TECHNICAL EVALUATION REPORT

Pennsylvania Power & Light Company
Susquehanna Steam Electric Station
Pump and Valve Inservice Testing Program
Revision 10, Unit 1 Second Ten-Year Interval
Revision 7, Unit 2 Second Ten-Year Interval

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ABSTRACT

This report presents the results of Brookhaven National Laboratory's evaluation of the relief requests, cold shutdown and refueling outage justifications and, for selected systems, a review of the scope of the Pennsylvania Power & Light Company, Susquehanna Steam Electric Station, Units 1 and 2, second ten year interval of the ASME Section XI Pump and Valve Inservice Testing Program, in effect on June 1, 1994.

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1.0 INTRODUCTION

Contained herein is a Technical Evaluation Report (TER) of the ASME Section XI Second Ten Year Program for pump and valve inservice testing (IST) submitted to the U.S. Nuclear Regulatory Commission (NRC) by Pennsylvania Power & Light Company for its Susquehanna Steam Electric Station (SSES), Units 1 and 2, on June 30, 1994 (Refs. 1 and 2). The program for this second ten year interval is based on the requirements of Section XI of the ASME Boiler and Pressure Vessel Code, 1989 Edition (Ref. 3). The 1989 edition of Section XI provides that the rules for inservice testing of pumps and valves are as specified in ASME/ANSI OMa-1988 Parts 6 and 10 (Refs. 4 and 5), respectively.

The SSES Units 1 and 2 are General Electric Boiling Water Reactors (BWRs) which began commercial operation on June 8, 1983 for Unit 1 and February 12, 1985 for Unit 2. The second ten year inservice inspection interval for both Units 1 and 2 commenced concurrently on June 1, 1994. This program revision supersedes all previous submittals.

Title 10 of the Code of Federal Regulations, §50.55a ¶(f), (Ref. 6), requires that inservice testing of ASME Code Class 1, 2, and 3 pumps and valves be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable addenda, except where specific relief has been requested by the licensee and granted by the Commission pursuant to §50.55a ¶(a)(3)(i), (a)(3)(ii), or (f)(6)(i). Pennsylvania Power & Light Company has requested relief from certain ASME Section XI testing requirements. A review of the relief requests was performed using Section 3.9.6 of the Standard Review Plan (Ref. 7), Generic Letter 89-04 (GL 89-04), "Guidance on Developing Acceptable Inservice Testing Programs," (Ref. 8), and the Minutes of the Public Meetings on Generic Letter 89-04, dated October 25, 1989 and September 26, 1991 (Refs. 9 and 10), and certain information in Draft NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants" (Ref. 11). The IST Program requirements apply only to testing of components (i.e., pumps and valves) and are not intended to provide a basis to change the licensee's current Technical Specifications for system test requirements. Relief requests for non-Code components do not require NRC approval, and, therefore, are not evaluated in this TER.

Section 2.0 of this report presents the evaluation of three of the four pump relief requests (Relief Request Nos. 03, 11, and 15). The fourth relief request (Relief Request No. 12) involves a non-ASME Code Class pump, for which no evaluation is required. The licensee has submitted 18 relief requests involving valves. Sixteen relief requests involve valves which are subject to inservice testing under the requirements of ASME Section XI. The other two involve a non-ASME Code class valve and a request that does not pertain to Code requirements. Ten of the requests are authorized by GL 89-04 with provisions (see Sections 5.4 and 5.5 of this TER), and the remaining six are evaluated in Section 3. The evaluation of the 13 Cold Shutdown Deferral Justifications and the 20 Refueling Outage Deferral Justifications is presented in Section 4.0, with reference to Table 4.1 for the Cold Shutdown Deferral Justifications and Table 4.2 for the Refueling Outage Deferral Justifications. Section 5.0 summarizes the actions required of the licensee resulting from the TER evaluations of the relief requests, the deferral justifications, and programmatic aspects, while Section 6.0 lists the references.

2.0 PUMP RELIEF REQUESTS

In accordance with 10 CFR 50.55a, Pennsylvania Power & Light Company has submitted four relief requests involving pumps at the Susquehanna Steam Electric Station Units 1 and 2, of which three involve pumps which are subject to inservice testing under the requirements of OMa-1988, Part 6. The fourth request, Relief Request No. 12, involves a non-ASME Code Class pump, for which no evaluation is required. The other three relief requests have been reviewed to verify their technical basis and determine their acceptability. The relief requests, along with the technical evaluation by BNL, are summarized below.

2.1 Relief Request No. 03, Diesel Fuel Oil Transfer Pumps (Unit 1)

Relief Request: The licensee has requested relief, for the Diesel Fuel Oil Transfer Pumps OP514 A through E, from the requirements of OMa-1988, Part 6, ¶5.2, that the flow rate, differential pressure, and vibration of pumps be measured during the Inservice Tests required by ¶5.1.

Alternate Testing: Each pump will continue to be functionally tested at least monthly via Technical Specification (TS) 4.8.1.1.2. No other testing will be performed.

Licensee's Basis for Relief: The licensee states: "Four of these pumps (OP514 A through D) are a sealed-unit submersible type with the entire unit submerged in the Diesel Oil Storage Tanks. None of these pumps include any provisions for flow rate, inlet pressure, bearing temperature, or vibration amplitude indication or measurement. The Susquehanna Steam Electric Station Technical Specifications presently require at least a monthly functional test of these pumps. This test verifies fuel oil flow from the storage tank to each diesel's skid-mounted day tank. Similarly, the diesel oil firing pumps are tested during the diesel functional tests. These pumps take suction from the day tank and supply the diesel cylinders. SSES considers all these pumps an extension of the diesel engine equipment skid, and therefore all are adequately tested per Technical Specifications along with the diesel itself. In addition the actual flow rate for the diesel fuel oil transfer pumps is over five times the required diesel engine fuel usage at rated conditions. Thus, even a large reduction in pump flow will not affect system operability."

Evaluation: These are the Diesel Fuel Oil Transfer Pumps OP514 A through E which have been designated by the licensee as ASME Code Class 3 pumps. (At the time of the May 28, 1992 Safety Evaluation (SE) by the NRC (Ref. 12), these pumps were considered non-ASME Code Class pumps). Pumps A through D are submerged within the respective Diesel Oil Storage Tanks while Pump E is external to its Diesel Oil Storage Tank. Each pump supplies fuel oil directly to the respective Diesel Generator Day Tank. All five pumps can discharge to the common header from the Diesel Oil Storage Tanks.

Lack of instrumentation is generally not sufficient justification for not complying with the Code requirements. However, a review of the Diesel Fuel Oil P&ID M-120, Sheets 1 and 2, indicates that the location of pumps A through D inside the respective Diesel Oil Storage Tanks makes it impractical to measure pump vibration amplitude.

To require the licensee to make system modifications to allow the measurement of pump vibration amplitude for the submerged pumps A through D would impose a hardship without a compensating increase in the level of quality and safety. However, the licensee should have a regular maintenance and spare parts program for these pumps that addresses bearing inspection and maintenance.

Using conventional techniques, it would be impractical to measure the pump vibration amplitude on a quarterly basis, one possible alternative would be to perform a disassembly and inspection of the pumps at least whenever the respective Diesel Oil Storage Tank is drained and the bearings are accessible (e.g., once every ten years as recommended by Regulatory Guide 1.137). If the bearing condition is found to be acceptable, this would provide reasonable assurance that the bearings in the remaining submerged pumps are also acceptable. If bearing deterioration is found, the licensee should evaluate the condition and determine if the remaining pumps could be affected in the same manner.

An action plan for inspection of the remaining pumps could be developed which accounts for the cause of the condition, maintenance history of the pumps, and schedule for draining the other tank and inspecting the pump. If the remaining pumps are not inspected immediately, the evaluation should justify their operational readiness until the pumps can be scheduled for inspection. Based on the maintenance history, the inspection frequency should be reviewed to ensure that it is adequate.

A possible alternative which might allow quarterly inspection of the submerged pumps' condition is acoustic signature monitoring and analysis. In considering alternative practices, the licensee should address previous maintenance and failure histories for these components and related components in a similar environment.

With respect to quarterly measurement of the pump flow rate, the licensee has not discussed the impracticality of measuring pump flow rate by observing and timing the change in oil level in the Diesel Generator Day Tanks which are supplied by the pumps and are assigned to individual Diesel Generators. Flow from all of the pumps is verified, but not measured, during the monthly functional test required by TS 4.8.1.1.2. Additionally, pressure transmitters are located on the pump discharge and inlet pressures may be determined from the tank level. The licensee has not addressed the impracticality of calculating differential pressure.

Although the licensee considers these pumps to be skid-mounted, the proposed DG TS testing does not appear to adequately assess the operational readiness of these pumps, with consideration that other means can be used. In view of the foregoing, for the submerged pumps, it is recommended that interim relief be granted in accordance with 10CFR50.55a(f)(6)(i), for a period of one year, or until the next refueling outage, whichever is later, on the basis of the impracticality of immediately imposing the Code requirements. The licensee should revise and resubmit this relief request to indicate an alternative course of action such as the institution of a regular maintenance and spare parts program for these pumps which includes provisions to inspect the pump bearings and perform maintenance at least whenever the storage tanks are drained and the bearings are accessible. Additionally, during the interim period, the licensee should evaluate the practicality of determining flow rates and differential pressure in accordance with the Code.

With respect to the external pump, OP514E, the licensee has not provided sufficient basis for not installing differential pressure instrumentations and using vibration instrumentation so that these parameters could be read at least quarterly during the TS required testing. It is recommended that interim relief be granted in accordance with 10CFR50.55a(f)(6)(i), for a period of one year, or until the next refueling outage, whichever is later, on the basis of the impracticality of immediately imposing the Code requirements, for the licensee to access the practicality of complying with the Code, such as by calculating differential pressure, using vibration instrumentation, and measuring flow rate by observing changes in the level of the Diesel Generator Day Tanks, or installing flow instrumentation.

2.2 Relief Request No. 11, High Pressure Coolant Injection (HPCI) Pumps (Units 1 and 2)

Relief Request: The licensee has requested relief, for the High Pressure Coolant Injection (HPCI) 1(2)P204 Main Pumps and 1(2)P209 Booster Pumps, from the requirements of OMa-1988, Part 6, ¶5.6, that the duration of the Inservice Pump test be at least 2 minutes, with the pump run under conditions as stable as the system permits.

Alternate Testing: The pumps shall be run for at least one minute under conditions as stable as the system permits. At the end of this time at least one measurement or observation of each of the quantities specified, i.e. flow rate, differential pressure, and vibration, shall be made and recorded.

Licensee's Basis For Relief: The licensee states: "These pumps are driven by a steam turbine which exhausts steam into the suppression pool, heating it toward its Technical Specification limit of 105°F. This is a severe limitation on test duration. Increasing suppression pool temperature toward its 105°F limit, while within limits, does reduce plant safety margin in the event of an accident occurring during or after a test. Frequent test repetition is not desirable due to the strong transient nature of a HPCI quick start. Such quick starts are recommended by INPO and have been adopted as PP&L's test method. Pump speed is not directly controllable, but can only be achieved through coordinated manipulation of the pump flow controller and the test system throttling valve. Test results are extremely sensitive to variations in pump speed, from all sources. These factors make this test uniquely time-dependent.

Furthermore, the HPCI Pump quarterly surveillance test procedure is structured to first demonstrate satisfaction of Technical Specification 4.5.1.b.3 by running the pump at its rated flow rate and discharge pressure conditions, which create essentially the same test conditions as those for inservice testing. This prior technical specification test performance has the effect of providing several minutes of pump warmup time at rated conditions before the inservice test."

Evaluation: These are the HPCI Main, 1(2)P204, and Booster, 1(2)P209, pumps which are part of the Emergency Core Cooling System (ECCS). According to the Pump Program Tables, the Main and Booster pumps operate in tandem and measurements are taken as one pump.

OMa-1988, Part 6, ¶5.6, requires that after the pump conditions are as stable as the system permits, each pump shall be run at least 2 minutes. At the end of this time, measurement of the required quantities shall be made. Prior to the HPCI Pump quarterly surveillance test, the licensee is running the pump at its rated flow rate and discharge pressure to demonstrate satisfaction of TS 4.5.1.b.3. The licensee's proposed alternative is to run the pump for at least one minute under conditions as stable as the system permits and at the end of this time at least one measurement or observation of each of the quantities specified, i.e., flow rate, differential pressure, and vibration, shall be made and recorded.

Although running the HPCI pump causes the steam exhaust of the pump turbine driver to exhaust to the suppression pool, thereby raising the suppression pool temperature, it does not appear that running the pump an additional minute would greatly affect the suppression pool temperature. Generic relief is not appropriate based on the lack of specific suppression pool temperature data taken during tests versus time. Licensees generally have administrative limits for suppression pool temperature such that the TS limits are not reached. The licensee could consider running the pump until the administrative limit is reached or two minutes, whichever is first. The licensee should also note that other BWRs have not requested relief from these Code requirements based on the suppression pool temperature. The licensee should review the test procedures and determine if the TS test conditions would satisfy the Code's two minute

requirement. Therefore, it is recommended that relief be denied. The licensee should comply with the Code, or revise and resubmit the request with additional test data.

2.3 Relief Request No. 15, Emergency Condenser Water Circulating Pumps (Unit 1)

Relief Request: The licensee has requested relief, for the Control Structure Chilled Water System Pumps:

OP162A & B Chilled water loop circulating pumps (Non-ASME Code Class) and
OP171A & B Emergency condenser water circulating (ECWC) pumps,

from the requirements of OMa-1988, Part 6, ¶5.2, that the resistance of the system be varied until either the measured differential pressure or the measured flow rate equals the corresponding reference value.

Alternate Testing: Monitor the chilled water loop chiller discharge temperature and verify that the specified discharge temperature is maintained demonstrating proper functioning of each entire chiller train. Additionally monitor the three Table 2 test quantities: differential pressure, flow rate, and vibration amplitude.

Licensee's Basis for Relief: The licensee states: "Control of the flows and pressures of these pumps is automatic; no means for manual control has been provided. The ultimate function of these pumps is to provide chilled water to the cooling coils of the Control Structure HVAC system. Rather than individually testing each pump for proper functioning based on the prescribed measurements required by IWP, operation of the chilled water loop with cooling supplied by the emergency condenser loop provides a functional system test which is indicative of proper operation of all system components. This testing is more practical and provides a method of pump testing which does not require the removal of this safety system from operation. See Relief Request Number 40 (*sic*)."

Evaluation: These are the Chilled Water Loop Circulating (CWLC) Pumps OP162A & B and the Emergency Condenser Water Circulating (ECWC) Pumps OP171A & B in the Control Structure Chilled Water System. Since the CWLC Pumps OP162A & B are not ASME Code Class pumps, no evaluation is required and this evaluation pertains only to the ECWC Pumps OP171A & B.

In the May 28, 1992 Safety Evaluation (SE) by the NRC, the NRC noted in Anomaly 11, with respect to former pump relief request PRR-50 for the ESW supply line pumps to the Control Structure Chillers, that the alternative testing then proposed verifies the functioning of the components on a system basis. Such testing will provide an indication of the capability of the valves and pumps to function on a system level, though, such alternative testing does not monitor the valves and pumps for degrading conditions.

The licensee's current proposed alternate testing for the pumps is again to monitor the chilled water loop chiller discharge temperature and verify that the specified discharge temperature is maintained demonstrating proper functioning of each entire chiller train. Additionally per the relief request, the licensee proposes to monitor the differential pressure, flow rate, and vibration amplitude of the pumps. According to the Pump Program Tables, only flow rate and vibration amplitude are being measured.

OMa-1988, Part 6, ¶5.2(b), requires that for the quarterly pump testing conducted to meet the requirements of ¶5.1, the resistance of the system be varied until either the measured differential pressure or the measured flow rate equals the corresponding reference value. Paragraph 5.2(c) allows, where system resistance cannot be varied, flow rate and pressure to be determined and compared to their

respective reference values. The licensee has not provided information on whether ¶5.2(c) can be complied with, nor the range of flow rate or differential pressure experienced. The licensee may be able to comply with ¶5.2(c) using multiple reference values (e.g., for summer or winter operation). If compliance with ¶5.2(c) is impractical, the staff has approved the use of pump curves when it is impractical to establish a fixed set of reference values.

Therefore, it is recommended that interim relief be granted for a period of one year or until the next refueling outage, whichever is later, based on the impracticality of immediately imposing the Code requirements, pursuant to 10 CFR 50.55a(f)(6)(i). In the interim, the licensee should evaluate compliance with ¶5.2(c), and revise and resubmit this relief request, as appropriate. The licensee should include information on the range of test values. Additionally, the licensee should ensure that differential pressure is being measured, and that all of the test parameters are measured, evaluated, and corrective actions taken in accordance with OMa-1988, Part 6. The Program Table should be revised to be consistent with the Relief Request, by including the measurement of pressure. Additionally, the licensee has referred to Relief Request 40 in the Basis, which does not exist. It appears that the correct reference is Request 13.

3.0 VALVE RELIEF REQUESTS

In accordance with 10 CFR 50.55a, Pennsylvania Power & Light Company has submitted 18 relief requests involving valves at the Susquehanna Steam Electric Station, Units 1 and 2. Sixteen of those requests involve valves which are subject to inservice testing under the requirements of ASME Section XI. Nine of the sixteen requests propose a sample disassembly and inspection program as discussed in NRC Generic Letter (GL) 89-04, Position 2, and one proposes the alternate testing discussed in Position 7. These requests have not been specifically evaluated. Anomalies associated with these requests can be found in TER Section 5.4 and 5.5. The remaining six requests, along with their evaluations, are summarized below.

Susquehanna's IST Program was written to comply with the 1989 Edition of Section XI. This edition references OMa-1988 Part 10 for valve testing. GL89-04 does not address Part 10. Part 10, unlike earlier versions of Section XI, discusses disassembly and inspection in lieu of check valve exercising with flow. Part 10, however, does not discuss a sampling technique and requires that disassembly be performed each refueling outage. The NRC, as documented in GL 89-04 Position 2, recognized that disassembling all applicable valves each refueling outage may be burdensome and allowed grouping of similar valves and a sampling plan such that one valve of the group is inspected each refueling outage, with any one valve disassembly not to exceed once every six years. The ASME Code Committees have since revised the OM Code to allow a sampling technique (i.e., in the 1994 Addenda). However, this code has not been endorsed by the NRC in §50.55a. Part 10 also does not address the alternative provided in Position 7 for control rod drive system valves. This alternative remains acceptable. Relief is therefore granted in accord with GL 89-04, Positions 2 and 7, pursuant to 10 CFR 50.55a(g)(6)(i) [now 10 CFR 50.55a(f)(6)(i)] provided the alternatives are in compliance with all of the guidance delineated in Position 2 and 7. The relief requests indicate that the proposed alternatives are in compliance with such guidance, except for the valve grouping and inspection intervals identified in many of the relief requests. Therefore, the licensee should revise these relief requests and ensure that the information to support compliance with Position 2 guidance is documented in the IST program, as GL 89-04 requests.

3.1 Relief Request No. 05, Automatic Depressurization System (ADS) Code Safety/Relief Valves (Units 1 and 2)

Relief Requested: The licensee has requested relief, for the six (6) safety relief valves assigned to the ADS which are pneumatically-assisted Category B and C valves, PSV-141F013G, J, K, L, M and N (PSV-241F013G, J, K, L, M and N), from the requirements of OMa-1988, Part 10, ¶4.2.1.1, 4.2.1.4, and 4.3.2.1 that the valves be exercised once per 92 days and the stroke time measured.

Alternate Testing: The ADS valves will be exercised once per 18 months in accordance with Technical Specification 4.5.1.d.2.b, which provides manual opening of each ADS valve with reactor dome pressure greater than or equal to 100 psig and observing either control valve or bypass valve response or corresponding change in measured steam flow. No stroke timing will be performed.

Additionally, to monitor for possible degradation of each ADS SRV, actuator lift time (opening stroke time) and actuator lift distance (opening stroke distance) will be measured during each safety valve/relief valve pressure setpoint test done to satisfy safety valve testing (i.e., once every 5 years).

Licensee's Basis for Requesting Relief: The licensee states: "The six safety relief valves assigned to the ADS system perform an essential safety function when operated by the pneumatic actuator with gas supplied through the ADS solenoid valves. Operation of these valves is not practical during power operation because this action will vent main steam to the suppression pool, inducing a transient condition and increasing the potentiality for an open failure of a safety relief valve. Also, no stroke timing is practical as these are pneumatic assisted SRVs. No direct position indication of the SRVs is provided. Although acoustic monitors attached to the valve discharge piping provide evidence of steam flow through each valve, which can be taken as indirect or secondary indication of valve position, no accurate stroke timing is possible. ADS valve stroke time could only be inferred very crudely from elapsed time between manual (non-ADS) actuation of each valve and acoustic monitor indication of steam flow or lack of steam flow in the valve discharge pipe line. Exercising during cold shutdown cannot be accomplished because of lack of steam flow (and attendant noise) provides no indirect or secondary indication of valve movement."

Evaluation: These valves are Code Safety/Relief Valves which are pneumatically operated when performing their function as part of the Automatic Depressurization System.

The ADS valves perform dual functions which may require them to be Category B/C in the IST program, although the ASME OM Committee has indicated it is reviewing this issue to determine the proper category or categories for these valves (R. Favreau, OM Meeting, September 21, 1993). The Category B power-operated function of the valves (i.e., including valve stroke time) would be tested in accordance with requirements of OMa-1988, Part 10, (OM-10), ¶4.2.1, at least during each refueling outage. The Category C function of the valves would be tested in accordance with the requirements of OM-10, ¶4.3.1 and OM-1.

In the May 28, 1992 safety evaluation (SE), the NRC indicated that the relief requested by the licensee for these valves under Relief Request VRR-10 was preapproved by Generic Letter 89-04 (i.e., grandfathered) but with limitations indicated in Anomaly No. 6. Specifically, Anomaly No. 6 stated: "In valve relief request VRR-10, the licensee has requested relief from testing per the method and frequency requirements for pressure safety/relief valves. This relief request was preapproved by Generic Letter 89-04. The licensee proposes to exercise valves in accordance with Technical Specifications 4.5.1.d.2.b, which provides for manual opening of each ADS valve with reactor dome pressure greater than or equal to 100 psig and observing either control valve or bypass valve response or corresponding change in measured steam flow. This testing will provide an indication of the capability of the valves to function, though, this alternative testing does not monitor the valves for degrading conditions. Therefore, the licensee should propose a method for monitoring these valves for degradation prior to implementation of the updated inservice testing program for the next 10-year interval. No current action is required."

In the current relief request, the licensee has added that no stroke timing can be done, so that to monitor for possible degradation of each ADS SRV, actuator lift time (opening stroke time) and actuator lift distance (opening stroke distance) will be measured during each safety valve/relief valve pressure setpoint test done to satisfy safety valve testing.

According to the Valve Program Tables, the licensee is testing these valves under OM-1987, Part 1 (OM-1) (Ref. 13). In particular, OM-1, ¶1.3.3, specifies the test frequency of Class 1 pressure relief devices to be that all valves of each type and manufacture shall be tested within each subsequent 5 year period with a minimum of 20% of the valves tested within any 24 months. This 20% shall be previously untested valves, if they exist. However, the licensee has not specified whether the Stroke Time

Acceptance Criteria and Corrective Actions of OMa-1988, Part 10, ¶4.2.1.8 and 4.2.1.9, will be adhered to.

Since position indication is not provided for the ADS valves at many plants, such plants may meet the Code requirements for ADS valves stroke time by using the acoustic monitors downstream of the valves. If a 2-second limiting value is assigned, this method is acceptable in accordance with Part 10, ¶4.2.1.8(e).

Other test acceptable methods include:

(1) measuring the stroke time at the set pressure test facility, with an exercise in-situ after reinstallation to ensure controls have been properly connected, and

(2) performing enhanced maintenance of the ADS and pilot valves, with stroke time measurements of the pilot valves.

It appears that the licensee has chosen to comply with option 1 above, except that no mention has been made of an exercise in-situ after reinstallation to ensure that controls have been properly connected, and also no mention has been made as to whether the Stroke Time Acceptance Criteria and Corrective Actions of OMa-1988, Part 10, ¶4.2.1.8 and 4.2.1.9, will be adhered to. It is assumed that an in-situ exercise will be performed in accordance with Part 1, ¶3.4.1.1(d). The licensee should establish stroke time acceptance criteria and take appropriate corrective action when the criteria is exceeded.

Testing in accordance with the Code is impractical given the current plant design and the potential for a stuck open relief valve (SORV) condition during plant operation, the inability of acoustic emission techniques to provide indication of valve position during cold shutdowns due to the lack of steam flow, and the lack of position indication. Testing in accordance with the TS, and measuring stroke time during the set point pressure testing, provides adequate assurance of the valves' operational readiness.

Therefore, it is recommended that relief be granted pursuant to 10CFR 50.55a(f)(6)(i), provided that the licensee establishes acceptance criteria and takes appropriate corrective action when the criteria is exceeded. The licensee should revise this relief request to document the acceptance criteria and corrective actions.

3.2 Relief Request No. 07, Control Rod Drive Hydraulic (CRDH) Valves (Units 1 and 2)

Relief Request: The licensee has requested relief, for the CRDH valves:

XV-147F010 (XV-247F010), XV-147F011 (XV-247-F011),
XV-147F180 (XV-247F180), XV-147F181 (XV-227F181),

from the requirements of OMa-1988, Part 10, ¶4.2.1.9.b, "Corrective Action" that valves with measured stroke times which do not meet the acceptance criteria of ¶4.2.1.8 shall be immediately retested or declared inoperable.

Alternate Testing: Exercise testing of the four valves is to be performed quarterly. OMa-1988, Part 6, ¶4.2.1.9.a Corrective Action will be taken, with comparison of the closure stroke time measurement for each valve with the plant Technical Specification 4.1.3.4.a.1 Stroke Time Limit of 30 seconds.

OMa-1988, Part 6, ¶4.2.1.9.b Corrective Action will not be taken.

Licensee's Basis For Relief: The licensee states that: "These globe valves are air operated and have comparatively complex actuation logic schemes sequencing their start and stop times. P&ID M-147 (M-2147) Notes #21 & 22 establish additional restraints, which are satisfied administratively, upon the stroke times and sequencing of these valves. The pneumatic actuators of these valves have their exhaust airflows metered by needle valves. Their actuation rate is extremely sensitive to the slightest changes in the positions of the needles in these needle valves, as caused by readjustment, by physical shock, or by thermal change. By readjustment of the exhaust needle valve position, these valves are maintained in compliance with the stroke time and sequencing limitations of the P&ID, which, although dissimilar from those of the OMa-1988 Standard, provide a more relevant basis for verifying the operational readiness of these particular valves.

Stroke time measurement of these AOVs is primarily a measure of the balance of their entire actuating air supply/exhaust network; it is not a reliable measure of the physical condition of the valve under test. Position change of the common needle valves in the actuating air exhaust lines has been the primary, dominant, and only significant cause of changes in stroke times of these AOVs. Measurements of the stroke times of these AOVs are indicative mainly of needle valve position; and not of the AOV physical condition. Mechanical failure of any of these valves would cause a large and definitive increase in its stroke time, causing it to exceed its 30 second Stroke Time Limit and plant Technical Specification 4.1.3.4.a.1 limit.

These valves are located in a radiologically contaminated area of the plant. They have no remote position indication useable for testing; and they have no individual control mechanism (only two common pushbuttons). Consequently, exercise testing of the valves requires simultaneous entry of their radiologically contaminated area by four observers. Upon the common actuation of all four valves, simultaneous direct observation (accompanied by stopwatch timing) is made of the valve stems of all four AOVs during their closure strokes. This crude testing method of simultaneous direct observation of valve stem motion does not produce stroke timing results accurate enough to justify any concern over 25 (or 50%) rates of variation in individual stroke time measurements."

Evaluation: These are the 1 in. CRDH Scram Discharge Volume (SDV) vent and drain air-operated globe valves.

On P&ID M-147, Sheet 1 of 2, Rev. 32, (M-2147, Sheet 1 of 2, Rev. 27), Notes 21 and 22 are limitations that the outboard SDV vent and drain valves XV-147F010 (XV-247F010) and XV-147F0ll (XV-247-F011), will fully close at least 5 seconds after their respective inboard valves, XV-147F180 (XV-247F180) and XV-147F181 (XV-227F181), close during a full core scram and start opening at least 5 seconds before their respective inboard valves open on the reset of a full core scram.

Specifically, Notes 21 and 22 on M-2147, Sheet 1, Rev. 27, read as follows:

> 21. The 247-F159B valve shall be adjusted so that the 247-F010B valve and the 247-F011B valve fully close at least five (5) seconds after the 247-F010A valve and the 247-F011A valve, respectively, close during a full core scram.

22. The 247-F159A valve shall be adjusted so that the 247-F010A valve and F011A valve start opening at least five (5) seconds after the 247-F180 valve and the 247-F181 valve, respectively, open on the reset of a full core scram.

In the May 28, 1992 SE, in the evaluation of Valve Relief Request VRR-61, the NRC stated:

> The requirements for increased test frequency as specified in IWV-3417(a) are to monitor for any additional increases in stroke times such that if the tested valve stroke time increases to an unacceptable level, corrective action to effect repairs will be taken immediately. When valves exhibit an increase in stroke time, for reasons such as described in the licensee's basis for relief, actions are to be taken to correct the condition(s) causing the increase, or more frequent testing is to be performed to continue to monitor for additional increase until the condition is corrected.

In Anomaly 16 of the May 28, 1992 SE, the NRC stated:

> For valve relief request VRR-61, relief has been denied. The basis and the proposed alternative do not provide sufficient justification for not complying with the requirements of IWV-3417(a). In the basis, reference is made to Notes 21 and 22 on P&ID M-147, but the technical justification for these notes is not discussed, nor is there a comparison of the expected stroke time to the 5 second limit in these notes. There is no explanation for the licensee's statement that these provide a more relevant basis for verifying the operational readiness of these particular valves. The licensee must meet the requirements of IWV-3417(a). If it is determined that additional justification should have been included in the relief request, a revised relief request should be submitted for further evaluation.

For a 1 in. air-operated globe valve, use of a 30 second limiting stroke time as proposed by the licensee in the current relief request appears to be excessive as a basis for responding to the onset of degrading conditions. Additionally, in view of the fact that the licensee still has not provided a technical justification for Notes 21 and 22, nor provided a comparison of the expected stroke time to the 5 second limit in these notes, nor provided an explanation for the statement that these notes provide a more relevant basis for verifying the operational readiness of these valves, it is recommended that the relief as requested be denied. The licensee should comply with the Code requirements or revise and resubmit this request as appropriate.

3.3 Relief Request No. 10, High Pressure Coolant Injection (HPCI) Turbine Stop Valve (Units 1 and 2)

Relief Request: The licensee has requested relief, for the HPCI Turbine Stop Valve FV-15612 (FV-25612), from the requirements of OMa-1988, Part 10, ¶4.2.1.4 that the stroke time of the valve be measured when exercised, once per 92 days.

Alternative Testing: Valve will be tested functionally each time the HPCI turbine is tested (quarterly). No trending of stroke times will be performed. In addition, response time testing for the HPCI system will be performed in accordance with Technical Specifications once Per 18 months.

Licensee's Basis for Relief: The licensee states: "The HPCI Turbine Stop Valve, FV-15612 (FV-25612), has a design closure stroke time of 0.5 seconds. This rapid closure is accomplished by spring force. As a rapid-acting valve, closure of this valve cannot be timed accurately nor trended from test-to-test. In contrast, opening is accomplished hydraulically by oil pressure working against spring force. Opening takes a much longer time than closing, but the length of time can vary greatly, depending on HPCI lube oil flow and pressure variations. The turbine stop valve has no independent manual control, but rather is controlled only by HPCI turbine oil pressure. Repetitious starts and stops of the HPCI turbine and its lube oil pumps to support attempts to precisely time stop valve movement are detrimental to the machine. The turbine stop valve is a skid-mounted component of the HPCI turbine, and structurally integrated with the turbine."

Evaluation: These 10 in., ASME Code Class 2, Category B, hydraulically-operated globe valves open to admit steam to the HPCI turbine and close to isolate steam in the event of a turbine trip.

In Anomaly 13, of the May 28, 1992 SE, the licensee was advised that since the valves stroke in less than 2 seconds, the licensee should investigate whether the stroke time is less than 2 seconds and consider assigning a maximum limiting value of full stroke time of 2 seconds to these valves, if practical. It was further stated that this would eliminate concerns with minor variations in the stroke time accuracies, and would be consistent with GL 89-04, Position 6, for detecting degraded conditions.

Skid-mounted components and component subassemblies that are identified as ASME Code Class 1, 2, or 3 in the Safety Analysis Report (SAR), are subject to IST, in accordance with the regulations. If these components are not identified as ASME Code Class 1, 2, or 3 in the SAR (or the SAR indicates that they are maintained as Code class but are not required to be Code class), they are not subject to IST in accordance with 10 CFR 50.55a. However, as discussed in Generic Letter 89-04, Position 11, these components may be subject to periodic testing in accordance with 10 CFR 50, Appendix A and Appendix B.

The staff has, however, determined that the testing of the major component (i.e., the HPCI pump) is an acceptable means for verifying the operational readiness of the skid-mounted and component sub-assemblies if the licensee documents this approach in the IST Program. This is acceptable for both Code class and non-Code class components tested and tracked by the IST Program.

Since the licensee appears to have opted not to classify these valves as rapidly acting valves, but rather to classify these valves as skid-mounted components of the HPCI pump and turbine, the proposed alternative provides an acceptable level of quality and safety and is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

3.4 Relief Request No. 13, Control Structure Chilled Water Temperature Control Valves (Unit 1)

Relief Request: The licensee has requested relief, for the Control Structure Chilled Water Temperature Control Valves:

TV-08612A	ASME Code Class 3
TV-08612B	ASME Code Class 3
TV-08643A	Non-Code; Safety Function
TV-08643B	Non-Code; Safety Function
TV-08652A	Non-Code; Safety Function
TV-08652B	Non-Code; Safety Function
TV-08662A	Non-Code; Safety Function
TV-08662B	Non-Code; Safety Function

from the requirements of OMa-1988, Part 10, ¶4.2.1.1 that the valves be exercised once per 92 days to the position(s) required to fulfill their function(s), and also from the requirements of individual valve stroke time acceptance criteria of ¶4.2.1.8(a).

Alternative Testing: As part of each quarterly Control Structure Chilled Water System flow test, monitor the chilled water loop chiller discharge temperature and verify that the specified discharge temperatures are maintained. In conjunction with this testing perform part-stroke exercising of these valves. In conjunction with Unit 1 Emergency Switchgear Room Cooling Subsystem flow balancing, conducted at least once each 18 month period, perform opening exercise tests of these valves to the full open position.

Licensee's Basis for Relief: The licensee states: "The ultimate function of these valves is providing chilled water to the cooling coils of the Control Structure HVAC system. Rather than individually testing each valve for proper functioning, operation of the chilled water loop with cooling supplied by the emergency condenser loop (cooled by ESW) provides a functional system test which is indicative of proper operation of all system components. As this is an auxiliary support system rather than a water-supply system, this testing provides more meaningful results than individual valve testing.

Individual stroke testing (including stroke time measurement) of the motor operated control valves in these subsystems is not feasible. System interlocks require initiation and startup of circulating pumps and/or chiller, after which the valves in the emergency condenser cooling loop automatically actuate in their temperature controlling mode. Time delays and equipment actuation times render any attempts at stroke time measurement meaningless. No provision is made for individual stroking of valves in the circuitry. Therefore, compliance with the Code requirements is impractical because of design limitations."

Evaluation: These are 6 in. motor-operated gate valves which control the temperature of the Control Structure Chilled Water System. Both their normal position and their safety position is throttled. These valves do not have remote position indication.

Since only TV-08612A & B are ASME Code Class valves, this evaluation pertains only to these valves. According to the Valve Program Tables, these valves are part-stroke exercised quarterly with no full-stroke exercising test nor stroke timing test. The safety position of these valves is throttled. Because there is no position indication, the licensee cannot perform a stroke time measurement of the valve operation from the fully closed to the throttled position during the quarterly part-stroke exercising tests

or during the full-stroke open testing which the licensee says in the relief request is performed every 18 months.

In the May 28, 1992 SE, Anomaly 11, appears to pertain to the same valves under the former relief request VRR-40, and pertains also to the Emergency Condenser Water Circulating (ECWC) pumps, which are the subject of the current Relief Request No. 15, formerly relief request PRR-50. In that anomaly, the NRC noted that "this alternative testing verifies the functioning of the components on a system basis. This testing provides an indication of the capability of the valves and pumps to function on a system level, though, this alternative testing does not monitor the valves and pumps for degrading conditions. Therefore, the licensee should propose a method for monitoring these valves for degradation prior to implementation of the updated inservice testing program for the next 10-year interval. No current action is required."

Therefore, it is recommended that the relief as requested be denied in view of the fact that the licensee has failed to respond to the NRC SE finding that the licensee should propose a method for monitoring these valves for degradation prior to implementation of the updated inservice testing program for the next 10 year interval, i.e., the current submittal. The licensee must revise and resubmit this relief request to propose a method for monitoring these valves individually for degradation.

3.5 Relief Request No. 21, Air-Operated Valves (Units 1 and 2)

Relief Request: The licensee has requested relief, for the valves listed below, from the requirements of OMa-1988 Part 10, ¶4.2.1.9(b) that a valve not meeting the stroke time reference value acceptance criteria of ¶4.2.1.8 shall be declared inoperable if the ¶4.2.1.9(b) conditions are not met for immediate retest; and, if ¶4.2.1.8 acceptance criteria are again not met during retest, that a conclusive data analysis be performed within 96 hours that verifies that the new stroke time represents acceptable valve operation, or the valve shall be declared inoperable.

ESW System Isolation

ESW/SWM	HV-10943A2/B2 (HV-20943A2/B2)
ESW/SWM	HV-11024A1/A2/A3/A4 (HV-21024A1/A2/A3/A4)
ESW/SWM	HV-11143A/B (HV-21143A/B)

Containment Isolation

CAC	HV-15703 (HV-25703), HV-15704 (HV-25704), HV-15705 (HV-25705), HV-15711 (HV-25711), HV-15713 (HV-25713), HV-15714 (HV-25714), HV-15721 (HV-25721), HV-15722 (HV-25722), HV-15723 (HV-25723), HV-15724 (HV-25724), HV-15725 (HV-25725)
LRW	HV-16108A1/A2 (HV-26108A1/A2) HV-16116A1/A2 (HV-26116A1/A2)
RBCW	HV-18781A1/A2/B1/B2 (HV-28781A1/A2/B1/B2), HV-18782A1/A2/B1/B2 (HV-28782A1/A2/B1/B2),

HV-18791A1/A2/B1/B2 (HV-28791A1/A2/B1/B2),
HV-18792A1/A2/B1/B2 (HV-28792A1/A2/B1/B2)

Alternate Testing: Valves not meeting the stroke time reference value acceptance criteria ranges (¶4.2.1.8), that are immediately retested per OMa-1988 Part 10 ¶4.2.1.9(b) with the second set of stroke time measurement data also not meeting the acceptance criteria ranges, shall have the second set of data analyzed within 96 hours to verify that the new stroke time data represents acceptable valve operation; or the valve test frequency shall be increased to once each month until corrective action has been taken, at which time the original test frequency shall be resumed.

Licensee's Basis for Relief: The licensee states: "Thirty-one of the 39 Air Operated Valves (AOV) that are the subject of this Relief Request are containment isolation valves in lines of the Reactor Building Chilled Water System (supplying drywell cooling), of the Liquid Radwaste System (returning from the drywell equipment drain tank), and of the Containment Atmosphere Control System; all with the safety function of closing to provide containment isolation. In the experience of this plant, these containment isolation valves have proven to be extremely dependable. No evidence of physical deterioration of any of the AOVs has ever been found to accompany their variations in stroke time.

As containment isolation valves, these AOVs are provided with Maximum Isolation Times by plant Technical Specifications (T.S. 4.6.3.3). These Maximum Isolation Times have been established as the Limiting Values of Full Stroke Time (per OMa-1988 Part 10, paragraph 4.2.1.4.a) and have served well in this application during the first 10 year inservice testing interval. As provided by OMa-1988 Part 10 paragraph 4.2.1.9(a), use of these Limiting Values of Full Stroke Time will continue, unchanged, as the criteria for each valve's continued operability. These criteria continue to provide an acceptable level of quality and safety.

Imposition of the additional, more restrictive OMa-1988 Part 10 paragraph 4.2.1.8 acceptance criteria, which are of an arbitrary nature and not valve specific, as determinants of operability, could have the effect of subjecting the plant to unnecessary transients because of the plant shutdowns that could be required to allow primary containment entry for either investigatory inspection or repair of any of the eight AOVs that are located inside containment. For valves outside containment the requirements of OMa-1988 paragraph 4.2.1.9(b) could necessitate removal of safety systems from service for valve investigatory inspection or repair during power operation, unnecessarily.

Other undesirable effects of attempting to determine valve operability by the arbitrary acceptance criteria of OMa-1988 Part 10 paragraph 4.2.1.8 are that potentially unwarranted and unproductive maintenance investigatory inspections would cause increased radiation exposure to plant personnel - contradictory to plant ALARA goals; and would increase the potential for spills and spread of contamination, due to breaching of contaminated systems to inspect valves that Susquehanna experience has demonstrated will likely show no material degradation.

An acceptable level of quality and safety will not only be maintained by continued use of the Limiting Values of Full Stroke Time as determinants of operability, but also by commitment to the OMa-1988 Part 10 paragraph 4.2.1.9(b) requirement to analyze deviations from the stroke time reference value acceptance criteria ranges of paragraph 4.2.1.8. Additionally, for valves for which a conclusive analysis cannot be performed without removal of the valve from service for investigatory inspection, enhanced condition monitoring will be as per the proposed Alternative Testing."

Evaluation: The valves in the Containment Atmosphere Control (CAC), Liquid Radwaste (LRW) Collection, and Reactor Building Chilled Water (RBCW) systems are air-operated containment isolation valves (CIVs). The valves in the Essential Service Water (ESW) system are air-operated valves which isolate non-essential loads in the Service Water system.

It appears that the licensee has inadvertently requested relief for ESW/SWM HV-11024A3/A4 (HV-21024A3/A4) when relief should have been requested for HV-11024B1/B2 (HV-21024B1/B2), as listed in the Valve Program Tables.

OMa-1988, Part 10, ¶3.3 states that reference values shall be determined from the results of preservice testing or from the results of inservice testing. These tests shall be performed under conditions as near as practicable to those expected during subsequent inservice testing. Therefore, the licensee's statement that the "imposition of the additional, more restrictive OMa-1988 Part 10 paragraph 4.2.1.8 acceptance criteria, which are of an arbitrary nature (*emphasis added*) and not valve specific, as determinants of operability,..." is clearly not true. The licensee is certainly free to consider the percentage values in the Stroke Time Acceptance Criteria of OMa-1988, Part 10, ¶4.2.1.8 to be arbitrary. However, the purpose of the Code is to establish some uniform and consistent standards. Short of empirical data being established for all valves in service in the industry, a virtually impossible task, the Code Committee must resort to some agreed upon limit of acceptability of measured stroke times. PP&L in a letter dated March 5, 1993 from H.W. Keiser to the ASME, made recommendations that the ASME not require dynamic or static testing of AOVs, noting that "Operability of AOVs should remain defined only in terms of current OM Code ISTC-required stroke timing, since...such testing is directly indicative of Air-Operated Valve degradation..." (Ref.22).

The NRC is aware that AOVs in particular have a large standard deviation when comparing historic stroke timing data, and some licensees have suggested that the first measured stroke time following maintenance or design change activities should not be the reference value. The Code requirements specified in OMa-1988, Part 10, ¶3.3 do not require that the first measured value be the reference value. Licensees establish reference values for valve stroke times in various ways such as by averaging a specific number of tests performed following maintenance activity, averaging several IST tests, or using the first test following maintenance.

For none of the valves in question in this relief request has the licensee provided a comparison between the actual stroke times exhibited by these valves during inservice testing and the TS allowed stroke times or the stroke times calculated by the acceptance criteria of OMa-1988, Part 10, ¶4.2.1.8.

OMa-1988, Part 10, ¶4.2.1.9(b) requires valves that exceed the acceptance criteria of ¶4.2.1.8 be immediately retested or declared inoperable. If the valve is retested and the second set of data does not meet the acceptance criteria, the data shall be analyzed within 96 hours to verify that the new stroke time represents acceptable operation or the valve shall be declared inoperable. Paragraph 4.2.1.9(c) specifies that valves declared inoperable may be repaired, replaced, or the data may be analyzed to determine the cause of the deviation and the valve shown to be operating acceptably. The licensee should consider trends of the actual stroke time relative to the limiting stroke time and the maintenance history to determine acceptable valve operation. Inspection or repair of a valve is not necessarily required. An increase in the test frequency from quarterly to monthly can provide additional assurance of operational readiness, but it should not be used generically in lieu of an analysis, as proposed by the licensee.

It is recommended that relief as requested be denied. The licensee may revise and resubmit this relief request to discuss the impracticality of basing the reference stroke times on those resulting from averaging a specific number of tests performed following maintenance activity, averaging several IST tests, or using the first test following maintenance versus those required by OMa-1988, Part 10, ¶4.2.1.8. The revised relief request should indicate clearly what are the reference values of valve stroke times established by the licensee and compare those to the requirements of OMa-1988, Part 10, ¶4.2.1.8 and discuss the impracticality of implementing the corrective actions of ¶4.2.1.9(b).

Additionally, the licensee has provided no basis in the request for the deviation from Code requirements for the ESW/SWM valves. The discussion in the Basis pertains only to the CIVs.

The licensee should also verify whether relief has been inadvertently requested for ESW/SWM HV-11024A3/A4 (HV-21024A3/A4) when relief should have been requested for HV-11024B1/B2 (HV-21024B1/B2), as listed in the Valve Program Tables.

3.6 Relief Request No. 22, Emergency Switchgear Room Cooling Switchgear Pressure Control Valves (Unit 2)

Relief Requested: The licensee has requested relief, for the Emergency Switchgear Room Cooling Pressure Control Valves HV-27203A/B, from the requirements of OMa-1988, Part 10, ¶4.2.1.1 that power-operated valves be exercised once per 92 days, and from the requirements of ¶4.2.1.4 that the valve stroke time be measured.

Alternate Testing: As part of each quarterly Emergency Switchgear Room Cooling Subsystem valve exercise test, monitor the direct expansion unit refrigerant pressure in the condenser and verify that pressures within the specified range are maintained. In conjunction with this testing perform part-stroke exercising of valves HV-27203A and B. In conjunction with Unit 2 Emergency Switchgear Room Cooling Subsystem flow balancing, conducted at least once each 18 month period, perform opening exercise tests of valves HV-27203A and B to their full open positions. No stroke timing will be performed.

Licensee's Basis for Relief: The licensee states: "Control valves HV-27203A and B are installed in the Emergency Service Water supply line to each Direct Expansion Unit Condenser. Each throttles flow through its respective line to maintain refrigerant pressure in the unit's condenser within an operating range of values. Each valve moves to its full open position only once each 18 month period, when its electrical control is defeated during performance of Emergency Service Water System flow balancing."

Evaluation: These are 2 in. motor-operated globe valves which control pressure in the refrigeration side of the condenser of the air refrigerating unit for the Emergency Switchgear Rooms, by controlling the cooling water flowrate exiting from the condenser. The normal position and the safety position are both throttled. The valves have remote position indication. (If there are analogous valves in Unit 1, they are not in the Unit 1 Program).

According to the Valve Program Tables, these valves are part-stroke exercised quarterly with no full-stroke exercising test nor stroke timing test nor position indication test. Since the valves do have remote position indication, and the safety position of these valves is throttled, it is not clear why the licensee cannot perform a stroke time measurement of the valve operation from the fully closed to the throttled position during the quarterly part-stroke exercising tests, or at least during the full-stroke open testing

which the licensee states in the relief request is performed every 18 months. It is also not clear why the remote position indicator is not observed locally at least once every 2 years as required by OMa-1988, Part 10, ¶4.1.

In the May 28, 1992 SE, Anomaly 11, which pertains to similar valves in the Control Structure Chilled Water System (see the evaluation for current Relief Request 13, §3.5), the NRC noted that "this alternative testing verifies the functioning of the components on a system basis. This testing provides an indication of the capability of the valves and pumps to function on a system level, though, this alternative testing does not monitor the valves and pumps for degrading conditions. Therefore, the licensee should propose a method for monitoring these valves for degradation prior to implementation of the updated inservice testing program for the next 10-year interval. No current action is required."

The licensee has provided no method to detect individual degradation of these valves, nor has the licensee provided any discussion of the burden or impracticality of performing testing in accordance with the Code requirements. Therefore, it is recommended that the relief as requested be denied. The licensee must revise and resubmit this relief request to propose a method for monitoring these valves individually for degradation, and discuss the impracticality of stroke time measurement of the valve operation from the fully closed to the throttled position during the quarterly part-stroke exercising tests or during the full-stroke open testing which the licensee says in the relief request is performed every 18 months, and to discuss the impracticality of observing the remote position indicator locally at least once every 2 years, as required by OMa-1988, Part 10, ¶4.1.

4.0 DEFERRED TESTING JUSTIFICATIONS

Pennsylvania Power & Light Co. has submitted 13 Cold Shutdown Justifications and 20 Refueling Outage Justifications which document the impracticality of testing valves quarterly, during operation, as required by OMa-1988, Part 10. These justifications were reviewed to verify their technical basis. Generally, those tests involving a plant trip, damage to a system or component, or excessive personnel hazards are not considered practical. Removing one train for testing or entering a limiting condition of operation is not sufficient basis alone for not performing the required tests, unless some other justification is provided such as that the testing renders systems inoperable for extended periods of time. As discussed in Generic Letter 91-18 (Ref. 14), it is not the intent of IST to cause unwarranted plant shutdowns or to unnecessarily challenge other safety systems. Other factors, such as the effect on plant safety or risk and the difficulty of the test may be considered.

BNL's evaluation of each Cold Shutdown Justification and Refueling Outage Justification is provided in Tables 4.1 and 4.2, respectively. The anomalies associated with the specific justifications are presented in Paragraph 5.11 and 5.12 of this TER.

Table 4.1 Susquehanna Steam Electric Station
Units 1 and 2
Evaluation of Cold Shutdown Deferral Justifications

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
REACTOR BUILDING CLOSED COOLING WATER (RBCCW)				
CSJ-01	HV-11313, (HV-21313) HV-11314, (HV-21314) HV-11345, (HV-21345) HV-11346, (HV-21346) 4 in. Cat. A, normally open, Reactor Recirculation Pump Bearing and Seal Cooler Supply & Return Isolation motor-operated gate valves	M-113 (M-2113)	"These valves are in the cooling water supply and return lines for the reactor recirculation pump bearing and seal coolers. Cycling of these valves during power operation would interrupt this cooling water flow, possibly causing pump bearing damage or seal failure."	Exercise valves during cold shutdowns (no more frequently than once per 92 days).
Evaluation: These are 4 in. normally open MOVs which are in the cooling water supply and return lines for the Reactor Recirculation Pump bearing and seal coolers. These valves are required to close for containment isolation. It is impractical to part-stroke or full-stroke exercise these valves to the closed position quarterly since this would interrupt cooling water flow to the Reactor Recirculation Pump bearing and seal coolers during pump operation, thereby potentially damaging the pumps or causing a seal failure. The alternative provides full-stroke exercising to the closed position during cold shutdowns in accordance with OMa-1988, Part 10, ¶4.2.1.2(c).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
CONTAINMENT INSTRUMENT GAS (CIG)				
CSJ-02	SV-12651, (SV-22651) 3 in., Cat. A, CIG Supply to MSIV, solenoid-operated, normally open, fail closed globe valves	M-126 (M-2126)	"Closing this valve interrupts instrument gas supply to several important valves inside containment such as the Safety/Relief Valves (non-ADS function) and the MSIVs. This could compromise the ability of the SRV's to operate in the relief mode which, while not an ECCS function, is important to safety. Loss of instrument gas could also cause the MSIVs to close, resulting in a severe reactor transient."	Exercise valve during cold shutdowns (no more frequently than once per 92 days).

Evaluation: These are 3 in. normally open globe valves which supply Containment Instrument Gas to the Main Steam Isolation Valves (MSIVs). The valves are required to close for containment isolation.

It is impractical to part-stroke or full-stroke exercise these valves closed quarterly since loss of Instrument Gas to the MSIVs could cause them to close, resulting in a severe reactor transient.

The alternative provides full-stroke exercising to the closed position during cold shutdowns in accordance with OMa-1988, Part 10, ¶4.2.1.2(c).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
CSJ-03	SV-12654A, SV-12654A (SV-22654B, SV-22654B) 1 in., Cat. A, Instrument Gas Supply to ADS SRVs, normally open, fail open, solenoid-operated globe valves	M-126 (M-2126)	"Closing these valves will interrupt instrument gas supply to the ADS solenoids of the Safety/Relief Valves, compromising their ability to provide the opening motive force for the ADS valves in support of the long-term cooling ECCS function."	Exercise valves during cold shutdowns (no more frequently than once per 92 days).

Evaluation: These are 1 in. normally open, fail-open globe valves whose safety position is to open to supply Instrument Gas to the ADS SRVs and whose safety position is to close to provide containment isolation.

The licensee states that closing these valves will interrupt Instrument Gas supply to the ADS solenoids of the Safety/Relief Valves, compromising their ability to provide the opening motive force for the ADS valves in support of the long-term cooling ECCS function. However, a review of Drawing M-126 (M-2126) indicates that each valve isolates only one train of Instrument Gas supply to the corresponding train of ADS SRVs, and that Instrument Gas would remain available to the opposite train of ADS SRVs during quarterly closure testing. Also, there is an accumulator dedicated to each train which should provide sufficient gas storage for several ADS valve operations without the need for resupply via the Instrument Gas System. Furthermore, these valves are designated as rapid acting valves in the Valve Program Tables, so that the valve outage time required for stroke testing is minimal.

The licensee should full-stroke exercise these valves open and closed quarterly or revise this deferral justification accordingly.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
MAIN STEAM ISOLATION VALVE (MSIV) LEAKAGE CONTROL SYSTEM (LCS)				
CSJ-04	HV-139F001, B, F, K, P (HV-239F001, B, F, K, P) 2 in. Cat. A, normally closed Outboard MSIV LCS Inboard Bleed Line Isolation, motor-operated gate valves; HV-139F001 B, F, K, P (HV-239F001 B, F, K, P) 2 in. Cat. B, normally closed Outboard MSIV LCS Inboard Bleed Line Isolation, motor-operated gate valves	M-139 (M-2139)	"The MSIV-LCS inboard bleed lines are directly connected to the main steam lines at the outboard MSIV. During power operations, these lines are pressurized with main steam up to the first isolation valve (HV-139F001 B,F,K,P). Double valve isolation is provided by HV139F002 B,F,K,P. Opening any of these valves during power operations will leave only one barrier against the release of main steam to occupied plant areas through the system piping. Maintenance of double valve isolation is desired for personnel safety considerations and for prevention of inadvertent leakage paths from the main steam lines."	Exercise valve during cold shutdowns (no more frequently than once per 92 days).
Evaluation: These are 2 in. normally closed gate valves which open to allow initiation of the MSIV Leakage Control System following closure of the MSIVs and close to provide containment isolation. It is impractical to part-stroke or full-stroke exercise these valves during power operation since this will leave only one barrier against the release of Main Steam to occupied plant areas, thereby increasing the potential hazard to personnel. The alternative provides full-stroke exercising during cold shutdowns in accordance with OMa-1988, Part 10, ¶4.2.1.2(c).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
CSJ-05	HV-139F006, (HV-239F006) HV-139F007, (HV-239F007) HV-139F008, (HV-239F008) HV-139F009, (HV-239F009) 2 in., Cat. B, normally closed, Main Steam Line Outboard Bleed and Blowdown motor-operated gate valves	M-139 (M-2139)	"The MSIV-LCS outboard bleed and blowdown lines are directly connected to the main steam lines at the steam line drain. During power operations, these lines are pressurized with main steam up to the first isolation valve [HV-139F006 (HV-239F006), HV-139F008 (HV-239F008)]. Double valve isolation is provided by HV-139F007 (HV-239F007) and HV-139F009 (HV-139F009). Opening any of these valves during power operations will leave only one barrier against the release of main steam to occupied plant areas through the system piping. Maintenance of double valve isolation is desired for personnel safety considerations and for prevention of inadvertent leakage paths from the main steam lines."	Exercise valve during cold shutdowns (no more frequently than once per 92 days).
Evaluation: These are 2 in. normally closed gate valves which open intermittently to allow drainage of condensate from the Main Steam lines and which must reclose to prevent uncontrolled leakage of Main Steam outside the Primary Containment. It is impractical to part-stroke or full-stroke exercise these valves during power operation since this will leave only one barrier against the release of Main Steam to occupied plant areas, thereby increasing the potential hazard to personnel. The alternative provides full-stroke exercising during cold shutdowns in accordance with OMa-1988, Part 10, ¶4.2.1.2(c).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
NUCLEAR BOILER				
CSJ-06	HV-141F022, A, B, C, D (HV-241F022, A, B, C, D) HV-141F028 A, B, C, D (HV-241F028 A, B, C, D) 26 in., Cat. A, normally open, fail closed, air-operated, Main Steam Isolation globe valves (MSIVs)	M-141 (M-2141)	"During full power operation, it is impractical to full stroke cycle these valves, since the interruption in steam flow would induce a reactor pressure transient with increased probability of reactor scram, main steam line isolation and SRV actuation."	Full stroke testing will be performed in Operational Condition 1, 2, or 3 preceding or following a cold shutdown when power level is low enough to prevent the above mentioned transients (no more frequently than once per 92 days). No reduction from high power levels will be made specifically to accomplish this testing.

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These are the 26 in. normally open inboard and outboard Main Steam Isolation Valves which close to provide containment isolation. It is impractical to full-stroke exercise these valves closed during power operation because closure would induce a reactor pressure transient, with increased probability of reactor scram, Main Steam line isolation, and Safety/Relief Valve (SRV) actuation. However, in Generic Letter 93-05, "Line Item Technical Specifications Improvements to Reduce Surveillance Requirements for Testing During Power Operations," (Ref. 15) and its reference NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements," (Ref. 16) the NRC continued to recommend that at least a quarterly part stroke exercise closed test of the MSIVs for BWRs be performed as currently required by OMa-1988, Part 10. Additionally, the revised Standard Technical Specification for BWR4 (NUREG-1433, January 1991), 3.6.1.3.7 Bases states that the frequency of MSIV stroke time surveillance are in accordance with the requirements of the IST program, but shall not exceed 92 days. Therefore, the licensee should review their TS and investigate the practicality of part-stroke exercising these valves closed quarterly during power operation and/or revise this justification accordingly.				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
REACTOR RECIRCULATION SYSTEM				
CSJ-07	HV-143F031, A, B (HV-243F031, A, B) 28 in. Cat. B, normally open, motor-operated Reactor Recirculation Pump Discharge Isolation gate valves.	M-143 Sheet 1 (M-2143 Sheet 1)	"The recirculation pump discharge isolation valves are in the main flowpath of the reactor recirculation system which is necessary to maintain reactivity control of the reactor. Cycling of these valves during power operations would interrupt the driving core flow, possibly resulting in severe changes in core power level."	Technical Specification 4.4.1.1.1.1 provides for and controls the exercising of these valves prior to exceeding 25% power during each startup (if not completed within the previous 31 days).
Evaluation: These are the 28 in. Reactor Recirculation Pump Discharge Isolation Valves which are in the flow path of the Low Pressure Coolant Injection (LPCI) System. It is impractical to part-stroke or full-stroke exercise these valves closed during power operation because this would interrupt the reactor core recirculation flow, possibly resulting in severe changes in core power level. The alternative provides full-stroke exercising to the closed position during cold shutdowns in accordance with OMa-1988, Part 10, ¶4.2.1.2(c).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
RESIDUAL HEAT REMOVAL SYSTEM				
CSJ-08	PIVs and CIVs: HV-151F015A, (HV-251F015A) HV-151F015B, (HV-251F015B) 24 in. Cat. A, RHR Pumps A & C/ B & D to Recirculation Loops A/B, Outboard Containment Isolation normally closed motor-operated gate valves HV-151F022, (HV-251F022) HV-151F023, (HV-251F023) 6 in. Cat. A, RHR Pumps A & C to RPV Head Inboard, Outboard Containment Isolation motor-operated normally closed gate valves	M-151 Sheet 1 (M-2151 Sheet 1) M-151 Sheet 3 (M-2151 Sheet 3)	"These normally closed isolation valves serve as the pressure isolation between RHR system piping and reactor coolant pressure. In accordance with guidance presented in IE Information Notice 84-74, draft R.G. 901-4, and previous NRC concerns regarding intersystem LOCAs, cycling these valves every 92 days during power operation increases the probability of exposing the downstream low pressure piping to reactor coolant pressure (since only one valve would have to be ruptured or stuck open to expose the low pressure system to reactor coolant pressure). Maintenance history on these valves has shown that excessive cycling at pressure will reduce the leak tightness of the valves. In addition, failure of these valves during testing to positively re-seat could cause loss of RHR system function."	Exercise valves during cold shutdowns (no more frequently than once per 92 days).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
CSJ-08 (Cont'd)	HV-151F050A, (HV-251F050A) HV-151F050B, (HV-251F050B) 24 in. Cat. A/C, RHR A & C/ B & D to Recirculation Loops A/B gas-operated Inboard Containment Isolation normally closed check valves HV-151F122A, (HV-251F122A) HV-151F122B, (HV-251F122B) 1 in. Cat. A, Instrument Gas Operated normally closed Inboard Pressure Isolation globe valves for RHR check valves HV-151F050A, (HV-251F050A) HV-151F050B, (HV-251F050B)			

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These are pressure isolation valves (PIVs) between the Reactor Coolant System (RCS) and the Residual Heat Removal (RHR) System. Except for the 1 in. valves, these valves also serve as containment isolation valves (CIVs). It is impractical to part-stroke or full-stroke exercise these valves open during power operation since this will leave only one barrier against the reactor coolant pressure, thereby increasing the potential hazard to personnel and to plant safety. The alternative provides full-stroke exercising to the open and closed positions during cold shutdowns in accordance with OMa-1988, Part 10, ¶4.2.1.2(c) and 4.3.2.2(c). However, for the 24 in. Category A/C check valves, although the valves are located inside containment and it appears that the only practical means of verifying closure is by performing a seat leakage test, the licensee should revise this deferral justification to discuss the impracticality of verifying closure of these valves quarterly. Also, the complete reference for "draft R.G. 901-4" is Draft Regulatory Guide MS 901-4 (Ref. 17).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
CSJ-09	HV-151F008, HV-151F009 (HV-251F008, HV-251F009) 20 in. Cat. A, RHR Recirculation Loop B to RHR Pumps' Suction Outboard/Inboard Containment Isolation normally closed, motor-operated gate valves	M-151 Sheet 3 (M-2151 Sheet 3)	"These normally closed isolation valves are only required to open when bringing the unit to a cold shutdown condition, providing the flowpath for the shutdown cooling mode of RHR. In accordance with guidance presented in IE Information Notice 84-74, draft R.G. 901-4, and previous NRC concerns regarding intersystem LOCAs, cycling these valves every 92 days during power operation increases the probability of exposing the downstream low pressure piping to reactor coolant pressure (since only one valve would have to be ruptured or failed open to expose the low pressure system to reactor coolant pressure). During reactor operations above approximately 100 psig, interlocks inhibit cycling of these valves for the express purpose of protecting low pressure piping."	Exercise valves during cold shutdown (no more frequently than once per 92 days).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These are 20 in. motor operated gate valves which are normally closed and serve to isolate the RCS from the suction of the RHR pumps. These valves are required to open to permit the Shutdown Cooling mode of operation of the RHR system. They are required to close for containment isolation. It is impractical to part-stroke or full-stroke exercise these valves during power operation since this will leave only one barrier against the reactor coolant pressure, thereby increasing the potential hazard to personnel and to plant safety. The alternative provides full-stroke exercising during cold shutdowns in accordance with OMa-1988, Part 10, ¶4.2.1.2(c). As noted in the evaluation of CSJ-08, the compete reference for "draft R.G. 901-4" is Draft Regulatory Guide MS 901-4 (Ref. 17).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
CORE SPRAY SYSTEM				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
CSJ-10	HV-152F005A, HV-152F005B (HV-252F005A HV-252F005B) 12 in. Cat. A, Outboard CIVs on CS Pumps Inlet Lines to RPV Spray Header, normally closed, motor-operated gate valves HV-152F006A, HV-152F006B (HV-252F006A HV-252F006B) 12 in. Cat. A/C, Inboard CIVs on CS Pumps Inlet Lines to RPV Spray Header, normally closed, Instrument Gas-operated testable check valves HV-152F037A, HV-152F037B (HV-252F037A HV-252F037B) 1 in. Cat. A, Inboard PIVs, normally closed, Instrument Gas-operated globe valves for testing of 12 in. testable check valves	M-152	"These normally closed isolation valves serve as the pressure isolation between CS system piping and reactor vessel pressure. In accordance with guidance presented in IE Information Notice 84-74, draft R.G. 901-4, and previous NRC concerns regarding intersystem LOCAs, cycling these valves every 92 days during power operation increases the probability of exposing the downstream low pressure piping to reactor coolant pressure (since only one valve would have to be ruptured or failed open to expose the low pressure system to reactor coolant pressure). In addition, failure of these valves after testing to positively reseat could cause loss of Core Spray system function."	Exercise valves during cold shutdown (no more frequently than once per 92 days).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These are normally closed pressure isolation valves (PIVs) between the Core Spray (CS) System and the reactor vessel pressure. Except for the 1 in. valves, they also serve as containment isolation valves (CIVs). They are required to open during actuation of the CS System, except for the 1 in. valves which are only required to open for testing of the 12 in. testable check valves. It is impractical to part-stroke or full-stroke exercise these valves during power operation since this will leave only one barrier against the reactor coolant pressure, thereby increasing the potential hazard to personnel and to plant safety. The alternative provides full-stroke exercising during cold shutdowns in accordance with OMa-1988, Part 10, ¶4.2.1.2(c) and 4.3.2.2(c). As noted in the evaluations of CSJ-08 and CSJ-09, the compete reference for "draft R.G. 901-4" is Draft Regulatory Guide MS 901-4. (Ref. 17).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
HIGH PRESSURE COOLANT INJECTION (HPCI) SYSTEM				
CSJ-11	HV-155F006 (HV-255F006) 14 in. Cat. A, HPCI Pump Discharge Injection Line to Feedwater CIV, normally closed, motor-operated gate valve	M-155 (M-2155)	"This valve is in the HPCI injection flowpath. The interlocks on this valve prevent its being open unless the Steam Admission and Turbine Stop Valves are open. This is only possible during pump flow testing. Cycling this valve during normal plant operation or HPCI testing may lead to HPCI injection into the vessel. This would affect reactor operations and introduce a thermal transient in the vessel nozzle."	Exercise valve during cold shutdowns (no more frequently than once per 92 days).

Evaluation: This is a 14 in. normally closed valve in the HPCI flowpath on the discharge side of the HPCI pump to the reactor vessel through Feedwater Loop B. This valve is required to open during actuation of the HPCI System, and closes for containment isolation.

It is impractical to part-stroke or full-stroke exercise this valve during power operation since operation of this valve is interlocked with HPCI pump operation. Therefore, cycling this valve could cause injection of cold water from the Condensate Storage Tank to the reactor vessel, thereby affecting reactor operation and potentially causing damage to the vessel nozzle due to thermal cycling.

The alternative provides full-stroke exercising during cold shutdowns in accordance with OMa-1988, Part 10, ¶4.2.1.2(c).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
CONTAINMENT ATMOSPHERE CONTROL (CAC) SYSTEM				
CSJ-12	HV-15703 (HV-25703) HV-15704 (HV-25704) 18 in. Cat. A, Containment Atmosphere Exhaust, Outboard CIV, normally closed, air-operated butterfly valves HV-15713 (HV-25713) HV-15714 (HV-25714) 24 in. Cat. A, Containment Atmosphere Exhaust, Outboard CIV, normally closed, air-operated butterfly valves HV-15705 (HV-25705) HV-15711 (HV-25711) 2 in. Cat. A, normally closed, air-operated globe valves [Bypass of HV-15704/HV-15714 (HV-25704/HV-25714)]	M-157 Sheet 1 (M-2157 Sheet 1)	"These normally closed containment isolation valves on the containment purge inlet and exhaust lines are not opened during power operations except during startup for inerting purposes and during shutdown procedure to de-inert. It is not good practice to cycle a normally closed containment isolation valve, as this increases the possibility of failure in the open position. Technical Specification 3.6.1.8 controls and limits the amount of time these valves can be open in a one-year period."	Exercise valves at cold shutdown (no more frequently than once per 92 days).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
CSJ-12 (Cont'd)	HV-15722 (HV-25722) HV-15723 (HV-25723) 24 in. Cat. A, Containment Atmosphere Purge, Outboard CIV, normally closed, air-operated butterfly valves HV-15724 (HV-25724) HV-15725 (HV-25725) 18 in. Cat. A, Containment Atmosphere Purge, Outboard CIV, normally closed, air-operated butterfly valves HV-15721 (HV-25721) 6 in. Cat. A, Containment Atmosphere Nitrogen Purge, Outboard CIV, normally closed, air-operated butterfly valves			

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These are normally closed air-operated valves on the containment purge and exhaust lines, which are opened only during startup and shutdown. They are maintained closed during power operation, and are required to close to provide containment isolation. Technical Specification 3.6.1.8 limits operation of the drywell and suppression chamber purge system to 90 hours in each 365 days with the supply and exhaust isolation valves in one supply line and one exhaust line open for inerting, deinerting, or pressure control. In consideration of the limitation of the Technical Specification that the supply and exhaust line valves be opened for inerting, deinerting, or pressure control, but not for testing, and the increase in risk of offsite consequences if one of the valves did fail to close during testing, it is impractical to part-stroke or full-stroke exercise these valves closed during power operation. The alternative provides full-stroke exercising during cold shutdowns in accordance with OMa-1988, Part 10, ¶4.2.1.2(c).				

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
REACTOR BUILDING CHILLED WATER (RBCW) SYSTEM				
CSJ-13	HV-18791A1 (HV-28791A1) HV-18791A2 (HV-28791A2) HV-18791B1 (HV-28791B1) HV-18791B2 (HV-28791B2) 3 in. Cat. A, RBCW to/from Reactor Recirculation Pump Motor Coolers, Outboard Drywell Isolation, normally open, air-operated gate valves HV-18792A1 (HV-28792A1) HV-18792A2 (HV-28792A2) HV-18792B1 (HV-28792B1) HV-18792B2 (HV-28792B2) 3 in. Cat. A, RBCW to/from Reactor Recirculation Pump Motor Coolers, Inboard Drywell Isolation, normally open, Instrument Gas-operated butterfly valves	M-187 Sheet 2 (M-2187 Sheet 2)	"These containment isolation valves are located in the Reactor Building Chilled Water supply and return lines serving the Reactor Recirculation pump motor coolers. The closure of these valves during power operation will interrupt cooling water flow to the Reactor Recirculation motor coolers, which creates the possibility of overheating and damage."	Exercise valves during cold shutdowns (no more frequently than once per 92 days).

Table 4.1 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These are 3 in. normally open valves in the RBCW System which are in the supply and return lines for the Chilled Water to and from the Reactor Recirculation Pump motor coolers. These valves are required to close for containment isolation. It is impractical to part-stroke or full-stroke exercise these valves to the closed position during power operation because closure of these valves interrupts the flow of Chilled Water to the Reactor Recirculation pump motor coolers, thereby creating the potential for damage to the pump motors. The alternative provides full-stroke exercising to the closed position during cold shutdowns in accordance with OMa-1988, Part 10, ¶4.2.1.2(c).				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Licensee's Justification: "Closure of the subject valves for exercise testing interrupts instrument gas supply to the ADS solenoids of the Safety/Relief Valves, compromising their ability to provide the opening motive force for the ADS valves, in support of the long-term cooling ECCS function. Due to the configuration of the CIG System, depressurization and venting of sufficient pipe lines to permit closure exercise testing of these valves further interrupts instrument gas supply to several important valves inside containment, such as the Safety/Relief Valves (non-ADS relief function) and the MSIVs. This could compromise the ability of the SRV's to operate in the relief mode which, while not an ECCS function, is important to safety. Loss of instrument gas supply could also cause the MSIV's to close, resulting in a severe reactor transient if operating; or in an undesirable ESF actuation, if shut down. Loss of instrument gas supply could also cause isolation of the drywell cooling lines, resulting in a drywell temperature excursion. Testing of these check valves at every cold shutdown is not practical because it requires isolation of a line feeding 25 air operated primary containment isolation valves. Isolation of this line at any time other than at a refueling outage creates the danger of unplanned actuations of Engineered Safety Features. Additionally, 4 of these 25 air operated containment isolation valves isolate drywell cooling lines. Unplanned isolation of drywell cooling during cold shutdown could cause a containment temperature transient that could exceed the design maximum temperature of the drywell. Only during refueling outages are provisions made for temporary additional cooling of the drywell."				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These 1 in. normally open check valves provide actuating Containment Instrument Gas (CIG) to the Automatic Depressurization feature of the Main Steam Relief Valves, to the Main Steam Isolation Valves (MSIVs), and to numerous other gas-operated valves inside containment. Although these valves are in two separate trains such that CIG is supplied to each train of ADS Main Steam Relief Valves (SRVs) and to each train of MSIVs independently, loss of instrument gas in either train could cause that train's MSIVs to close, resulting in a severe reactor transient during power operations or in an undesirable actuation of the Engineered Safety Features (ESF) during cold shutdown. These valves do not have remote position indication. In accordance with OMa-1988, Part 10, ¶4.3.2.4(a), seat leakage testing is an acceptable means of verifying closure. It is impractical to perform a seat leakage test during cold shutdowns because such testing would also require the interruption of instrument gas supply to the MSIVs, resulting in possible unplanned ESF actuations. The alternative provides verification of closure capability by reverse flow seat leakage testing during refueling outages in accordance with OMa-1988, Part 10, ¶4.3.2.2(e) and 4.3.2.4(a).				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
ROJ-02	Containment Instrument Gas (CIG) Containment Isolation Valves (CIVs), Cat. A/C 126072 (226072) 1 in. normally open check valves 126074 (226074) 3 in. normally open check valves 126152 (226152) 126154 (226154) 1 in. normally open check valves 126164 (226164) 1 in. normally closed check valves	M-126 Sheet 1 (M-2126 Sheet 1)	See below.	See below.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Licensee's Justification: "These check valves serve the containment isolation function inside containment and are not equipped with remote position indicators. Downstream of the valves (inside containment) there are no pressure measurement devices or other means of remotely verifying valve position. The only practical method of closure testing involves pressurizing the downstream side and measuring pressures with temporary instrumentation. With the inerted containment, such testing can only be performed during a major outage which requires containment purging. This testing, which requires significant effort in the installation and removal of temporary equipment in the high radiation area of the containment drywell, is already performed during Category A leak rate testing. Two valves, 126152 and 126154, serve a safety function on opening as well as their containment isolation function. The open test cannot be performed as there would be no positive indication (flow measurements) of function. Operation of the equipment serviced by these valves (ADS function of the safety/relief valves) will not verify their proper opening since the accumulators at the SRV operators provide capacity for several lifts. Performing continued lifts in an attempt to verify check valve opening will increase the potential for SRV leakage or failure to reseat, will impact proper maintenance of reactor pressure control, and has the potential for degradation of the ADS function."				
Proposed Alternate Testing: Valve closure is demonstrated by completion of leak rate testing performed once per refueling outage. Commencing with the first refueling outage, verification of the opening capability of valves 126152 and 126154 will also be performed at that time with an air pressure applied through the outboard test valves (126021, 126031), opening the inboard test valves (126155, 126153), and observing essentially unrestricted flow.				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These are check valves which serve a containment isolation function. All of these valves are located inside containment, except for 126164 (226164). The valves do not have remote position indication. Check valve 126070 (226070) which is the valve inside containment corresponding to 126164 (226164) is not included in the IST Program, but appears to be a Class 2 valve, based on the piping designation on P&ID M-126 Sheet 1 (M-2126 Sheet 1). The licensee should review the classification and function of this valve and revise the IST Program as necessary. The licensee states that the only practical means of verifying closure of these valves is by performing a reverse flow seat leakage test. In accordance with OMa-1988, Part 10, ¶ 4.3.2.4(a), seat leakage testing is an acceptable means of verifying closure. It is impractical to perform a seat leakage test during power operation because the valves are located inside the containment. In addition, the containment atmosphere is inert. It is impractical to leak test these valves during cold shutdowns because the containment atmosphere is usually maintained inert. In addition, leak testing during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and cause radiation exposure to personnel, and could extend the shutdown. Valves may be tested during refueling outages if they would otherwise be tested during cold shutdown outages that require the containment atmosphere be made de-inert for performance of this testing. The NRC does not consider that making the containment atmosphere de-inert solely for the purpose of valve testing is warranted. The alternative provides exercising to the closed position at refueling outages in accordance with OMa-1988, Part 10, ¶ 4.3.2.2(e) and ¶4.3.2.4(a). It is impractical to full-stroke exercise open check valves 126152 (226152) and 126154 (226154) during power operation or cold shutdowns because the only practical method for testing these valves open is to use the test connections located inside the inerted containment. However, the licensee has not provided justification for not performing a part-stroke exercise of these valves in the open position during cold shutdowns, during ADS valve testing. The licensee should part-stroke exercise these valves open during cold shutdowns or revise and resubmit this deferral justification to discuss the impracticality of part-stroke exercising these valves open during cold shutdowns. Also, the licensee should confirm that the valves pass the required maximum accident flow during the refueling outage test, as described in Generic Letter 89-04, Position 1.				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
DIESEL GENERATORS (STARTING AIR SYSTEM)				
ROJ-03	034067A, 034067B 034067C, 034067D 034153E1, 034075A 034075B, 034075C 034075D, 034153E2 1 in. Cat. C, EDG Starting Air Receiver Tank Inlet Line, normally closed check valves	M-134, Sheet 2	"These 1 in. ball check valves, located in the inlet line to each diesel starting air receiver tank, are installed in lines that have no pressure nor airflow instrumentation and that have no provision for connecting any temporary instruments. Therefore, compliance with the code requirement is impractical because of design limitations. The only method available for closure exercise testing of these check valves is to shutoff a diesel start air compressor, coincident with opening of a test connection upstream of the check valve under test. As this procedure degrades the readiness of each train of the diesel air start subsystem, it is not practicable for performance any more frequently than refueling outage frequency (once per 18 months)."	Each check valve will be closure exercise tested once per 18 months (±3 months).

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These are 1 in. normally closed ball check valves in the Diesel Generator Starting Air system flow path. Their safety function is to close in the upstream direction upon reversal of flow, isolating the Diesel Generator Starting Air Receiver Tanks from the non-safety related air supply. The licensee states that these valves are installed in lines which have neither pressure nor airflow instrumentation nor provisions for connecting any temporary instruments; and consequently that compliance with the Code requirement is impractical because of design limitations. However, from a review of the P&ID, M-134 Sheet 2, and also from UFSAR Section 8.3 regarding Starting Air System Trouble, it appears that the starting air pressure in the Diesel Starting Air Receiver Tanks A & B is monitored at all times with annunciation provided locally and in the main control room, and that the test only involves opening a test connection valve and isolating the nonsafety related starting air compressor from the respective diesel generator. It appears that this test does not affect the operational readiness of the diesel generator itself, and would not take much time to perform, so that such testing appears to be practical. The licensee should verify the closure capability of these valves quarterly or revise the deferral justification to provide more information on the impracticality of quarterly or cold shutdown testing.				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
NUCLEAR BOILER				
ROJ-04	141F010 A & B, (241F010 A & B) 24 in. Cat. A/C, Reactor Feedwater normally open check valves	M-141 Sheet 2 (M-2141 Sheet 2)	"These check valves remain open maintaining the flow path to the vessel whenever the feedwater/condensate, HPCI or RCIC systems are providing makeup to the vessel or when Reactor Water Cleanup is returning flow to the vessel. Due to the necessity of maintaining this flow path in virtually all modes of operation, closure testing is only practical during extended outages such as refuelings during which these systems are shutdown. Also, plant design does not provide a practical means of demonstrating closure other than by upstream pressurization performed during leak rate testing. This testing involves significant effort for installation of temporary equipment, and requires complete purging of the inerted reactor containment."	Proper valve closure will be verified by completion of leak rate testing performed once per refueling outage.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These are the normally open 24 in. Reactor Feedwater check valves which must remain open during power operation. The valves are required to close for containment isolation. According to the Valve Program Tables and the P&IDs, these valves do not have remote position indication. The licensee states that the only practical means of verifying closure of these valves is by performing a seat leakage test. In accordance with OMa-1988, Part 10, ¶ 4.3.2.4(a), seat leakage testing is an acceptable means of verifying closure. It is impractical to perform a seat leakage test during power operation because this would require entry inside containment. In addition, the containment atmosphere is inert. It is impractical to leak test these valves during cold shutdowns because the containment atmosphere is usually maintained inert. In addition, leak testing during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and cause radiation exposure to personnel, and could extend the shutdown. Valves may be tested during refueling outages if they would otherwise be tested during cold shutdown outages that require the containment atmosphere be made de-inert for performance of this testing. The NRC staff does not consider that making the containment atmosphere de-inert solely for the purpose of valve testing is warranted. The alternative provides verification of closure capability by reverse flow seat leakage testing during refueling outages in accordance with OMa-1988, Part 10, ¶4.3.2.2(e) and 4.3.2.4(a).				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
ROJ-05	141F024A (241F024A) 141F024B (241F024B) 141P024C (241P024C) 141F024D (241F024D) 141F029A (241F029A) 141F029B (241F029B) 141F029C (241F029C) 141F029D (241F029D) 1 in. Cat. C, CIG to MSIV Accumulator Inlet Line check valves	M-141 Sheet 1, (M-2141 Sheet 1)	See below.	See below.

Licensee's Justification: "These check valves, located in MSIV accumulator inlet (air) lines provide Containment Instrument Gas System and Instrument Air System gas flow into their respective MSIV accumulators, while preventing flow of gas stored in the MSIV accumulator in the reverse direction, during closure of their respective MSIV's at the onset of a LOCA. Plant configuration and exclusion of personnel from the purged drywell during operation preclude completion of closure exercise testing throughout the period of each plant operating cycle. Any exercise testing of these check valves requires or causes closure of the associated MSIVs, rendering it impractical except during refueling outages. The design basis of these check valves for the inboard MSIVs is established by PP&L Calculations M-MSS-025 and M-MSS-028, from which testing appropriate to their safety function is derived.

Exercise testing of these check valves requires both access to each MSIV accumulator and that the MSIV associated with each check valve tested remain closed throughout the test to prevent unplanned actuations of Engineered Safety Features. As the primary containment is not opened and entered during every cold shutdown and as plant configuration does not always support MSIV closure while primary containment entry is in progress, exercise testing of these check valves is not practical at every cold shutdown, and can be performed safely and reliably only during each refueling outage."

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Proposed Alternate Testing: Demonstrate closure of each MSIV accumulator check valve by monitoring the essential restriction of its reverse flow of gas, through measurement of the rate of decay of pressure in its respective MSIV accumulator (downstream of the check valve under test) once per refueling outage. This MSIV accumulator pressure decay test provides verification of the closure of the inlet check valve.				
Evaluation: These 1 in. check valves which are intermittently open have a safety function to close to prevent reverse flow of CIG or Instrument Air out through the MSIV accumulator inlet (gas or air) supply lines to the valve operator accumulators. According to the Valve Program Tables and the P&IDs, these valves do not have remote position indication. The licensee's proposed alternate testing for quarterly full-stroke exercising of these valves is to perform a reverse flow seat leakage test. In accordance with OMa-1988, Part 10, ¶ 4.3.2.4(a), seat leakage testing is an acceptable means of verifying closure. It is impractical to perform a seat leakage test during power operation because performing a seat leakage test would require entry inside containment. In addition, the containment atmosphere is inert. It is impractical to leak test these valves during cold shutdowns because the containment atmosphere is usually maintained inert. In addition, leak testing during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and cause radiation exposure to personnel, and could extend the shutdown. Valves may be tested during refueling outages if they would otherwise be tested during cold shutdown outages that require the containment atmosphere be made de-inert for performance of this testing. The NRC staff does not consider that making the containment atmosphere de-inert solely for the purpose of valve testing is warranted. The alternative provides verification of closure capability by reverse flow seat leakage testing during refueling outages in accordance with OMa-1988, Part 10, ¶4.3.2.2(e) and 4.3.2.4(a).				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
ROJ-06	141F036A (241F036A) 141F036B (241F036B) 141F036C (241F036C) 141F036D (241F036D) 141F036E (241F036E) 141F036F (241F036F) 141F036G (241F036G) 141F036H (241F036H) 141F036J (241F036J) 141F036K (241F036K) 141F036L (241F036L) 141F036M (241F036M) 141F036N (241F036N) 141F036P (241F036P) 141F036R (241F036R) 141F036S (241F036S) 141F040G (241F040G) 141F040J (241F040J) 141F040K (241F040K) 141F040L (241F040L) 141F040M (241F040M) 141F040N (241F040N) 1 in. Cat. C, check valves on CIG Inlet Lines to Main Steam Relief Valve Accumulators Class 3	M-141 Sheet 1 (M-2141 Sheet 1)	"These check valves, located in SRV accumulator inlet (air) lines provide Containment Instrument Gas System gas flow into their respective SRV accumulators, while preventing flow of gas stored in the SRV accumulator in the reverse direction during opening of SRV's in either the ADS mode or the manually controlled, relief mode. Plant configuration and exclusion of personnel from the purged drywell during operation preclude completion of closure exercise testing throughout the period of each operating cycle. Exercise testing of these check valves requires access to each SRV accumulator. As the primary containment is not opened and entered during every cold shutdown, exercise testing of these check valves is not practical at every cold shutdown, and can be performed safely and reliably only during each refueling outage."	Demonstrate closure of each SRV accumulator check valve by monitoring the essential restriction of its reverse flow of gas, through measurement of the rate of decay of pressure in its respective SRV accumulator (downstream of the check valve under test) once per refueling outage. This SRV accumulator pressure decay test provides verification of the closure of the inlet check valve.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These 1 in. check valves have a safety function to close to prevent reverse flow out through the SRV accumulators' inlet (air) lines. According to the Valve Program Tables, these valves do not have remote position indication. The licensee's proposed alternate testing for quarterly full-stroke exercising of these valves is to perform a reverse flow seat leakage test. In accordance with OMa-1988, Part 10, ¶4.3.2.4(a), seat leakage testing is an acceptable means of verifying closure. It is impractical to perform a seat leakage test during power operation because interruption of CIG flow to the Main Steam Safety Relief Valves (MS SRVs) accumulators could cause the MSIVs to close. Furthermore, performing a seat leakage test would require entry inside containment. In addition, the containment atmosphere is inert. It is impractical to leak test these valves during cold shutdowns because the containment atmosphere is usually maintained inert. In addition, leak testing during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and cause radiation exposure to personnel, and could extend the shutdown. Valves may be tested during refueling outages if they would otherwise be tested during cold shutdown outages that require the containment atmosphere be made de-inert for performance of this testing. The NRC staff does not consider that making the containment atmosphere de-inert solely for the purpose of valve testing is warranted. The alternative provides verification of closure capability by reverse flow seat leakage testing during refueling outages in accordance with OMa-1988, Part 10, ¶4.3.2.2(e) and 4.3.2.4(a).				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
NUCLEAR BOILER				
ROJ-07	HV-141F032A (HV-241F032A) RCIC Flowpath thru Feedwater System HV-141F032B (HV-241F032B) HPCI Flowpath thru Feedwater System 24 in. Cat. A/C, normally open, motor-operated stop check valves	M-141 Sheet 2 (M-2141 Sheet 2)	"a. These check valves remain open maintaining the flowpath to the vessel whenever the feedwater/ condensate systems are providing makeup to the vessel. Interruption of the feedwater flowpath by motor operator closure of these valves can only be practically accomplished during cold shutdowns. b. No practical means other than upstream pressurization similar to leak rate testing is available to demonstrate valve closure as check valves."	a. Cycle valves shut using stop-check motor operators during cold shutdowns (no more frequent than once per 92 days). b. Closure testing as check valves will be demonstrated by completion of leak rate testing to be performed once per refueling outage.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These 24 in. normally open stop check valves must open or remain open to provide or maintain Feedwater/Condensate system flow to the reactor vessel. These valves must close for containment isolation and to prevent diversion of RCIC/HPCI flow away from the reactor vessel. It is impractical to close these valves during power operation to demonstrate part-stroke or full-stroke open exercising because flow of Feedwater to the reactor vessel would be interrupted. The alternative provides full-stroke exercising to the open position during cold shutdowns in accordance with OMa-1988, Part 10, ¶4.2.1.2(c) and 4.3.2.2(c). The licensee states that the only practical means of verifying closure of these valves is to perform a reverse flow seat leakage test. In accordance with OMa-1988, Part 10, ¶4.3.2.4(a), seat leakage testing is an acceptable means of verifying closure. It is impractical to perform a seat leakage test during power operation because this would require interruption of Feedwater flow to the reactor vessel. Furthermore, performing a seat leakage test would require entry inside containment. In addition, the containment atmosphere is inert. It is impractical to leak test these valves during cold shutdowns because the containment atmosphere is usually maintained inert. In addition, leak testing during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial man-hours and cause radiation exposure to personnel, and could extend the shutdown. Valves may be tested during refueling outages if they would otherwise be tested during cold shutdown outages that require the containment atmosphere be made de-inert for performance of this testing. The NRC staff does not consider that making the containment atmosphere de-inert solely for the purpose of valve testing is warranted. The alternative provides verification of closure capability by reverse flow seat leakage testing during refueling outages in accordance with OMa-1988, Part 10, ¶4.3.2.2(e) and 4.3.2.4(a).				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
NUCLEAR BOILER VESSEL INSTRUMENTATION				
ROJ-08	142032 (242032), 142044 (242044), 142059 (242059), 142071 (242071), 142033 (242033), 142045 (242045), 142060 (242060), 142072 (242072) 3/8 in., non-ASME Code Class, Cat. A/C, CRDH check valves for Reactor Water Level instrumentation backfill lines	M-142 Sheet 2 (M-2142 Sheet 2)	See below.	Demonstrate closure of each check valve in the reactor water level instrumentation backfill lines and demonstrate reverse flow leakage of each check valve less than its limit once per refueling outage.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Licensee's Justification: "These check valves, located in backfill lines for the reactor water level instrumentation, provide Control Rod Drive Hydraulic System water flow into their respective instrument line reference legs, while preventing flow of instrument line water inventory in the reverse direction. To support the continued integrity of the reactor water level instrumentation during accident conditions, these check valves have been assigned a very small reverse flow leakage limit (0.5 lbm/hr) by PP&L. These check valves have been designed for periodic removal from their system and bench testing of their reverse flow leakage, to facilitate the demonstration that they meet their unusually small leakage limit. Removal of these check valves from the system for exercise testing and leakage testing on a test bench is not practical during periods of plant operation nor during periods of plant cold shutdown because their isolation for removal and testing causes loss of some reactor water level indication in the control room and creates the potential for actuation of Engineered Safety Features (ESF's) associated with each of the instrument lines being isolated. Loss of control room indication of reactor water level on some instruments is acceptable and prevention of unplanned ESF actuations is possible only during refueling outages. Further, removal, testing, and reinstallation of the check valves produces a risk of introducing air into the reference leg piping. As the purpose of this equipment is prevention of gas entertainment in the reference leg piping, removal, testing, and reinstallation of the check valves may be attempted only during refueling outages."				
Evaluation: These 3/8 in. check valves prevent reverse flow of Control Rod Drive Hydraulic water out through the backfill line for the Reactor Water Level instrumentation. These are non-Code Class valves which perform a safety function. Therefore, no evaluation is required.				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
REACTOR RECIRCULATION				
ROJ-09	143F013 A & B, (243F013 A & B) 1 in. Cat. A/C, normally open, CRDH line to Reactor Recirculation Pump seal check valves	M-143 Sheet 2 (M-2143 Sheet 2)	"These simple check valves serve as containment isolation valves inside containment. The valves are not equipped with remote indication and there is no pressure indication downstream of the valves. For these valves, closure testing is only practical through pressurization downstream of the valve with the upstream piping vented, and verification of the absence of flow upstream. Interruption of the CRD flow (seal purge) during Reactor Recirculation Pump operation to perform this testing could result in seal damage. This type of testing can only be performed during a period when the containment is accessible. The deinerting of the containment will only be performed during major outages and the testing will be performed during local leak rate testing."	Valve closure is demonstrated by completion of leak rate testing performed once per refueling outage.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These 1 in. normally open check valves in the Control Rod Drive Hydraulic lines to the Reactor Recirculation Pump seals are required to close for containment isolation. These valves do not have remote position indication. The licensee states that the only practical means of verifying closure of these valves is to perform a reverse flow seat leakage test. In accordance with OMa-1988, Part 10, ¶4.3.2.4(a), seat leakage testing is an acceptable means of verifying closure. It is impractical to perform a seat leakage test during power operation because this would require interruption of CRD seal purge flow to the Reactor Recirculation Pump seals, which could result in damage to the seals. Furthermore, performing a seat leakage test would require entry inside containment. In addition, the containment atmosphere is inert. It is impractical to leak test these valves during cold shutdowns because the containment atmosphere is usually maintained inert. In addition, leak testing during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and cause radiation exposure to personnel, and could extend the shutdown. Valves may be tested during refueling outages if they would otherwise be tested during cold shutdown outages that require the containment atmosphere be made de-inert for performance of this testing. The NRC staff does not consider that making the containment atmosphere de-inert solely for the purpose of valve testing is warranted. The alternative provides verification of closure capability by reverse flow seat leakage testing during refueling outages in accordance with OMa-1988, Part 10, ¶4.3.2.2(e) and 4.3.2.4(a).				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
ROJ-10	XV-143F017 A & B, (XV-243F017 A & B) 1 in. Cat. A/C, CRD to Reactor Recirculation Pump normally open excess flow check valves	M-143 Sheet 2 (M-2143 Sheet 2)	"Closure testing of these excess flow check valves involves depressurization of the CRD system side of the valves and verification that the valve will close and stop excess flow. Such actions require interruption of seal water to the recirculation pumps, which creates a potential for pump seal damage; disruption of CRD Hydraulic System flow; and installation of temporary equipment."	Closure testing will be demonstrated by completion of leak rate testing to be performed once per refueling outage.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These are 1 in. normally open Control Rod Drive to the Reactor Recirculation Pumps excess flow check valves which are required to close in the upstream direction for containment isolation and in the downstream direction to prevent excess flow. Although, according to the Valve Program Tables, these valves do have remote position indication, the licensee states that the only practical means of verifying closure of these valves is to perform a seat leakage test because closure testing involves depressurization of the CRD system side of the valves. In accordance with OMa-1988, Part 10, ¶4.3.2.4(a), seat leakage testing is an acceptable means of verifying closure. It is impractical to perform a seat leakage test during power operation because this would require interruption of CRD flow to the Reactor Recirculation Pump seals, which could result in damage to the seals. Furthermore, performing a seat leakage test would require entry inside containment. In addition, the containment atmosphere is inert. It is impractical to leak test these valves during cold shutdowns because the containment atmosphere is usually maintained inert. In addition, leak testing during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and cause radiation exposure to personnel, and could extend the shutdown. Valves may be tested during refueling outages if they would otherwise be tested during cold shutdown outages that require the containment atmosphere be made de-inert for performance of this testing. The NRC staff does not consider that making the containment atmosphere de-inert solely for the purpose of valve testing is warranted. The alternative provides verification of closure capability by reverse flow seat leakage testing during refueling outages in accordance with OMa-1988, Part 10, ¶4.3.2.2(e) and 4.3.2.4(a). Since excess flow check valves typically are not provided with remote position indication, the licensee should verify whether such a feature exists for these valves.				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
STANDBY LIQUID CONTROL				
ROJ-11	HV-148F006 (HV-248F006) 1.5 in. Cat. A/C, SLC Injection line, normally open, motor-operated stop check valve	M-148 (M-2148)	"To verify proper opening of this stop-check valve, it is necessary to pass fluid through the valve. This action would result in an injection into the reactor vessel and would require actuation of an explosive valve. Both actions are undesirable during power operations. Closure testing as a motor-operated stop-check valve during power operations presents the danger of having the disc stick in the closed position, blocking the only SLC injection flowpath, with no means of detecting the failure."	The proper functioning of the Standby Liquid Control System injection flowpath, including opening of HV-148F006 (HV-248F006), will be demonstrated once per 18 months in accordance with Technical Specification Section 4.1.5.d. Closure testing of the valve by motor operator will be performed just prior to the injection testing once per 18 months.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: This is a 1.5 in. normally open stop check valve outside containment on the common injection line from the SLC pumps to the reactor vessel. The valve is required to open for the SLC function and is required to close for containment isolation. The valve operator has remote position indication. It is impractical to part-stroke or full-stroke exercise this valve open during power operation because this would require injection of highly borated SLC fluid into the reactor vessel, possibly causing a plant transient. It is impractical to exercise this valve closed using the motor operator during power operation because this could potentially disable both trains of SLC if the valve failed in the closed position since there is no means of detecting the failure. However, the licensee has provided no justification for not performing either a part-stroke or full-stroke exercise test to the open position during cold shutdowns, nor has the licensee provided justification for not performing an exercise closed test during cold shutdowns. Therefore, the licensee should full-stroke exercise this valve open during cold shutdown and exercise this valve closed during cold shutdowns, or revise and resubmit this deferral justification accordingly.				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
ROJ-12	148F007 (248F007) 1.5 in. Cat A/C normally closed SLC injection line check valve	M-148 (M-2148)	"To verify proper opening of this check valve, it is necessary to pass fluid through the valve. This action would result in an injection into the vessel and would require actuation of an explosive valve, both undesirable during power operations. Closure testing is only practical by pressurizing downstream of the valve (the upstream side being vented) and verifying absence of flow in the upstream side. This requires installation of temporary equipment and access to the containment which is inerted during power operation."	The proper functioning of the Standby Liquid Control System injection flowpath, including opening of 148F007 (248F007), will be demonstrated once per 18 months in accordance with Technical Specification Section 4.1.5.d. Valve closure is demonstrated by completion of leak rate testing performed once per 18 months.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: This is a 1.5 in. normally closed check valve inside containment on the common injection line from the SLC pumps to the reactor vessel. The valve is required to open for the SLC function and is required to close for containment isolation. It is impractical to part-stroke or full-stroke exercise this valve open during power operation because this would require injection of highly borated SLC fluid into the reactor vessel, possibly causing a plant transient. However, the licensee has provided no justification for not performing either a part-stroke or full-stroke exercise test to the open position during cold shutdowns using existing test connections. Therefore, the licensee should full-stroke exercise this valve open during cold shutdowns, or revise and resubmit this deferral justification accordingly. The licensee states that the only practical means of verifying closure is by performing a reverse flow seat leakage test. In accordance with OMa-1988, Part 10, ¶4.3.2.4(a), seat leakage testing is an acceptable means of verifying closure. It is impractical to perform a seat leakage test during power operation because this would require entry inside containment. In addition, the containment atmosphere is inert. It is impractical to leak test these valves during cold shutdowns because the containment atmosphere is usually maintained inert. In addition, leak testing during cold shutdowns would be burdensome to the licensee due to the extensive test setup, which would require substantial manhours and cause radiation exposure to personnel, and could extend the shutdown. Valves may be tested during refueling outages if they would otherwise be tested during cold shutdown outages that require the containment atmosphere be made de-inert for performance of this testing. The NRC staff does not consider that making the containment atmosphere de-inert solely for the purpose of valve testing is warranted. The alternative provides verification of closure capability by reverse flow seat leakage testing during refueling outages in accordance with OMa-1988, Part 10, ¶4.3.2.2(e) and 4.3.2.4(a).				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
REACTOR CORE ISOLATION COOLING (RCIC)				
ROJ-13	149F028 (249F028) 2 in. Cat. A/C, RCIC Vacuum Pump Discharge line normally closed check valve 149F040 (249F040) 10 in. Cat. A/C, RCIC Turbine Exhaust line normally closed check valve 149F021 (249F021) 2 in. Cat. A/C, RCIC Pump Discharge line to Suppression Pool normally closed check valve	M-149 (M-2149)	"These check valves are not equipped with position indication and system design does not provide any practical method of verifying closure other than pressurization similar to leak rate testing. Such testing requires installation of temporary equipment which is impractical on a quarterly basis, and it would render the RCIC system inoperable during the testing period. While RCIC is not an ECCS system, it is important to safety and can provide an additional margin for prevention or mitigation of reactor transients. Normally, testing of this type is accomplished by required containment local leak rate testing in accordance with 10CFR50, Appendix J. More frequent performance represents an unnecessary burden on the licensee."	Demonstrate closure by completion of leak rate testing performed once per refueling outage.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These normally closed RCIC System check valves are all located outside containment. They are required to close for containment isolation. These valves do not have remote position indication. The licensee states that the only practical means of verifying closure of these valves is by performing a reverse flow seat leakage test. There are test connections located upstream and downstream of these valves with which to perform a seat leakage test. In accordance with OMa-1988, Part 10, ¶4.3.2.4(a), seat leakage testing is an acceptable means of verifying closure. If no other practical means are available, it is acceptable to verify that check valves are capable of closing by performing leak-rate testing, such as local leak rate testing in accordance with 10 CFR 50 Appendix J at each reactor refueling outage. Recognizing that the setup and performance limitations may render leak testing impractical during power operation and cold shutdown outages, the NRC has determined that it is acceptable to defer backflow testing of a check valve which can only be tested by performing a leak test, when test equipment setup is necessary, to a refueling outage. Therefore, the alternative provides verification of closure capability by reverse flow seat leakage testing during refueling outages in accordance with OMa-1988, Part 10, ¶4.3.2.2(e) and 4.3.2.4(a).				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
ROJ-14	149F063 (249F063) 149F064 (249F064) 2 in., Cat. C, normally closed RCIC Turbine Exhaust to Containment vacuum breaker check valves	M-149 (M-2149)	"These vacuum breakers installed on the RCIC turbine exhaust line are not provided with position indication equipment nor is there pressure indication installed that would provide positive verification of valve operation. A practical method of testing involves supplying low pressure air upstream of the valve and verifying that flow can be detected downstream of the valve. This test method involves installation of temporary equipment and is not practical except during major outages, and it would render the RCIC system inoperable during the testing period. While RCIC is not an ECCS system, it is important to safety and can provide an additional margin for prevention or mitigation of reactor transients. More frequent performance represents an unnecessary burden on the licensee."	Demonstrate opening once per refueling outage in conjunction with leak rate testing.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These are 2 in. normally closed vacuum breaker check valves on the RCIC Turbine Exhaust Line to the Containment. They are required to open to prevent water from the Suppression Pool from being siphoned into the exhaust line. These valves do not have remote position indication. All of these valves are located outside containment, have test connections upstream and downstream of each valve, and are capable of being isolated by motor-operated isolation valves. The licensee states that the only practical means of exercising these valves open is by supplying low pressure air upstream of the valves and verifying that flow can be detected downstream of the valves, and that such testing is performed at refueling outages in conjunction with reverse flow seat leakage testing of these valves. If no other practical means are available, it is acceptable to verify that check valves are capable of closing by performing leak-rate testing, such as local leak rate testing in accordance with 10 CFR 50 Appendix J at each reactor refueling outage. Recognizing that the setup and performance limitations may render leak testing impractical during power operation and cold shutdown outages, the NRC has determined that it is acceptable to defer backflow testing of a check valve which can only be tested by performing a leak test, when test equipment setup is necessary, to a refueling outage. Similar reasoning could be applied to the forward flow test in question. However, simply stating that installing temporary equipment is impractical is not adequate justification. The licensee must provide additional information on the impracticality of testing quarterly, including the length of time the RCIC system would be inoperable to perform the test versus the Limiting Condition of Operation. Additionally, there are licensees of other BWR units, e.g., FitzPatrick, who perform a similar open exercise of these valves during cold shutdowns (Ref. 18). Therefore, the licensee should revise this deferral justification to discuss the impracticality of exercising these valves open quarterly or during cold shutdowns.			

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
HIGH PRESSURE COOLANT INJECTION (HPCI)				
ROJ-15	155F049 (255F049) 20 in., Cat. A/C, normally closed HPCI Turbine Exhaust to Suppression Pool check valve 155F046 (255F046) 4 in., Cat. A/C, normally closed HPCI Pump Discharge to Suppression Pool check valve	M-155 (M-2155)	"This valve is not equipped with position indication. Its configuration with an open discharge into the suppression pool prevents usage of reverse flow to demonstrate closure. No practical method exists to perform closure testing other than the downstream pressurization of leak rate testing. Such testing requires installation of temporary equipment and closure of valves which renders the system inoperable."	Demonstrate closure once per refueling outage by completion of leak rate testing.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These normally closed HPCI System check valves are located outside containment. They are required to close for containment isolation. These valves do not have remote position indication. The licensee states that the only practical means of verifying closure of these valves is by performing a reverse flow seat leakage test. There are test connections located upstream and downstream of these valves with which to perform a seat leakage test. In accordance with OMa-1988, Part 10, ¶4.3.2.4(a), seat leakage testing is an acceptable means of verifying closure. If no other practical means are available, it is acceptable to verify that check valves are capable of closing by performing leak-rate testing, such as local leak rate testing in accordance with 10 CFR 50 Appendix J at each reactor refueling outage. Recognizing that the setup and performance limitations may render leak testing impractical during power operation and cold shutdown outages, the NRC has determined that it is acceptable to defer backflow testing of a check valve which can only be tested by performing a leak test, when test equipment setup is necessary, to a refueling outage. Therefore, the alternative provides verification of closure capability by reverse flow seat leakage testing during refueling outages in accordance with OMa-1988, Part 10, ¶4.3.2.2(e) and 4.3.2.4(a).				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
ROJ-16	155F076 (255F076) 155F077 (255F077) 3 in. Cat. C, normally closed HPCI Turbine Exhaust to Containment vacuum breaker check valves	M-155 (M-2155)	"These vacuum breakers installed on the HPCI turbine exhaust line are not provided with position indication equipment nor is there pressure indication installed that would provide positive verification of valve operation. A practical method of testing involves supplying low pressure air upstream of the valves and verifying that flow can be detected downstream of the valve. This test method involves installation of temporary equipment and is not practical except during major outages. Its implementation would also require temporary removal of the HPCI System from service."	Demonstrate opening once per refueling outage in conjunction with leak rate testing.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These are 3 in. normally closed Vacuum Breaker check valves on the HPCI Turbine Exhaust Line to the Containment. These valves do not have remote position indication. They are required to open to prevent water from the Suppression Pool from being siphoned into the exhaust line. These valves do not have remote position indication. All of these valves are located outside containment, have test connections upstream and downstream of each valve, and are capable of being isolated by motor-operated isolation valves. The licensee states that the only practical means of exercising these valves open is by supplying low pressure air upstream of the valves and verifying that flow can be detected downstream of the valves, and that such testing is performed at refueling outages in conjunction with reverse flow seat leakage testing of these valves. If no other practical means are available, it is acceptable to verify that check valves are capable of closing by performing leak-rate testing, such as local leak rate testing in accordance with 10 CFR 50 Appendix J at each reactor refueling outage. Recognizing that the setup and performance limitations may render leak testing impractical during power operation and cold shutdown outages, the NRC has determined that it is acceptable to defer backflow testing of a check valve which can only be tested by performing a leak test, when test equipment setup is necessary, to a refueling outage. Similar reasoning could be applied to the forward flow test in question. However, simply stating that installing temporary equipment is impractical is not adequate justification. The licensee must provide additional information on the impracticality of testing quarterly, including the length of time the HPCI system would be inoperable to perform the test versus the Limiting Condition of Operation. Additionally, there are licensees of other BWR units, e.g., FitzPatrick, who perform a similar open exercise of these valves during cold shutdowns (Ref. 18). Therefore, the licensee should revise this deferral justification to discuss the impracticality of exercising these valves open quarterly or during cold shutdowns.				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
CONTROL STRUCTURE CHILLED WATER (CSCW) AND EMERGENCY SERVICE WATER (ESW)				
ROJ-17	086018, 086118 6 in., Cat. C, Emergency Condenser Water Circulating (ECWC) Pumps A/B discharge (normally closed) check valves 086039, 086139 6 in., Cat. C, Chilled Water Loop Circulating (CWLC) Pumps A/B discharge (normally open) check valves 111144, 111145 8 in., Cat. C, ESW to Control Structure Chiller A/B (normally closed) inlet check valves	M-186 Sheet 1 (M-2186 Sheet 1) M-186 Sheet 2 (M-2186 Sheet 2) M-111 Sheet 2 (M-2111 Sheet 2)	See below.	See below.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Licensee's Justification: "The ultimate function of these valves is providing chilled water to the cooling coils of the Control Structure HVAC system. Rather than individually testing each valve for proper functioning, operation of the chilled water loop with cooling supplied by the emergency condenser loop (cooled by ESW) provides a functional system test which is indicative of proper operation of all system components. As this is an auxiliary support system rather than a water-supply system, this testing provides more meaningful results than individual valve testing. Individual exercise testing of the check valves in these subsystems is not feasible. System interlocks require initiation and startup of circulating pumps and/or chiller, after which the valves automatically actuate . Check valves 086018 and 086118 are installed in the emergency condenser water circulating pump discharge line of each chiller. Check valves 111144 and 111145 are installed in the Emergency Service Water supply line to the emergency condenser of each chiller. Flow through each of these lines is controlled by a temperature control valve, whose internal geometry reduces flow through the line as cooling water temperature decreases below its straight-through full flow setpoint. Maximum required accident condition flow of 740 gpm through each line is normally achieved only once each 18 month period, during performance of Emergency Service Water System flow balancing, by defeating electrical control of each of the temperature control valves. Check valves 086039 and 086139 are installed in each chilled water pump discharge line. Each line has a permanently installed flow rate instrument, with an uninstrumented 2" line coming off upstream of the flow instrument to service the Unit 1 Emergency Switchgear Rooms Cooling load. Adequacy of design flow through these lines is measured and confirmed once each 18 month period, during Unit 1 Emergency Switchgear Rooms Cooling Subsystem flow balancing."				
Alternate Testing: As part of each quarterly chilled water flow verification test, monitor the chilled water loop chiller discharge temperature and verify that the specified discharge temperatures are maintained. In conjunction with this testing perform "partial" opening exercise tests of check valves 086018, 086039, 086118, 086139, 111144 and 111145. In conjunction with Emergency Service Water System Flow Balance Testing, conducted at least once each 18 month period, perform "full" opening exercise tests of check valves 086018, 086118, 111144 and 111145. In conjunction with Unit 1 Emergency Switchgear Rooms Cooling Subsystem flow balancing, conducted at least once each 18 month period, perform "full" opening exercise tests of check valves 086039 and 086139.				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: 6 in. check valves 086018 and 086118 are normally closed valves on the discharge lines of the Emergency Condenser Water Circulating (ECWC) pumps A and B. 6 in. check valves 086039 and 086139 are normally open valves on the discharge lines of the Chilled Water Loop Circulating (CWLC) pumps A and B. 8 in. check valves 111144 and 111145 are normally closed valves on the Emergency Service Water (ESW) inlet lines to the Control Structure Chillers A and B. The licensee is proposing that a "partial" flow individual test of each of these valves is performed quarterly through the monitoring of the Chilled Water Loop Chiller discharge temperature. It is impractical to full-stroke exercise these valves open to the maximum required accident condition flow of 740 GPM quarterly or during cold shutdowns because such testing requires defeating electrical control of each of the respective temperature control valves. Such testing is normally performed only every 18 months, during performance of the Emergency Service Water System flow balancing testing. A full flow test of valves 086018 and 086118 on the discharge of the ECWC pumps can be performed every 18 months (at refueling outages) by direct reading of the flow instrumentation on the discharge side of the ECWC pumps. However, from a review of the P&IDs, it is not apparent how the flow rate through the remaining valves is determined during the Emergency Service Water System and Emergency Switchgear Rooms Cooling Subsystem flow balancing conducted during refueling outages. In the Public Meeting Minutes for Generic Letter 89-04, Question Group 2, the NRC states that a flow test through parallel lines without individual flow measurement may not be sufficient to indicate that check valves in the lines are full-stroke exercised. Licensees are advised to consider using nonintrusive techniques in conjunction with flow testing. Therefore, for valves 086018 and 086118, the alternative provides part-stroke exercising to the open position quarterly and full-stroke exercising to the open position at refueling outages in accordance with OMa-1988, Part 10, ¶ 4.3.2.2(b) and 4.3.2.2(e). However, for valves 086039, 086139, 111144 and 111145, the licensee should verify that flow through these valves can be measured, or revise this deferral request accordingly.				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
KEEPFILL LINES FROM CONDENSATE TRANSFER SYSTEM TO RCIC, RHR, CORE SPRAY, HPCI, ESW/CSCW				
ROJ-18	All 2 in. Cat. C, Keepfill check valves: 149015 (249015) RCIC 151F089A (251F089A) 151F089B (251F089B) 151F090A (251F090A) 151F090B (251F090B) RHR 152F029A (251F029A) 152F029B (251F029B) 152F030A (252F030A) 152F030B (252F030B) Core Spray 155012 (255012) HPCI 086241, 086341 ESW/CSCW (Unit 1) 211165A, 211165B ESW (Unit 2)	M-149 (M-2149) M-151 Sheet 1 (M-2151 Sheet 1) M-151 Sheet 3 (M-2151 Sheet 3) M-152 (M-2152) M-155 (M-2155) M-186 Sheet 1 (M-2186 Sheet 1) M-186 Sheet 2 (M-2186 Sheet 2)	See below.	See below.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Licensee's Justification: "The check valves located in keepfill lines for the RHR, Core Spray, RCIC and HPCI Systems provide Condensate Transfer System water flow into their respective headers, while preventing flow of process water in the reverse direction, during operation of the respective ECCS System. In the RHR, RCIC and HPCI Systems, test connections exist between the two tandem check valves existing in each line, while in the Core Spray System, a single test connection exists upstream of both check valves, which are located very close together. These configurations allow individual testing of the downstream check valve in the RHR, RCIC and HPCI Systems, but support only dual testing of each pair of Core Spray System check valves in combination. Using these test connections in RHR, Core Spray, RCIC and HPCI to monitor essential restriction of reverse flow involves collecting radioactively contaminated seepage while the process system is pressurized, as during flow testing. This creates the potential for spills and spread of contamination. The increase in potential for water hammer in these systems due to isolation of keep fill lines during testing, the increase in personnel radiation exposure required to perform this testing during plant operation, and the increase in potential for contamination of personnel and equipment through this testing justify reduced frequency. The stainless steel construction of each check valve and the series configuration of each pair of check valves reduce the probability of failure to restrict reverse flow through any keepfill line. The relatively small size of each keepfill line minimizes the impact of any such failure. The combination of these mitigating factors warrant reduction in testing frequency. The single check valves located in the keepfill lines for the CSCW System provide Service Water System flow into their respective headers, while preventing flow of process water in the reverse direction, during operation of ESW System. Test connections upstream of each check valve support testing of its reverse flow individually. Using these test connections in ESW to monitor essential restriction of reverse flow involves collecting raw service water seepage, which has the potential to chemically contaminate and degrade the operation of the plant Liquid Radwaste System. The stainless steel construction of each check valve reduces the probability of failure to restrict reverse flow through any keepfill line. The relatively small size of each keepfill line minimizes the impact of any such failure. The combination of these mitigating factors warrant reduction in testing frequency."			

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Proposed Alternate Testing: Demonstrate closure of each check valve in the keepfill lines of the RHR, RCIC and HPCI Systems by monitoring the essential restriction of its reverse flow, through its upstream test connection, once per refueling outage while the process system is pressurized, as during flow testing. Demonstrate closure of at least one of the two check valves in each pair in the keepfill lines of the Core Spray System by monitoring the essential restriction of their reverse flow, through their upstream test connections, once per refueling outage while the process system is pressurized, as during flow testing. Demonstrate closure of each check valve in the keepfill lines of the CSCW System by monitoring the essential restriction of their reverse flow, through their upstream test connections, once per 18 months (±3 months) while the process system is pressurized, as during flow testing.				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation: These 2 in. check valves all prevent reverse flow out through their respective keepfill lines. These valves do not have remote position indication. This deferral justification is identical to Relief Request 24 evaluated in the May 28, 1992 SE in Section 2.1 (Ref. 12). Specifically, in Section 2.1.3, Evaluation, the NRC stated in part: "....The proposed alternative testing meets the Code testing methods, but at an extended interval, and provides a reasonable level of quality and safety, provided the core spray valves which are tested in series are both repaired or replaced when the acceptance criteria are not met...." In the Conclusion, Section 2.1.4, the NRC stated: "Relief is granted....to exercise the RHR, Core Spray, HPCI and ESW keepfill check valves in accordance with the frequency requested....provided the licensee repairs or replaces the valves tested in series if the acceptance criteria are not met." If licensees have no practical means for verifying the ability of each valve in a series to close, they may 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, i.e., 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 IST. If the licensee finds indication that the closure capability of the pair of valves is questionable, both valves must be declared inoperable and be repaired or replaced before being returned to service. Both valves in a series pair must be verified to function if the plant safety analysis credits or otherwise requires both valves. To perform testing on the pair of valves in series, the licensee must obtain relief because the Code requirements for individual valves are not met. The relief request typically includes information on the safety analysis, quality assurance requirements, the acceptance criteria, and the corrective actions that would be taken if excessive leakage is identified.			

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Evaluation (cont'd): The licensee's proposed alternative testing for verifying closure of these valves is performing a reverse flow seat leakage test. There are test connections located upstream and downstream of these valves with which to perform a seat leakage test. In accordance with OMa-1988, Part 10, ¶4.3.2.4(a), seat leakage testing is an acceptable means of verifying closure. If no other practical means are available, it is acceptable to verify that check valves are capable of closing by performing leak-rate testing, such as local leak rate testing in accordance with 10 CFR 50 Appendix J at each reactor refueling outage. Recognizing that the setup and performance limitations may render leak testing impractical during power operation and cold shutdown outages, the NRC has determined that it is acceptable to defer backflow testing of a check valve which can only be tested by performing a leak test, when test equipment setup is necessary, to a refueling outage. Therefore, for the RCIC, RHR, HPCI, ESW/CSCW, and ESW keepfill check valves, which are capable of being individually monitored, the alternative provides verification of closure capability by reverse flow seat leakage testing during refueling outages in accordance with OMa-1988, Part 10, ¶4.3.2.2(e) and 4.3.2.4(a). However, for the Core Spray check valves, the licensee should address the issues discussed above concerning whether one or both valves are required, and submit a relief request with the appropriate information.				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
CONTAINMENT INSTRUMENT GAS (CIG) AND CONTAINMENT ATMOSPHERIC CONTROL (CAC) SOLENOID VALVES				
ROJ-19	Numerous Category A CIG and CAC containment isolation solenoid-operated valves and Category B instrument gas storage solenoid-operated valves. (Refer to the licensee's Refueling Outage Test Justification 19 for specific valve identification).	M-126 Sheet 1 (M-2126 Sheet 1) M-126 Sheet 2 (M-2126 Sheet 2) M-157 Sheet 1 (M-2157 Sheet 1) M-157 Sheet 5 (M-2157 Sheet 5) M-157 Sheet 6 (M-2157 Sheet 6) M-157 Sheet 7 (M-2157 Sheet 7)	See below.	See below.
Licensee's Justification: "The subject solenoid valves, all of which are manufactured by the Target Rock Corporation, all are constructed in a manner that precludes local verification of valve operation by direct observation. All movements and positions of valve parts are obscured by the valve structure within which they travel and within which they are sealed. A method for indirect observation of valve movement, utilizing ferritic steel objects (steel shot) moved along the surface of each valve's indicating tube by the permanent magnet attached to the valve stem inside, was devised, used for 18 months, and subsequently abandoned because its employment necessitated partial disassembly of the solenoid valve for the test. This disassembly and reassembly, consisting of removal and reinstallation of the reed switch housing assembly, or cover, has been found to cause damage to the wiring and its connections to the reed switches."				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Proposed Alternate Testing: Confirmation of coincident valve movement and remote indication is accomplished by listening to the valve with a stethoscope, for the audible signal of the valve disk arriving at a new position. Accuracy of remote indication of valve operation is essentially verified for these solenoid valves once per refueling outage by the combination of containment isolation valve leak testing (LLRT) (or instrument gas storage leakdown testing) with accomplishment of General Operating Procedures (GO-100-002) for plant startup and heatup. These activities are completed at least once each refueling outage. (Refer to the licensee's Refueling Outage Test Justification 19 for additional information).				
Evaluation: These valves are solenoid valves which perform either a containment isolation or instrument gas storage function. This deferral justification is identical to Relief Request 58 evaluated in the May 28, 1992 SE in Section 2.2. However, at that time, relief was requested from the requirements of Section XI, ¶IWV-3300, that valves with remote position indicators shall be observed at least once every 2 years to verify that valve operation is accurately indicated. OMa-1988, Part 10, ¶4.1, adds that where local observation is not possible, other indications shall be used for verification of valve observation. Since the licensee is conducting the verification of valve position indication at the frequency, and in a manner, conforming to the requirements of OMa-1988, Part 10, ¶ 4.1, neither a justification for deferral of test frequency nor relief from the Code requirements is necessary.				

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
MISCELLANEOUS CONTAINMENT ISOLATION EXCESS FLOW CHECK VALVES				
ROJ-20	Numerous 1 in. Category C Containment Isolation excess flow check valves in Main Steam, MSIV-Leakage Control System, Reactor Pressure Vessel, Reactor Recirculation, Reactor Water Cleanup, RCIC, RHR, Core Spray, and HPCI systems. (Refer to the licensee's Refueling Outage Test Justification 20 for specific valve identification).	M-139 (M-2139) M-141 Sheet 1 (M-2141 Sheet 1) M-141 Sheet 2 (M-2141 Sheet 2) M-142 Sheet 1 (M-2142 Sheet 1) M-143 Sheet 1 (M-2143 Sheet 1) M-143 Sheet 2 (M-2143 Sheet 2) M-144 (M-2144) M-149 (M-2149) M-151 Sheet 3 (M-2151 Sheet 3) M-152 (M-2152) M-155 (M-2155)	See below.	Functional testing with verification that flow is checked will be performed at least once per 18 months per Technical Specification 4.6.3.4.

Table 4.2 (Cont'd)

Item No.	Valve Identification	Drawing No.	Licensee's Justification for Deferred Testing	Proposed Alternate Testing
Licensee's Justification: "Excess flow check valves are installed on instrument lines penetrating containment in accordance with Regulatory Guide 1.11. As such, the lines are sized and/or orificed such that off-site doses will be substantially below 10CFR100 limits in the event of a rupture. Therefore, individual leak rate testing of these valves is not required for conformance with 10CFR50, Appendix J requirements. Functional testing of valves to verify closure can be accomplished by the process of venting the instrument side of the valve while the process side is under pressure. Such testing is required by Technical Specification 4.6.3.4 at least once per 18 months. Testing on a more frequent basis is not feasible for several reasons. Instruments serviced by these valves frequently have interlock or actuation functions that would be interfered with should testing be attempted during plant operation. Also, process liquid will be contaminated to some degree, requiring special measures to collect flow from the vented instrument side."				
Evaluation: These are numerous 1 in. excess flow check valves all of which are located outside containment and required to close for containment isolation. These valves do not have remote position indication. The licensee's proposed alternate testing is to verify closure of these valves by venting the instrument side of the valve while the process side is under pressure, i.e., by performing a reverse flow seat leakage test. In accordance with OMa-1988, Part 10, ¶4.3.2.4(a), seat leakage testing is an acceptable means of verifying closure. If no other practical means are available, it is acceptable to verify that check valves are capable of closing by performing leak-rate testing, such as local leak rate testing in accordance with 10 CFR 50 Appendix J at each reactor refueling outage. Recognizing that the setup and performance limitations may render leak testing impractical during power operation and cold shutdown outages, the NRC has determined that it is acceptable to defer backflow testing of a check valve which can only be tested by performing a leak test, when test equipment setup is necessary, to a refueling outage. Therefore, the alternative provides verification of closure capability by seat leakage testing during refueling outages in accordance with OMa-1988, Part 10, ¶4.3.2.2(e) and 4.3.2.4(a).				

5.0 IST PROGRAM RECOMMENDED ACTION ITEMS

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

In general, the licensee's program is very well organized and easy to follow, particularly since all of the component designations are based on the P&ID No. on which they appear. Consequently, the components are presented in the Pump Program Tables and the Valve Program Tables in numerical-alphabetical order according to the numerical sequence of the P&IDs.

While the safety position of each valve is indicated, it would be helpful if the Valve Program Tables included the normal position of the valve and, for the full stroke exercising, whether the exercising is to the open or closed position.

5.1 The review performed for this TER did not include verification that all pumps and valves within the scope of 10 CFR 50.55a and Section XI are contained in the IST Program, and did not ensure that all applicable testing requirements have been identified. The IST Program's scope was reviewed for selected systems.

Specifically, the pumps and valves in the Emergency Service Water, Nuclear Boiler, and Residual Heat Removal systems were reviewed against the requirements of Section XI and the regulations. The review results showed compliance with the Code, except for the following items. The licensee should review these items and make changes to the IST Program, where appropriate. Additionally, the licensee should verify that there are not similar problems with the IST Program for other systems.

A. Nuclear Boiler

Instrument gas-operated relief valves PSV-141F013A through F (PSV-241F013A through F), which appear on P&ID M-141 Sheet 1 (M-2141 Sheet 1), are designated solely as ASME Code Category C valves. The licensee should verify whether these valves should also be considered Category B valves which are subject to the stroke testing and timing requirements for power-operated valves, as defined in OMa-1988, Part 10, Section 4.2.

B. Residual Heat Removal

1. PSV-151F030A, which appears on M-151, Sheet 1 @ G-6, is incorrectly identified in the Valve Program Tables as appearing @ B-6.

2. The licensee should verify whether 1 in. excess flow check valves XV-15110A & C on M-151 Sheet 1 @ C7 (XV-25110A & C on M-2151 Sheet 1 @ C7) and XV-15110B & D on M-151 Sheet 3 @ B3 (XV-25110B & D on M-2151 Sheet 3 @ B3) should be included in the Program. These valves are part of the Core Spray System.

3. The licensee should verify whether 6 in. vacuum breaker valves PSV-151F141A on M-151 Sheet 2 @ D1 (PSV-2151F141A on M-2151 Sheet 2 @ D1) and PSV-151F141B on M-151 Sheet 4 @ D9 (PSV-2151F141B on M-2151 Sheet 4 @ D9) should be included

in the Program. These valves, which are located inside the primary containment, are vacuum breaker relief valves for the discharge lines of relief valves PSV-15106A & B (PSV-25106A & B) which provide thermal relief for the RHR heat exchangers. The outlet of the discharge lines of the relief valves is submerged under the water in the Suppression Pool.

4. One in. valves SV-151F079A on M-151 Sheet 2 @ G5 (SV-251F079A on M-2151 Sheet 2 @ G5) and SV-151F079B on M-1[illegible] Sheet 4 @ G5 (SV-251F079B on M-2151 Sheet 4 @ G5) are included in the program. These valves are fail closed solenoid operated valves on a sample line from the RHR discharge of the RHR heat exchangers. The licensee should verify whether the 1 in. valves SV-151F080A on M-151 Sheet 2 @ G5 (SV-251F080A on M-2151 Sheet 2 @ G5) and SV-151F080B on M-151 Sheet 4 @ G5 (SV-251F080B on M-2151 Sheet 4 @ G5), which are immediately adjacent to, and apparently identical to, the former 1 in. 079 valves should also be included in the Program.

5.2 Relief Request No. 03 applies to the diesel fuel oil transfer pumps OP514 A through E. For the submerged pumps, OP514A through D, it is recommended that interim relief be granted in accordance with 10CFR50.55a(f)(6)(i), for a period of one year, or until the next refueling outage, whichever is later, on the basis of the impracticality of immediately imposing the Code requirements. The licensee should revise and resubmit this relief request to indicate an alternative course of action such as the institution of a regular maintenance and spare parts program for these pumps which includes provisions to inspect the pump bearings and perform maintenance at least whenever the storage tanks are drained and the bearings are accessible. Additionally, the licensee should evaluate the feasibility of determining pump flowrates and differential pressure in accordance with the Code by observing level changes of the day tanks or by installing flow instrumentation, and calculating inlet pressure.

With respect to the external pump, OP514E, the licensee has not provided sufficient basis for not using vibration instrumentation, calculating differential pressure, or determining flowrate so that these parameters could be read at least quarterly during the TS required testing. It is recommended that interim relief be granted in accordance with 10CFR50.55a(f)(6)(i), for a period of one year, or until the next refueling outage, whichever is later, on the basis of the impracticality of immediately imposing the Code requirements, for the licensee to evaluate the feasibility of calculating differential pressure, using vibration instrumentation, and determining flow rates to comply with the requirements of OMa-1988, Part 6, ¶5.2. (TER Section 2.1)

5.3 In Relief Request 11, the licensee has requested relief from running the HPCI Pumps two minutes based on the suppression pool temperature increase. It is recommended that relief be denied. The licensee should comply with the Code, and if desired, revise and resubmit the relief request. The revised request should contain specific information on the suppression pool temperature rise during testing versus time and the suppression pool's administrative limits. (TER Section 2.2)

5.4 In Relief Request 15, for the emergency condenser water circulating (ECWC) pumps OP171A & B in the control structure chilled water system, it is recommended that interim relief be granted for a period of one year or until the next refueling outage, whichever is later, based on the impracticality of immediately imposing the Code requirements pursuant to 10 CFR 50.55a(f)(6)(i). In the interim, the licensee should evaluate compliance with ¶5.2(c) and revise

and resubmit this relief request. The request should include information on the range of test values. The licensee may also want to investigate the use of pump reference curves, as the staff has approved their use when it is impractical to establish a fixed set of reference values. Additionally, the licensee should ensure that differential pressure is being measured, and that all of the test parameters are measured, evaluated, and corrective actions taken in accordance with OMa-1988, Part 6. (TER Section 2.3)

5.5 In Relief Requests 01, 02, 04, 08, 09, 16, 17, 18, 19, and 20, the licensee is proposing sample disassembly and inspection of check valves and/or full flow testing combined with nonintrusive testing (NIT) techniques. The NRC staff position with respect to sample disassembly and inspection of check valves is described Generic Letter 89-04, Position 2.

Relief is granted in accordance with Generic Letter 89-04, provided that all the criteria in Position 2 is complied with. However, a number of the requests (i.e., 2, 4, 8, 9, 16, 17, and 18) do not appear to comply with the inspection interval or sample size discussed in Position 2. One valve in the sample group, not to exceed four valves, is to be inspected at every refueling outage. An expansion of the group size to more than four valves, or a proposal that does not include inspection of one valve at each outage requires justification of "extreme hardship" as discussed in Generic Letter 89-04, Position 2 and the minutes to the Generic Letter. This justification must include information on the inspection results of all the valves, a review of industry experience, and a review of valve installation for problematic locations. The licensee is referred to Questions 12 and 20 of the Minutes, for additional guidance. Additionally, Relief Requests 16 and 17 group valves of different sizes. The Generic Letter states that the group must contain valves of the same design (including size) and service. The licensee should ensure that all the criteria in Position 2 is complied with and revise the requests so that the information to support compliance with the Position 2 guidance is documented.

Additionally, in Request 20, the licensee has stated that the groupings may include valves from both units. The staff has allowed groupings from multiple units, however, if the licensee identifies a problem, the remaining valves from the same unit must also be disassembled and inspected during the same outage, and the remaining valves in the other unit must be disassembled and inspected at that units next outage.

For NIT techniques, grouping may also be applied. All of the valves in the group must be flow tested quarterly, while the NIT techniques are applied to only one valve in the group. Additionally, the staff has determined that all valves in the group must be in the same Unit. Licensees can prepare justifications for alternate test frequency, such as for conducting the NIT and/or flow testing during cold shutdowns or refueling outages, as allowed by the Code based on impracticality. This method complies with the Code as an "other positive means" of determining valve obturator position and no relief is required.

The licensee should revise and resubmit Relief Requests 01, 02, 08, 09, 16, 17, 18, 19, and 20 to clarify the proposed alternate testing and to assure compliance with Generic Letter 89-04, Position 2.

5.6 In Relief Requests 04 and 8, for the main steam isolation valve (MSIV) leakage control system ball check valves 139F010 (239F010) and 139F011 (239F011) and core spray check valves

152005 (252005), provided the licensee complies with all the criteria in Generic Letter 89-04, Position 2, the alternatives are authorized in accordance with Generic Letter 89-04.

The licensee, however, does not specifically mention anywhere in the relief requests, or in the Valve Program Tables, that these valves actually will be disassembled and inspected in accordance with Generic Letter 89-04, Position 2. Instead the relief requests merely mentions that the valves will be "periodically inspected", and that the proposed 6 year length of the inspection period is the same as that established by NRC Generic Letter 89-04 as an acceptable guide line for a "similar program of periodic inspections of check valves," while the Valve Program Tables only mention that the test frequency is "Other."

At least one valve must be inspected at every refueling outage and all valves must be inspected within a six year interval. Otherwise, if the licensee does not disassemble and inspect at least one of the valves during each refueling outage, the licensee must justify "extreme hardship" as defined in Position 2 and Question Group 19 Response in the Public Meeting Minutes.

Therefore, provided the licensee complies with all the criteria in Position 2, the alternatives are authorized in accordance with Generic Letter 89-04. The licensee should confirm that the proposed "periodic inspection" complies with all of the criteria in Position 2, and revise the relief requests to document this.

Additionally, the requests must be revised to demonstrate the extreme hardship of disassembling one valve every refueling outage. Additionally, the licensee must document in detail the condition of each valve, review industry experience for similar valves, and review the installation of each valve addressing the EPRI guidelines for problematic locations, all as discussed in the Generic Letter, Position 2.

5.7 In Relief Request 05, for the six (6) safety relief valves assigned to the ADS which are pneumatically-assisted Category B and C valves, PSV-141F013G, J, K, L, M and N (PSV-241F013G, J, K, L, M and N), it is recommended that relief be granted, pursuant to 10CFR50.55a(f)(6)(i), provided that the licensee establishes stroke time acceptance criteria and takes appropriate corrective action when the criteria is exceeded. The request should be revised to document the criteria and corrective action. (TER Section 3.1)

5.8 In Relief Request 07, for the 1 in. CRDH scram discharge volume (SDV) vent and drain air-operated globe valves, XV-147F010 (XV-247F010), XV-147F0il (XV-247-F011), XV-147F180 (XV-247F180), and XV-147F181 (XV-227F181), use of a 30 second limiting stroke time as proposed by the licensee in the current relief request appears to be excessive as a basis for responding to the onset of degrading conditions. Additionally, in view of the fact that the licensee still has not provided a technical justification for Notes 21 and 22 (appearing on the P&IDs M-147 and M-2147 and referenced in the justification), nor provided a comparison of the expected stroke time to the 5 second limit in these notes, nor provided an explanation for the statement that these notes provide a more relevant basis for verifying the operational readiness of these valves, it is recommended that the relief as requested be denied. The licensee should comply with the Code requirements or revise and resubmit this request as appropriate. (TER Section 3.2)

5.9 In Relief Request 13, for the control structure chilled water temperature control valves, TV-08612A and TV-08612B, it is recommended that the relief as requested be denied in view of the fact that the licensee has failed to respond to the May 28, 1992 NRC SE finding (Anomaly 11) that the licensee should propose a method for monitoring these valves for degradation prior to implementation of the updated inservice testing program for the next 10 year interval, i.e., the current submittal. The licensee must revise and resubmit this relief request to propose a method for monitoring these valves individually for degradation. (TER Section 3.4)

5.10 In Relief Request 21, for several air-operated valves which provide isolation of the emergency service water system and of the containment, it is recommended that relief as requested be denied. The licensee should revise and resubmit this relief request to discuss the impracticality of basing the reference stroke times on those resulting from averaging a specific number of tests performed following maintenance activity, averaging several IST tests, or using the first test following maintenance versus those required by OMa-1988, Part-10, ¶4.2.1.8. The revised relief request should indicate clearly what are the reference values of valve stroke times established by the licensee and compare those to the requirements of OMa-1988, Part 10, ¶4.2.1.8 and discuss the impracticality of implementing the corrective actions of ¶4.2.1.9(b).

Additionally, the licensee has provided no basis in the request for the deviation from Code requirements for the ESW/SWM valves. The discussion in the basis pertains only to the containment isolation valves.

The licensee should also verify whether relief has been inadvertently requested for ESW/SWM HV-11024A3/A4 (HV-21024A3/A4) when relief should have been requested for HV-11024B1/B2 (HV-21024B1/B2), as listed in the Valve Program Tables. (TER Section 3.5)

5.11 In Relief Request 22, for the emergency switchgear room cooling pressure control valves HV-27203A/B, the licensee has provided no method to detect individual degradation of these valves, nor has the licensee provided any discussion of the burden or impracticality of performing testing in accordance with the Code requirements. Therefore, it is recommended that the relief as requested be denied.

The licensee must revise and resubmit this relief request to propose a method for monitoring these valves individually for degradation, and discuss the impracticality of stroke time measurement of the valve operation from the fully closed to the throttled position during the quarterly part-stroke exercising tests or during the full-stroke open testing which the licensee says in the relief request is performed every 18 months, and to discuss the impracticality of observing the remote position indicator locally at least once every 2 years, as required by OMa-1988, Part 10, ¶4.1. (TER Section 3.6)

5.12 The licensee has submitted 13 Cold Shutdown Justifications (CSJ) which document the impracticality of testing valves quarterly, during operation, as required by OMa-1988, Part 10. As documented in this TER, Table 4.1, the following deferrals require further action by the licensee:

* In CSJ-03, for the 1 in., instrument gas supply to ADS SRVs, solenoid-operated globe valves SV-12654A, SV-12654A (SV-22654B, SV-22654B), the licensee states that closing these valves will interrupt instrument gas supply to the ADS solenoids of the safety/relief

valves, compromising their ability to provide the opening motive force for the ADS valves in support of the long-term cooling ECCS function. However, a review of Drawing M-126 (M-2126) indicates that each valve isolates only one train of instrument gas supply to the corresponding train of ADS SRVs, and that instrument gas would remain available to the opposite train of ADS SRVs during quarterly closure testing. Also, there is an accumulator dedicated to each train which should provide sufficient gas storage for several ADS valve operations without the need for resupply via the instrument gas system. Furthermore, these valves are designated as rapid acting valves in the Valve Program Tables, so that the valve outage time required for stroke testing is minimal. Therefore, the licensee should full-stroke exercise these valves open and closed quarterly or revise this deferral justification accordingly.

* In CSJ-06, for the 26 in. main steam isolation valves (MSIVs) HV-141F022, A, B, C, D (HV-241F022, A, B, C, D) and HV-141F028 A, B, C, D (HV-241F028 A, B, C, D), it is impractical to full-stroke exercise these valves closed during power operation because closure would induce a reactor pressure transient, with increased probability of reactor scram, Main Steam line isolation, and safety/relief valve (SRV) actuation. However, in Generic Letter 93-05, "Line Item Technical Specifications Improvements to Reduce Surveillance Requirements for Testing During Power Operations," (Ref. 15), and its reference NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements," (Ref.16), the NRC continued to recommend that at least a quarterly part stroke exercise closed test of the MSIVs for BWRs be performed as currently required by OMa-1988, Part-10. Therefore, the licensee should at least part-stroke exercise these valves closed quarterly during power operation and/or revise this justification accordingly.

* In CSJ-08, for the 24 in. RHR check valves, HV-151F050A, (HV-251F050A) HV-151F050B, (HV-251F050B), although the valves are located inside containment and it appears that the only practical means of verifying closure is by performing a seat leakage test, the licensee should revise this deferral justification to discuss the impracticality of verifying closure of these valves quarterly.

  Also, for CSJ-08, CSJ-09, and CSJ-10, the complete reference for "draft R.G. 901-4" is Draft Regulatory Guide MS 901-4 (Ref. 17).

5.13 The licensee has submitted 20 Refueling Outage Justifications (ROJ) which document the impracticality of testing valves quarterly, during operation, and during cold shutdowns, as required by OMa-1988, Part 10. As documented in this TER, Table 4.2, the following deferrals require further action by the licensee:

* In ROJ-2, for the containment instrument gas (CIG) containment isolation check valves 126072 (226072), 126074 (226074), 126152 (226152), 126154 (226154), and 126164 (226164), it is impractical to full-stroke exercise open check valves 126152 (226152) and 126154 (226154) during power operation or cold shutdowns because the only practical method for testing these valves to open is to use the test connections located inside the containment, which has an inert atmosphere. However, the licensee has not provided justification for not performing a part-stroke exercise of these valves in the open position during cold shutdowns during ADS valve testing.

The licensee should part-stroke exercise these valves open during cold shutdowns or revise and resubmit this deferral justification to discuss the impracticality of part-stroke exercising these valves open during cold shutdowns. Also, the licensee should confirm that the valves pass the required maximum accident flow rate during the refueling outage test, as described in Generic Letter 89-04, Position 1.

Also, check valve 126070 (226070) which is the valve inside containment corresponding to 126164 (226164), is not included in the IST Program, but appears to be a Class 2 valve, based on the piping designation on the P&IDs, M-126 Sheet 1 @ H7 (M-226 Sheet 1 @ H7). The licensee should review the classification and function of this valve and revise the IST Program as necessary.

* In ROJ-03, for the 1 in. EDG starting air receiver tank inlet lines check valves, 034067A through D, 034075A through D, and 034153E1 and 034153E2, the licensee states that these valves are installed in lines which have neither pressure nor airflow instrumentation nor provisions for connecting any temporary instruments; and consequently that compliance with the Code requirement is impractical because of design limitations. However, from a review of the P&ID, M-134 Sheet 2, and also from UFSAR Section 8.3 regarding Starting Air System Trouble, it appears that the starting air pressure in the Diesel Starting Air Receiver Tanks A & B is monitored at all times with annunciation provided locally and in the main control room, and that the test only involves opening a test connection valve and isolating the nonsafety related starting air compressor from the respective diesel generator. It appears that this test does not affect the operational readiness of the diesel generator itself, and would not take much time to perform, so that such testing appears to be practical. The licensee should verify the closure capability of these valves quarterly or revise the deferral justification to provide more information on the impracticality of quarterly or cold shutdown testing.

* In ROJ-10, for the control rod drive (CRD) to reactor recirculation pump excess flow check valves, XV-143F017 A & B (XV-243F017 A & B), since excess flow check valves typically are not provided with remote position indication, the licensee should verify whether such a feature exists for these valves.

* In ROJ-11, for the 1.5 in. standby liquid control (SLC) injection line motor-operated stop check valve, HV-148F006 (HV-248F006), the licensee has provided no justification for not performing either a part-stroke or full-stroke exercise test to the open position during cold shutdowns, nor has the licensee provided justification for not performing an exercise closed test during cold shutdowns. Therefore, the licensee should full-stroke exercise this valve open and closed during cold shutdowns, or revise and resubmit this deferral justification accordingly.

* In ROJ-12, for the 1.5 in. standby liquid control (SLC) injection line check valve, 148F007 (248F007), the licensee has provided no justification for not performing either a part-stroke or full-stroke exercise test to the open position during cold shutdowns using existing test connections. Therefore, the licensee should full-stroke exercise this valve open during cold shutdowns, or revise and resubmit this deferral justification accordingly.

* In ROJ-14, for the 2 in. RCIC turbine exhaust to containment vacuum breaker check valves, 149F063 (249F063) and 149F064 (249F064), and in ROJ-16, for the 3 in. HPCI turbine exhaust to containment vacuum breaker check valves, 155F076 (255F076) and 155F077 (255F077), simply stating that installing temporary equipment is impractical is not adequate justification. The licensee must provide additional information on the impracticality of testing quarterly, including the length of time the RCIC system would be inoperable to perform the test versus the Limiting Condition of Operation.

  Additionally, there are licensees of other BWR units, e.g., FitzPatrick, who perform a similar open exercise of these valves during cold shutdowns (Ref. 18). Therefore, the licensee should revise this deferral justification to discuss the impracticality of exercising these valves open quarterly or during cold shutdowns.

* In ROJ-17, for the 6 in. chilled water loop circulating (CWLC) pumps A/B discharge check valves 086039 and 086139 and the 8 in. ESW to control structure chiller A/B inlet check valves for valves, 111144 and 111145, the licensee should verify that flow through these valves can be measured, or revise this deferral request accordingly.

* In ROJ-18, for the 2 in. core spray system keepfill check valves, 152F029A (251F029A) and 152F029B (251F029B), 152F030A (252F030A) and 152F030B (252F030B), the licensee should submit a relief request in order to test the valves as a pair. The requests should address whether one or both valves are required by the plant safety analysis assumptions, the quality assurance requirements, the acceptance criteria, and the corrective actions that would be taken if excessive leakage is identified.

6.0 REFERENCES

1. Letter, re: SSES Rev. No. 10 for Unit 1, Rev. No. 7 for Unit 2 to Inservice Inspection Program Plans for Pump and Valve Operational Testing, R.G. Byram, PP&L, to C.L. Miller, U.S. NRC, June 30, 1994.

2. a) ISI-T-100-0, "SSES Unit 1 Inservice Inspection Program Plan for Pump and Valve Operational Testing," Rev. 10, May 17, 1994.
   b) ISI-T-200-0," SSES Unit 2 Inservice Inspection Program Plan for Pump and Valve Operational Testing," Rev. 7, May 17, 1994.

3. ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection, 1989 Edition.

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

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

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

7. Standard Review Plan, NUREG-0800, Section 3.9.6, Inservice Testing of Pumps and Valves, Rev. 2, July 1992.

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

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

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

11. Draft NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants", P. Campbell, November 1993.

12. NRC Memorandum, "Safety Evaluation-Inservice Testing (IST) Program Relief Request SSES, Units 1 and 2, TAC No. M82617, M82618," to J.J. Raleigh, from J.A. Norberg, May 28 1992.

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

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

15. NRC Generic Letter 93-05, "Line Item Technical Specifications Improvements to Reduce Surveillance Requirements for Testing During Power Operation", September 27, 1993.

16. NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements", Paragraph 9.2, December, 1992.

17. Draft Regulatory Guide MS 901-4, "Identification of Valves for Inclusion in Inservice Testing Program," November 1981.

18. New York Power Authority, "Revision 6 of the FitzPatrick Second Interval Inservice Test Program for Pumps and Valves," Docket No. 50-333, Public Documents Room Accession No: 9301270185, Date: 93/01/21.

19. Updated Final Safety Analysis Report (UFSAR) for Susquehanna Steam Electric Station, Units 1 and 2.

20. Technical Specifications, Susquehanna Steam Electric Station, Units 1 and 2.

21. Regulatory Guide 1.137, Fuel-Oil Systems for Standby Diesel Generatos, October 1979.

22. Letter, re: Cost/Benefit Concerns for ASME OM-19 Development, H.W. Keiser, PP&L, to S.D.Weinman, ASME, March 5, 1994.

Appendix A List of Reference Drawings

Flow diagram Dwg. No.	System	Revision
M-109 Sheet 1	Service Water System	Rev. 40
M-109 Sheet 2	Service Water System	Rev. 6
M-109 Sheet 3	Chemical Addition System	Rev. 3
M-110 Sheet 1	Service Water System	Rev. 31
M-111 Sheet 1	Emergency Service Water System	Rev. 36
M-111 Sheet 2	Emergency Service Water System	Rev. 35
M-111 Sheet 3	Emergency Service Water System	Rev. 10
M-112 Sheet 1	RHR Service Water System	Rev. 38
M-112 Sheet 2	RHR Service Water System	Rev. 8
M-113 Sheet 1	Reactor Building Closed Cooling Water System	Rev. 37
M-120 Sheet 1	Diesel Oil Storage & Transfer System	Rev. 23
M-120 Sheet 2	Diesel Oil Storage & Transfer System	Rev. 8
M-126 Sheet 1	Containment Instrument Gas System	Rev. 29
M-126 Sheet 2	Containment Instrument Gas System	Rev. 7
M-134 Sheet 1	"A-D" Diesel Auxiliaries (Fuel, Oil, Lube Oil, Air Intake, & Exhaust & Jacket Water Cooling Systems	Rev. 35
M-134 Sheet 2	"A-D" Diesel Auxiliaries Starting Air Systems	Rev. 11
M-134 Sheet 3	"A-D" Diesel Auxiliaries Starting Air Systems	Rev. 10
M-134 Sheet 4	Diesel Auxiliaries - Jacket Water and Lube Oil Storage Systems	Rev. 9

Flow diagram Dwg. No.	System	Revision
M-134 Sheet 5	"E" Diesel Auxiliaries (Starting Air and Water Systems	Rev. 6
M-134 Sheet 6	Diesel "E" Auxiliaries (Starting Air Systems	Rev. 5
M-134 Sheet 7	"E" Diesel Auxiliaries (Fuel, Oil System, Lube Oil System, and Air Intake, & Exhaust Systems	Rev. 7
M-139 Sheet 1	MSIV-Leakage Control System	Rev. 15
M-141 Sheet 1	Nuclear Boiler System	Rev. 32
M-141 Sheet 2	Nuclear Boiler System	Rev. 5
M-142 Sheet 2	Nuclear Boiler Vessel Instrumentation System	Rev. 8
M-143 Sheet 1	Reactor Recirculation System	Rev. 32
M-143 Sheet 2	Reactor Recirculation System	Rev. 6
M-144 Sheet 1	Reactor Water Clean-up System	Rev. 33
M-144 Sheet 2	Reactor Water Clean-up System	Rev. 8
M-144 Sheet 3	Reactor Water Clean-up System	Rev. 2
M-147 Sheet 2	Control Rod Drive Part-B System	Rev. 32
M-147 Sheet 2	Control Rod Drive Part-B System	Rev. 4
M-148 Sheet 1	Standby Liquid Control System	Rev. 27
M-149 Sheet 1	Reactor Core Isolation Cooling System	Rev. 37
M-150 Sheet 1	R.C.I.C. Turbine-Pump System	Rev. 21
M-152 Sheet 1	Core Spray System	Rev. 29
M-153 Sheet 1	Fuel Pool Cooling & Clean-up System	Rev. 32
M-153 Sheet 2	Fuel Pool Cooling & Clean-up System	Rev. 8

Flow diagram Dwg. No.	System	Revision
M-151 Sheet 1	Residual Heat Removal System	Rev. 46
M-151 Sheet 2	Residual Heat Removal System	Rev. 41
M-151 Sheet 3	Residual Heat Removal System	Rev. 10
M-151 Sheet 4	Residual Heat Removal System	Rev. 10
M-155 Sheet 1	High Pressure Coolant Injection System	Rev. 36
M-156 Sheet 1	H.P.C.I. Turbine-Pump System	Rev. 28
M-156 Sheet 2	H.P.C.I. Lubricating and Control Oil System	Rev. 6
M-157 Sheet 1	Containment Atmosphere Control System	Rev. 39
M-157 Sheet 2	Containment Atmosphere Control System	Rev. 28
M-157 Sheet 3	Containment Atmosphere Control System	Rev. 22
M-157 Sheet 4	Containment Atmosphere Control System	Rev. 4
M-157 Sheet 5	Containment Atmosphere Control Wetwell Sampling System	Rev. 0
M-157 Sheet 6	Containment Atmosphere Control Cont. Rad. Monitoring LOOP A System	Rev. 0
M-157 Sheet 7	Containment Atmosphere Control Cont. Rad. Monitoring LOOP B System	Rev. 0
M-161 Sheet 1	Liquid Radwaste Collection System	Rev. 38
M-161 Sheet 2	Liquid Radwaste Collection System	Rev. 30
M-161 Sheet 3	Liquid Radwaste Collection System	Rev. 8

Flow diagram Dwg. No.	System	Revision
M-186 Sheet 1	Control Structure Chilled Water System "A"	Rev.34
M-186 Sheet 2	Control Structure Chilled Water System "B"	Rev. 6
M-186 Sheet 3	Control Structure Chilled Water Chiller OK112A System	Rev. 1
M-186 Sheet 4	Control Structure Chilled Water Chiller OK112B System	Rev. 1
M-187 Sheet 1	Reactor Building Chilled Water System	Rev. 30
M-187 Sheet 2	Reactor Building Chilled Water System	Rev. 27
M-187 Sheet 3	Reactor Building Chilled Water System	Rev.0
M-187 Sheet 4	Reactor Building Chilled Water Chiller IK206A System	Rev. 1
M-187 Sheet 5	Reactor Building Chilled Water Chiller IK206B System	Rev. 1
M-2109 Sheet 1	Service Water System	Rev. 32
M-2109 Sheet 2	Service Water System	Rev. 5
M-2110 Sheet 1	Service Water System	Rev. 30
M-2111 Sheet 1	Emergency Service Water System	Rev. 33
M-2112 Sheet 1	RHR Service Water System	Rev. 23
M-2113 Sheet 1	Reactor Building Closed Cooling Water System	Rev. 29
M-2126 Sheet 1	Containment Instrument Gas System	Rev. 28
M-2126 Sheet 2	Containment Instrument Gas System	Rev. 5
M-2139 Sheet 1	MSIV-Leakage Control System	Rev. 21
M-2141 Sheet 1	Nuclear Boiler System	Rev. 29

Appendix A (Cont'd)

Flow diagram Dwg. No.	System	Revision
M-2141 Sheet 2	Nuclear Boiler System	Rev. 7
M-2142 Sheet 1	Nuclear Boiler Vessel Instrumentation System	Rev. 30
M-2142 Sheet 2	Nuclear Boiler Vessel Instrumentation System	Rev. 10
M-2142 Sheet 3	Nuclear Boiler Vessel Instrumentation System	Rev. 0
M-2143 Sheet 1	Reactor Recirculation System	Rev. 30
M-2143 Sheet 2	Reactor Recirculation System	Rev. 3
M-2144 Sheet 1	Reactor Water Clean-up System	Rev. 33
M-2144 Sheet 2	Reactor Water Clean-up System	Rev. 5
M-2144 Sheet 3	Reactor Water Clean-up System	Rev. 0
M-2147 Sheet	Control ROD Drive Part-B System	Rev. 27
M-2147 Sheet 2	Control ROD Drive Part-B System	Rev. 2
M-2148 Sheet 1	Standby Liquid Control	Rev. 21
M-2149 Sheet 1	Reactor Core isolation Cooling System	Rev. 25
M-2150 Sheet 1	R.C.I.C. Turbine-Pump System	Rev. 17
M-2151 Sheet 1	Residual Heat Removal System	Rev. 36
M-2151 Sheet 2	Residual Heat Removal System	Rev. 33
M-2151 Sheet 3	Residual Heat Removal System	Rev. 10
M-2151 Sheet 4	Residual Heat Removal System	Rev. 5
M-2151 Sheet 1	Core Spray System	Rev. 19
M-2153 Sheet 1	Fuel Pool Cooling & Clean-up System	Rev. 27
M-2153 Sheet 2	Fuel Pool Cooling & Clean-up System	Rev. 3

Flow diagram Dwg. No.	System	Revision
M-2155 Sheet 1	High Pressure Coolant Injection System	Rev. 29
M-2156 Sheet 1	H.P.C.I. Turbine-Pump System	Rev. 20
M-2156 Sheet 2	H.P.C.I. Lubricating and Control Oil System	Rev. 6
M-2157 Sheet 1	Containment Atmosphere Control System	Rev. 24
M-2157 Sheet 2	Containment Atmosphere Control System	Rev. 24
M-2157 Sheet 3	Containment Atmosphere Control System	Rev. 16
M-2157 Sheet 4	Containment Atmosphere Control System	Rev. 4
M-2157 Sheet 5	Containment Atmosphere Control Wetwell Sampling System	Rev. 0
M-2157 Sheet 6	Containment Atmosphere Control Cont. Rad. Monitoring LOOP A System	Rev. 0
M-2157 Sheet 7	Containment Atmosphere Control Cont. Rad. Monitoring LOOP B System	Rev. 0
M-2161 Sheet 1	Liquid Radwaste Collection System	Rev. 22
M-2161 Sheet 2	Liquid Radwaste Collection System	Rev. 16
M-2161 Sheet 3	Liquid Radwaste Collection System	Rev. 5
M-2172 Sheet 1	Emergency Switchgear Room Cooling System	Rev. 14
M-2187 Sheet 1	Reactor Building Chilled Water System	Rev. 26
M-2187 Sheet 2	Reactor Building Chilled Water System	Rev. 15

Flow diagram Dwg. No.	System	Revision
M-2187 Sheet 3	Reactor Building Chilled Water System	Rev. 0
M-2187 Sheet 4	Reactor Building Chilled Water Chiller 2K206A System	Rev. 3
M-2187 Sheet 5	Reactor Building Chilled Water Chiller 2K206B System	Rev. 5