish flow into the RCS at normal operating pressures. To allow a full-stroke exercise of these valves quarterly during power operations, extensive system modifications would have to be performed, such as installing full flow test loops. It would be costly and burdensome for the licensee to make such modifications. Additionally, reduced system reliability could result from failures that could divert the injection flow away from the RCS.

These valves are in non-instrumented parallel flow paths. It is impractical to verify the maximum required accident flow rate through each valve using conventional methods during refueling outages when the vessel head is removed to provide an expansion volume.

The licensee's relief request does not include a basis for not full-stroke exercising these valves during cold shutdowns. Yet, the basis provided for not verifying a full-stroke exercise during refueling outages should also apply during cold shutdowns. Therefore, it is impractical to verify a full-stroke of valves 3(4)-0876B and -0876C during cold shutdowns using conventional methods.

Disassembly and inspection, to verify the full-stroke capability of check valves is an option only where full-stroke exercising cannot practically be performed by flow or by other positive means. The NRC considers valve disassembly and inspection to be a maintenance procedure and

not a test equivalent to exercising produced by fluid flow. This procedure has some risk, which might make its routine use as a substitute for testing undesirable when some method of testing is possible. Check valve disassembly is a valuable maintenance tool that can provide a much information about a valve's internal condition and as such should be performed under the plant maintenance program at a frequency commensurate with the valve type and service.

The minutes of the public meeting on GL 89-04 states that part-stroke exercise testing with flow should be performed after completing disassembly and inspection but before returning the valve to service. This testing provides a degree of confidence that the disassembled valve is re-assembled properly and that the disk moves freely.

The licensee proposed to disassemble each of these four valves on a sampling basis over the 10-year inspection interval. The grouping and inspection interval is not in accordance with the provisions of GL 89-04, Attachment 1, position 2, since the valves in the group do not meet the service conditions criteria (i.e., they are in different units). The licensee has neither justified the grouping nor extending the disassembly interval.

The use of valve diagnostics to determine that a check valve opens fully or sufficiently to pass maximum required accident flow is considered an acceptable alternative to full flow testing. A non-intrusive method of testing these valves might, however, be practical. Therefore, an interim period should be provided to permit the licensee time to investigate whether non-intrusive methods can be used to verify maximum required accident flow through these valves or verify that they fully open or open sufficiently to allow passage of maximum required accident flow when RHR flow is established through them during cold shutdown or refueling outages. After the interim period the licensee should implement testing with non-intrusive flow instrumentation or valve diagnostics or demonstrate this alternative is impractical.

These are simple check valves without remote position indication to determine disk position. The only practical method of verifying valve closure is to perform a leak test. It is impractical to leak test these valves quarterly or during cold shutdowns because many of the test connections are inside containment. Access for testing would present a personnel safety hazard due to high radiation levels and the presence of high energy systems. These valves will be verified closed during refueling outages in conjunction with PIV leak rate testing.

While the licensee's proposed testing is not acceptable on a long term basis, part-stroke exercising during cold shutdowns, sample disassembly and inspection and leak rate testing at refueling outages should allow a reasonable assessment of valve operational readiness during the interim period of 12 months or until the end of the next refueling outage (for each unit), whichever is longer.

Based on the determination that compliance with the Code requirements is impracticable and burdensome, and considering the proposed alternate testing and frequency, interim relief should be granted for 12 months or until the end of the next refueling outage (for each unit), whichever is longer, provided the licensee disassembles at least one of these valves from each unit every refueling outage during the interim period. Valves disassembled in lieu of testing should have a post maintenance part-stroke exercise performed prior to their return to service. This interim interval starts on August 20, 1990. The licensee should investigate using non-intrusive diagnostic techniques to verify that valves 3(4)-0875D, 3(4)-0875E, and -0875F full-stroke exercise open when subjected to flow from a source, such as a reduced pressure accumulator, during refueling outages.

3.6.1.6 Relief Request. The licensee has requested relief in VR-15 from the exercising method and frequency requirements of Section XI, Paragraph IWV-3520, for 3(4)-0876D and -0876E, the alternate RHR injection check valves to the RCS cold legs, and proposed to part-stroke exercise these valves during cold shutdowns and to disassemble, inspect, and manually exercise them during refueling outages with each of the four valves being disassembled and inspected at least once every 10-year inspection interval.

The licensee will also leak rate test these valves at least once every two years in conjunction with PIV leak testing.

3.6.1.6.1 Licensee's Basis for Requesting Relief--Full stroke exercising of these valves to the open position, as defined in Paragraph 4.4, based on the maximum accident flow rate resulting from two Low-pressure Safety Injection (RHR) Pumps injection to a depressurized RCS loop, is not practical due to the system configuration that splits the flow between the two valves in the line.

Partial-flow testing of these valves would require injecting into the RCS since no downstream recirculation path exists. At power operation this is not possible because the RHR pumps cannot develop sufficient discharge pressure to overcome reactor coolant system pressure. During normal cold shutdown conditions, injection via the RHR pumps can be accomplished for part-stroke exercising.

These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or backflow test. During plant operation, access is limited to the system since most of the components needed for leak testing are in the containment building. Performing leak tests of these valves involves a considerable effort such that testing at each cold shutdown outage would constitute an unreasonable burden on the plant staff.

Alternate Testing: Each of these valves will be part stroke tested to the open position during cold shutdowns. At least once every two (2) years, each of these valves will be verified to close in conjunction with PIV leak testing. At least once during each 10-year inspection interval these valves will be disassembled, inspected, and manually exercised per Reference 2.8, Position 2.

3.6.1.6.2 Evaluation--IWV-3520 requires that check valves be exercised to their safety function position(s) quarterly or, if justified, during cold shutdowns. It is impractical to full or part-stroke exercise valves 3(4)-0876D and -0876E during power operations because the only flow path through these valves is from the RHR pumps into the RCS and the RHR

pumps do not produce sufficient head to establish flow into the RCS. To full-stroke exercise these valves quarterly during power operations, extensive system modifications would have to be performed, such as installing full flow test loops. It would be costly and burdensome for the licensee to make such modifications. Additionally, reduced system reliability could result from failures that could divert the injection flow away from the RCS.

These valves are in non-instrumented parallel flow paths. It is impractical to verify the maximum required accident flow rate through each valve using conventional methods during cold shutdowns or refueling outages.

Disassembly and inspection, to verify the full-stroke capability of check valves is an option only where full-stroke exercising cannot, practically, be performed by flow or by other positive means. The NRC considers valve disassembly and inspection to be a maintenance procedure and not a test equivalent to exercising produced by fluid flow. This procedure has some risk, which might make its routine use as a substitute for testing undesirable when some method of testing is possible. Check valve disassembly is a valuable maintenance tool that can provide much information about a valve's internal condition and as such should be performed under the plant maintenance program at a frequency commensurate with the valve type and service.

The minutes of the public meeting on GL 89-04 states that part-stroke exercise testing with flow should be performed after valve disassembly and inspection is completed but before its return to service. This testing provides a degree of confidence that the disassembled valve is re-assembled properly and that the disk moves freely.

The licensee proposed to disassemble each of these four valves on a sampling basis over the 10-year inspection interval. The grouping and inspection interval is not in accordance with the provisions of GL 89-04, Attachment 1, position 2, since the valves in the group do not meet the service conditions criteria (i.e., they are in different units). The licensee has neither justified the grouping nor extending the disassembly interval.

The use of valve diagnostics to show that a check valve opens fully or sufficiently to pass maximum required accident flow is considered an acceptable alternative to full flow testing. A non-intrusive method of testing these valves might, however, be practical. Therefore, an interim period should be provided to permit the licensee time to investigate whether non-intrusive methods can be used when RHR flow is established through them during cold shutdown or refueling outages. After this interim period the licensee should implement testing with non-intrusive flow instrumentation or valve diagnostics or provide the results of a study that demonstrates this alternative to be impractical.

These are simple check valves without remote position indication to determine disk position. The only practical method of verifying valve closure is to perform a leak test. It is impractical to leak test these valves quarterly or during cold shutdowns because many of the test connections used to perform this testing are inside containment. Access for testing would present a personnel safety hazard due to high radiation levels and the presence of high energy systems. These valves will be verified closed at least once every two years in conjunction with PIV leak rate testing.

While the licensee's proposal is not acceptable on a long term basis, part-stroke exercising during cold shutdowns, sample disassembly and inspection at refueling outages, and leak rate testing at least once every two years should allow a reasonable assessment of valve operational readiness during the interim period of 12 months or until the end of the next refueling outage (for each unit), whichever is longer.

Based on the determination that compliance with the Code requirements is impracticable and burdensome, and considering the proposed alternate testing and frequency, interim relief should be granted for 12 months or until the end of the next refueling outage (for each unit), whichever is longer. The licensee should disassemble at least one of these valves from each unit every refueling outage during the interim period. Valves disassembled in lieu of tested should be part-stroke exercised before their return to service. This interim interval starts on August 20, 1990. The

licensee should investigate the use of non-intrusive diagnostic techniques to verify that valves 3(4)-0875D, 3(4)-0875E, and -0875F full-stroke exercise open when subjected to flow from a source, such as a reduced pressure accumulator, during refueling outages.

3.6.1.7 Relief Request. The licensee has requested relief in VR-17 from the exercising closed test frequency requirement of Section XI, Paragraph IWV-3520, for 3(4)-0876A, the RHR injection check valves to the RCS loop A cold legs, and proposed to verify closure by leak rate testing these valves at least once every two years in conjunction with PIV leak testing.

3.6.1.7.1 Licensee's Basis for Requesting Relief--These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or backflow test. This would require a considerable effort, including bleeding down the pressure in the nitrogen supply system, which is undesirable during plant operation and would be an unreasonable burden on the plant staff to perform at cold shutdown.

Alternate Testing: At least once every two (2) years, each of these valves will be verified to close in conjunction with the PIV leak testing program.

3.6.1.7.2 Evaluation--IWV-3520 requires that check valves be exercised to their safety function position(s) quarterly or, if justified, during cold shutdowns. These are simple check valves without remote position indication to determine valve disk position. The only practical method of verifying valve closure is to perform a leak test. It is impractical to leak test these valves quarterly or during cold shutdowns as many of the test connections used to perform this testing are inside containment. Access for testing would present a personnel safety hazard due to high radiation levels and the presence of high energy systems. Performing this testing during cold shutdowns would subject plant personnel to increased radiation dosages and other potential hazards. This could delay the return to power, which would be burdensome to the licensee. The proposal to leak rate test these valves at least once every two years in

conjunction with PIV leak rate testing provides reasonable assurance of their ability to perform their safety function in the closed position.

Based on the determination that compliance with the Code test frequency is impracticable and burdensome, and since the licensee's proposal to verify valve closure by performing leak rate testing at least once every two years provides a reasonable alternative to the Code requirements, relief should be granted as requested from the Code test frequency.

3.6.2 Category C Valves

3.6.2.1 Relief Request. The licensee has requested relief in VR-8 from the test frequency requirements of Section XI, Paragraph IWV-3522, for the safety injection pump discharge check valves, 3-0879A, -0879B, 4-0879C and -0879D, and proposed to part-stroke exercise these valves quarterly and full-stroke exercise these valves each refueling outage.

3.6.2.1.1 Licensee's Basis for Requesting Relief--Full-stroke exercising of these valves would require operating each safety injection pump at nominal accident flow rate. The only flowpath available for such operation would necessitate injecting into the reactor coolant system since no full flow recirculation path exists. At power operation this is not possible because the SIS pumps do not develop sufficient discharge pressure to overcome reactor coolant system pressure. During normal cold shutdown conditions, injection via the SIS pumps is precluded by restrictions related to low-temperature overpressurization protection concerns and Technical Specifications, Section 3.15.

Alternate Testing: Each of these valves will be part-stroke exercised quarterly in conjunction with testing of the SIS pumps via the minimum flow test line. During each refueling outage, each valve will be exercised at least once to demonstrate full stroke capability.

3.6.2.1.2 Evaluation--It is impractical to full-stroke exercise these check valves with flow during power operation because the only full flow path is into the RCS. The charging pumps cannot develop full design

accident flow against operating reactor pressure. These valves cannot be full-stroke exercised with flow during cold shutdown because the RCS does not contain sufficient expansion volume to accommodate the flow required and a low temperature overpressure condition could result. These are simple check valves not equipped with external operators or position indicators.

Full-stroke exercising these valves quarterly would require system redesign and modifications. This would be costly and burdensome to the licensee. The proposal to part-stroke exercise these valves quarterly with flow through the minimum flow recirculation line and to full-stroke exercise these valves each refueling outage provides reasonable alternative to the Code test frequency requirements.

Based on the determination that compliance with the Code test frequency is impracticable and burdensome, and since the licensee's proposal provides a reasonable alternative to the Code, relief should be granted as requested from the Code test frequency requirements.

3.7 Primary and Demineralized Water System

3.7.1 Category A/C Valves

3.7.1.1 Relief Request. The licensee has requested relief in VR-18 from the test frequency requirements of Section XI, Paragraph IWV-3522, for the containment isolation valves in the primary water supply lines to containment, 3-10-0567 and 4-10-0567, and proposed to exercise them at least every two years during Appendix J leak testing.

3.7.1.1.1 Licensee's Basis for Requesting Relief--These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or backflow test. This would require a considerable effort, including bleeding down the pressure in the primary water supply system, which is undesirable during plant operation and would be an unreasonable burden on the plant staff to perform at cold shutdown.

In addition, these valves are normally closed during plant operation with the inboard manual valves (3-10-0582) also closed. Thus, in effect, they are passive valves and essentially, need not be exercised.

Alternate Testing: At least once every two (2) years, each of these valves will be verified to close in conjunction with Appendix J leak testing program.

3.7.1.1.2 Evaluation--These containment isolation check valves are in the primary water supply lines to containment. They are simple check valves, not equipped with external operators or position indicators. It is impractical to verify them closed during power operation or during cold shutdowns. System reconfiguration and hooking up and disconnecting leak testing equipment during cold shutdowns would likely delay the return to power. System redesign and modification would be necessary to allow testing these valves closed quarterly. These would be costly and burdensome to the licensee.

The only practical means available for determining their capability to restrict seat leakage is by leak rate testing. This requires establishing a reverse differential pressure across the valves and measuring the rate of leakage past the seat. The licensee's proposal to verify closure during Appendix J local leak rate testing at least once every two years allows an adequate assessment of operational readiness and provides a reasonable alternative to the Code.

Based on the determination that compliance with the Code test frequency is impracticable and burdensome, and considering the licensee's proposal, relief should be granted as requested from the Code test frequency requirements.

3.8 Emergency Diesel Generator System

3.8.1 Category B Valves

3.8.1.1 Relief Request. The licensee has requested relief in VR-22 from the valve stroke timing requirements of Section XI, Paragraph

IWV-3413(b), for the emergency diesel generator fuel oil supply valves, CV-2046A, -2046B, SV-2051A, -2051B, SV-*-3522A and -3522B, and proposed to verify these valves' operation during diesel testing.

3.8.1.1.1 Licensee's Basis for Requesting Relief--These valves have no external position indicating devices that can be used for measuring stroke time.

Alternate Testing: These valves will be tested in conjunction with testing of the emergency diesel generators and the diesel generator fuel oil transfer pumps. The satisfactory response and operation of the associated diesel generator and the fuel oil transfer pumps will demonstrate valve operability but no valve stroke times will be measured.

3.8.1.1.2 Evaluation--Valves DGA-SOV-1 and SOV-2 are enclosed solenoid operated valves, with no externally visible indication of valve position. It is difficult to accurately measure valve stroke times as there is no installed provision for determining when the valve receives a signal to operate or when it reaches the desired position. The licensee has proposed to determine operational readiness by verifying satisfactory operation of the diesel generator and transfer pumps without measuring and evaluating these valves' stroke times as required. Yet, an appropriate test method and acceptance criteria are needed to assess operational readiness. This is to ensure a severely degraded valve is declared inoperable and repaired or replaced prior to its return to service. Stroke timing or otherwise equivalently evaluating the condition of these valves is vital to the determination of operational readiness.

The licensee's proposal gets some information about valve condition and provides an adequate alternative to the Code for an interim period of one year or until the next refueling outage, whichever is longer. Yet, it does not provide a reasonable long-term alternative to the Code test method requirements. During the interim period the licensee should consider methods, such as ultrasonics, magnetics, and acoustics for stroke timing or otherwise monitoring the condition of these valves. Appropriate acceptance

criteria should be assigned so that a severely degraded valve is identified for corrective action.

Based on the determination that the licensee's proposal provides a reasonable short but not a long term alternative to the Code requirements and considering the licensee's proposal, interim relief should be granted for one year or until the next refueling outage, whichever is longer. This interim interval starts on August 20, 1990.

3.9 Containment Spray System

3.9.1 Category A/C Valves

3.9.1.1 Relief Request. The licensee has requested relief in VR-9 from the test method and frequency requirements of Section XI, Paragraph IWV-3520, for 3(4)-0890A and -0890B, the containment spray header check valves, and proposed to disassemble, inspect, and manually exercise them on a sampling basis during refueling outages. The licensee will also leak rate test them at least once every 2 years in conjunction with Appendix J testing and part-stroke exercise them open with air during the spray nozzle functional test once every 5 years.

3.9.1.1.1 Licensee's Basis for Requesting Relief--Full-stroke exercising of these valves to the open position would require operating each containment spray pump at nominal accident flow rate. Since no recirculation flow path exists downstream of these valves, the only flow path available for such operation would require injecting borated water into the containment spray header and thence into the containment building atmosphere via the spray nozzles. Dousing of equipment inside the containment in such a manner is obviously undesirable.

At 5-year intervals each valve is part stroke tested during spray nozzle functional testing by pressurizing the header with air and verifying flow from the containment spray nozzles.

Since these are simple-acting check valves with no provision for determining disc position, the only practical means of verifying closure

involves performing a leak test. Performance of such a test at each cold shutdown would constitute an unreasonable burden on the plant staff.

Alternate Testing: During each reactor refueling outage one of these valves will be disassembled, inspected, and manually exercised on a sequential and rotating schedule. At 5-year intervals each valve will be part-stroke tested during spray nozzle functional testing by pressurizing the header with air and verifying flow from the containment spray nozzles. Each of these valves will be verified to close at least once every two (2) years in conjunction with Appendix J leak testing activities.

3.9.1.1.2 Evaluation--Valves 3(4)-0890A and -0890B are simple check valves without remote or other external indication of disk position. Full-stroke exercising these valves by establishing fluid flow through them is impractical during any plant operating mode. The only flow path through these valves is through the containment spray rings, which would spray water inside containment. This would wet down equipment and structures inside containment and could cause damage to equipment and insulation. System modifications, such as installation of a full-flow test loop, would be necessary to permit full-stroke exercising these valves with fluid flow. It would be costly and burdensome to require the licensee to perform these major system modifications.

The licensee's proposed disassembly and inspection program might be the only practical alternate exercising method available. Yet, the NRC considers valve disassembly and inspection to be a maintenance procedure and not a test equivalent to the exercising produced by fluid flow. This procedure has some risk, which might make its routine use as a substitute for testing undesirable when some method of testing is possible. Check valve disassembly is a valuable maintenance tool that can provide a much information about a valve. It should be performed under the plant maintenance program at a frequency commensurate with the valve type and service.

Disassembly and inspection, to verify the full-stroke capability of check valves is an option only where full-stroke exercising cannot practically be performed by flow or by other positive means. The use of

valve diagnostics to show that a check valve opens fully or sufficiently to pass maximum required accident flow during a partial flow test is considered an acceptable alternative to full flow testing. A non-intrusive method of testing might be practical. Therefore, the use of disassembly and inspection should be conditionally approved for an interim period to permit the licensee time to investigate whether non-intrusive methods can be used when subjected to a partial flow. After this interim period the licensee should implement partial flow testing (by means such as establishing air flow through the valves) with diagnostics or demonstrate this alternative to be impractical.

The minutes of the public meeting on GL 89-04 states that part-stroke exercise testing with flow should be performed after valve disassembly and inspection is completed but before its return to service. This testing provides a degree of confidence that the disassembled valve is re-assembled properly and that the disk moves freely.

Disassembly, inspection, and manually exercising the valve disks on a sampling basis during reactor refueling outages would provide an indication of valve mechanical condition and their ability to perform their safety-related functions.

Based on the determination that compliance with the Code requirements is impracticable and burdensome, and considering the proposed alternate testing and frequency, interim relief should be granted for 12 months or until the end of the next refueling outage (for each unit), whichever is longer, provided the licensee performs a post-maintenance part-stroke exercise of the valves after reassembly. This interim interval starts on August 20, 1990. The licensee should investigate the use of non-intrusive diagnostic techniques to verify that valves 3(4)-0890A and -0890B full-stroke exercise open when subjected to a partial flow air test during refueling outages. If another method is developed to verify the reverse flow closure capability of these valves, this relief request should be revised or withdrawn.

APPENDIX A

'IST PROGRAM ANOMALIES IDENTIFIED DURING THE REVIEW

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Summarized below are inconsistencies and omissions in the licensee's IST program noted during this review. The licensee should resolve these items according to the evaluations, conclusions, and guidelines presented in this report.

1. The licensee has requested relief in PR-2 (See Section 2.2.1 of this report) from the Code flow rate measurement and run time requirements for the emergency diesel generator fuel oil transfer pumps and proposed to calculate flow rate based on the rate of change of day tank level. Relief should be granted provided the flow rate calculations meet the accuracy requirements of Table IWP-4110-1 for measured values.

2. The licensee has requested relief in VR-2, VR-6, and VR-22 (See Sections 3.3.1.1, 3.5.1.1, and 3.8.1.1 of this report) from the Code valve stroke timing requirements for various power operated valves and proposed to verify they operate in response to demands during system operation or testing. Interim relief should be granted from the Code requirements for one year or until the next refueling outage, whichever is longer. These relief requests as well as VR-9, and VR-11 thru -15 were evaluated and interim relief was granted by a letter dated August 20, 1990, to Mr. J. H. Goldberg of FP&L Company from NRC. Therefore, the starting date for interim approval for these requests is August 20, 1990. During the interim period the licensee should consider methods, such as ultrasonics, magnetics, and acoustics for stroke timing or otherwise adequately assessing the operational readiness of these valves. Acceptance criteria should be assigned so that severely degraded valves are identified for corrective action.

3. The licensee has requested relief in VR-7 (See Section 3.1.1.1 of this report) from the Code test frequency requirements for valves that can be tested only during cold shutdowns and proposed to test at the frequency described in the relief request. Relief should be granted only for valves that can be tested during any cold shutdown. For any valve, or class of valves, that cannot be tested during each cold

shutdown of sufficient duration to complete all testing, a relief request must be submitted to and approved by NRC prior to implementation.

4. The licensee has requested relief in VR-11 (See Section 3.6.1.2 of this report) from the Code test method and frequency requirements for the SI hot leg injection check valves and proposed to part-stroke exercise them open during refueling outages and leak rate test them every 2 years. Interim relief should be granted for one year or until the end of the next refueling outage (for each unit), whichever is longer. This interim interval starts on August 20, 1990. The licensee should investigate non-intrusive valve diagnostic techniques to verify these valves full-stroke exercise open when subjected to flow during refueling outages.

5. The licensee has requested relief in VR-9, VR-12, VR-13, VR-14, and VR-15 (See Sections 3.6.1.3, 3.6.1.4, 3.6.1.5, 3.6.1.6, and 3.9.1.1 of this report) from the Code test method and frequency requirements for various check valves and proposed to disassemble and inspect them on a sampling basis during refueling outages at the described frequencies. The NRC considers this to be a maintenance procedure not a test equivalent to exercising produced by fluid flow. This procedure has some risk, which might make its routine use as a substitute for testing undesirable when some method of testing is possible. Check valve disassembly is a valuable maintenance tool that can provide a much information about a valve's internal condition. As such, it should be performed under the plant maintenance program at a frequency commensurate with the valve type and service.

Disassembly and inspection, to verify the full-stroke capability of check valves is an option only where full-stroke exercising cannot practically be performed by flow or by other positive means. The use of valve diagnostics to determine that a check valve opens fully or sufficiently to pass maximum required accident flow during a partial flow test is considered an acceptable alternative to full flow testing. Non-intrusive methods of testing these valves might be

practical, therefore, the use of disassembly and inspection should be conditionally approved for an interim period to permit the licensee time to investigate whether non-intrusive methods can be used. After this interim period the licensee should implement partial flow testing (by means such as establishing air flow through the valves) with diagnostics or demonstrate that this alternative is impractical.

The minutes of the public meeting on GL 89-04 states that part-stroke exercise testing with flow should be performed after valve disassembly and inspection is completed but before its return to service.

Interim relief should be granted from the Code exercising method and frequency requirements for a period of 12 months or until the end of the next refueling outage for each unit, whichever is longer, provided the licensee performs a post-maintenance part-stroke exercise of the valves after reassembly. This interim interval starts on August 20, 1990. The licensee should investigate the use of non-intrusive diagnostic techniques to verify these valves full-stroke exercise open when subjected to flow during testing. If a suitable method is developed the affected relief request should be revised or withdrawn.

6. The licensee has requested relief in VR-24 from the test frequency requirements for safety-related pumps or valves that must be removed from service for testing. The licensee proposes to defer testing when the redundant subsystem is out of service for maintenance or repairs, and to perform the testing after the out of service subsystem is returned to service. This issue is addressed and the requirements are as stated in plant Technical Specifications. Therefore, this relief request is not evaluated in this TER.

7. The licensee has requested relief in VR-25 (See Section 3.1.4.1 of this report) from individually leak rate testing certain CIVs listed in Table VR-25-1 according to the Code and proposed to test these valves in groups and evaluate the measured group leakage rates against assigned group leakage rate limits. Where practicable, valves should be individually leak rate tested and evaluated as required by the Code,

even if these valves are in groups with others that cannot be tested individually. In cases where it is impracticable to leak rate test individual valves, testing in groups can be acceptable provided group leakage limits are set such that excessive leakage through any valve in the group is detected, the valve declared inoperable, and corrective action taken prior to its return to service.

Relief should be granted from individually testing valves that can be practically tested only in groups provided the licensee leak rate tests these valves in groups and assigns maximum group leakage rate limits conservatively based on the smallest valve in the group. This is to ensure that corrective action is taken whenever the leak tight integrity of any of the group tested valves is in question. Relief should be denied for valves that can be tested individually.