

SAFETY EVALUATION REPORT

APPENDIX J REVIEW

PILGRIM, UNIT 1

DOCKET NO. 50-293

1.0 INTRODUCTION

By letter dated August 7, 1975[1], the NRC requested Boston Edison Company (BEC) to review its containment leakage testing program for Pilgrim, Unit 1 and the associated Technical Specifications, for compliance with the requirements of Appendix J to 10 CFR Part 50.

Appendix J to 10 CFR Part 50 was published on February 14, 1973. Since there already were many operating nuclear power plants and a number of others in advanced stages of design or construction, the NRC decided to have these plants re-evaluated against the requirements of this new regulation. Therefore, beginning in August 1975, requests for review of the extent of compliance with the requirements of Appendix J were made of each licensee. Following the initial responses to these requests, NRC staff positions were developed which would assure that the objectives of the testing requirements of the above cited regulation were satisfied. These staff positions have since been applied in our review of the submittals filed by the Pilgrim, Unit 1 licensee. The results of our evaluation are provided below.

2.0 EVALUATION

Our consultant, the Franklin Research Center, has reviewed the licensee's submittals [2, 3, 4, 7] and prepared the attached technical evaluation of containment tests for Pilgrim, Unit 1. We have reviewed this evaluation and concur in its bases and findings.

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Enclosure

In its report, the staff's consultant recommended that the licensee's request (in Reference 3) to exempt the Traversing Incore Probe (TIP) System lines from leakage testing not be accepted.

Even though TIP penetrations are small, the potential for leakage of containment atmosphere can be substantial because of the number of lines involved. Therefore, TIP penetrations size considerations alone do not justify granting a permanent exemption. Furthermore, another BWR licensee has successfully tested these valves, without installing additional valves in the lines, by disconnecting the TIP tubes at fittings just inside the drywell. This technique is now in effect at several BWR units. Consequently, the staff's consultant finds that BEC's proposal to permanently exempt these lines from Type C testing is unacceptable and that these valves should be tested in accordance with Appendix J. We concur with our consultant's conclusion that the TIP valves must be tested in accordance with Appendix J.

In Reference 2, BEC requested an exemption to permit performance of the local leak rate test before the integrated leak rate test (Type A) and add subsequent leakage changes to the integrated leak test results.

The intent of the Appendix J, 10 CFR Part 50 requirement that the integrated leak rate test be conducted following the required containment inspection and before any repairs or adjustments are made is to provide assurance that the containment is tested in as close to the "as is" condition as practical. Due to design considerations many local leak rate tests are incapable of establishing what portions of the total measured leakage was into containment and what portion was out of the containment. Consequently, if the local leak rate tests were conducted before the integrated leak rate test, an

element of uncertainty would exist as to the method and its accuracy when correcting back to establish the "as is" integrated leak rate results.

Providing that the total measured local leak rate is conservatively assumed to be out of the containment when making the back correcting calculations to establish the "as is" integrated leak rate, the staff and its consultant find that the proposed approach is acceptable.

In Reference 2, BEC requested an exemption from the requirement to test the Main Steam Isolation Valves according to 10 CFR Part 50, Appendix J. BEC proposed to test at 23 psig rather than Pa (45 psig).

Section III.C.2 of Appendix J requires that containment isolation valves be locally leak tested (Type C) at the peak calculated containment pressure, Pa. BEC has requested an exemption to allow a continuation of a 23 psig test pressure for the main steam isolation valve. The main steam system design in most operating BWR plants necessitates leak testing of the MSIV's by pressurizing between the valves. The MSIV's are angled in the main steam lines to afford better sealing in the direction of accident leakage while acting to lift the inboard disc off its seat resulting in excessive leakage when pressurized in the reverse direction at full containment pressure. The reduced pressure test at 23 psig does not cause the inboard disc to unseat, and at the same time will result in a conservative determination of the leakage rate through the valves because of the angled design. Therefore, we consider it to be an acceptable practice and find the proposed exemption from Appendix J to be acceptable.

In Reference 2, BEC requested an exemption from the requirement for Type C testing of check valves 301-98 on the Control Rod Hydraulic Drive System.

According to Note 5 in Reference 3, this valve cannot be leak tested due to system design and, consequently, BEC requested an exemption from the requirement for testing. They requested that this action be taken in lieu of installing appropriate test fittings.

Given that the licensee has installed test fittings to enable testing of the feedwater check valves (Reference 7), it must follow that the CRD system check valve 301-95, which connects to the same line, could be simultaneously tested by opening valve 301-99.

In the event of a design basis accident, check valve 301-95 would be relied upon to perform a containment isolation function. For that reason our consultant finds the requested exemption to be unacceptable and that the licensee should conform to the requirements of Appendix J. We concur with our consultant's conclusion that check valve 301-95 on the Control Rod Hydraulic Drive System must be subjected to a Type C leak test.

In Reference 2, BEC requested an exemption from the requirements for Type C testing of standby Liquid Control Injection Valve number 1101-15. Further information provided in Reference 3 shows that this valve is inside containment and also cannot be leak tested due to system design.

In Reference 3, the licensee states that another check valve (1101-16) on the same line of the Standby Liquid Control System is Type C tested, which suggests that the licensee considers this penetration to be a possible significant leakage path. In the event that check valve 1101-16 fails to seat properly during the course of an accident, check valve 1101-15 will be relied upon to operate successfully. For these reasons we and our consultant find

the requested exemption is inappropriate. Action should be taken to enable Type C testing of check valve 1101-15 in order to conform to the requirements of Appendix J.

In Reference 7, BEC states that replacing the reactor water cleanup check valves with air-testable check valves was not considered justified since the purpose of these valves is to limit reverse direction flow in case of a postulated pipe break until downstream motor operated isolation valves are shut.

Our consultant concludes that there is a need to test this valve in accordance with Appendix J - 10 CFR Part 50 since valve 1201-82 is a normally open manual valve and containment integrity is dependent upon the leak tightness of check valve 1201-81.

Furthermore, check valve 1201-81 can be tested during the normal feedwater line testing by opening Valve No. 1201-82. Hence, leakage testing in accordance with Appendix J - 10 CFR Part 50 is both feasible and necessary.

The licensee states that replacing the core spray to reactor check valves with air testable check valves is not considered justified since the purpose of these valves is to limit reverse flow in case of a postulated upstream pipe break until downstream motor-operated isolation valves are shut. The licensee also quotes FSAR 5.2.3.5.1. of the Pilgrim Nuclear Power Station which states that "automatic isolation valves in the usual sense are not used on the inlet lines of the reactor core and containment cooling systems and reactor feedwater systems since operation of these systems is essential following a design basis loss-of-coolant accident.

In the event of a design basis accident, the core spray system motor operated valves MO 1400-25A & B and MO 24A & B would open permitting flow to the core spray discharge. Assuming a single active failure of one core spray pump, a potential leak path would then exist through the untested check valves, cut to the condensate transfer system which is vented to the atmosphere. Consequently, our consultant finds that check valves A0-1400-9A & B should be tested in accordance with 10 CFR Part 50, Appendix J to substantiate their integrity as a qualified containment boundary. We concur with our consultant's conclusion that the proposed requirement to test these valves is appropriate.

3.0 CONCLUSION

Based on our review of the attached technical evaluation report as prepared by our consultant and on the above discussion, we conclude that:

- 1) The request to exempt Type C testing of the Traversing Incore Probe (TIP) lines is unacceptable. These lines should be tested in accordance with Appendix J.
- 2) Local leak rate tests may be performed prior to Type A testing provided that correction of the Type A results to determine the "as is" condition includes the conservative assumption that the change between pre-and-post repair local leakage was entirely containment out-leakage.
- 3) Testing of main steam isolation valves at 1/2 Pa by pressurizing between the valves is acceptable.
- 4) The following valves should be tested in accordance with Appendix J because exemptions are inappropriate:

CRD Check Valve 301-98
Stand-by Liquid Check Valve 1101-15
RWCU Check Valve 1201-81
Core Spray Check Valves AO-1400-9A & B

4.0 REFERENCES

- 1) NRC generic letter regarding implementation of 10 CFR Part 50, Appendix J, at Pilgrim 1, dated August 7, 1975.
- 2) October 10, 1975; reply to NRC Division of Reactor Licensing From Boston Edison Company (J. C. Howard).
- 3) January 27, 1976; additional information from Boston Edison Company (J. E. Howard) to NRC Division of Reactor Licensing (D. L. Ziemann).
- 4) June 4, 1976; additional information from Boston Edison Company (J. E. Howard) to NRC Division of Reactor Licensing (D. L. Ziemann).
- 5) July 23, 1976; reply by NRC (D. L. Ziemann) to Boston Edison Company (J. E. Larson).
- 6) August 12, 1980; request for information by NRC (T. M. Novak) to BEC (G. C. Andoguini).
- 7) October 27, 1980; reply to Reference 6 from BEC (A. V. Morisi) to NRC (T. A. Ippolito).

(DRAFT)

TECHNICAL EVALUATION REPORT

CONTAINMENT LEAKAGE RATE TESTING

BOSTON EDISON COMPANY
PILGRIM UNIT 1

NRC DOCKET NO. 50-293

NRC TAC NO. 08836

NRC CONTRACT NO. NRC-03-79-118

FRC PROJECT C5257

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 TECHNICAL EVALUATION REPORT
 CONTAINMENT LEAKAGE TESTING
 PILGRIM UNIT 1

CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>
1.0	BACKGROUND	1
2.0	EVALUATION CRITERIA	2
3.0	TECHNICAL EVALUATION	3
3.1	Request for Exemption from Requirements of Appendix J	3
3.1.1	Traveling Incore Probe System-TIPS	3
3.1.2	Exemption from Airlock Testing Procedures	3
3.1.2.a	After Each Opening	4
3.1.2.b	Reduced Pressure After Each Opening	5
3.1.2.c	Reduced Pressure Six Month Intervals.	5
3.1.3	Alteration of Local Leak Rate Test Sequence	6
3.1.4	Feedwater Check Valves Test	7
3.1.5	Main Steam Isolation Valves Test at 1/2 PA	7
3.1.6	Exemption From Type C Testing For Certain Valves	8
3.1.6.a	Valves Which Terminate Below Surface of Suppression Pool	8
3.1.6.b	Control Rod Hydraulic Drive System	9
3.1.6.c	Standby Liquid Control Injection System	10
3.1.6.d	Reactor Water Cleanup Return	10

CONTENTS

	3.1.6.e	Reactor Core Isolation Cooling (RCIC) Pump Discharge	11
	3.1.6.f	High Pressure Coolant Injection (HPCI) Pump Discharge	11
	3.1.6.g	Core Spray to Reactor.	12
	3.1.6.h	Residual Heat Removal (RHR) Vessel Injection Lines	13
4.0	CONCLUSIONS	14
5.0	REFERENCES	15

1.0 BACKGROUND

On August 5, 1975 [1] the NRC requested Boston Edison Company (BEC) to review the containment leakage testing program at Pilgrim 1 Nuclear Plant (Pilgrim 1) and to provide a plan for achieving full compliance with 10CFR50, Appendix J including appropriate design modifications, changes to technical specifications, or requests for exemption for the requirements pursuant to 10CFR50.12, where necessary.

BEC responded to the NRC's request in a letter dated October 10, 1975 [2] in which it requested exemptions from the requirement in several areas. Additional supporting information was supplied to the NRC by BEC in two follow-up letters dated January 27, 1976 [3] and June 4, 1976 [4].

The need for further clarification of specific exemption requests was indicated by the NRC in a letter dated August 12, 1980 [6]. BEC replied in a letter, dated October 27, 1980 [7] clarifying positions taken by BEC regarding testing procedure and exemptions for various check valves.

The purpose of this report is to provide technical evaluations of all outstanding requests for exemption submitted by BEC relative to Pilgrim 1.

2.0 EVALUATION CRITERIA

Code of Federal Regulations, Title 10, Part 50 (10CFR50), Appendix J, Containment Leakage Testing, was specified by the NRC as containing the criteria for the technical evaluations. Where applied to the following evaluations, the criteria are either referenced or briefly stated, where necessary, in support of the determinations or conclusions. Furthermore, in recognition of plant specific conditions that could lead to requests for exemption not explicitly covered by the regulation, the NRC directed that the technical review constantly emphasize the intent of Appendix J, that potential containment atmospheric leakage paths be identified, monitored, and maintained below established limits.

3.0 TECHNICAL EVALUATION

3.1 Requests for Exemption from the Requirements of Appendix J

Reference 2 outlines BEC's request for exemption from a number of requirements of 10CFR50, Appendix J in response to NRC's generic letter, Reference 1. Technical evaluations of these requests for exemption, as modified in subsequent correspondence, are provided in the sections below.

3.1.1 TIPS - Traveling Incore Probe System

According to Reference 3, BEC states that Traverse Incore Probe System Lines are not fit with appropriate testing connections and thus cannot be tested. To prevent leakage of containment atmosphere from TIP probe lines, BEC states that they are isolated by automatic closure of a ball valve. As additional support for their claim that TIP lines need not be tested, BEC states that a shear valve can be manually actuated from the control room in the event a probe fails to retract.

FRC EVALUATION:

Although TIP penetrations are small, because of the number of lines involved the potential for leakage of containment atmosphere can be substantial and does not justify permanent exemptions. Furthermore, another BWR licensee has successfully tested these valves without installing additional valves in the lines by disconnecting the TIP tubes at fittings just inside the drywell. This technique is now in effect at several BWR units. Consequently, FRC finds that BEC's proposal to permanently exempt these lines from Type C testing is unacceptable and that these valves should be tested in accordance with Appendix J.

3.1.2 Exemption from Airlock Testing Procedures as Stated in Appendix J

According to Section II.G.2 of Appendix J, Type B tests are required to detect local leaks and measure leakage across pressure-containing boundaries

for airlock door seals and door operating mechanisms. In Reference 2, Boston Edison Company requests permission to modify their Type B testing procedure as follows:

3.1.2.a After Each Opening Exemption

Section III.D.2 of Appendix J (prior to the 1980 rule change) stated that airlocks which are opened between 6 month test intervals should be retested "after each opening". BEC requests that a series of openings closely spaced in time be considered the same as a single opening, and that testing occur after that series of openings.

EVALUATION:

Airlocks represent a potentially large leakage path which is more subject to human error than other isolation barriers; therefore they are tested more often than other isolation barriers. For certain reactors, however, frequent usage of airlocks has occurred. Testing of airlocks after each opening may represent a situation in which a more rapid degradation occurs to the critical isolation barriers being tested. Moreover, experience obtained since 1969 from the testing of airlocks indicates that only a very few airlocks tested have resulted in greater than allowable leak rates. This infrequent failure of airlock tests, plus the possibility that excessive testing could lead to a loss of reliability due to equipment degradation leads to the judgment that testing after each opening may be undesirable.

As of October 22, 1980, Appendix J, Section III.D.2 was revised by the NRC to provide airlock testing requirements which met the intent of the previous rule but were more practical in light of the experience gained in airlock testing at operating reactors since the issuance of Appendix J.

Basically, the revised section requires airlocks to be tested as follows:

1. Every 6 months, at an internal pressure not less than Pa.
2. At the end of periods when integrity is not required and airlocks have been opened, at an internal pressure not less than Pa.

*only airlocks
need to do
this*

3. When integrity is required, within 3 days of opening (or every 3 days during periods of frequent openings) by:
- a. Pressurizing testable seals, or
 - b. Pressurizing to less than Pa (as specified in Technical Specifications).

In view of this modification of paragraph III.D.2.(b)(iii) (October 22, 1980) of 10CFR50 Appendix J, FRC concludes that no exemption from 10CFR50, Appendix J is needed in that the revised requirements are compatible with BEC's request.

3.1.2.b Reduced Pressure After Each Opening

Section III.B.2 of Appendix J states that all preoperational and periodic Type B tests shall be performed by local pneumatic pressurization of containment penetrations at a pressure not less than Pa. Boston Edison Company requests an exemption from Appendix J which would allow testing of these door seals at a pressure ≥ 10 psig as required by Technical Specifications.

FRC EVALUATION:

In view of the recent rule change, BEC's request to confirm the integrity of airlock seals after each opening (or series of openings) by subjecting them to a pressure of ≥ 10 psig is acceptable. An exemption is no longer required. Intermediate tests may be performed at a reduced pressure without requiring the application of strongbacks, at pressures identified in the Technical Specifications. This provision of reduced pressure testing requires that the leakage results be conservatively extrapolated to full pressure in order to determine acceptability in accordance with Appendix J.

→ 3.1.2.c Reduced Pressure at Six-Month Intervals

[In Reference 2, BEC requests exemption from testing airlock door seals at a pressure of Pa during the six month test, and proposes to test at a pressure of ≥ 10 psig according to Technical Specifications.]

EVALUATION:

For plants designed prior to issuance of Appendix J and with airlocks not designed to withstand this pressure in the reverse direction against the inner door, the NRC criterion requires the installation of strongbacks or other holding devices to support the normal door operating mechanism in order to perform the test. Due to the necessity of proving the integrity of this potentially large leakage source at 6 months intervals, actions necessary to support this test must be undertaken at least every 6 months.

Consequently, [ERC finds that BEC's proposal to confirm the integrity of airlock seals by subjecting them to a pressure less than Pa is unacceptable.]
The airlock test conducted every 6 months must be at a pressure of Pa.

3.1.3. Alteration of Local Leak Rate Test Sequence

In Reference 2, Boston Edison Company requests an exemption from the requirements of Section III.A.1.a of Appendix J in the area of local leak rate testing procedure. BEC desires to conduct the local leak rate test before the integrated leak rate test (Type A) and add subsequent leakage changes to the integrated leak test results. This value would be valid as the "as is" representation of the containment integrity at the beginning of the outage.

EVALUATION:

The intent of the Appendix J, 10CFR50 requirement that the integrated leak rate test be conducted following the required containment inspection and before any repairs or adjustments are made is to provide assurance that the containment tested in as close to the "as is" condition as practical. Due to design considerations many local leak rate tests are incapable of establishing what portions of the total measured leakage was into containment and what portion was out of the containment. Consequently, if the local leak rate test were conducted before the integrated leak rate test, an element of uncertainty would exist as to the method and its accuracy when correcting back to establish the "as is" integrated leak rate results.

Providing that the total measured local leak rate is conservatively assumed to be out of the containment when making the back correcting calculations to establish the "as is" integrated leak rate, FRC finds that the proposed approach is acceptable.

3.1.4 Test Feedwater Check Valves With Water

In Reference 3, BEC requests exemption from air testing of feedwater check valves to permit testing with water as a medium as they are not designed to be tested with air. BEC's justification for this request is as follows:

"Immediately after the design basis LOCA water will be trapped in the feedwater vertical piping...", representing an "as is" condition. Although they state that "30-40% of the initially filled water volume" will flash to steam, no calculation of further water loss through the feedwater valve was shown. In closing they state "...replacement of the feedwater check valves with valves qualified for air testing is not justified."

Subsequent to this request for exemption, BEC modified the feedwater check valves with soft seats (as stated in Reference [7]). The Licensee states that they are presently testing this valve with air.

EVALUATION:

FRC finds that the licensee has withdrawn its request for exemption from testing feedwater check valves with air and that the subsequent valve change allows testing of these valves in conformance with 10CFR50 Appendix J.

3.1.5 Main Steam Isolation Valves Tested at 1/2 Pa

In Reference 2, Boston Edison Company requests exemption from testing Main Steam Isolation Valves according to 10CFR50, Appendix J. BEC requests permission from NRC to test at 23 psig rather than Pa (45 psig).

EVALUATION:

Section III.C. 2 of Appendix J requires that containment isolation valves be locally leak tested (Type C) at the peak calculated containment pressure,

Pa. BEC has requested an exemption to allow a continuation of a 23 psig test pressure for the main steam isolation valve. The main steam system design in most operating BWR plants necessitates leak testing of the MSIV's by pressurizing between the valves. The MSIV's are angled in the mainsteam lines to afford letter sealing in the direction of accident leakage while acting to lift the inboard disc off its seat resulting in excessive leakage when pressurized in the reverse direction at full containment pressure. The reduced pressure test at 23 psig does not cause the inboard disc to unseat and at the same time will result in a conservative determination of the leakage rate through the valves because of the angled design. Therefore it is considered an acceptable practice and an exemption from Appendix J is appropriate.

is license going to extrapol leakage rate up to Pa. 7

3.1.6. Request for Exemption for Appendix J Tests for Certain Valves

3.1.6.a Valves Which Termination Below the Surface of Suppression Pool-Type C Exemption

In Reference 2, the Boston Edison Company requests exemption from Type C testing for valves on lines which terminate below the level of the suppression pool. The licensee has identified the following valves;

- MOV-1001-36, b
- MO-1001-13a, b; 2a, b, c, d
- MO-1301-60
- MO-1301-47
- AO-8000
- AO-8001
- 1400-35a, b
- MO-1400-4a, c
- 2301-40
- MO-2301-14
- MO-1301-25, 26
- MO-2301-35, 36
- MO-1001-7a, b, c, d
- 2301-74, 75

1301-41, 64
1301-54, 40
MO-1400-3a, b

FRC EVALUATION:

Following a design based LOCA, containment accident pressure (Pa) would cause water from the suppression pool to contact the previously enumerated valves. Since the volume of water in the suppression pool will always be sufficient to cover the lines' terminal end, the valves will remain water covered throughout the duration of the accident. Consequently, these valves do not require Type C testing in accordance with Appendix J, they are not relied upon to prevent the escape of containment air to atmosphere and therefore are not containment isolation valves as defined in Section II.B of Appendix J. No exemption is needed.

3.1.6.b. Control Rod Hydraulic Drive System

In Reference 2, BEC requests exemption from Type C testing of Check valve 301-98 on the Control Rod Hydraulic Drive System. According to Note 5 in Reference 3 this valve cannot be leak tested due to system design and, consequently, BEC requests exemption from the requirement for testing. They request this action be taken in preference to installing appropriate test fittings.

FRC EVALUATION:

Given that the licensee has installed test fittings to enable testing of the feedwater check valves (Reference 7), it must follow that the CRD system check valve 301-98 which connects to the same line, could be simultaneously tested by opening valve 301-99. (Parenthetically, since a review of P&ID drawing M-250 does not verify the existence of valve 301-98, FRC assumes valve 301-95 to be the true object of this review.)

In the event of a design basis accident, check valve 301-95 would be relied upon to perform a containment isolation function. For that reason FRC

finds, the requested exemption to be unacceptable and that the licensee should conform to the guidelines of Appendix J.

3.1.6.c Standby Liquid Control Injection System

In Reference [2], BEC requests exemption from requirements for Type C testing of standby Liquid Control Injection Valve number 1101-15. Further information provided in Reference 3 shows that this valve is inside containment and also cannot be leak tested due to system design. For this reason Boston Edison Comp: / requests exemption from the requirement to test this valve in accordance with Appendix J.

FRC EVALUATION:

In Reference 3, the licensee states that it is Type C testing another check valve (1101-16) on the same line of the Standby Liquid Control System, which suggests that the licensee considers this penetration to be a possible significant leakage path. In the event that check valve 1101-16 fails to seat properly during the course of an accident, check valve 1101-15 will be relied upon to operate successfully. For these reasons FRC deems the requested exemption inappropriate. Action should be taken to enable Type C testing of check valve 1101-15 in order to conform to the requirements of Appendix J.

3.1.6.d Check Valves in Reactor Water Clean-up nes

In Reference 7, BEC states that replacing these check valves with air-testable check valves was not considered justified since the purpose of these valves is to limit reverse direction flow in case of a postulated pipe break until downstream motor operated isolation valves are shut.

FRC EVALUATION:

FRC concludes that there is a need to test this valve in accordance with Appendix J - 10CFR50, since valve 1201-82 is a normally open manual valve and containment integrity is dependent upon the leak tightness of check valve 1201-81.

Further check valve 1201-81 can be tested during the normal feedwater line testing by opening Valve Number 1201-82. Hence, containment leakage testing in accordance with Appendix J-10CFR50 is both feasible and necessary. An exemption for check valve 1201-81 would be inappropriate.

3.1.6.e Reactor Core Isolation Cooling (RCIC) Pump Discharge

The RCIC Pump Discharge line taps into the Feedwater injection piping between the inboard and the outboard Feedwater Check Valves in Loop 'A'. BEC has withdrawn its exemption request for the Loop 'A' Feedwater Check Valves (Penetration 9A) and consequently, has withdrawn their request for exemption from testing valve AO-1301-50, RCIC Pump Discharge Check Valve (Reference [7]). This exemption request withdrawal is submitted in recognition that this valve is now testable and will be tested according to guidelines set forth in 10CFR50 Appendix J.

FRC EVALUATION:

Since the exemption request has been withdrawn, no evaluation is provided.

3.1.6.f High Pressure Coolant Injection (HPCI) Pump Discharge

The HPCI Pump Discharge line taps into the feedwater injection piping between the inboard and outboard feedwater check Valves in Loop 'B'. Since the request for exemption has been withdrawn for the Loop 'B' Feedwater Check Valves (Penetration 9B), the HPCI Pump Discharge Check Valve is now also tested with air and the licensee has withdrawn its request for exemption (Reference 7).

FRC EVALUATION:

Since the exemption request has been withdrawn, no evaluation is provided.

3.1.6.g Core Spray to Reactor Check Valves

The Licensee states that replacing these check valves with air testable check valves is not considered justified since the purpose of these valves is

to limit reverse flow in case of a postulated upstream pipe break until downstream motor-operated isolation valves are shut.

The Licensee also quotes PSAR 5.2.3.5.1. of the Pilgrim Nuclear Power Station which states that "automatic isolation valves in the usual sense, are not used on the inlet lines of the reactor core and containment cooling systems, and reactor feedwater systems, since operation of these systems is essential following a design basis loss-of-coolant accident. Since normal flow of water in these systems is inward to the reactor vessel or the primary containment, check valves in these lines will provide automatic isolation if necessary."

Further the licensee states that the core spray to reactor piping was not designed or constructed to allow testing of AO-1400-9A & B and therefore these valves (AO-1400-9A & B) cannot be currently tested as per 10CFR50 Appendix J.

FRC EVALUATION:

In the event of a design basis accident, the core spray system motor operated valves MO 1400-25A & B and MO 24A & B would open permitting flow to the core spray discharge. Assuming a single active failure of one core spray pump a potential leak path would then exist through the untested check valves, out to the condensate transfer system which is vented to the atmosphere.

Consequently, FRC finds that check valves (AO-1400-9A & B) should be tested in accordance with 10CFR50 Appendix J to substantiate their integrity as an qualified containment boundary. An testing exemption for these valves is not acceptable.

3.1.6.h Residual Heat Removal (RHR) Vessel Injection Lines

The Licensee states that the Residual Heat Removal piping was not designed or constructed to allow testing of AO-1001-68A & B. Therefore, the Licensee states, the RHR Vessel Injection Line Check Valves (AO-1001-68A & B) cannot be tested as per 10CFR50 Appendix J. However the, the Licensee states,

"an engineering evaluation to determine a possible method for future leak testing of these valves has been initiated".

FRC EVALUATION:

Section III.A.1.(d) of Appendix J requires Type C testing of containment isolation valves in systems which penetrate containment. Section II.B of Appendix J defines containment isolation valves as those valves relied upon to perform a containment isolation function. Valves AO-1001-68A & B, are normally water covered post accident.

Further, sufficient redundancy exists in RHR input pumping capability to prevent loss of water pressure in this system inspite of a possible single active failure, which therefore prevents escape of containment accident environment following a design based LOCA. Consequently, there is no possibility for leakage of containment atmosphere through this path. FRC finds that testing of these valves is not required by Appendix J and no exemption from Appendix J is necessary.

4.0 CONCLUSIONS

Technical evaluations of BEC's requests for exemption from requirements of 10CFR50, Appendix J, for Pilgrim 1 have been performed. The following conclusions are provided:

- A request to exempt Type C testing of Traveling Incore Probe (TIP) lines is unacceptable. These lines should be tested in accordance with Appendix J.
- Containment airlocks should be tested in accordance with the revision to Section III.D.2 of Appendix J (effective October 22, 1980). No exemption is required.
- Local leak rate tests may be performed prior to Type A testing provided that correction of the Type A results to determine the "as is" condition includes the conservative assumption that the change between pre-and-post repair local leakage was entirely containment out-leakage.
- Testing of main steam isolation valves at 1/2 Pa by pressurizing between the valves is acceptable.
- Valves in lines terminating below the level of the suppression pool do not require Type C testing.
- The following valves should be tested in accordance with Appendix J because exemptions are inappropriate:

CRD Check Valve 301-98
Stand-by Liquid Check Valve 1101-15
RWCU Check Valve 1201-81
Core Spray Check Valves AO-1400-9A & B

5.0 REFERENCES:

- [1] August 5, 1975; Generic letter from Nuclear Regulatory Commission (Karl Goller) to Boston Edison Company (Maurice J. Feldman).
- [2] October 10, 1975; reply to NRC Division of Reactor Licensing from Boston Edison Company (J.C. Howard).
- [3] January 27, 1976; additional information from Boston Edison Company (J.E. Howard) to NRC Division of Reactor Licensing (D.L. Ziemann).
- [4] June 4, 1976; additional information from Boston Edison Company (J.E. Howard) to NRC Division of Reactor Licensing (D.L. Ziemann).
- [5] July 23, 1976; reply by NRC (D.L. Ziemann) to Boston Edison Company (J.E. Larson).
- [6] August 12, 1980; request for information by NRC (T.M. Novak) to BEC (G.C. Andoguini).
- [7] October 27, 1980; reply to Reference [6] from BEC (A.V. Morisi) to NRC (T.A. Ippolito).