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TECHNICAL EVALUATION REPORT
PUMP AND VALVE INSERVICE TESTING PROGRAM
MAINE YANKEE ATOMIC POWER STATION

Docket Number 50-309

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ABSTRACT

This report presents the results of our evaluation of the Maine Yankee Atomic Power Station Inservice Testing program for safety-related pumps and valves.

PREFACE

This report is part of the "Technical Assistance in Support of Operating Reactors Inservice Testing Relief Requests" program conducted for the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Mechanical Engineering Branch, by EG&G Idaho, Inc., DOE/NRC Support Programs.

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1. INTRODUCTION

This report provides the results of the technical evaluation of certain relief requests from the pump and valve inservice testing (IST) program for the Maine Yankee Atomic Power Plant submitted by Maine Yankee Atomic Power Company.

Section 2 presents Maine Yankee Atomic Power Company's bases for requesting relief from the requirements for pumps followed by an evaluation and conclusion. Section 3 presents similar information for valves.

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

1.1 IST Program Description

Maine Yankee Atomic Power Company submitted Revision 0 of their Third Inspection Interval IST program with a letter to the Nuclear Regulatory Commission (NRC) dated February 2, 1993. The IST program is dated January 28, 1993, and covers the third ten-year interval starting December 28, 1992, and ending December 27, 2002. The Code of record for the third ten-year inspection interval IST program is the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (the Code), Section XI, 1986 Edition and the Code of Federal Regulations (CFR), 10 CFR 50.55a. However, the licensee has adopted ASME/ANSI OMa-1988, Part 6, in its entirety for the pump testing program at Maine Yankee Plant. The use of Part 6 is approved by Code Case N-465, "Alternative Rules for Pump Testing," which is endorsed in Revision 8 of Regulatory Guide 1.147.

1.2 IST Requirements

10 CFR 50.55a(f) states that IST of certain ASME Code Class 1, 2, and 3 pumps and valves will be done according to the ASME Code, Section XI, Subsections IWP and IWV, except where the alternative is authorized or relief is granted by NRC in accordance with 10 CFR 50.55a(a)(3)(i), (a)(3)(ii), or (f)(6)(i). Maine Yankee Atomic Power Company requests relief from the ASME Code testing requirements for specific pumps and valves. Certain of these requests are evaluated in this Technical Evaluation Report (TER) using the acceptance criteria of the Standard Review Plan, Section 3.9.6, NRC Generic Letter No. 89-04 (GL 89-04), "Guidance on Developing Acceptable Inservice Testing Programs," and 10 CFR 50.55a. Other requests in the licensee's IST program that are not evaluated in this TER, may be granted by provisions of GL 89-04 or include non-Code Class 1, 2, or 3 components.

In rulemaking to 10 CFR 50.55a effective September 8, 1992 (See 57 Federal Register 34666), the 1989 Edition of ASME Section XI was incorporated in ¶ (b) of § 50.55a. The 1989 Edition of Section XI provides that the rules for IST of pumps and valves are as specified in ASME/ANSI Operations and Maintenance Standards Part 6 (OM-6), *Inservice Testing of Pumps in Light-Water Reactor Power Plants*, and Part 10 (OM-10), *Inservice Testing of Valves in Light-Water Reactor Power Plants*. Pursuant to ¶ (f)(4)(iv), portions of

editions or addenda may be used provided that all related requirements of the respective editions or addenda are met, and therefore, relief is not required for those inservice tests that are conducted in accordance with OM-6 and OM-10, or portions thereof. Whether all related requirements are met is subject to NRC inspection.

1.3 Scope and Limits of the Review

The scope of this review includes, but is not limited to, the cold shutdown justifications and relief requests for safety-related Code Class 1, 2, and 3 pumps and valves submitted with the licensee's IST program. Other portions of the program, such as general discussions, pump and valve test tables, etc., are not necessarily reviewed. Endorsement of these aspects of the program by the reviewer is not stated or implied.

The Containment Spray, Steam Generator Feedwater, and Safety Injection Systems were specifically reviewed for scope and completeness of the licensee's IST program. The system drawings were reviewed and many valves evaluated to determine if they perform a safety-related function. Although this review was more detailed than normally performed, it was a spot check and does not constitute a comprehensive system review or endorsement of the licensee's scope.

The evaluations in this TER are applicable only to the components or groups of components identified by the submitted requests. Further, the evaluations and recommendations are limited to the requirement(s) and/or function(s) explicitly discussed in the applicable TER section. For example, the results of an evaluation of a request involving testing of the containment isolation function of a valve cannot be extended to allow the test to satisfy a requirement to verify the valve's pressure isolation function, unless that extension is explicitly stated.

Maine Yankee Atomic Power Company provided several deferred test justifications for exercising Category A, B, and C valves during cold shutdowns and refueling outages instead of quarterly. Valves identified to be tested during cold shutdowns need not be tested if testing was performed within three months of the cold shutdown in accordance with IWV-3412(a) and -3522. These justifications were reviewed and appear to be acceptable except as noted in Section 4 of this report and in Appendix A.

2. PUMP TESTING PROGRAM

The following relief requests are evaluated against the requirements of ASME/ANSI OMa-1988, Part 6, 10 CFR 50.55a, and applicable NRC positions and guidelines. A summary is presented for each relief request followed by the licensee's basis for relief and the evaluation with the reviewer's recommendations. The requests are grouped according to topic or system.

2.1 High Pressure Safety Injection Pumps

2.1.1 Inlet Pressure Instrument Full-Scale Range

2.1.1.1 Relief Request. P-1 requests relief from the instrument full-scale range requirements of ASME/ANSI OM-6, Paragraph 4.6.1.2(a), for the High Pressure Safety Injection (HPSI) Pumps, P-14A, -14B, and -14S. The licensee proposes to use the installed 0-120 psia pressure gauges to measure pump inlet pressure.

2.1.1.1.1 Licensee's Basis for Requesting Relief--The following text is quoted from relief request P-1 in the Maine Yankee Third Inspection Interval IST Program dated January 28, 1993:

> During normal plant operation, these pumps are aligned as charging pumps and have a suction pressure of approximately 30 psia. ASME Section XI requires that the gauge used to measure the suction pressure during inservice pump tests shall have a maximum range of zero to three times the reference value which in this case is 0-90 psia. Also, the accuracy must be within ±2% of full-scale. However, during an accident where a Recirculation Actuation Signal (RAS) occurs, these pumps are realigned as High Pressure Safety Injection Pumps and take suction from the discharge of the Containment Spray Pumps. In this situation, the suction pressure of the pumps would exceed 90 psia. A suction pressure in excess of 90 psia would damage a 0-90 psia gauge. Therefore, Maine Yankee deems it necessary to use a 0-120 psia gauge to ensure that the gauge will be operable during an accident situation. Also, this 0-120 psia gauge is calibrated to within ±1% of full-scale (1.2 psi) as compared to the code required accuracy for the 0-90 psia gauge of ±2% full-scale (1.8 psi). Therefore, the 0-120 psia gauge is more accurate than the code requires. The pumps also have a large differential pressure of about 2500 psi. This means that significant variations in suction pressure will cause small percentage changes in differential pressure. For example, a 10 psi error in the suction pressure reading would give a change in differential pressure of only 0.4%. This is well within the code allowed variation of differential pressure of plus 10% minus 10% of the reference differential pressure.
>
> Alternate Testing: For the reasons stated above, Maine Yankee will use 0-120 psia gauges to measure the suction pressure on the High Pressure Safety Injection Pumps during Inservice Testing.

2.1.1.1.2 Evaluation--The Code requires measurement and analysis of pump differential pressure quarterly. These measurements are evaluated with flow rate measurements to assess pump hydraulic condition and detect degradation. OM-6, Paragraph 4.6.1.2(a) states that the full-scale range of analog instruments shall not be greater than three times the reference value

of the parameter. This requirement is to ensure that the instrumentation used for testing is sufficiently readable and accurate. The licensee proposes to determine differential pressure using the existing station inlet pressure instrument that has a full-scale range of 120 psig where the reference value is approximately 30 psig (three times 30 psig is 90 psig).

OM-6 does not require measurement and evaluation of pump inlet pressure. However, since there is no direct reading differential pressure instrument for the HPSI pumps, inlet pressure must be measured to determine the differential pressure developed across the pumps. Therefore, the Code quality and range requirements apply to the HPSI inlet pressure instrument to assure that measurements are sufficiently accurate and readable to permit detection of pump degradation. The installed inlet pressure instrument full-scale range is greater than three times the test reference value (120 psig in lieu of $\leq$90 psig). The higher range is necessary to prevent instrument damage due to over-ranging during expected system operating conditions, therefore, installing an instrument that meets the range requirements may not be prudent. The accuracy of the installed instrument ($\pm$1%) is better than is required for pressure instruments in OM-6, Table 1 ($\pm$2%). The proposed inlet pressure instrument reading inaccuracy might be as great as $\pm$1.2 psi ($\pm$4% of the reference value). However, the differential pressure of these pumps is approximately 2500 psid and the inlet pressure is so small in comparison that a slight inaccuracy in inlet pressure is meaningless (the $\pm$1.2 psi inaccuracy is only $\pm$0.05% of the 2500 psid differential pressure). Use of the installed inlet pressure instrument would have no appreciable impact on the ability to evaluate the condition of these pumps. Test instruments that meet the Code could have up to a $\pm$1.8 psi inaccuracy at the reference value, therefore, installing test instruments that comply with the Code for testing would be a hardship without a compensating increase in the level of quality and safety. The proposed alternative provides sufficiently accurate data for assessing pump degradation.

Based on the determination that compliance with the Code full-scale range requirements for the HPSI pump inlet pressure instruments is a hardship without a compensating increase in the level of quality and safety, we recommend that the alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

3. VALVE TESTING PROGRAM

The following relief requests are evaluated against the requirements of the 1986 Edition 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 followed by an evaluation and reviewer's recommendation. Relief requests are grouped according to system and Code Category.

3.1 Various Systems

3.1.1 Reference Stroke Times for Power Operated Valves

3.1.1.1 Relief Request. VRR-1 requests relief from the stroke time corrective action requirements of Section XI, Paragraph IWV-3417(a), for all of the power-operated valves in the IST program. The licensee proposes to base corrective action requirements on deviation from reference stroke times, established when the valves are known to be operating acceptably, in lieu of comparing stroke times to the previous measurements.

3.1.1.1.1 Licensee's Basis For Requesting Relief--The following text is quoted from relief request VRR-1 in the Maine Yankee Third Inspection Interval IST Program dated January 28, 1993:

> Using a fixed reference value provides a more logical and stringent basis for determining increased test frequencies. This value is determined from the results of previous tests established when the valve was known to be operating acceptably and represents a proper perspective of the valves' normal actuation time.
>
> Alternate Testing: A fixed reference value based on the results of the previous tests when the valve was known to be operating properly, will be assigned to the valve. If a fixed reference value is exceeded by either:
>
> a. 25% or more for those reference values greater than 10 seconds, or
> b. 50% or more for those reference values less than or equal to 10 seconds. Maine Yankee shall increase that frequency to once a month until the condition is corrected.

3.1.1.1.2 Evaluation--The Code requires stroke timing of power-operated valves quarterly, or during cold shutdowns if quarterly testing is impractical. This testing helps to identify valve degradation. Position 5 of GL 89-04 provides guidance for developing limiting values of full-stroke times for power-operated valves. It states in part, "The limiting value of full-stroke time should be based on the valve reference or average stroke time of a valve when it is known to be in good condition and operating properly."

The licensee proposes to determine reference stroke times for valves when they are known to be operating acceptably. Stroke times measured during testing will be compared to those reference values and the acceptance criteria. Corrective action, as specified in Paragraph IWV-3417(a), will be taken if required. This is consistent with the recommendations of GL 89-04, Position 5, and is an improvement over the stroke time measurement requirements of Section XI because it does not permit extensive creeping of valve stroke times due to gradual degradation. Therefore, the licensee's

proposal to use reference stroke times for comparison with test data should provide an acceptable level of quality and safety.

OM-10, Paragraph 4.2.1.8, provides acceptance criteria for valve stroke times based on stroke time reference values. The staff considers these criteria to be better than the Section XI criteria because they recognize differences in valve types and establish separate criteria for electric-motor-operated valves. Electric-motor-operated valves would likely fail catastrophically prior to reaching the acceptance criteria of Paragraph IWV-3417(a). Therefore, the OM-10 acceptance criteria are set lower for this valve type. In addition, OM-10, Paragraph 4.2.1.9, provides corrective actions that the staff considers to be preferable to those of Section XI. When the measured stroke time exceeds the acceptance criteria of Paragraph 4.2.1.8, in lieu of monthly testing, the valve must be immediately declared inoperable or be retested. If the retest exceeds the criteria of Paragraph 4.2.1.8, an analysis must be performed to verify that the new stroke time represents acceptable valve operation or the valve must be declared inoperable. Because of these improvements over Section XI, when using stroke time reference values, the staff requires compliance with the related requirements of OM-10, which include Paragraphs 1.3, 3.1 through 3.6, and 4.2.1.3 through 4.2.1.9.

In rulemaking to 10 CFR 50.55a effective September 8, 1992, the 1989 Edition of ASME Section XI was incorporated in 10 CFR 50.55a(b). The 1989 Edition of Section XI provides that the rules for inservice testing of valves are as specified in OM-10. 10 CFR 50.55a(f)(4)(iv) provides that IST of valves may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in 10 CFR 50.55a(b), subject to the limitations and modifications listed, and subject to NRC approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions or addenda are met.

As described above, OM-10 allows the use of reference values to evaluate valve stroke time measurements. The staff imposed no limitations to OM-10 associated with the stroke time measurement requirements for power-operated valves. Accordingly, basing stroke time corrective actions on reference stroke times is in compliance with the rulemaking effective September 8, 1992, and relief is not required. Therefore, we recommend that the alternative of using stroke time reference values be approved pursuant to 10 CFR 50.55a(f)(4)(iv), provided the licensee implements all related requirements, which include Paragraphs 1.3, 3.1 through 3.6, and 4.2.1.3 through 4.2.1.9. Whether all related requirements are met is subject to NRC inspection.

3.2 Chemical and Volume Control System

3.2.1 Category C Valves

3.2.1.1 Relief Request. VRR-3 requests relief from the exercising frequency requirements of Section XI, Paragraph IWV-3521, for the normal charging line containment isolation check valve, CH-40. The licensee proposes to disassemble and inspect this valve once every other refueling outage.

3.2.1.1.1 Licensee's Basis For Requesting Relief--The following text is quoted from relief request VRR-3 in the Maine Yankee Third Inspection

Interval IST Program dated January 28, 1993:

> This valve must be open during normal plant operation and cold shutdowns to provide volume control to the reactor coolant system. The safety function of this valve is closed for containment isolation. Because of the physical arrangement of the system, backpressure testing of this check valve is not possible. To provide reverse flow would require testing through the vent of the regenerative heat exchanger. This vent valve is located in a high radiation area (~10R/hr). Performing this test utilizing this vent path would result in high levels of radiation exposure. CH-40 has been previously disassembled and inspected after 17 years of plant operation. No significant damage or degradation has been observed. A review of the maintenance history of this valve indicates no failures during plant operation. Minor pin cover leakage of this valve has been identified and corrected. An NPRDS search of this valve based on manufacturer, type and size revealed minor problems such as hinge pin cover leakage. No major failures were characterized. This valve has been reviewed in accordance with INPO SOER 86-3 and EPRI's APPLICATION GUIDELINE FOR CHECK VALVES IN NUCLEAR POWER PLANTS. Although this valve does not meet all the recommendations of the review, e.g., 5 to 10 pipe diameters from a major flow disturbance, specific plant history does not reveal a history of repeat failures.
>
> Alternate Testing: Maine Yankee will disassemble this valve to verify its safety function every other reactor refueling. This valve has previously been exempted from leakage testing by NRC Letter to MYAPCO Docket no. 50-309, dated 05-23-86. This Relief Request has used GL-89-04 Position 2 as guidance.

3.2.1.1.2 Evaluation--The Code requires a full-stroke exercise of safety-related check valves quarterly if practical and provides a hierarchy for part and full-stroke exercising quarterly, at cold shutdowns, or during refueling outages if quarterly full-stroke exercising is impractical. This testing is to demonstrate that a valve is capable of moving to its safety function position(s) to assess its operational readiness. The licensee proposes to disassemble and inspect valve CH-40 once every other refueling outage.

CH-40 is a simple check valve in the normal charging line to the regenerative heat exchanger and reactor coolant system (RCS). This valve does not have position indication, therefore, the only practicable conventional method of verifying valve closure is leak testing. It is impractical to leak test this valve at any frequency because the regenerative heat exchanger vent valve must be used for this testing and the vent valve is located in a 10R/hr radiation field. Since it is impractical to verify closure of this valve by leak testing, the licensee's proposal to disassemble and inspect it may be the only practicable method to periodically verify valve closure. The proposed method is permitted by OM-10, Paragraph 4.3.2.4(c), however, the proposed test frequency is not in accordance with OM-10.

Paragraph 4.3.2.4(c) permits the use of check valve disassembly every refueling outage as an alternative to exercising. GL 89-04, Position 2, permits the use of a sampling program for identical valves in similar applications. The Generic Letter also provides a mechanism for extending the valve disassembly interval. However, GL 89-04 permits extension of the

disassembly interval only in cases of extreme hardship. The licensee's basis supports extending the disassembly interval based on the low failure rate of this specific valve and similar valves in the nuclear industry. However, the licensee has not adequately demonstrated that disassembly of this valve each refueling outage would constitute an unusual hardship.

In the past several years there has been substantial development and refinement of alternate techniques for testing check valves. Therefore, some test method may be feasible to verify closure of valve CH-40 in lieu of disassembly and inspection. The licensee should consider methods such as using non-intrusive techniques (e.g., acoustics, ultrasonics, magnetics, radiography, and thermography) to verify closure of this check valve. This testing may only be practical at refueling outages. The licensee should perform their investigation and if a test method is found to be practicable, the IST requirements for valve CH-40 should be satisfied by testing instead of disassembly and inspection.

Based on the determination that the licensee has not adequately demonstrated the extreme hardship of disassembling this valve each refueling outage, we recommend that relief from the OM-10 disassembly interval not be granted as requested. The disassembly interval may be extended if all of the provisions of GL 89-04, Position 2, are met.

4. DEFERRED TEST EVALUATIONS

The following relief requests and deferred test justifications involve the frequency of testing safety-related valves. These requests and justifications are listed in Table 4.1 and are evaluated in accordance with the exercising frequency requirements of Section XI Paragraph IWV-3411, IWV-3521, OM-10 Paragraph 4.2.1.1, or 4.3.2.1 as discussed below.

4.1 Bases for Deferring Valve Exercising

Section XI, Paragraphs IWV-3411 and -3521 specify that valves be exercised every three months except as provided by Paragraphs IWV-3412 and -3522 respectively. Paragraphs IWV-3412 and -3522 permit valve full-stroke exercising to be deferred until cold shutdowns if full-stroke operation is impractical during plant operation.

In rulemaking to 10 CFR 50.55a effective September 8, 1992, the 1989 Edition of ASME Section XI was incorporated in 10 CFR 50.55a(b). The 1989 Edition of Section XI provides that the rules for inservice testing of valves are as specified in OM-10. 10 CFR 50.55a(f)(4)(iv) provides that IST of valves may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in 10 CFR 50.55a(b), subject to the limitations and modifications listed, and subject to NRC approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions or addenda are met.

OM-10, Paragraphs 4.2.1.2 and 4.3.2.2, permit deferral of full-stroke exercising until refueling outages when this exercising is not practicable during plant operation or cold shutdowns. The NRC staff imposed no limitations to OM-10 associated with the test frequency requirements. However, to utilize this provision of OM-10, the licensee must implement all related requirements, which include Paragraphs 4.3.2.2(h) and 6.2. These related requirements should be followed for all of the deferred test justifications evaluated in Table 4.1 where the alternate test frequency is in accordance with OM-10, Paragraph 4.2.1.2 or 4.3.2.2, and is authorized by 10 CFR 50.55a(f)(4)(iv).

4.2 Conclusion

For all of these relief requests and deferred test justifications where the licensee has demonstrated the impracticality of full-stroke exercising the listed valves quarterly and/or during cold shutdowns, deferral of this testing until cold shutdowns or refueling outages is covered by Section XI and/or OM-10. Accordingly, the licensee's proposed alternate testing is in compliance with either the Code or the rulemaking effective September 8, 1992. Therefore, we recommend that the proposed alternatives be approved pursuant to 10 CFR 50.55a(f)(4)(iv). If testing is deferred until refueling outages in accordance with OM-10, the licensee must implement all related requirements, which include Paragraphs 4.3.2.2(h) and 6.2. Whether all related requirements are met is subject to NRC inspection. Cases where the licensee has not adequately demonstrated the impracticality of full-stroke exercising these valves quarterly and/or during cold shutdowns, are identified in Table 4.1 and in anomalies in Appendix A to this report.

Where full-stroke exercising is impractical quarterly and/or during cold

shutdowns, Section XI and OM-10 require part-stroke exercising quarterly and/or during cold shutdowns if practical. Where full-stroke exercising is deferred until cold shutdowns or refueling outages, the licensee should part-stroke exercise the applicable valves as specified by Section XI, Paragraph IWV-3412, IWV-3522, OM-10 Paragraph 4.2.1.2, or 4.3.2.2, as appropriate.

4.3 Disassembly and Inspection

Several of the licensee's deferred test justifications propose check valve disassembly and inspection in lieu of full-stroke exercising the applicable valves open and/or closed with system pressure or flow. These items deviate from the Section XI Code in both test frequency and test method since they involve the use of an intrusive maintenance technique in place of check valve testing. Check valve disassembly and inspection is not specifically addressed in Section XI. However, there are valves that cannot practically be verified to full-stroke exercise open and/or closed using system pressure or flow. Therefore, the staff approved the use of disassembly and inspection during refueling outages in GL 89-04 for those cases where it is impractical to verify a full-stroke exercise by testing.

OM-10, Paragraph 4.3.2.4(c), permits the use of disassembly and inspection to verify check valve obturator movement. This testing is to be performed at refueling outages, however, no provisions are made to allow using a sampling program. GL 89-04, Position 2, provides guidelines for check valve disassembly and inspection on a sampling basis. This technique is approved for groups of identical valves in similar applications provided that it is performed in accordance with all of the provisions of the Generic Letter. This topic is also addressed in Appendix A, Items 2 and 4.

Table 4.1
DEFERRED TEST EVALUATIONS
MAINE YANKEE ATOMIC POWER PLANT

Item Number	Valve Identification	Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
DTJ-1	Isolation valves between the volume control tank and the charging pumps: CH-M-1 and -87	Normal operating position for these valves is open. Full-stroke exercising during power operation would result in a loss of pressurizer level control. Additionally, any alternate suction to the charging pumps during power operation would result in a reactivity change to the reactor due to either dilution or addition of borated water.	Part-stroke exercise quarterly and full-stroke exercise closed during cold shutdowns.	It is impractical to full-stroke exercise these valves quarterly. Therefore, the alternative is in accordance with IWV-3411.
DTJ-2	Normal charging line flow control and isolation valve: CH-F-38	Normal operating position for this valve is modulating. Full-stroke exercising during power operation would result in a loss of charging flow, which would induce a pressurizer level perturbation and a possible loss of level control.	Part-stroke exercise quarterly and full-stroke exercise closed during cold shutdowns.	It is impractical to full-stroke exercise this valve quarterly. Therefore, the alternative is in accordance with IWV-3411.
DTJ-3	Containment spray (CS) pump casing vent line containment isolation check valve: CS-54	Normal operating position for this valve is closed. Full or partial-stroke exercising of this check valve quarterly would emit contaminated, borated water to flow into containment. To verify operability would require a containment entry at power.	Full-stroke exercise open during cold shutdowns. Full-stroke exercise closed by Appendix J testing during refueling outages.	Full-stroke exercising this valve closed quarterly is impractical, however, the DTJ does not adequately demonstrate the impracticality of cold shutdown testing (see Appendix A, Item 3).
DTJ-4	CS and low pressure safety injection (LPSI) pump casing vent containment isolation valves: CS-A-55 and -56	Normal operating position for these valves is closed. Full or partial-stroke exercising of these valves quarterly would emit contaminated, borated water to flow into containment.	Full-stroke exercise open during cold shutdowns. Full-stroke exercise closed by Appendix J testing during refueling outages.	Full-stroke exercising these valves closed quarterly is impractical, however, the DTJ does not adequately demonstrate the impracticality of this testing during cold shutdowns (see Appendix A, Item 3).
DTJ-5	Emergency feedwater header check valves: EFW-104, -204, and -304	Normal operating position for these valves is closed. Full or partial-stroke exercising during power operation would inject cold water into the steam generators causing thermal transients on the steam generator nozzles and possible failure. Closure verification is performed quarterly.	Full-stroke exercise open during cold shutdowns.	It is impractical to full-stroke exercise these valves quarterly. Therefore, the alternative is in accordance with IWV-3521.

Item Number	Valve Identification	Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
DTJ-6	Main feedwater header flow control valves: FW-F-107, -207, and -307	Normal operating position for these valves is modulating. Full or partial-stroke exercising during power operation would secure or restrict flow to the steam generators causing a loss of water level which could result in a reactor trip.	Full-stroke exercise closed during cold shutdowns.	It is impractical to full-stroke exercise these valves quarterly. Therefore, the alternative is in accordance with IWV-3411.
DTJ-7	Letdown line isolation valve: LD-M-2	Normal operating position for this valve is open. Full or partial-stroke exercising during power operation would result in disruption of the normal letdown flow.	Full-stroke exercise closed during cold shutdowns.	The DTJ does not adequately demonstrate the impracticality of exercising this valve closed quarterly (see Appendix A, Item 3).
DTJ-8	Letdown line containment isolation valve: LD-A-68	Normal operating position for this valve is open. Full or partial-stroke exercising during power operation would result in the disruption of the normal letdown flow.	Full-stroke exercise closed during cold shutdowns.	The DTJ does not adequately demonstrate the impracticality of exercising this valve closed quarterly (see Appendix A, Item 3).
DTJ-9	Main steam isolation valves: MS-M-10, -20, and -30	Normal operating position for these valves is open. Full or partial-stroke exercising during power operation would interrupt the main steam flow to the turbine causing system perturbation and possible turbine trip.	Full-stroke exercise closed during cold shutdowns.	It is impractical to full-stroke exercise these valves closed quarterly. Therefore, the alternative is in accordance with IWV-3411.
DTJ-10	Main steam line excess flow check valves: MS-11, -22, and -33	Normal operating position for these valves is open. Full-stroke exercising during power operation would interrupt the main steam flow to the turbine causing system perturbation and reactor and turbine trip.	Partial-stroke exercise quarterly and full-stroke exercise closed during cold shutdowns.	It is impractical to full-stroke exercise these valves closed quarterly. Therefore, the alternative is in accordance with IWV-3521.
DTJ-11	Primary component cooling (PCC) containment isolation valves: PCC-A-216, -238, -252, -254, -268, -270, -300, and -302	Normal operating position for these valves is open. Full or partial-stroke exercising during power operation would cause undesired system perturbations and interrupt necessary systems cooling with probable equipment damage.	Full-stroke exercise closed during cold shutdowns.	It is impractical to full-stroke exercise these valves closed quarterly. Therefore, the alternative is in accordance with IWV-3411.
DTJ-12	PCC supply line isolation valve for equipment inside containment: PCC-M-219	Normal operating position for this valve is open. Full or partial-stroke exercising during power operation would isolate or restrict cooling water to the reactor coolant pumps which are required during normal power operation.	Full-stroke exercise closed during cold shutdowns.	It is impractical to full-stroke exercise this valve closed quarterly. Therefore, the alternative is in accordance with IWV-3411.

Item Number	Valve Identification	Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
DTJ-13	PCC for equipment inside containment return line check valves: PCC-508 and -509	Normal operating position for these valves is open. Full or partial-stroke exercising during power operation would require isolating PCC flow to components required to be operable during normal plant operations.	Full-stroke exercise closed during cold shutdowns.	The DTJ does not adequately demonstrate the impracticality of exercising these valves closed quarterly (see Appendix A, Item 3).
DTJ-14	Pressurizer quench tank vent isolation valves: PR-M-89 & -90 Reactor head vent line valves: RC-M-54 & -56	Normal operating position for these valves is closed. In their September 8, 1983 letter to MYAPCO, the NRC restricted the testing of these valves to cold shutdowns. This restriction has been incorporated into plant Technical Specifications 3.3 and 4.6 under Amendment No. 100.	Full-stroke exercise open during cold shutdowns.	It is impractical to full-stroke exercise these valves open quarterly. Therefore, the alternative is in accordance with IWV-3411.
DTJ-15	Reactor coolant pump (RCP) seal water return three-way valve: DR-A-10	This is a three-way valve. Normal operating position for this valve is open to the Volume Control Tank and closed to the Quench Tank. Full or partial-stroke exercising during power operation would cause perturbation in the seal water system which may adversely affect the RCP seals.	Full-stroke exercise open and closed during cold shutdowns.	The DTJ does not adequately demonstrate the impracticality of exercising these valves quarterly (see Appendix A, Item 3).
DTJ-16	RCP seal water isolation valve: SL-P-3	Normal operating position for this valve is full open. Full or partial-stroke exercising during power operation would stop or restrict seal water flow to the reactor coolant pumps, which could cause seal failure.	Full-stroke exercise closed during cold shutdowns.	It is impractical to full-stroke exercise this valve closed quarterly. Therefore, the alternative is in accordance with IWV-3411.
DTJ-17	RCP seal water return isolation valves: SL-M-29, -40, -51, and SL-A-53	Normal operating position for these valves is open. Full or partial-stroke exercising during power operation would stop or restrict seal water flow from the reactor coolant pumps which could cause RCP seal failure.	Full-stroke exercise closed during cold shutdowns.	It is impractical to full-stroke exercise these valves closed quarterly. Therefore, the alternative is in accordance with IWV-3411.
DTJ-18	Secondary component cooling (SCC) to main turbine flow control valves: SCC-T-227, -257, and -315	Normal operating position for these valves is modulating. Full OR partial-stroke exercising during power operation would cause overheating of the turbine generator, electrohydraulic governor oil control system, which are required for continued power operation.	Full-stroke exercise closed during cold shutdowns.	The DTJ does not adequately demonstrate the impracticality of exercising these valves closed quarterly (see Appendix A, Item 3).

Item Number	Valve Identification	Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
DTJ-19	PCC supply to containment air coolers check valve: PCC-222	Normal operating position for this valve is open. Full or partial-stroke exercising during power operation would require isolating PCC flow to the containment recirculation air coolers which are required during normal plant operation.	Full-stroke exercise closed during cold shutdowns.	The DTJ does not adequately demonstrate the impracticality of exercising this valve closed quarterly (see Appendix A, Item 3).
DTJ-20	Containment purge valve instrument air line check valves: VP-64, -65, -67, and -68	Normal operating position for these valves is open. Full or partial-stroke exercising during power operation would require stroking the containment purge valves which are out of service during normal operation.	Full-stroke exercise closed during cold shutdowns.	The DTJ does not adequately demonstrate the impracticality of exercising these valves closed quarterly (see Appendix A, Item 3).
DTJ-21	PCC isolation valves to non-safety related equipment: PCC-M-90 and -150	Normal operating position for these valves is open. Full or partial-stroke exercising during power operation or cold shutdown would render many primary plant components without cooling water causing the systems to overheat. Additionally, the control logic for these valves does not permit part-stroke exercising.	Full-stroke exercise closed during refueling outages.	Full-stroke exercising these valves closed quarterly or during cold shutdowns is impractical. Therefore, the alternate is approved pursuant to 10 CFR 50.55a (f)(4)(iv), provided all related requirements are met.
DTJ-22	Main feedwater header check valves: FW-131, -231, and -331	Normal operating position for these valves is open. Full or partial-stroke exercising during power operation would require stopping the main feedwater flow to the steam generators. During cold shutdowns the steam generators are depressurized and an adequate backpressure test cannot be performed.	Full-stroke exercise closed during refueling outages with the steam generators in wet layup.	The DTJ does not adequately demonstrate the impracticality of exercising these valves closed quarterly or during cold shutdowns (see Appendix A, Item 3).
DTJ-23 Part 1	SCC isolation valves to non-safety related equipment: SCC-A-460 and -461	Normal operating position for these valves is open. Full or partial-stroke exercising during power operation or cold shutdown would shock the connected systems and restrict or isolate coolant from critical components which could overheat.	Full-stroke exercise closed during refueling outages.	It is impractical to full-stroke exercise these valves quarterly or during cold shutdowns. The alternative is approved pursuant to 10 CFR 50.55a (f)(4)(iv), provided all related requirements are met.

Item Number	Valve Identification	Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
DTJ-23 Part 2	Check valves in the air supply lines to the valve operating air accumulator for SCC-A-460 and -461: SCC-475 and -476	To exercise these valves closed would require the SCC trip valves to be held shut. Additionally, these valves are in series and cannot be tested individually without making a plant modification. Per telecon on 04/12/90 with Ted Sullivan of the NRC, it was agreed that a plant modification is not necessary in this application. The modification was considered an undue hardship without compensating increase in the level of quality and safety.	Verify closure as a pair during refueling outages.	The DTJ proposed an alternate test method as well as a deferred test frequency. A relief request must be submitted and approved in order to use the proposed test method (see Appendix A, Item 6).
DTJ-24	Check valves in the PCC return lines from non-safety related equipment: PCC-445 and -446	Normal operating position for these valves is open. Full or partial-stroke exercising during power operation or cold shutdown is not possible due to the piping configuration.	Disassemble during refueling outages.	The proposed testing is in accordance with OM-10 4.3.2.4(c). The alternate is approved pursuant to 10 CFR 50.55a (f)(4)(iv), provided all related requirements are met. (See Appendix A, Items 3 and 4)
DTJ-25	Letdown line containment isolation valve (CIV): LD-T-5	Normal operating position for this valve is open. Full or partial-stroke exercising during power operation would result in the disruption of the normal letdown flow.	Full-stroke exercise closed during cold shutdowns.	The DTJ does not adequately demonstrate the impracticality of exercising this valve closed quarterly (see Appendix A, Item 3).
DTJ-26	Auxiliary feedwater pump discharge check valve: AFW-18	Normal operating position for this valve is closed. Full or partial-stroke exercising during power operation would require flow into the steam generators. This would inject cold water into the steam generators causing thermal transients on the steam generator nozzles and possible failure.	Full-stroke exercise open during cold shutdowns.	It is impractical to full-stroke exercise this valve open quarterly. Therefore, the alternative is in accordance with IWV-3521.
DTJ-27	Emergency feedwater pump discharge check valves: EFW-15 and -314	Normal operating position for these valves is closed. Full or partial-stroke open exercising during power operation would require flow into the steam generators. This would inject cold water into the steam generators causing thermal transients on the steam generator nozzles and possible failure. Pressurization for examination in the closed position during power operation is not permissible by TS since it would render all 3 trains inoperable.	Full-stroke exercise open and closed during cold shutdowns.	It is impractical to full-stroke exercise these valves quarterly. Therefore, the alternative is in accordance with IWV-3521.

Item Number	Valve Identification	Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
DTJ-28	Check valve in the combined CS and LPSI pump recirculation line back to the refueling water storage tank (RWST): CS-53	Normal operating position for this valve is closed. Full-stroke exercising during power operation or cold shutdowns is not practicable. To assure that this valve goes full open and passes the maximum possible flow, four of these pumps would be required to operate in the full recirculation mode simultaneously. This would render both trains of LPSI and CS inoperable. Tech. Specs. require both trains operable during normal plant operation. This would also render both trains of Residual Heat Removal (RHR) inoperable during cold shutdowns.	Partial-stroke exercise quarterly and disassemble during refueling outages.	The proposed testing is in accordance with OM-10 4.3.2.4(c). The alternate is approved pursuant to 10 CFR 50.55a (f)(4)(iv), provided all related requirements are met. (See Appendix A, Items 4 and 7)
DTJ-29	CS pump discharge check valves: CS-25, -26, -48, and -51	Normal operating position for these valves is closed. Full or partial-stroke exercising during power operation or cold shutdown is not practicable since the only flow paths are into the low pressure safety injection or containment spray headers. The containment spray pumps cannot develop sufficient pressure to inject water into the RCS while the plant is operating, so the LPSI header may not be used. The use of containment spray header is also unacceptable because of spraying the containment with borated water. When the plant is in the cold shutdown condition, the containment spray pumps can provide the required flow if the RCS is maintained at approximately 100 psig. However the RCS would have to be drained and vented to accommodate the volume of water injected during these tests. The only time the RCS is drained and vented is during refueling outages.	Full-stroke exercise open and closed during refueling outages.	It is impractical to full-stroke exercise these valves quarterly or during cold shutdowns. The alternate is approved pursuant to 10 CFR 50.55a (f)(4)(iv), provided all related requirements are met.

Item Number	Valve Identification	Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
DTJ-30	CS header check valves: CS-29 and -30	Normal operating position for these valves is closed. Full or partial-stroke exercising during power operation or cold shutdown is not practicable since the only flow paths are into the low pressure safety injection or containment spray headers. The containment spray pumps cannot develop sufficient pressure to inject water into the RCS while the plant is operating, so the LPSI header may not be used. The use of containment spray header is also unacceptable because of spraying the containment with borated water. When the plant is in the cold shutdown condition, the containment spray pumps can provide the required flow if the RCS is maintained at approximately 100 psig. However the RCS would have to be drained and vented to accommodate the volume of water injected during these tests. The only time the RCS is drained and vented is during refueling outages.	Full-stroke exercise open during refueling outages.	It is impractical to full-stroke exercise these valves quarterly or during cold shutdowns. The alternate is approved pursuant to 10 CFR 50.55a (f)(4)(iv), provided all related requirements are met.
DTJ-31	Charging pump discharge check valves: CH-10, -19, and -26	Normal operating position for these valves is open with charging operation. Full-stroke exercising during power operation to achieve required test flow would require the initiation of High Pressure Safety Injection. This is not practicable with the RCS at pressure. During cold shutdowns the plant cannot initiate high pressure safety injection or an equivalent charging flow because of low temperature overpressurization concerns.	Partial-stroke exercise quarterly and full-stroke exercise open during refueling outages.	The DTJ does not adequately demonstrate the impracticality of exercising these valves open quarterly (see Appendix A, Item 3).

Item Number	Valve Identification	Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
DTJ-32	LPSI injection check valves: LSI-12, -22, and -32 HPSI injection check valves: HSI-61, -62, and -63 Combined injection header check valves: HSI-17, -27, and -37	Normal operating position for these valves is closed. Full or partial-stroke exercising open during power operation is not possible as the LPSI pumps do not develop sufficient head to overcome RCS pressure. The most effective means of closure verification for these individual valves is equivalent to a leak test. This would be possible during a cold shutdown, however due to ALARA and the fact that these valves are specified in TS 3.19.A.4 as PIVs and being tested in accordance with TS 4.6.A.2f at a refueling frequency which would prove redundant, it is not considered practicable to perform a closure verification test during cold shutdown.	Full-stroke exercise open during cold shutdowns using RHR. Full-stroke exercise closed accredited to TS testing during refueling outages	The DTJ does not adequately demonstrate the impracticality of exercising valves HSI-17, -27, -37, -61, -62, and -63 open quarterly. In addition, it is not clear how it is verified that the full-stroke exercise open criteria of GL 89-04, Position 1, is met for these valves during cold shutdown testing using RHR (see Appendix A, Item 10).
DTJ-33	HPSI injection header check valves: HSI-15, -25, and -35	Normal operating position for these valves is closed. Full-stroke exercising during power operation to achieve required test flow would require the initiation of High Pressure Safety Injection. This is not practicable with the RCS at pressure. During cold shutdowns the plant cannot initiate high pressure safety injection or an equivalent charging flow because of low temperature overpressurization concerns. Full flow HPSI would exceed letdown capacity and quickly fill the pressurizer.	Partial-stroke exercise during cold shutdown and full-stroke exercise open during refueling outages.	The DTJ does not adequately demonstrate the impracticality of exercising these valves open quarterly (see Appendix A, Item 3).
DTJ-34	LPSI pump discharge check valves: LSI-50, and -51	Normal operating position for these valves is closed. Full or partial-stroke exercising open during power operation is not possible as the LPSI pumps do not develop sufficient head to overcome RCS pressure.	Full-stroke exercise open and closed during cold shutdowns.	It is impractical to full-stroke exercise these valves quarterly. Therefore, the alternative is in accordance with IWV-3521.

Item Number	Valve Identification	Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
DTJ-35	HPSI hot leg injection line CIV: CH-72	Normal operating position for this valve is closed. Full or partial-stroke exercising during power operation would require the initiation of alternate charging. Potential power excursions imposing unnecessary thermal cycles on nozzles and piping which could occur due to the differences in the boron concentration of the alternate charging line versus the RCS is not practicable. Also, alternate charging would require changing to alternate letdown which reduces the operators' ability to control reactivity. Closure testing is performed by opening the first isolation from the RCS and providing backpressure on the check valve. This is not practicable at power because it is contrary to the requirements of the FSAR to maintain a second isolation.	Full-stroke exercise open and closed during cold shutdowns.	It is impractical to full-stroke exercise this valve quarterly. Therefore, the alternative is in accordance with IWV-3521.
DTJ-36	Auxiliary feedwater header check valves: EFW-39 and -40	Normal operating position for these valves is closed. Full or partial-stroke exercising during power operation or cold shutdown would require isolating both trains of emergency feedwater from the steam generators and injecting cold water into the steam generators. This would also violate the TS requirement for automatic alignment capabilities of emergency feed to the steam generators. Full flow testing during refueling is not possible as steam to drive the pump turbine is not available. Since these two check valves are installed adjacent to each other, reverse flow tests would only verify that one valve is performing its function. These valves were disassembled and inspected after thirteen years of service and were found to be in excellent operating condition. These valves are grouped per Position 2 of NRC Generic Letter 89-04.	Alternately for full-stroke exercise open and closed, disassemble one valve every refueling outage. If a degraded condition is found, the other valve shall be disassembled. (Ref. Relief Request VRR-2)	The DTJ does not adequately demonstrate the impracticality of exercising these valves open with flow during cold shutdowns or during refueling outages. In addition, it appears that these valves do not meet the grouping criteria of GL 89-04, Position 2. Disassembly of each valve every refueling outage is permitted by OM-10, 4.3.2.4(c). OM-10 is approved pursuant to 10 CFR 50.55a (f)(4)(iv), provided all related requirements are met. However, sample disassembly and inspection should only be performed as authorized by and in accordance with GL 89-04, Position 2 (see Appendix A, Items 4 and 8).

Item Number	Valve Identification	Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
DTJ-37	RCP seal water supply line CIVs: SL-25, -36, and -47	Normal operating position for these valves is open. Full or partial-stroke exercising during power operation or cold shutdown would incur potential seal damage from isolating seal water flow. These valves are grouped per Position 2 of NRC Generic Letter 89-04.	Alternately for full-stroke exercise closed, disassemble one valve every refueling outage. If a degraded condition is found, the other valve shall be disassembled. (Ref. Relief Request VRR-2)	It is impractical to full-stroke exercise these valves closed quarterly or during cold shutdowns. The alternate is approved by GL 89-04 provided that the testing complies with all of the provisions of GL 89-04, Position 2 (see Appendix A, Item 4).
DTJ-38	Check valves in the charging pump suction from the RHR heat exchangers: HSI-56 and -57, CH-149 and -150	Normal operating position for these valves is closed. Full or partial-stroke exercising during power operation would require injection of highly borated water into the reactor coolant system causing a reactivity excursion, which could result in a reactor trip. Full-stroke exercise during cold shutdown requires a large expansion volume in the RCS which is not available.	Partial-stroke exercise during cold shutdown and full-stroke exercise open during refueling outages.	It is impractical to full-stroke exercise these valves open quarterly or during cold shutdowns. The alternate is approved pursuant to 10 CFR 50.55a (f)(4)(iv), provided all related requirements are met.
DTJ-39	Check valves in the HPSI pump suction line from the RWST: HSI-52 and -53	Normal operating position for these valves is closed. Full or partial-stroke exercising during power operation would require injection of highly borated water into the reactor coolant system causing a reactivity excursion, which could result in a reactor trip. Full-stroke exercise during cold shutdown requires a large expansion volume in the RCS which does not exist.	Partial-stroke exercise during cold shutdown and full-stroke exercise open during refueling outages. Alternately for full-stroke exercise closed, disassemble one valve every refueling outage for closure verification. (Ref. Relief Request VRR-2)	It is impractical to full-stroke exercise these valves quarterly or during cold shutdowns. The alternate frequency for the open exercise is approved pursuant to 10 CFR 50.55a (f)(4)(iv), provided all related requirements are met. The alternate method for closure is approved by GL 89-04 provided that the testing complies with all of the provisions of GL 89-04, Position 2 (see Appendix A, Item 4).

Item Number	Valve Identification	Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's ...tification
DTJ-40	Safety injection tank (SIT) discharge check valves: SIA-10, -20, and -30	Normal operating position for these valves is closed. Full or partial-stroke exercising during power operation is not possible due to the fact that the accumulator pressure (230 psig) is below the RCS pressure. During cold shutdown, discharging the accumulators would challenge the Low Temperature Overpressure Protection System. The pressurizer and practical vent paths will not provide the same capacity as the 14" SI lines. A full flow test during refueling would result in the discharging of a large volume of nitrogen from the accumulators which would propel contaminated material into the containment buildings' atmosphere. Past maintenance of these valves and the absence of seat leakage indicates that these valves are in good working order. These valves were inspected and exhibited little or no wear after 10 years of operation.	Partial-stroke exercise open during refueling outages. Alternately for full-stroke exercise open, disassemble one valve every refueling outage for open verification. If a degraded condition is found, the other valve shall be disassembled. (Ref. Relief Request VRR-2)	It is impractical to full-stroke exercise these valves open quarterly or during cold shutdowns. The alternate is approved by GL 89-04 provided that the testing complies with all of the provisions of GL 89-04, Position 2 (see Appendix A, Item 4).
DTJ-41	Check valves in the CS pump suction lines from the containment sump: CS-93 and -94	Normal operating position for these valves is closed. Full or partial-stroke exercising during power operation, cold shutdown or refueling would require operating a 5,000 gpm pump taking suction from the safeguards sump located on the -2 ft. elevation in the containment building. The safeguards sump only holds approximately 400 gallons which is not sufficient to operate the 5,000 gpm pump. Supplying a sufficient volume would require flooding the containment building from the -39 ft. to the 0 ft. elevation, submerging many components in the process. The primary grade borated water in these valves is very compatible with the valve internals. These valves are not subject to any vibration induced failures because the RAS sump is only used during an accident. Disassembly of these valves requires working in a highly contaminated area with respirators. These valves have been previously disassembled with no signs of degradation.	Alternately, disassemble one valve every refueling outage. If a degraded condition is found, the other valve shall be disassembled. (Ref. Relief Request VRR-2)	It is impractical to full-stroke exercise these valves open quarterly or during cold shutdowns. The alternate is approved by GL 89-04 provided that the testing complies with all of the provisions of GL 89-04, Position 2 (see Appendix A, Item 4).

Item Number	Valve Identification	Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
DTJ-42	CS header check valves inside containment: CS-3 and -4	Normal operating position for these valves is closed. Full or partial-stroke exercising during power operation would introduce contaminated water into the containment building. These valves were previously disassembled after 10 years of service with no evidence of degradation.	Partial-stroke exercise during cold shutdown using a drain line flowpath and full-stroke exercise closed accredited to Appendix J testing during refueling. Alternately, disassemble one valve every refueling outage for full-open verification. (Ref. Relief Request VRR-2)	It is impractical to full-stroke exercise these valves quarterly or during cold shutdowns. The alternate frequency for closure verification is approved pursuant to 10 CFR 50.55a (f)(4)(iv), provided all related requirements are met. The alternate method for full-stroke open verification is approved by GL 89-04 provided that the testing complies with all of the provisions of GL 89-04, Position 2 (see Appendix A, Item 4).
DTJ-43	LPSI pump suction check valves: LSI-44 and -45	Normal operating position for these valves is closed. Full-stroke exercising during power operation is not possible. The LPSI lines are the only paths capable of handling the flow required to full-stroke these valves. The LPSI pumps cannot supply adequate flow to overcome RCS pressure. The LPSI pumps could provide the required flow during a cold shutdown if the RCS could be maintained at less than 100 psig. The RCS would have to be partially drained and vented to accommodate the volume of water injected during these tests. The only time the RCS is partially drained and vented is during refueling outages.	Partial-stroke exercise quarterly and full-stroke exercise open during refueling outages.	It is impractical to full-stroke exercise these valves open quarterly or during cold shutdowns. The alternate is approved pursuant to 10 CFR 50.55a (f)(4)(iv), provided all related requirements are met.

Item Number	Valve Identification	Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
DTJ-44	Check valves in the CS and LPSI pump suction lines from the RWST: LSI-42 and -43	Normal operating position for these valves is closed. Full-stroke exercising during power operation is not possible. The LPSI lines are the only paths capable of handling the flow required to full-stroke these valves. The LPSI pumps cannot supply adequate flow to overcome RCS pressure. The LPSI pumps could provide the required flow during a cold shutdown if the RCS could be maintained at less than 100 psig. The RCS would have to be partially drained and vented to accommodate the volume of water injected during these tests. The only time the RCS is partially drained and vented is during refueling outages.	Partial-stroke exercise quarterly and full-stroke exercise open during refueling outages. Alternately for full-stroke exercise closed, disassemble one valve every refueling outage for closure verification. (Ref. Relief Request VRR-2)	It is impractical to full-stroke exercise these valves quarterly or during cold shutdowns. The alternate frequency for full-stroke open verification is approved pursuant to 10 CFR 50.55a (f)(4)(iv), provided all related requirements are met. The alternate method for closure verification is approved by GL 89-04 provided that the testing complies with all of the provisions of GL 89-04, Position 2 (see Appendix A, Item 4).
DTJ-45	Check valves in the service water lines to the PCC and SCC heat exchangers: SW-16 and -17	Normal operating position for these valves is open, and is verified quarterly. Full-stroke exercising during power operation or cold shutdown to verify closure would require isolating one header. This would result in system perturbation as well as insufficient flow to maintain adequate cooling for PCC and SCC operation. Reverse flow can be initiated during refueling, however system configuration does not permit verification. Service conditions of these valves warrant periodic disassembly for internals inspection.	Alternately, disassemble one valve every refueling outage for closure verification. If a degraded condition is found, the other valve shall be disassembled. (Ref. Relief Request VRR-2)	It is impractical to full-stroke exercise these valves closed quarterly or during cold shutdowns. The alternate method for closure verification is approved by GL 89-04 provided that the testing complies with all of the provisions of GL 89-04, Position 2 (see Appendix A, Item 4).

Item Number	Valve Identification	Justification for Deferring Valve Exercising	Proposed Alternate Testing	Evaluation of Licensee's Justification
DTJ-46	Check valves in the air supply lines to the valve operating air accumulator for emergency feedwater flow control valves: EFW-331, -332, -350, and -351	Normal operating position for these valves is open and closed. Testing these valves during power operation or cold shutdown requires isolating the instrument air supply from the accumulator. This would effectively inop all three trains of Emergency Feedwater. Additionally, these valves are in series and cannot be adequately tested individually without making a plant modification. Per telecon on 04/12/90 with Ted Sullivan of the NRC, i t was agreed that a pl ant modification is not necessary in this application. The modification was considered an undue hardship without compensating increase in the level of quality and safety. In response to NRC Info Notice 85-35, "Failure of Air check Valves to Seat", required testing was developed on a refueling basis to ensure sufficient capacity of the accumulator upon rapid or gradual loss of instrument air.	Full-stroke exercise closed during refueling outages.	It is impractical to full-stroke exercise these valves closed quarterly or during cold shutdowns. The alternate frequency is approved pursuant to 10 CFR 50.55a (f)(4)(iv), provided all related requirements are met. The DTJ proposed an alternate test method as well as a deferred test frequency. A relief request must be submitted and approved in order to use the proposed test method (see Appendix A, Item 9).

APPENDIX A

IST PROGRAM ANOMALIES

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IST PROGRAM ANOMALIES

Anomalies or inconsistencies found during the evaluation are given below. These anomalies summarize concerns with the IST program that require additional actions by the licensee for resolution. The licensee should resolve these items as indicated.

1. The IST program does not include a description of how the components were selected and how testing requirements were identified for each component. The review performed for this Safety Evaluation (SE)/TER did not include verification that all pumps and valves within the scope of 10 CFR 50.55a and Section XI are contained in the IST program, and did not ensure that all applicable testing requirements have been identified. Therefore, the licensee is requested to include this information in the IST program. The program should describe the development process, such as a listing of the documents used, the method of determining the selection of components, the basis for the testing required, the basis for categorizing valves, and the method or process used for maintaining the program current with design modifications or other activities performed under 10 CFR 50.59.

2. Relief request VRR-2 and the associated Deferred Test Justifications deal with sample disassembly of check valves. OM-10, Paragraph 4.3.2.4(c) permits the use of disassembly of check valves to verify obturator movement as an alternative to exercising with flow or a mechanical exerciser. However, when using this method, OM-10 requires disassembly of each valve every refueling outage. GL 89-04 permits the use of a sampling program for groups of identical valves in similar applications. Therefore, VRR-2 is approved by GL 89-04 and is not evaluated in this TER. The licensee indicated compliance with GL 89-04, but did not specifically address all aspects of the Generic Letter provisions in the request. It is assumed that the licensee is complying with all of the requirements of GL 89-04. Relief is not granted for the above relief request for testing that deviates from that prescribed in GL 89-04. Whether the licensee complies with the provisions of GL 89-04 is subject to NRC inspection. If the licensee intends to deviate from a GL 89-04 position, a revised relief request must be submitted for review and approval prior to implementing the testing.

3. Several of the Deferred Test Justifications do not adequately demonstrate the impracticality of testing the subject valves quarterly during power operation or during cold shutdowns (if testing is deferred until refueling outages). OM-10, Paragraphs 4.2.1.2 and 4.3.2.2, permit deferral of full-stroke exercising until cold shutdowns when this exercising is not practicable during plant operation and permit deferral until refueling outages when this exercising is not practicable during plant operation or cold shutdowns. OM-10, Paragraph 6.2(d), requires the owner to include the justifications for these deferrals in their test plans. These justifications should provide technical bases that show why testing more frequently is impracticable. These bases should explain the negative consequences that may result if the valve is tested during power operation or during cold shutdowns (if applicable). Examples of negative consequences of testing that adequately demonstrate

impracticality are that the testing could cause equipment damage, represent a safety hazard to test personnel, or result in a significant power reduction or plant trip.

DTJ-7, -8, and -25 are examples of cases where the justification does not identify any negative consequence that may make more frequent testing impracticable. The licensee states that testing would "... result in disruption of the normal letdown flow." The reader is left to determine if the duration of the disruption would be sufficient to cause an increase in pressurizer level that could result in a plant trip, cause sufficient fluctuations of RCS pressure to be of concern, cause thermal stress and possible damage to the regenerative heat exchangers, or result in some other negative consequence.

Other DTJs that do not provide adequate justifications for not testing at power operation and/or during cold shutdowns are listed below along with the frequency for which additional justification is needed. In most of these cases the reviewer can confidently postulate the negative consequences of performing testing during power operations and/or during cold shutdowns (as applicable). However, due to differences in plant design and operation, the reviewer should not have to make these assumptions, therefore, the pertinent information should be furnished by the licensee. This is not to suggest that the licensee should change the proposed testing frequency for the affected valves, although, upon further evaluation, the licensee may elect to change these frequencies as is justified. These DTJs should be revised to adequately justify the deferral of valve testing.

DTJ-3	Cold shutdowns (for closure)
DTJ-4	Cold shutdowns (for closure)
DTJ-13	Power operation
DTJ-15	Power operation
DTJ-18	Power operation
DTJ-19	Power operation
DTJ-20	Power operation
DTJ-22	Power operation and cold shutdowns
DTJ-24	Power operation and cold shutdowns
DTJ-31	Power operation
DTJ-33	Power operation
DTJ-36	Cold shutdowns

4. In Deferred Test Justifications DTJ-24, -28, -36, -37, -39, -40, -41, -42, -44, and -45 the licensee proposes to verify the required obturator movement of affected check valves by disassembly and inspection. 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 make its routine use as a substitute for testing undesirable when some method of testing is practicable. Disassembly and inspection, to verify the full-stroke open or closure capability of check valves should be used only where exercising cannot be practically performed by system pressure, flow, or other positive means. 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 maintenance program at a frequency commensurate with the valve type and service.

Regarding several of these DTJs, the licensee has not adequately demonstrated the impracticality of verifying the required obturator movement by testing. Some test method may be feasible to verify the required exercise of these valves. The licensee should consider methods such as using non-intrusive techniques (e.g., acoustics, ultrasonics, magnetics, radiography, and thermography) to verify a full-stroke exercise of the subject check valves. This testing may only be practical at cold shutdowns or refueling outages. The licensee should perform their investigation and if a test method is found to be practicable, the IST requirements of the applicable valves should be satisfied by testing instead of disassembly and inspection. The licensee should respond to this concern.

5. VRR-3 requests relief from the exercising frequency requirements of Section XI for the normal charging line containment isolation check valve, CH-40. The licensee proposes to disassemble and inspect this valve once every other refueling outage. The proposed method is permitted by OM-10, Paragraph 4.3.2.4(c), however, the proposed test frequency is not in accordance with OM-10. Paragraph 4.3.2.4(c) permits the use of check valve disassembly every refueling outage as an alternative to exercising. GL 89-04, Position 2, permits the use of a sampling program for identical valves in similar applications and provides a mechanism for extending the valve disassembly interval. However, GL 89-04 permits extension of the disassembly interval only in cases of extreme hardship. The licensee's basis supports extending the disassembly interval based on the low failure rate of this specific valve and similar valves in the nuclear industry. However, the licensee has not adequately demonstrated that disassembly of this valve each refueling outage would constitute an unusual hardship. Based on the determination that the licensee has not adequately demonstrated the extreme hardship of disassembling this valve each refueling outage, relief from the OM-10 disassembly interval should not be granted. The disassembly interval may be extended if all of the provisions of GL 89-04, Position 2, are met. The licensee should consider methods such as using non-intrusive techniques to verify closure of this check valve. This testing may only be practical at refueling outages.

6. DTJ-23 regards SCC-475 and -476, which are check valves in the air supply to the valve operating accumulator for valves SCC-A-460 and -461. The Code requires that safety-related valves be individually exercised to their safety function position(s) to verify their operational readiness. These check valves are in a series arrangement without a test tap or other provisions for verifying individual closure. The licensee proposes to verify closure of these series check valves as a pair. Since the proposed testing is only capable of verifying that one of the two valves is closed, it does not meet the Code requirements.

   The staff has determined that in cases where there is no practical means for verifying the ability of each valve in a series to close, the licensee should review the plant safety analysis to determine if both valves are required to function. If only one of the two valves is credited in the safety analysis (that is, if one valve could be removed without creating an unreviewed safety question or creating a conflict with regulatory or license requirements), then verification that the pair of valves are capable of closing is acceptable for inservice

testing. Both series check valves must be included in the IST program and should be subject to equivalent quality assurance criteria. Testing (such as the use of pressure indication to verify the closure of one of the check valves) must be performed each quarter or at an extended interval as allowed by the Code. No additional testing need be performed unless the licensee finds indication that the closure capability of the pair of valves is questionable. If so, both valves must be declared inoperable and be repaired or replaced before being returned to service.

Deferred Test Justifications should be used only to justify deferral of the test frequency when quarterly and cold shutdown (if applicable) testing is impracticable. Because testing series check valves as a pair is not in accordance with Code requirements, the licensee must obtain relief to use this method. The relief request should include information on the safety analysis, the quality assurance requirements, the acceptance criteria, and the corrective actions.

7. DTJ-28 lists the alternate tests as "Partial-stroke exercise quarterly AND Disassemble during refueling outages OR," however, it does not identify any testing that could serve as an option to the disassembly. If it is the intent of the licensee to specify an optional test to the disassembly and inspection of valve CS-53, the alternate testing should be clearly identified in the DTJ.

8. The justification in DTJ-36 states that full-stroke exercising is impractical during cold shutdowns and refueling outages because "... steam to drive the pump turbine is not available." However, the licensee has not addressed testing these valves with flow when steam is still available while going into or starting up from cold shutdowns or refueling outages. Additionally, the licensee should consider the series check valve position identified in Item 6 above. It may be practicable to test these valves and not rely on disassembly and inspection to verify their full-stroke capabilities. The licensee should investigate these testing methods to determine if they are feasible for these valves.

   The proposed sample disassembly and inspection may not meet the grouping criteria of GL 89-04. Position 2 requires each valve in the group to have the same service conditions. Although these series valves always have the same flow through them, the downstream valve (EFW-40) is periodically subjected to reverse differential pressure when either emergency feedwater pump is operated and the upstream valve (EFW-39) is never subjected to this reverse differential pressure unless the downstream valve fails open or leaks excessively. Therefore, these valves could have different degradation mechanisms such that the condition of one would not necessarily be representative of the condition of the other. If disassembly and inspection is used in lieu of testing, it must be performed in accordance with OM-10, Paragraph 4.3.2.4(c), or GL 89-04, Position 2.

9. DTJ-46 lists the drawing number as FM-17A/78A. The FM-78A listing is an error, the correct number is FM-73A. Also, the Category is listed as both B and C, which is also an error. All four of the listed valves are simple check valves, which should be categorized C. The licensee should

correct these typographical errors. In addition, the proposed alternate testing involves a test method (testing series check valves as a pair) that deviates from the Code requirements. A relief request is required to use this test method (refer to Item 6 above). The licensee should address this concern as indicated in Item 6.

10. The justification in DTJ-32 for not full or part-stroke exercising during power operation reads "... the LPSI pumps do not develop sufficient head to overcome RCS pressure." However, the justification does not provide a reason that flow could not be established through the HPSI/LPSI header valves, HSI-61, -62, and -63, and the combined injection header valves, HSI-17, -27, and -37 (see Figure 1), using the centrifugal charging pumps. This testing need not be performed if it is impractical, however, if it is not performed, the basis should be documented in the program plan. Another concern is the full-stroke exercise of the combined injection header check valves, HSI-17, -27, and -37. The proposed alternate test indicates that these valves will be full-stroke exercised open during cold shutdowns using RHR. Since the combined injection header accident condition flow would also include HPSI and safety injection tank flow, it is not clear how the licensee verifies that the proposed testing of these valves meets the full-stroke open criteria of GL 89-04, Position 1. The licensee should respond to these concerns.

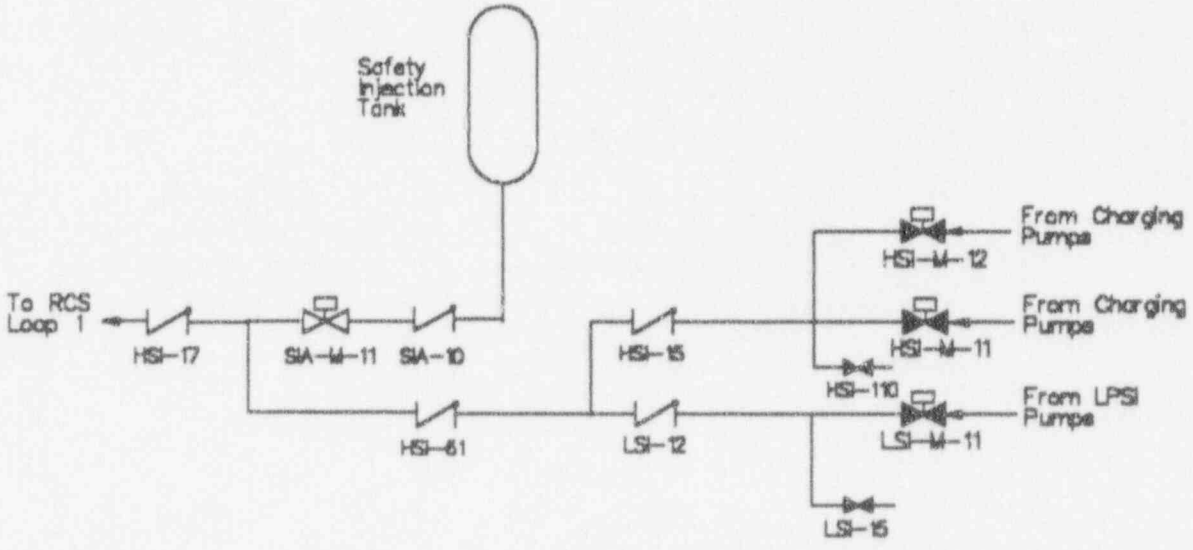

Figure 1
Safety Injection System (Typical of three)