



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

50-293

February 26, 1982

MEMORANDUM FOR: Thomas M. Novak, Assistant Director for Operating Reactors, DL
THRU: Domenic B. Vassallo, Chief, Operating Reactors Branch #2 *DL*
FROM: Kenneth T. Eccleston, Project Manager, ORB#2:DL
SUBJECT: ENVIRONMENTAL QUALIFICATION OF ELECTRIC EQUIPMENT FOR
PILGRIM NUCLEAR POWER STATION

I have reviewed the information provided by Boston Edison Company (BECO) as supplemental information to their 90 day submittal of September 11, 1981. For equipment identified in the 90 day SER, the licensee: 1) states that the equipment items are environmentally qualified; 2) provides technically sound bases for its justification for continued plant operation; or 3) provided additional information which in my judgment provides an acceptable basis for justification for continued operation.

Based upon my review of the supplemental information provided by BECO in its February 8, 1982 submittal, I have concluded 1) that the licensee's submittal is responsive to deficiencies identified in the EEQ SER and 2) that adequate justification for continued operation during the interim period necessary to complete the documentation and to implement corrective actions has been provided for components not shown to be environmentally qualified.

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NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ENVIRONMENTAL QUALIFICATION REVIEW
FOR JUSTIFICATION FOR CONTINUED
OPERATION OF PILGRIM NUCLEAR POWER STATION

1.0 Introduction

The Boston Edison Company (BECO) response (Reference 1) to the NRC 90-day Safety Evaluation Report (SER) did not provide justification for continued operation for each item identified in this SER. The licensee did provide, however, additional information by letter dated February 8, 1982 (Reference 3). This supplemental information provided justification for interim operation for each item identified in the NRC 90-day SER. Based upon a review of the information provided by the licensee in its February 8, 1982 submittal (Reference 3) it was concluded in a February 26, 1982 memorandum (Reference 4) 1) that Boston Edison Company's submittal is responsive to deficiencies identified in the EEQ SER and 2) that adequate justification for continued operation during the interim period necessary to complete the documentation and to implement corrective action has been provided for components not shown to be environmentally qualified.

The licensee also provided additional information by letter dated January 28, 1982 (Reference 2) concerning previous operation of the Pilgrim station with elevated drywell temperatures and the effect of such operation on equipment qualification.

2.0 Evaluation

Reference 3 was reviewed to determine if this submittal provided adequate justification for interim operation. The following four categories of justification were accepted as a basis for continued interim operation:

- Category 1 Redundant equipment is available to substitute for the unqualified equipment.
- Category 2 Another system is capable of providing the required function of the system with unqualified equipment.
- Category 3 The unqualified equipment will have performed its safety function prior to failure.
- Category 4 The plant can be safely shut down in the absence of the unqualified equipment.

In addition, for those cases where aging tests were not performed on specific pieces of equipment detailed aging analyses were performed by the licensee based on the Arrhenius methodology. In conducting the review of the licensee's submittal these analyses were accepted as a basis for determining the qualification of equipment on an interim basis. The results of the detailed review of Boston Edison's January 28, 1982 submittal concerning high drywell temperature operation were documented in the safety evaluation supporting Amendment No. 58 (Reference 5) to Facility Operating License No. DPR-35 (Attachment 1). Amendment No. 58 was issued on March 20, 1982, to startup of Pilgrim for Cycle 6 operation.

Prior to receipt of the information contained in Reference 3, our contractor, the Franklin Research Center concluded that 1) the licensee has not completed its response to the qualification deficiencies identified in the SER, 2) the licensee has not provided justification for continued operation for each equipment item with outstanding qualification deficiencies, and 3) the licensee's generic justification for continued operation is inadequate in light of the specific qualification deficiencies identified in the SER.

After review of the additional information provided by Boston Edison in Reference 3 FRC concluded (Reference 6) that the licensee has provided sufficient technical basis to support justification for interim operation. This conclusion supports the conclusions stated in Reference 4.

3.0 Summary

Based upon the evaluation discussed above and as documented in References 4, 5 and 6, we find continued operation to be justified for Pilgrim.

Attachment: Safety Evaluation Supporting Amendment No. 58.

REFERENCES

1. September 11, 1981 letter from A. V. Horisi (Boston Edison) to B. H. Grier (USNRC)
2. January 28, 1982 letter from W. H. Deacon (Boston Edison) to D. B. Vassallo (USNRC)
3. February 8, 1982 letter from W. H. Deacon to R. C. Haynes (USNRC)
4. February 26, 1982 memo from K. T. Eccleston (USNRC) to T. M. Novak (through D. B. Vassallo)
5. Amendment No. 58 to Facility Operating License No. DPR-35, dated March 20, 1982.
6. Revised Appendix D to FRC TER C 5257-489



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Attachment 1
to Enclosure 2

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 58 TO FACILITY LICENSE NO. DPR-35

BOSTON EDISON COMPANY

PILGRIM NUCLEAR POWER STATION

DOCKET NO. 50-293

Authors: K. Eccleston
H. Garg
O. Rothberg

I. Introduction

During previous cycles of operation, Pilgrim Nuclear Power Station was operated with higher than normal ambient drywell temperatures due to inadequate drywell cooling. The temperatures experienced during Cycle 5 operation ranged as high as 250°F at the upper elevations of the drywell. This evaluation addresses the effects of these higher than normal drywell temperatures on structures and equipment important to safety and the adequacy of the Technical Specification changes proposed by Boston Edison Company (the licensee) in its March 1, 1982 application to provide limiting conditions for operation and surveillance requirements concerning drywell temperature and associated temperature monitoring instrumentation.

II. Background

On September 26, 1981 during a routine shutdown for refueling, the installed Yarway water level instrumentation experienced oscillations. These oscillations have been attributed to flashing in the reference leg of these Yarway instruments caused by the excessively high drywell temperatures. By letter dated January 18, 1982 the licensee provided its evaluation of the effects of high drywell temperature operation on structures, components, and on transient and accident analyses. This evaluation also described the measures taken to correct or repair identified deficiencies and described the licensee's plans and programs for modifications and replacements to enhance drywell cooling capability and to assure equipment operability and qualification for at least one more cycle of power operation.

III. Evaluation

A. Structural

1 Drywell penetrations

Drywell penetrations are designed for thermal expansion at a drywell temperature of 281°F, which envelopes the drywell temperatures experienced prior to and during the last cycle. Consequently, no detrimental effects of thermal

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expansion on drywell penetrations would have resulted from operation with the maximum drywell temperatures experienced during previous cycles of operation.

2. Differential expansion of the steel and concrete portions of the drywell

The steel containment liner is mechanically attached to the concrete shell only in the lower regions of the drywell (lower 7 feet of the drywell). At these elevations the experienced drywell temperature was below the maximum drywell design temperature; therefore, no adverse effects resulting from differential expansion of concrete and steel would have resulted from operation during previous cycles.

3. Resistance of the drywell structure to jet impingement and other LOCA loads

The Pilgrim Final Safety Analysis Report (Appendix L) containment stress analysis performed assumed target area temperatures of 300°F, which is the same temperature as that of the impinging jet. Since the drywell temperature did not exceed 300°F at any time, these analyses are not invalidated by the higher drywell temperatures experienced during previous cycles.

4. Effect of high drywell temperatures on drywell concrete strength

The licensee has provided the results of analyses performed by its consultant using published test data to determine residual concrete strength after cyclic heating. The licensee states that these analyses indicate an average residual strength of the concrete closest to the liner of approximately 4500 psi and that this is conservative when compared to the actual computed stresses of less than 2000 psi. Based on the margins available between required strength and analyzed strength, we find this acceptable for restart. However, to provide long-term assurance that the concrete structure is capable of carrying its applicable loads, we will require that the licensee provide further confirmation of its evaluation by performing an analysis of the concrete structure assuming conservatively high temperature values and conservatively low concrete strength through the wall.

B. Equipment and Components

Our evaluation of the individual components identified as being subject to the high drywell temperatures experienced is as follows:

1. ASCO solenoid valve, model no. NP8320A184E

Initial qualification testing of these valves was performed in a 268F ambient temperature with the solenoids in the energized condition. The manufacturer's catalog data indicate that energization of the solenoids results in a 144F temperature rise above ambient. Using this assumption, a qualified life of several thousand years would be expected for a deenergized valve (the normal operating mode) in a 190F environment. However, even if credit is only given for about one-half of the solenoid temperature rise as a result of energization, the calculated remaining qualified life of the ASCO solenoids is more than one operating cycle. Consequently, we conclude that continued operation is justified.

2. AVCO solenoid valves, model no. C5159

No aging test was performed on the subject valves but the licensee has provided a detailed aging analysis based on the Arrhenius methodology. Based on this analysis the licensee has established that the qualified life of the subject valves is eight years. However, based on more recent information from the licensee on March 19, 1982, the licensee stated that all nonmetallic parts of the subject valves have been replaced. Based on this replacement, we find that continued operation is justified.

3. NAMCO limit switches, model no. EA740-50100

The licensee has performed the aging analysis and based on the analysis has replaced the Buna-N gaskets and EPR seals with new silicone rubber material for all affected limit switches. The licensee has also indicated that both grease and oil have a manufacturer's rating of 400F to 500F and therefore do not require replacement. Based on our evaluation of the licensee's assessment, we find that continued operation is justified.

4. Target rock solenoid valves, model no. 1/2 SMS-A-01

The licensee has replaced the subject valves with new Target Rock solenoid valves that are qualified to IEEE-323, 1974 and have a six-year manufacturer's recommended maintenance interval. Based on this, we find that continued operation is justified.

5. Limitorque valve actuators, model SMB-(various)

The licensee has performed an aging analysis and visual inspection and based on that has verified that (a) Viton seals are used in all MOV's, (b) melamine or fiberite has been used for the limit switch material, (c) jumper wires for M01001-63, M01001-50 and M01201-2 have been replaced, (d) all lubricants have been replaced, and (e) new limit switch gear frames and limit switch compartment covers are on order and will be replaced next refueling outage. Based on the above and since (1) Limitorque has judged the limit switch compartment cover acceptable for BWR operation and (2) no visual corrosion effects were found on the gear frames, we find that continued operation is justified.

6. TEC valve flow monitor system, model no. 1414

The licensee has indicated that the charge converter and cable assembly are new units and the only component of this system which has been exposed to high drywell temperature is the accelerometer sensor. The licensee has indicated that the sensor does not contain any age sensitive material and the connector is manufactured from a silicate compound with an expected life of 147,548 years. Based on our evaluation of the licensee's assessment, we find that continued operation is justified.

7. Junction boxes

The licensee has performed the aging analysis and based on this analysis has replaced gasket material for all junction boxes above the 30' elevation with the new silicone rubber gaskets. Gaskets below 30' elevation have a remaining expected life of 13.25 years at 152°F or qualified life of 4.4 years at 152°F. Based on our evaluation of the licensee's assessment, we find that continued operation is justified.

8. Ring tongue type termination

The use of sound installation practices to attach terminations to a qualified barrier-type terminal block assures that adequate clearance is provided so that failure of the lug shank insulation would not impair circuit operability. The licensee has either installed new, qualified ring tongue type terminations or, by inspection, verified proper installation and that adequate clearance between connections has been provided. Based on these considerations we find that continued operation is justified.

9. Kerite 600V power and control cable type FR/FR

The licensee has taken two samples, one from the 41' elevation and another one from the 73' elevation, and performed physical (elongation) and electrical tests. Based on these tests the licensee has listed the percentage elongation for sample 1 as 235 for the insulation and 250 for the jacket while for sample 2 the percentage elongation was 110 and 160, respectively. The licensee has also quoted the percentage elongation of 150 and 190 for the material aged to 40 years at 90C operating temperature. Based on these numbers it is apparent that sample 2 has lost more elongation than for the original test. However, it should be noted that the original testing for radiation was tested for 200 Mrads while the expected post-accident LOCA dose is only 64 Mrad. This indicates that the elongation measured after 40 years thermal aging and radiation will be less at Pilgrim than that predicted from the original test. Assuming the linear degradation in elongation and accounting for normal radiation dose, the licensee has evaluated that 4 1/2 years of remaining life is left for the subject cables between elevation 41' and 73'. Based on the above the staff agrees with the licensee's assessment that continued operation is justified.

10. Okonite power and control cable, Okonite insulation, Okoprene jacket

The licensee has replaced the subject cable above 41' elevation. For the cables below 41' elevation, the licensee has provided the analysis which indicated that the jacket might be damaged but the insulation still has the remaining qualified 6.2 years at the rated temperature of 90°C. The licensee has also indicated that the okonite cable at PNPS was qualified without the jacket. Based on the above and the fact that the drywell is inerted during power operation and the jacket is used for the purpose of flame retardancy, we agree with the licensee's assessment and find that continued operation is justified.

11. GE switchboard wire, type SIS

The licensee has performed the aging analysis which indicated that the qualified life at 160°F is 45.5 years while at the rated condition the cable is good for only 6.1 years. The licensee has also performed the equivalent degradation time

the cable has been used and indicated the degradation time of 1.7 years at 160°F and 1.94 years at 194°F. Since the cable has been used since 1972, ten years of the life has been used at the rated temperature. However, since the cable will not operate at the rated condition and is expected to operate somewhere in between 160°F and 194°, we agree with the licensee's assessment and find that continued operation is justified. However, the staff also requires that the licensee should submit the new analysis based on the temperature rise based on cable use and demonstrate that continued operation is justified beyond one refueling outage.

12. Raychem cable splices, model WCSF-N

The licensee has performed an aging analysis and determined that the material which comprises this equipment is insensitive to thermal degradation for the range of temperatures to which it was exposed. We have reviewed the information provided by the licensee and find that continued operation is justified.

13. GE electrical penetration, cannister type

The licensee has performed an aging analysis and demonstrated that continued operation is justified. The staff agrees with the licensee's assessment except for the cables. The licensee is using the GE SIS type wires. The staff's position regarding these wires is covered in Item 11. Based on our evaluation of the licensee's assessment, we find that continued operation is justified.

14. Physical science electrical penetration

The licensee has performed an aging analysis and determined that this equipment contains no age sensitive materials which would compromise pressure boundary integrity. In addition, testing has been performed during this outage to establish the pressure integrity of this equipment. Based upon our review of the information provided by the licensee, we find that continued operation is justified.

15. Bergen Patterson snubbers

The licensee has performed an aging analysis and based on this analysis has replaced all snubbers above 44' elevation. All snubbers below 44' elevation have a remaining life of 6.9 years at 194°F. Based on our evaluation of the licensee's assessment, we find that continued operation is justified.

16. ITT Hammel-Dahl air operators

The licensee has performed an aging analysis and determined that Buna-N o-rings and Buna-N/nylon diaphragms have an expected life of only 39 days. The licensee has also stated that these air operators are fail safe and failure of any nonmetallic part will not impair the safe operation of the plant. The licensee will disassemble, inspect, and rebuild all air operators. Air regulators will be replaced. Based on our evaluation of the licensee's assessment, we find that continued operation is justified.

17. Hydroline air operators

The licensee has performed an aging analysis and determined that continued operations is justified. Based on our review of the information provided by the licensee, we find that continued operations is justified.

C. Accident Analyses

The effect of high initial drywell temperature on design basis loss of coolant accident (LOCA) analyses was reviewed. The design basis LOCA results in the most severe drywell pressurization rate and peak pressure loading. Therefore, it is bounding for other accidents. The containment pressure/temperature response results for a number of higher initial drywell temperatures was compared with the results obtained from analyses assuming an initial drywell temperature of 135°F (average design drywell temperature). These analyses indicated that lower peak pressures and lower drywell pressurization rates resulted when higher initial drywell temperatures were assumed and that the effect on peak post-LOCA drywell temperatures was negligible.

These results are expected since higher initial drywell temperatures result in a lower air density and mass than at lower temperatures. Thus, both peak post-LOCA drywell pressure and drywell pressurization result. Likewise, the effect on peak temperatures would also be expected to be negligible because of the small (relative to post-LOCA heat addition) additional heat content of the drywell atmosphere and structure as a result of high initial drywell temperatures.

Finally, regression analysis results obtained from the Mark I Containment Program 1/4 Scale Test Program have demonstrated that torus pool swell loads (both downforce and upforce) will be lower for a higher initial drywell temperature.

Therefore, we conclude that operation with a drywell ambient temperature higher than the nominal design value does not adversely affect accident analyses previously performed.

D. Technical Specifications

The licensee has proposed Technical Specifications which provide LCOs and surveillance requirements for drywell temperatures and for drywell temperature monitoring instrumentation. These TS provide a drywell temperature limit of 194°F above elevation 40' and 150°F at or below elevation 40'. These temperatures were developed taking into consideration the long-term effects of ambient temperature on equipment design limits and materials of components required for accident mitigation or plant shutdown.

Upon exceeding the proposed TS temperature limits, an engineering evaluation is required to be performed to assess potential damage and render a determination as to the ability of safety related equipment to perform its intended functions.

In addition, if the drywell temperature at any elevation exceeds 215°F for more than 30 minutes, the proposed TS requires the plant to be in a cold shutdown condition within 24 hours.

Finally, limiting conditions for operation and surveillance requirements for drywell temperature monitoring instrumentation have been proposed which provide assurance that the temperature monitoring instrumentation is operable at different elevations throughout the drywell.

We have reviewed the proposed TS and have determined that they limit containment drywell temperatures to values which will not have an adverse impact on drywell equipment, components, and structures required for safe plant operation. Consequently, we find the proposed TS changes acceptable.

4.0 Environmental Considerations

We have determined that the amendment does not involve a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR 51.5(d)(4) that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of the amendment.

Conclusions

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: March 20, 1982

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APPENDIX D - REVIEW OF LICENSEE'S RESPONSE TO NRC EEQ
SER CONCERNING JUSTIFICATION FOR INTERIM OPERATION

1. BACKGROUND

The NRC Safety Evaluation Report (SER) concerning equipment environmental qualification (EEQ) states [13]:

"Subsection 4.2 identified deficiencies that must be resolved to establish the qualification of the equipment; the staff requires that the information lacking in this category be provided within 90 days of receipt of this SER. Within this period, the licensee should either provide documentation of the missing qualification information which demonstrates that such equipment meets the DOR guidelines or NUREG-0588 or commit to a corrective action (requalification, replacement, relocation, and so forth) consistent with the requirements to establish qualification by June 30, 1982. If the latter option is chosen, the licensee must provide justification for operation until such corrective action is complete."

On January 19, 1982, FRC representatives met with NRC Division of Licensing personnel at NRC offices to discuss the potential for FRC to assist the staff in the technical review of licensees' statements regarding justification for interim plant operation submitted in response to outstanding qualification deficiencies in the NRC EEQ SERs. The results of the meeting were as follows: (1) FRC was requested to proceed immediately with the technical review of licensees' justification for interim operation, (2) the format was established, and (3) the criteria for the review were established. These criteria are presented in Section 2 of this appendix.

On January 21, 1982, the NRC provided the following modification to Final Assignment 13 concerning this subject:

"The FRC review will consist of:

- o Review the licensee's justification for interim operation and provide FRC independent analysis which shows whether or not licensee provided technically sound rationale as a basis for justification for continued plant operation.

- o On January 27, 1982, FRC shall provide a list of those power reactors that have provided technically sound justification for continued operation. FRC shall also provide a list of those power reactors which have not provided technically sound justification for continued operation. In addition to the lists, FRC may provide any additional information which in FRC's judgment is necessary to support the conclusions regarding justification for continued operation."

On January 25, 1982, the NRC was provided with the completed review of the licensees' statements presented as a basis for justification for interim operation in response to the NRC ILQ SER.* On February 5, 1982, at the NRC's request, the NRC was provided with actual examples of licensees' responses to the NRC EEQ SER that provide adequate rationale as a basis for justification for interim operation.**

2. GENERAL DISCUSSION

In general, licensee-submitted justifications for interim operation are based on systems considerations, equipment operability evaluations, or failure-modes-and-effects analyses.

Systems considerations often involve the availability of backup equipment capable of performing the particular safety function of concern. The backup equipment is either environmentally qualified, unqualified but not exposed to a harsh environment at the same time as the primary equipment, or located so that it is unlikely that both the primary and backup equipment would be simultaneously exposed to a severe environment. In general, these systems discussions should consider (1) the possibility of a single-active failure

* C. J. Crane

Letter to R. A. Clark, NRC. Subject: Transmittal of FRC Review of Licensees' Responses to NRC EEQ SER Concerning Justification for Interim Operation
FRC, 25-Jan-82

** C. J. Crane

Letter to R. A. Clark, NRC. Subject: Transmittal of Actual Examples of Licensees' Responses to NRC EEQ SER Which Provide Adequate Rationale as a Basis for Justification of Interim Operation
FRC, 5-Feb-82

disabling the backup equipment, (2) any major differences in the characteristics of the primary and backup equipment (unless it is obvious that the equipment is essentially identical), (3) the possibility of electrical failure of the primary equipment causing an adverse effect on other safety-related equipment or power supplies, and (4) in the case of display instrumentation, the possibility of an operator being misled by the failed primary equipment. Where equipment has not been demonstrated to be qualified, some justifications discuss administrative procedures or revised operating procedures in effect. Depending upon the specific equipment involved, each of the above considerations need not be discussed in every instance, but, in general, a complete systems discussion would consider the above points.

Where equipment qualification evaluations were used, licensees generally (1) received additional information from manufacturers, (2) applied engineering judgment, (3) performed material analysis, and/or (4) used partial test data in support of the original qualification documentation. Where these evaluations were performed, the licensees determined that, although full qualification was not documented, there was sufficient evidence to suggest that the equipment would perform its intended safety function, thereby justifying interim operation until qualified equipment is installed.

Some licensees provided detailed failure-modes-and-effects analyses of electrical circuitry to demonstrate that, under all identified failure modes, the safety function of the equipment could still be accomplished.

Other justifications involved a combination of qualification information and systems information. For example, if a licensee has qualification information (such as a generic test report or other partial qualification documentation) that tends to confirm the ability of the equipment to remain operable for a specified period of time, justification for interim operation often was based upon a discussion of the required safety function being performed prior to the potential failure. This type of discussion often applies to equipment which performs a short-term trip or isolation function in the early stages of an accident.

3. PLANT-SPECIFIC REVIEW

As a result of the review, this plant was evaluated and the results documented on the "Summary of Review of Licensee's 90-Day Response" form reproduced below:

"EQUIPMENT ENVIRONMENTAL QUALIFICATION (EEQ)
Review of Licensees' Resolution of Outstanding Issues
From NRC Equipment Environmental Qualification
Safety Evaluation Reports

SUMMARY OF REVIEW
OF LICENSEE 90-DAY RESPONSE

Utility: Boston Edison Company
Plant Name: Pilgrim Nuclear Power Station Unit 1
NRC Docket No. 50-293
NRC TAC No. 42477
NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 489

References:

- a. A. V. Morisi
Letter to B. H. Grier (NRC)
Subject: Environmental Qualification of Electrical Equipment for
Pilgrim Nuclear Power Station, Unit 1 - Partial Response to Safety
Evaluation Report.
Boston Edison Company, 11-Sep-81
BECO. Ltr. #81-213
- b. Office of Nuclear Reactor Regulation
Safety Evaluation Report for Pilgrim Unit 1
Environmental Qualification of Safety-Related
Electrical Equipment
NRC, 03-Jun-81

The Licensee has submitted technical information in Reference a in response to the NRC SER [b] on environmental qualification. FRC has reviewed these documents [a, b]. As a result of this review, FRC notes that the Licensee has stated that the equipment items 'are not environmentally unqualified.'

The Licensee's response to the SER addressed and provided resolution of deficiencies identified in the SER and provided a generic rationale as a basis for justification for interim operation as follows:

'JUSTIFICATION FOR CONTINUED OPERATION

The computerized summary in Section 5 documents BECo.'s equipment qualification efforts to date and shows that many items meet the DOR guidelines. Program plans have been established and are being implemented to obtain qualification data or replace equipment that have not yet been qualified. Results of evaluation performed to date indicate that qualification has not been established because of lack of adequate documentation rather than receipt of documentation which demonstrates that the equipment is unacceptable for the postulated service conditions.

Equipment with outstanding items identified and not yet resolved will be evaluated individually (on a component basis) and generically (on a manufacturer, system, function, and location basis). Since the initial evaluation was based on very conservative criteria, subsequent more detailed evaluations will demonstrate that equipment originally identified as unqualified is actually acceptable for the particular safety function that it is required to perform. Among the areas investigated in these more detailed evaluations are (depending on type of outstanding item):

- 1) need for component
- 2) actual operating time requirement
- 3) failure mode and how it affects safety function
- 4) other means to perform same function (manual operation, other system, back-up qualified device, etc.)
- 5) cause of outstanding item (lack of data limitations of test, etc.)
- 6) EPRI Equipment Qualification Data Bank
- 7) Experience and maintenance history at the plant
- 8) Conservatism in postulated service conditions.

In many instances BECo. has elected to replace equipment with qualified replacements rather than pursue analytical or testing resolutions that may be ineffective from a cost, scheduling or qualification basis.

Resolutions to identified outstanding items continue to be activities performed by Boston Edison. From the review of equipment performed to date, none of the equipment has been shown to be unqualified. One LER was written for equipment in the Standby Gas Treatment System (ref. LER 81-026/OIT-0, 'SBGTS'). This LER was written based on preliminary information which indicated that the subject equipment may not be qualified for the specified service conditions. Immediate corrective actions were implemented to provide more positive assurance of the qualification status of the system. These actions included vendor surveys to obtain more accurate data, replacement with qualified replacements, and safety analyses.

Based on activities performed to date Boston Edison has concluded that continued operation of the plant would not be affected as a result of deficiencies currently identified. Additionally, we have concluded that:

- 1) Any outstanding items identified which required immediate corrective action have been resolved to such a status that the outstanding item does not compromise the safety of the plant (ref LER 81-026/OIT-0),
- 2) some of the items with outstanding items have been or are being replaced or relocated,
- 3) the harsh environmental conditions for which the equipment must be qualified result from low probability events. Events, which might reasonably be anticipated during the very limited time period before qualification will be obtained, would lead to substantially less demanding service conditions for the equipment.

BECO. is maintaining its commitment to its environmental qualification program and continues to involve significant resources in order to complete the program in a timely manner. BECO.'s program and efficient utilization of available resources will assure that the equipment qualification program will provide complete, accurate and auditable documentation to demonstrate that all equipment within the scope of IEB 79-01B is properly qualified.'

FRC concludes that (1) the Licensee has not completed its response to the qualification deficiencies identified in the SER, (2) the Licensee has not provided justification for continued operation for each equipment item with outstanding qualification deficiencies, and (3) the Licensee's generic justification for continued operation is inadequate in light of the specific qualification deficiencies identified in the SER.

It is recommended that the Licensee provide justification for interim operation for each equipment item with outstanding qualification deficiencies."

4. SUBSEQUENT REVIEW

As a result of FRC's review of the Licensee's 90-day response, described in Section 3 above, a meeting was held between the NRC staff and certain Licensee personnel. Following the meeting, the Licensee submitted Reference 15, in which additional information justifying interim operation was submitted for each equipment item not documented as environmentally qualified.

Evaluation

An evaluation has been conducted of the information provided by the Licensee in Reference 15 regarding justification for interim operation. After reviewing the technical basis of the Licensee's justification for continued operation for each item, it is concluded that the Licensee has provided sufficient technical basis to support justification for interim operation.