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NUCLEAR ENGINEERING & SERVICES DEPARTMENT

Docket Nos. 50-352
50-353

License Nos. NPF-39
NPF-85

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Limerick Generating Station, Units 1 and 2
First Ten Year Interval Pump and Valve Inservice Testing (IST) Program

Gentlemen:

This letter is being submitted to provide a voluntary response to an NRC letter dated March 5, 1991, transmitting the Safety Evaluation (SE) and supporting Technical Evaluation Report (TER) for the Limerick Generating Station (LGS), Units 1 and 2, First Ten Year Interval Pump and Valve Inservice Testing (IST) Program.

The March 5, 1991 NRC letter indicated that the LGS IST Program relief requests submitted by our letter dated November 23, 1988, were acceptable for implementation provided that items identified in Appendix A of the TER be addressed within the time frame specified in the SE. Appendix A of the TER listed fifteen (15) IST Program anomalies, covering both the Program and selected relief requests, that were identified during the NRC review and which require resolution. The SE stipulated that the actions described in Items 1 through 9, 11, 12, 13, and 15 in Appendix A of the TER should be made within six months of receipt of the SE, while the actions described in Items 10 and 14 should be completed within one year of receipt of the SE or by the end of the next refueling outage, whichever is longer. We received the NRC letter and attached SE and supporting TER on March 15, 1991. The recommended changes to the LGS IST Program and selected relief requests were completed within the six (6) month period as specified in the SE.

Enclosure 1 of this letter contains a restatement of each IST Program anomaly identified in Appendix A of the TER followed by our response. Futhermore, eight (8) revised IST Program relief requests are enclosed. These relief request were revised in order to address IST Program anomalies identified by the NRC in its review. The relief

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requests were revised in accordance with the provisions specified in the NRC's SE and supporting TER. The relief request associated with TER Item 13 (i.e., Relief Request No. 52-VRR-1) has been revised, since only partial relief was granted, and was submitted separately for review and approval by our letter dated April 15, 1992.

Enclosure 2 of this letter contains an uncontrolled copy of latest revision of the LGS IST Program (i.e., Specification ML-008, Revision 2) for your use and information. Since we originally submitted the IST Program by our letter dated November 23, 1988, the document and associated relief requests have been revised in format. The enclosed copy incorporates changes recommended by the NRC in the SE and supporting TER, and was issued for use within six months of receipt of March 15, 1991 NRC letter, as specified in the SE. The enclosed Program document contains a "Record of Changes" section describing the latest changes to LGS IST Program. However, no IST Program relief requests have been revised except those described above.

In addition, we are taking this opportunity to inform the NRC of a possible discrepany in its SE concerning Relief Request No. 43-VRR-1. This relief request was included as part of our original IST Program, submitted by our letter dated November 23, 1988. However, Relief Request No. 43-VRR-1 was not specifically addressed in the NRC's SE, but was discussed in the TER under Section 3.4. This relief request applies to the Reactor Recirculation Pump System and requests relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code Section XI, Subsection IWV requirements concerning testing of the recirculation pump seal purge primary containment isolation check valves. As specified in TER Section 3.4, relief from the ASME Code requirements concerning testing of these check valves may be granted as requested in this relief request. Therefore, we consider Relief Request No. 43-VRR-1 approved, since the SE stipulates that the NRC concurs with the evaluation and conclusions contained in the TER.

If you have any questions or require additional information, please do not hesitate to contact us.

Very truly yours,

G. J. Beck
Manager
Licensing Section

Enclosures

cc: T. T. Martin, Administrator, USNRC, Region I (w/ enclosures)
T. J. Kenny, USNRC Senior Resident Inspector (w/ enclosures)

ENCLOSURE 1

Response to NRC Identified Anomalies Regarding
the
Limerick Generating Station
Units 1 and 2
First Ten Year Interval
Pump and Valve Inservice Testing
(IST) Program

Limerick Generating Station, Units 1 and 2
Response to the Identified Anomalies Regarding the First Ten Year Interval Pump and Valve Inservice Testing (IST) Program

In a letter dated November 6, 1987, the NRC transmitted a list of questions and comments that were developed during a review of the Limerick Generating Station (LGS), Units 1 and 2, First Ten Year Interval Pump and Valve Inservice Testing (IST) Program, and requested a meeting with Philadelphia Electric Company (PECo) representatives to discuss these issues. A meeting was held on February 24-25, 1988, with representatives from the NRC, to discuss the NRC's questions and comments regarding the LGS IST Program. Items 1 through 3 in Appendix A of the Technical Evaluation Report (TER) were discussed during this meeting, and each of the three (3) items is restated below followed by our response.

TER Appendix A, Item 1

In Item P.2 of the working meeting minutes dated March 31, 1988, the licensee committed to remove the reference in their program to the forward flow testing performed on Residual Heat Removal (RHR) system check valves 51-1(2)F031A, -1(2)F031B, -1(2)F031C, -1(2)F031D. A review of the current program indicates this change has not been made.

Response

The check valves identified in Item 1 above were not included as part of Question P.2 of the working meeting minutes. However, these check valves were discussed in Question O.2, and therefore, PECo will assume that Item 1 refers to Question O.2 in the March 31, 1988 working meeting minutes.

Question O.2 of the March 31, 1988 working meeting minutes, states: "What are the consequences of valves 51-1(2)F031A, -1(2)F031B, -1(2)F031C, and -1(2)F031D failing open following an exercise test? How would that failure be detected?" This question is a reiteration of question presented for discussion at the February 24-25, 1988 meeting.

During the February 24-25, 1988 meeting, PECo indicated that the consequences of the subject valves failing to re-close following an exercise test, would result in draining the RHR system piping to the suppression pool. This failure would be detected because, as part of the applicable testing procedures, closure of the check valves is audibly verified after the pump is stopped during the quarterly pump flow test. In addition, if the valves failed to close, RHR system inventory would be lost to the suppression pool causing an unexplainable increase in level. Furthermore, we indicated that these valves are verified to close quarterly and that the reference to "forward flow test only" would be deleted.

However, after further evaluation, PECo has determined that these valves perform a safety function to open and should be "forward flow tested" accordingly. Check valve closure after forward flow testing is verified in the valve surveillance test.

These check valves open and close periodically as follows: during normal plant operation for suppression pool cooling (i.e., seasonal operation only and affecting the A and B RHR loops only), during reactor shutdown (i.e., A and B loops only), and during quarterly inservice testing. However, they have a specific safety function in the open direction which is for Low Pressure Coolant Injection (LPCI) and suppression pool cooling in the event of a Loss of Coolant Accident (LOCA). Therefore, inservice testing is performed to verify that the valves perform their safety function which is to open on forward flow.

A surveillance test (ST) procedure provides for forward exercising these valves. After the ST is completed and the pump is shut off, the operator verifies that the valves re-close by one (1) of three (3) methods identified below.

1) Audible verification; listening for disc-to-seat impact.

2) Visual verification; verifying that the lever arm attached to the hinge pin swings from a full-open to a full-closed position.

3) High point vent low level annunciator. If the valve remains open, the RHR header will drain which would be signaled by the high point vent low level annunciator.

Because these methods are included in the ST procedure, we are assured that a stuck open valve will be detected immediately and corrective action will be taken.

TER Appendix A, Item 2

In Item P.3 of the working meeting minutes dated March 31, 1988, the licensee committed to investigate a positive method of full-stroke exercising RHR system mini-flow check valves 51-1(2)F046A, -1(2)F046B, -1(2)F046C, and -1(2)F046D. This remains an open item for the licensee.

Response

The RHR system check valves identified in Item 2 above were not included in Question P.3 of the meeting minutes. However, these check valves were discussed in Question O.3, and therefore, PECo will assume that Item 2 above refers to Question O.3 in the March 31, 1988 working meeting minutes.

Question O.3 of the March 31, 1988 working meeting minutes, states: "How are valves 51-1(2)F046A, -1(2)F046B, -1(2)F046C, and -1(2)F046D verified to full-stroke exercise quarterly?"

ASME Code Section XI, Paragraph IWV-3522, defines acceptable exercising procedures for check valves that are normally closed during plant operation and whose function is to open and permit flow on a reversal of closing differential pressure (i.e. forward flow). It is necessary for these valves to operate in a forward flow direction to permit a system, in which the valves are installed, to perform its intended safety function. Their operation in the forward flow direction is verified by observation of flow (i.e., pump achieving expected performance for configuration, audible system flow, or flow to drain).

During the February 24-25, 1988 meeting, PECo indicated these RHR system mini-flow line check valves are verified to stroke fully open during the quarterly pump tests by listening as the valve opens. However, the NRC did not consider this method as a positive indication of determining whether a valve stroked fully open. The quarterly stroke test was revised to include a quantitative flow rate to verify that the valves open as required.

These RHR mini-flow line check valves are full-stroke tested on a quarterly basis, in accordance with an ST procedure, by ensuring that the maximum required accident condition flow through the valve is achieved by measuring pump differential pressure and determining corresponding flow rate.

The design flow rate of the RHR mini-flow line is 10% of rated system flow (i.e., approximately 1,000 gpm). To verify that the required flow is achieved, the pump differential pressure is calculated and the corresponding flow rate is approximated using the pump curve developed from the preservice inspection flow test for the specific pump.

This method of determining flow verifies that the maximum required accident condition flow through the valve is achieved. In addition, this testing method is in accordance with the guidance specified in NRC Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," Attachment 1, Position 1.

TER Appendix A, Item 3

In Item Q.3 of the working meeting minutes dated March 31, 1988, the licensee committed to investigate a positive method of full-stroke exercising Core Spray system pump mini-flow check valves 52-1(2)F036A, -1(2)F036B, -1(2)F036C, and -1(2)F036D. This remains an open item for the licensee.

Response

The Core Spray (CS) check valves identified in Item 3 were not included in Question Q.3 of the meeting minutes. However, these check valves were discussed in Question P.3, and therefore, PECo will assume that the question pertains to Question Q.3 in the March 31, 1988 working meeting minutes.

Question P.3 of the March 31, 1988 working meeting minutes, states: "How are valves 52-1(2)F036A, -1(2)F036B, -1(2)F036C, and -1(2)F036D verified to full-stroke exercise quarterly?"

ASME Code Section XI, Paragraph IWV-3522, defines acceptable exercising procedures for check valves that are normally closed during plant operation and whose function is to open and permit flow on a reversal of closing differential pressure (i.e. forward flow). It is necessary for these valves to operate in a forward flow direction to permit a system, in which the valves are installed, to perform its intended safety function. Their operation in the forward flow direction is verified by observation of flow (i.e., pump achieving expected performance for configuration, audible system flow, or flow to drain). Additional verification of valve full-stroke capability is obtained by verifying flow rate as described below.

These CS mini-flow line check valves are full-stroke tested on a quarterly basis, in accordance with an ST procedure, by ensuring that the maximum required accident condition flow through the valve is achieved by measuring flow with ultrasonic flow instrumentation (for Unit 1), or by pump differential pressure and determining corresponding flow rate (for Unit 2).

The design flow rate of the CS mini-flow line is 10% of rated system flow (approximately 320 gpm). To verify that this flow is achieved for Unit 1, ultrasonic flow instruments are installed on the piping adjoining the valve to directly measure the flow rate. For Unit 2, a flow orifice differential pressure is used to determine the flow rate. Additionally, a plant modification is presently being installed to provide flow orifice measurement capability on the Unit 1 mini-flow line. These techniques provide a direct method for verifying that accident condition flow rates are achieved. In addition, these testing methods are in accordance with guidance specified in NRC GL 89-04, Attachment 1, Position 1.

Note

TER Appendix A Items 4 through 15 are addressed on the following pages of this enclosure (i.e., pages 5 to 9). These Items have not been restated; however, a response to each has been provided.

Response to TER Appendix A, Item 4

The table below specifies the instruments where Relief Request No. GPRR-2 is applied. The indicated accuracy, which is less than 6% in all cases, is determined by dividing the actual instrument tolerance by the reference value x 100%.

Relief Request No. GPRR-2 Instrumentation Requiring Relief

KEY
011 Emergency Service Water
012 Residual Heat Removal Service Water
049 Reactor Core Isolation Cooling
051 Residual Heat Removal
055 High Pressure Coolant Injection

FI Flow Indication (units in gpm)
PI Pressure Indicator (units in psig)

Sys.	Instr. No.	Refer Value	Instr. Range	Instr. Acc'y	Instr. Tol.	Indic. Acc'y
011	FLOW E1517	3,400	0-12,000	1.51%	181.2	5.33%
011	FLOW E1547	3,400	0-12,000	1.51%	1812	5.33%
011	FLOW E2517	3,400	0-12,000	1.51%	181.2	5.33%
011	FLOW E2547	3,400	0-12,000	1.51%	181.2	5.33%
012	FI-51-1R601A	9,000	0-12,000	3.20%	384	4.27%
012	FI-51-1R601B	9,000	0-12,000	3.20%	384	4.27%
012	FI-51-1R602A	9,000	0-12,000	3.20%	384	4.27%
012	FI-51-1R602B	9,000	0-12,000	3.20%	384	4.27%
049	FI-49-1R600-1	570	0-700	3.08%	21.56	3.78%
049	FI-49-2R600-1	650	0-700	3.08%	21.56	3.32%
051	FI-51-1R603A	10,000	0-12,000	3.20%	384	3.84%
051	FI-51-1R603B	10,000	0-12,000	3.20%	384	3.84%
051	FI-51-1R603C	10,000	0-12,000	3.20%	384	3.84%
051	FI-51-1R603D	10,000	0-12,000	3.20%	384	3.84%
051	FI-51-2R603A	10,000	0-12,000	3.20%	384	3.84%
051	FI-51-2R603B	10,000	0-12,000	3.20%	384	3.84%
051	FI-51-2R603C	10,000	0-12,000	3.20%	384	3.84%
051	FI-51-2R603D	10,000	0-12,000	3.20%	384	3.84%
055	FI-55-1R600-1	5,600	0-6,000	3.08%	184.8	3.30%
055	FI-55-2R600-1	5,300	0-6,000	3.08%	134.8	3.49%
055	PI-55-1R601	860	0-1,500	3.05%	45.75	5.32%
055	PI-55-2R601	860	0-1,500	3.05%	45.75	5.32%

The data in the above table are provided in response to a request by the NRC. This information was requested during a telephone discussion concerning the LGS IST Program between representatives of PECo and the NRC and its contractor, on August 27, 1991.

Response to TER Appendix A, Item 5

Relief Request No. GVRR-1 was granted with a provision that for penetrations with multiple valves being tested as a group, the maximum allowed leakage rate would be based on the smallest valve in the group. PECo has established maximum leakage criterion based on the smallest valve in the group where possible. However, there are 23 valve groups per unit at LGS where we can not meet this criterion. This issue was discussed during a telephone conversation with representatives from the NRC and its contactor and PECo, on August 27, 1991.

During that telephone conversation, PECo described several penetrations with valves of different sizes (i.e., 24-inch valve, 1.5-inch valve and 1-inch valve) that are tested in parallel. Because of the large difference in valve size, we are unable to assign a maximum valve group leak rate that is low enough to detect significant leakage from the 1-inch valve, and high enough to allow acceptable leakage from the 24-inch valve. Assigning a maximum leakage value based on the smallest valve would result in unnecessary maintenance being performed due to acceptable leakage through the larger valve. Based on our discussions with the NRC, performing maintenance on these valves was determined to be unnecessary. Therefore, we established maximum allowable leakage rates based on the summation of the individual valve leak rates.

The individual valve leak rates are determined using ASME Section XI Code requirements. Additionally, an "alert" limit is established based on previous valve group test results. This "alert" limit is used for comparing current test data with previous test results. In addition, the "alert" value is used to trend the leak tight performance of the valve group.

Of the 23 valve groups identified, 14 have sufficient test taps available to perform visual leakage inspections which can be used for detecting leakage through the smaller valves in the group. This visual inspection is performed when leak rates exceed the "alert" limit even though the total leak rate may be less than the maximum allowed for the group. For the remaining 9 groups where test taps are not available, a conservative combined leak rate is used to assess the leak tight integrity of the valves in the group. If leak rates exceed the specified "alert" limit, corrective actions are implemented.

The method used to establish the maximum allowable leak rate for each valve, and subsequently the valve group, is based on the ASME Section XI Pargragh IWV-3426 criteria. Although individual valve leak rates are not being measured, this method meets the intent of the Code since the leakage value is quantified and corrective action is taken if the total leakage for the group exceeds the maximum allowed for the group.

Response to TER Appendix A, Item 6

Relief Request No. GVRR-4 was revised to add the following statement to the "Alternate Test" section: "Both valves will be declared inoperable if testing indicates the valves do not close on reverse flow."

Response to TER Appendix A, Item 7

Relief Request No. GVRR-5 and associated valve tables were revised to add reverse exercise testing requirements for the following valves.

49-1(2)017	55-1(2)025
49-1(2)018	55-1(2)026
49-1(2)F068	55-1(2)F080
49-1(2)F081	55-1(2)F094

Response to TER Appendix A, Item 8

Relief Request No. 20-VRR-1 and associated valve tables were revised to add quarterly stroke time requirements, and to change the exercise test interval from 18 months to quarterly. In addition, a limiting diesel start time was added to the relief request.

Response to TER Appendix A, Items 9 and 10

Relief Request Nos. 55-VRR-1 and 55-VRR-2 were revised to add the following statement to the "Alternate Tests" section: "...partial stroke will be performed after valve re-assembly."

Response to TER Appendix A, Item 11

Relief Request No. GVRR-6 was revised in order to follow the recommendations for sample disassembly and inspections specified in NRC Generic Letter 89-04, Attachment 1, Position 2, "Alternative to Full Flow Testing of Check Valves." In addition, this relief request was revised to add the following statement to the "Alternate Tests" section: "...partial stroke will be performed after valve re-assembly."

Response to TER Appendix A, Item 12

Relief Request No. 41-VRR-2 and the associated valve tables were revised to add stroke time requirements in the open direction for relief valves PSV-41-1(2)F013E,H,K,M, and S.

Response to TER Appendix A, Item 13

Relief Request No. 52-VRR-1 was revised to provide additional justification in the "Basis For Relief." In addition, this relief request was revised to provide further clarification that manually stroking the valve will be performed in accordance with ASME Section XI Paragragh IWV-3522(b) requirements. This revised relief request was previously submitted for NRC review and approval by our letter dated April 15, 1992.

Response to TER Appendix A, Item 14

The interim relief that was granted for Relief Request No. 90-VRR-1 has now expired. This relief request is being deleted from the LGS IST Program in Addendum 1 to Revision 2 of the Program. Stroke time testing for the valves associated with this relief request is being performed in accordance with the applicable ASME Section XI requirements and the guidance provided in NRC Generic Letter 89-04 as appropriate.

Response to TER Appendix A, Item 15

TER Appendix A, Item 15 states that the control rod drive (CRD) scram accumulator check valves should be categorized as A/C instead of C, as specified in the previous IST Program. Additionally, the information describing the pressure decay acceptance criteria used to test these valves should be provided to the NRC.

The applicable IST Program valve tables have been revised to indicate Category A/C valves with the appropriate LP-T designation (i.e., ASME Section XI leak testing) in the TEST-FREQ column of the table. Also, Cold Shutdown Test Justification 47-VCS-1 has been revised to indicate Category A/C valves.

These scram accumulator check valves, as described in the LGS Updated Final Safety Analysis Report (UFSAR) Section 4.6.1, store sufficient energy to fully insert control rods at low reactor pressure (i.e., less than 600 psig) when CRD pumps are unavailable. Above 600 psig, vessel pressure is great enough to insert all control rods without CRD accumulator assistance. During normal plant operation (OPCON 1), the reactor operates at approximately 1,000 psig. Should a sudden decrease in reactor pressure occur, plant systems will automatically initiate a closure of the main steam line isolation valves (MSIVs) and subsequent reactor scram at 756 psig. Any event which would depressurize the reactor in OPCON 1 would result in a scram initiation signal prior to reaching 600 psig reactor vessel pressure, the pressure at which accumulator assistance would be required.

MSIV closure due to low steam line pressure is discussed in Section 15.2 of the LGS UFSAR and Section 3/4.3 of the Technical Specifications. The MSIVs will not begin to close for approximately 13 seconds following this event. However, once valve movement begins, these valves will close in three (3) to five (5) seconds. Therefore, a scram signal will result within the first 18 seconds after reactor pressure reaches the low pressure setpoint of 756 psig. Adding a maximum control rod scram insertion time of seven (7) seconds to the initiating event results in a total maximum transient response time of 25 seconds. Therefore, the CRD scram accumulator check valves need to be demonstrated operable for at least 25 seconds in OPCON 1.

During OPCON 2 (i.e., Start-up), the MSIV low steam line pressure isolation is not required by plant Technical Specifications, and is bypassed. If, during periods of reduced reactor pressure, CRD accumulator operability is threatened by the tripping of both CRD water pumps, sufficient administrative controls exist to ensure control rod insertion prior to substantial CRD accumulator pressure loss. As required by plant Technical Specifications and station Off-Normal Procedure 107 (ON-107), the reactor operator will immediately scram the reactor anytime two (2) or more accumulators reach 970 psig ±15 psig with reactor pressure less than 900 psig. Initial entry into the ON-107 procedure is made as soon as a CRD pump trips, fails to provide sufficient accumulator charging water pressure, or indicates drive water filter problems. Operators are trained and tested on entry symptoms of this procedure (including simulator instruction). Upon entry, operators monitor CRD accumulator instrumentation for signs of accumulator pressure decay. In the event accumulator trouble alarms are received, the operated will take the appropriate actions as directed by procedures. Allowing 20 seconds from the time of the second accumulator alarm for trouble alarm acknowledgement and operator response, and an additional 7 seconds for control rod insertion, results in a total maximum time of 27 seconds.

For inservice testing purposes, pressure decay testing is used in lieu of specified leakage testing so all 185 scram accumulator check valves can be tested simultaneously. The acceptance criteria for these valves is an accumulator pressure decay not to exceed 195 psig in 30 seconds. This test is performed in accordance with Surveillance Test (ST) Procedure ST-3-047-203-1(2), which demonstrates that the check valves close on reverse flow and that leakage through the valve is less than 195 psig in 30 seconds. This acceptance criteria is based on the system minimum requirements as described above and verified as follows.

> The hydraulic control unit accumulator pressure is confirmed to be at normal operating condition of 1,050 to 1,150 psig with the CRD pump operating. The CRD pump is secured and a stopwatch is immediately started. Accumulator pressure is then monitored for 30 seconds. If accumulator pressure at the end of 30 seconds is greater than or equal to 970 psig ±15 psig, the valves are acceptable and the ST is signed-off satisfactory.

Satisfactory completion of this ST ensures that the valves will close on reversal of flow and that accumulator pressure will be maintained to enable control rod insertion in the event of a scram at low reactor pressure.

Revised IST Program
Relief Requests

RELIEF REQUEST NO. GPRR-2, REVISION 1

Pump(s):

Main Control Room Chilled Water	0AP162 0BP162	
Residual Heat Removal Service Water	0AP506 0BP506	0CP506 0DP506
Emergency Service Water	0AP548 0BP548	0CP548 0DP548
Residual Heat Removal	1AP202 1BP202 1CP202 1DP202	2AP202 2BP202 2BP202 2DP202
Reactor Core Isolation Cooling	1OP203	2OP203
High Pressure Coolant Injection	1OP204	2OP204

Testing Requirement(s): Pump instrumentation accuracy and full-scale range shall be within the limits specified in ASME Section XI Subsection IWP Articles IWP-4110 and IWP-4120.

Basis for Relief: Various permanently installed pressure and flow instruments are calibrated to an accuracy that exceeds ±2% of full-scale or have a full-scale range that exceeds the three times the reference value criteria that is specified by the Code. Although these instruments do not meet the Code requirements, they are able to provide the same or better indication accuracy at the reference value that is allowed by the Code.

For instruments to be in compliance with ASME Section XI Subsection IWP, two requirements must be satisfied. The first requirement (specified in IWP-4110, Table IWP-4110-1) states that flow and pressure instrumentation must be accurate to within ±2% of the full-scale value; the second requirement (specified in IWP-4120) states that "the full-scale range of each instrument shall be three times the reference value or less." Based on these requirements, a maximum indication accuracy of ±6% can be calculated by comparing the actual tolerance of the instrument to the reference value being measured. An example of calculating the indicated accuracy is shown below.

Example
Using a flow reference value of 10,000 gpm and a flow gauge with an actual full-scale range of 12,000 gpm that is calibrated to ±2% of full-scale:

Code Requirement
Reference value = 10,000 gpm
IWP-4120, 3 x reference value = 30,000 gpm
Instrument tolerance = ±600 gpm (±2% x 30,(gpm)

Indicated accuracy
±600 gpm / 10,000 gpm x 100% = ±6%

The indicated accuracy for the instruments on the pumps listed are less than or equal to ±6% at the reference value. These accuracies are the same or better than allowed by the Code.

Alternate Testing: The existing permanently installed pump instrumentation is acceptable provided the indicated accuracy is less than or equal to ±6% of the reference value. No alternate testing will be performed.

RELIEF REQUEST NO. GVRR-4, REVISION 1

Valve(s):	49-1032	49-2032
	49-1033	49-2033
	51-1115A,C	51-2115A,C
	51-1116A,C	51-2116A,C
	52-1045A	52-2045A
	52-1046A	52-2046A

Category: C

Testing Requirement(s): Exercise in the reverse direction.

Basis for Relief: These check valves are installed in series and are not provided with a means to facilitate individual exercising. There are no vents, drains, or test valves located between each pair of valves, therefore, no practical method exists to verify proper operation of the individual valves upon reversal of flow. The fact that two valves are in series lesser the probability of failure to retard backflow. In all cases, of check valves in series, there is a means provided to verify proper valve operability of at least one of the two valves.

Alternate Testing: Each set of series check valves will be exercised quarterly, in the reverse direction, as a unit. Both valves will be declared inoperable if testing indicates that the valves do not close on reverse flow.

RELIEF REQUEST NO. GVRR-5, REVISION 1

Valve(s):	49-1017	49-2017	55-1025	55-2025
	49-1018	49-2018	55-1026	55-2026
	49-1F068	49-2F068	55-1F080	55-2F080
	49-1F081	49-2F081	55-1F094	55-2F094

Category: C

Testing Requirement(s): Exercise in the forward and reverse direction.

Basis for Relief: These check valves, that function as vacuum relief valves, are installed in series-parallel and were not provided with air operators to facilitate testing (exercising). The piping configurations in the High Pressure Coolant Injection and Reactor Core Isolation Cooling systems do not allow for individual testing of these valves. Since a series-parallel arrangement was used, there are multiple combinations of flowpaths any one of which would provide vacuum relief. No single valve failure would prevent the system from providing vacuum relief. Because single valve failure will not prevent the system from functioning as designed, and system configuration does not allow for individual valve testing in the forward direction, testing as a unit will verify that the system can provide vacuum relief as designed.

Additionally, the existing system configuration does not allow for individual valve testing in the reverse direction. However, there are sufficient test taps available to allow for testing each parallel set of check valves to verify closure on reverse flow.

Alternate Testing: Check valves will be tested quarterly, in the forward direction, as a unit (4 valves). All valves will be declared inoperable if the group fails to allow the required forward flow. Each parallel set of check valves (2 sets, 2 valves per set) will be tested quarterly in the reverse direction. Both valves in the set will be declared inoperable if testing indicates that the valves do not close on reverse flow.

RELIEF REQUEST NO. GVRR-6, REVISION 1

Valve(s):	51-1032A,B	51-2032A,B
	51-1115B,D	51-2115B,D
	51-1F090A,B,C,D	51-2F090A,B,C,D
	52-1045B	52-2045B
	52-1F030A,B	52-2F030A,B
	55-1048	55-2048
	55-1F078	55-2F078

Category: C

Testing Requirement(s): Exercise in the reverse direction.

Basis for Relief: The above valves function as the safeguard piping stay fill or condensate transfer stay fill check valves. Because of system configuration, these valves cannot be verified closed using visual verification, system parameters or by leak testing methods. Valve disassembly will be required to verify reverse direction closure. Disassembly of the valves, if attempted at cold shutdown, could result in a delayed plant start-up.

Alternate Testing: Condensate transfer stay fill check valves will be verified to operate in the reverse direction during refueling or associated system mini outages by valve disassembly. Safeguard piping stay fill check valves will be verified to operate in the reverse direction during refueling or Safeguard Piping Fill System mini outages by valve disassembly; partial stroke will be performed after valve reassembly.

In accordance with the NRC guidance provided in Generic Letter 89-04 Attachment 1, Item 2, a sample disassembly and inspection plan is being adopted for the check valves identified above. This plan groups valves of identical construction which are used in similar applications. Input criteria to the group selections included valve design features and materials, service conditions, maintenance/failure history and piping arrangement considerations. This information is documented in Limerick's Check Valve Design Application Review (1988) which was prepared in response to INPO SOER 86.03. The valve groupings and inspection frequencies are described on the following page.

RELIEF REQUEST NO. GVRR-6 (continued)

UNIT 1

GROUP	VALVES	NUMBER OF VALVES	DISASSEMBLY & INSPECTION FREQUENCY
1	51-1032A,B 51-1F090A,B,C,D	6	2 valves each refueling outage
2	51-1115B,D 52-1045B	3	1 valve each refueling outage
3	52-1F030A,B 55-1F078	3	1 valve each refueling outage
4	55-1048	1	1 valve each refueling outage

UNIT 2

GROUP	VALVES	NUMBER OF VALVES	DISASSEMBLY & INSPECTION FREQUENCY
1	51-2032A,B 51-2F090A,B,C,D	6	2 valves each refueling outage
2	51-2115B,D 52-2045B	3	1 valve each refueling outage
3	52-2F030A,B 55-2F078	3	1 valve each refueling outage
4	55-2048	1	1 valve each refueling outage

RELIEF REQUEST NO. 20-VRR-1, REVISION 1

System: Emergency Diesel Generators

Valve(s):

20-92-1302 A,B,C,D	20-92-2302 A,B,C,D
20-92-1303 A,B,C,D	20-92-2303 A,B,C,D
20-92-1308 A,B,C,D	20-92-2308 A,B,C,D
20-92-1309 A,B,C,D	20-92-2309 A,B,C,D

Category: B

Function: Emergency Diesel Generator starting air valves

Testing Requirement(s): Quarterly stroke time measurement.

Basis for Relief: These valves are non ASME but are in air starting lines that are designed to ASME III Class-3 requirements. The valves were not provided with any position indication, therefore stroke timing by local or remote position indication is not possible. Significant degradation or failure of these valves to operate would, however, be indicated by an increased starting time on the Emergency Diesel Generator or its failure to start. Because it is not possible to measure individual valve stroke times, Emergency Diesel Generator starting times will be measured in its stead.

Alternate Testing: In lieu of the individual valve stroke time testing required by IWV-3413, failure of the Emergency Diesel Generator to start within 10 seconds will be evaluated to determine if the cause can be attributed to the associated starting air valves. (Note: Start is defined as the diesel accelerating to 200 rpm in response to a start signal). Alternate isolation of the air headers will verify individual performance these valves.

RELIEF REQUEST NO. 41-VRR-2, REVISION 1

System: Nuclear Boiler

Valve(s): PSV-41-1F013E, H, K, M, S
PSV-41-2F013E, H, K, M, S

Category: B, C

Function: Depressurization of the RCS to allow for low pressure coolant injection.

Testing Requirement(s): Exercise quarterly and stroke time.

Basis for Relief: If any of these valves fail to reclose after testing, the plant would be placed in a LOCA condition requiring plant shutdown in accordance with T.S. 3.4.2.b. In addition, a recent study (BWR Owner's Group Evaluation of NUREG-0737, Item II.K.3.16, Reduction of Challenges and Failures of Relief Valves) recommends that the number of ADS openings be reduced as much as possible. Based on this study and the potential for causing a LOCA condition, exercise testing of the ADS valves will be performed during restart after refueling.

Also, a direct method to stroke time the ADS valves is not available since the control room indication only indicates if the solenoid valve is energized, and not the actual valve disc position. An alternate indirect method to stroke time the ADS valves is available which includes measuring the time from the initiation signal for the valve, and the acoustic monitoring detection on the tail pipe.

Alternate Testing: Exercise during restart after refueling. Stroke time test during restart after refueling by timing the interval between energizing the pilot valve and accoustics monitoring detection on the tail pipe.

RELIEF REQUEST NO. 55-VRR-1, REVISION 1

System: High Pressure Coolant Injection (HPCI)

Valve(s): 55-1F045
55-2F045

Category: C

Function: HPCI pump suction from suppression pool check.

Testing Requirements: Exercise in the forward direction.

Basis for Relief: Full stroke exercising of these valves in the forward direction by normal system flow paths would require injecting poor quality suppression pool water into either the reactor vessel or the condensate storage tank. Technical Specification 3.4.4 requires Reactor Coolant System conductivity and chloride levels to be within specified levels. Injection of poor quality water from the suppression pool into the condensate storage tank (reactor coolant makeup water) or Reactor Coolant System, would result in increased chloride and conductivity levels exceeding Technical Specification limits.

These valves are exercised by returning flow to the suppression pool via the test return loop, however, due to the smaller line size of the test return loop, the flow rates that would be obtained would result in only a partial opening of the valves. Because no means is available to verify a full stroke in the open direction for these valves, valve disassembly will be required. Disassembly of the valves, if attempted at cold shutdown, could result in a delayed plant start-up.

Alternate Testing: Valves will be partial stroked in the forward direction quarterly. Full stroke exercise will be verified at refueling by valve disassembly; partial stroke will be performed after valve reassembly.

RELIEF REQUEST NO. 55-VRR-2, REVISION 1

System: High Pressure Coolant Injection (HPCI)

Valve(s):
55-1058
55-1059
55-2058
55-2059

Category: C

Function:
HPCI pump discharge to Feedwater
HPCI pump discharge to Core Spray

Testing Requirements: Exercise in the forward direction.

Basis for Relief: Verifying forward flow operability during operation, would require the injection of relatively cold water from the condensate storage tank into the reactor vessel via the HPCI pump. The introduction of relatively colder water into the Reactor Coolant System would result in an excessive number of thermal cycles to system piping and components. Additionally, the introduction of colder water would increase reactivity due to the colder moderator temperature. Full exercise therefore, can only be accomplished by valve disassembly. Valve disassembly if attempted at cold shutdown could result in a delayed plant start-up.

Alternate Testing: Full stroke exercising in the forward direction will be accomplished at refueling by valve disassembly; partial stroke will be performed after valve reassembly.