

TECHNICAL EVALUATION REPORT

EQUIPMENT ENVIRONMENTAL QUALIFICATION

COMMONWEALTH EDISON COMPANY
QUAD CITIES NUCLEAR POWER STATION UNIT 1

NRC DOCKET NO. 50-254

NRC TAC NO. 42478

EG&G IDAHO, INC. SUBCONTRACT NO. K-7615

FRC PROJECT C5417

FRC TASK 12

Prepared by

Franklin Research Center
The Parkway at Twentieth Street
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FRC Group Leader: C. J. Crane

Prepared for

EG&G Idaho, Inc.
Idaho Falls, Idaho 83401

June 11, 1981

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CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>
1	INTRODUCTION.	1-1
1.1	Purpose of the Evaluation	1-1
1.2	Generic Issue Background	1-1
1.3	Scope of the Evaluation	1-7
2	NRC CRITERIA FOR ENVIRONMENTAL QUALIFICATION.	2-1
2.1	Criteria Provided by the NRC	2-1
2.2	Staff Positions and Supplemental Criteria	2-1
2.2.1	Service Conditions Inside Containment for a Loss-of-Coolant Accident.	2-1
2.2.2	Submergence	2-2
2.2.3	Equipment Located in Areas Normally Maintained at Room Conditions	2-2
2.2.4	Simulated Service Conditions and Test Duration	2-3
2.2.5	Deferment of Qualification Review	2-3
2.2.6	Test Sequence	2-4
2.2.7	Radiation	2-4
3	METHODOLOGY USED BY FRC	3-1
4	TECHNICAL EVALUATION.	4-1
4.1	Methodology Used by the Licensee	4-1
4.1.1	Completeness of Equipment List	4-1
4.1.2	Environmental Service Conditions	4-2
4.1.3	Aging and Qualified Life	4-6
4.2	NRC Category I Equipment That Satisfies the General Requirements of the DCR Guidelines and IE Bulletin 79-01B	4-10

CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>
4.3	NRC Category II Equipment That the Licensee Will Modify or Relocate . . .	4-11
4.4	NRC Category III Equipment That the Licensee Believes To Be Exempt From Qualification	4-13
4.5	NRC Category IV Equipment That Has Qualification Testing Scheduled but Not Completed.	4-14
4.6	NRC Category V Equipment That Does Not Satisfy One or More of the General Requirements of the DCR Guidelines and IE Bulletin 79-01B	4-15
4.7	NRC Category VI Equipment for Which Qualification Is Deferred	4-43
4.8	Summary of the Evaluation	4-80
5	CONCLUSIONS.	5-1
6	REFERENCES	6-1
APPENDIX A - ENVIRONMENTAL SERVICE CONDITIONS		
APPENDIX B - LISTING OF SAFETY-RELATED ELECTRICAL EQUIPMENT		
APPENDIX C - SAFETY SYSTEMS FOR WHICH ENVIRONMENTAL QUALIFICATION IS TO BE ADDRESSED		

1. INTRODUCTION

1.1 PURPOSE OF THE EVALUATION

The NRC Office of Inspection and Enforcement (IE) issued Bulletin 79-01B, "Environmental Qualification of Class 1E Equipment" in January 1980. This Bulletin required the licensee to perform a detailed evaluation of the environmental qualification of Class 1E electrical equipment required to function under postulated accident conditions and to submit a report on this action.

The objectives of the NRC Equipment Environmental Qualification Review program are to evaluate nuclear power plant safety-related electrical equipment in accordance with criteria established by the NRC and to identify (1) equipment whose qualification documentation is adequate, i.e., substantiates that the equipment is capable of performing its specified design basis safety function when it is exposed to a harsh environment and (2) equipment whose qualification documentation is deficient, i.e., does not give reasonable assurance that the equipment is capable of performing its specified safety function.

To meet the overall program goals, the objective of this Technical Evaluation Report is to review the Licensee's submittals to determine if the Licensee reviewed its safety-related electrical equipment for environmental qualification in accordance with the DOR Guidelines and NUREG-0588 as required by IE Bulletin 79-01B. The NRC will perform an audit of the qualification documentation references as part of its safety evaluation program. If discrepancies are found, the audit will be extended.

1.2 GENERIC ISSUE BACKGROUND

Safety-related electrical equipment must be capable of performing design safety functions under all normal, abnormal, and accident conditions. Of particular concern is the assurance that equipment will remain operable during

and following exposure to the harsh environmental conditions (i.e., temperature, pressure, humidity (steam), chemical sprays, radiation, and submergence) imposed as a result of a design basis accident. These harsh environments are generally defined by the limiting conditions resulting from the complete spectrum of postulated break sizes, break locations, and single failures consequent to a loss-of-coolant accident (LOCA), main steam line break (MSLB) inside the reactor containment, or a high energy line break (HELB) outside reactor containment (such as a main steam or feedwater line break). The purpose of equipment qualification is to provide tangible evidence that equipment will operate on demand and to verify design performance, thereby establishing assurance that the potential for common-mode failure is minimized.

Qualification criteria applied during the licensing of the older nuclear power plants have been modified over the years, and specific industry standards concerning qualification have been revised as the design of reactor systems has changed and as regulatory and operating experience has accumulated. Examples of such standards are IEEE Standards 279-71, 323-74, 383-74, 317-76, 334-74, 381-77, 382-80, and 627-80. NRC NUREG documents 0413 and 0588 have been developed to address this topic. In particular, NUREG-0588 (published for comment in December 1979) formally presented the NRC staff positions regarding selected areas of environmental qualification of safety-related electrical equipment in the resolution of General Technical Activity A-24, "Qualification of Class 1E Safety Related Equipment." The positions documented therein are applicable to plants that are or will be in the construction permit or operating license review process.

Although qualification standards and regulatory requirements have undergone considerable development, all of the currently operating nuclear power plants are required to comply with 10CFR50, Appendix A, General Design Criteria for Nuclear Power Plants, Section 1, Criterion 4. This criterion states in part that "structures, systems and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing and postulated accidents, including loss-of-coolant accidents."

Qualification requirements are also embodied in 10CFR50 Appendix A, General Design Criteria 1, 2, and 23 and Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants, Criteria III and XI. These requirements are applicable to safety-related equipment located inside as well as outside containment.

The NRC staff has evaluated the Licensee's equipment qualification program by reviewing the qualification documentation of selected safety-related equipment as part of the operating license review for each plant. The NRC staff has also used a variety of methods to assure that these general requirements are met for electrical safety-related equipment. In the oldest plants, qualification was based on the fact that electrical components were of high industrial quality. After 1971, qualification was judged on the basis of IEEE Std 323-71; however, no regulatory guide was issued adopting this standard. For plants whose Safety Evaluation Reports were issued after July 1, 1974, the Commission issued Regulatory Guide 1.89, which in most respects adopted the most recent standard, IEEE Std 323-74.

In 1977, the NRC staff instituted the Systematic Evaluation Program (SEP) to determine the degree to which the older operating nuclear power plants deviated from current licensing criteria. The subject of electrical equipment environmental qualification (SEP Topic III-12) was selected for accelerated evaluation as part of this program. Seismic qualification of equipment was to be addressed as a separate SEP topic. In December 1977, the NRC issued a generic letter to all SEP plant licensees requesting that they determine the adequacy of existing equipment qualification documentation.

Preliminary NRC review of licensee responses led to the preparation of NUREG-0458, an interim NRC assessment of the environmental qualification of electrical equipment. This document concluded that "no significant safety deficiencies requiring immediate remedial actions were identified." However, it was recommended that additional effort should be devoted to examining the installation and environmental qualification documentation of specific electrical equipment in all operating reactors.

On May 31, 1978, the NRC Office of Inspection and Enforcement issued IE Circular 78-08, "Environmental Qualification of Safety-Related Electrical Equipment at Nuclear Power Plants," which required all licensees of operating plants (except those included in the SEP program) to examine their installed safety-related electrical equipment and ensure appropriate qualification documentation for equipment function under postulated accident conditions. Subsequently, on February 8, 1979, the NRC Office of Inspection and Enforcement issued IE Bulletin 79-01, which was intended to raise the status of IE Circular 78-08 to the level of Bulletin, i.e., action requiring a licensee response. This Bulletin required a complete re-review of the environmental qualification of safety-related electrical equipment as described in IE Circular 78-08.

The review of the licensee responses indicated certain deficiencies in the scope of equipment addressed, definition of harsh environments, and adequacy of support documentation. It became apparent that generic criteria were needed to evaluate the electrical equipment environmental qualification for both SEP and non-SEP operating plants. Therefore, during the second half of 1979, the Division of Operating Reactors (DOR) of the NRC issued internally a document entitled "Guidelines for Evaluating Environmental Qualification of Class IE Electrical Equipment in Operating Reactors" [29].* (The document is hereafter referred to as the "DOR Guidelines.") The document was prepared as a screening standard for reviewing all operating plants, including SEP plants. It was originally intended that the licensees would evaluate their qualification documentation in accordance with the DOR Guidelines. However, initial NRC review of this documentation, which was compiled to support licensee submittals, revealed the need for obtaining independent evaluations and for accelerating the qualification review program.

*For References, see Section 6. Note that the reference numbers are not presented in sequential order.

On January 14, 1980, the NRC Office of Inspection and Enforcement issued the DCR Guidelines and IE Bulletin 79-01B, which expanded the scope of IE Bulletin 79-01 and requested additional information on environmental qualification of safety-related electrical equipment at operating facilities, excluding the 11 facilities undergoing the SEP review. This Bulletin cited the DCR Guidelines as the criteria to be used in evaluating the adequacy of the safety-related electrical equipment qualification. The scope of the review was expanded to include high energy line breaks (inside and outside containment) in addition to equipment aging and submergence. The NRC advised the licensees that the criteria contained in the DCR Guidelines would be used in its review of licensee submittals; problems arising from this review would be resolved using NUREG-0588 as a guide.

In early February 1980, the NRC decided that Indian Point Units 2 and 3 and Zion Units 1 and 2 should be included within SEP Topic III-12 for the purpose of equipment environmental qualification review.

On February 21, 1980, the NRC and representatives of the SEP Plant Owners Group held an open meeting at NRC headquarters to discuss an accelerated review program in accordance with the DCR screening guidelines. Representatives of the Indian Point Units and Zion Station also attended this meeting. The NRC formally issued to all licensees represented at the meeting the DCR Guidelines document which included a second document, "Guidelines for Identification of That Safety Equipment of SEP Operating Reactors for Which Environmental Qualification Is To Be Addressed" [29], together with the request that the licensees review their plant systems and provide additional equipment environmental qualification information to the NRC on an accelerated schedule.

For non-SEP plants, the NRC Office of Inspection and Enforcement formed a task force including a principal reviewer in each region and a task leader from headquarters. The regional members were assigned responsibility for the technical review of the licensees' responses to IE Bulletin 79-01B, and the task leader was assigned responsibility for the overall coordination of the review effort with NRC staff to assure overall consistency. The regional

reviewers held meetings with the licensees in their respective regions, which resulted in staff positions being issued in a supplement to IE Bulletin 79-01B dated February 29, 1980.

In April 1980, the NRC organizational structure was modified and the Equipment Qualification Branch was formed within the new Division of Engineering. Responsibility for reviewing the status of equipment qualification for all plants was assigned to this branch.

On May 27, 1980, the NRC issued Memorandum and Order CLI-80-21 (32), specifying that licensees and applicants must meet the requirements set forth in the DOR Guidelines and NUREG-0588 regarding environmental qualification of safety-related electrical equipment in order to satisfy 10CFR50, Appendix A, General Design Criteria, Section I, Criterion 4. This Order also established that the Safety Evaluation Reports on this subject, to be prepared by the NRC staff, must be issued on February 1, 1981 and that all subsequent actions to be taken by licensees to achieve full compliance with the DOR Guidelines or NUREG-0588 must be completed no later than June 30, 1982.

The staff held regional meetings with the licensees and interested parties during the week of July 13, 1980. The staff issued a second supplement to IE Bulletin 79-01B, a response to significant questions raised during the public meetings, and two Orders. The Order, dated May 30, 1980, required the licensees to comply with the previously issued Commission Memorandum and Order of May 27, 1980 (CLI-80-21). The above Orders required the licensees to complete the tasks identified in IE Bulletin 79-01B no later than November 1, 1980 to allow the staff to comply with the February 1, 1981 date imposed by the Commission Order. The responses to the questions were issued on February 29, 1980; and the second and third supplements to IE Bulletin 79-01B, highlighting the staff positions affecting the licensees' responses, were issued on September 29 and October 24, 1980, respectively.

In October 1980, EG&G Idaho, Inc. awarded Franklin Research Center (FRC) a contract to provide assistance in the equipment environmental qualification review for 13 of the plants whose licensees responded to IE Bulletin 79-01B. FRC was to evaluate the licensees' equipment environmental qualification

submittals and to present the results in the form of a Technical Evaluation Report for each plant.

1.3 SCOPE OF THE EVALUATION

Environmental qualification of safety-related electrical equipment was selected by the NRC for accelerated review. Therefore, the scope of this report is limited to equipment that must function to mitigate the consequences of a LOCA or HELB and whose environment is adversely affected by those events. In addition, IE Bulletin 79-01B requires environmental qualification in accordance with the DCR Guidelines or NUREG-0588 for all safety-related electrical equipment exposed to a harsh environment. Harsh environments include the limiting conditions resulting from (i) the entire spectrum of postulated line breaks resulting from a LOCA or HELB inside and outside containment and (ii) radiation from fluids that are recirculated from inside containment to accomplish long-term cooling subsequent to an accident. Qualification aspects not included within the scope of this evaluation are:

- o seismic qualification
- o equipment protection against natural phenomena
- o equipment operational service conditions (e.g., vibration, voltage, and frequency deviations)
- o equipment located where it is subject to outdoor environments
- o equipment protection against fire hazards
- o equipment protection against missiles.

2. NRC CRITERIA FOR ENVIRONMENTAL QUALIFICATION

2.1 CRITERIA PROVIDED BY THE NRC

The DOR screening guidelines used by FRC to evaluate the electrical equipment environmental qualification programs were:

- o "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors" [29]
- o "Guidelines for Identification of That Safety Equipment of SEP Operating Reactors for Which Environmental Qualification Is To Be Addressed" [29]
- o NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment" [34].

These guidelines were issued for implementation to all licensees by the NRC in February 1980.

2.2 STAFF POSITIONS AND SUPPLEMENTAL CRITERIA

The NRC identified the following staff positions and supplemental criteria to be used in conjunction with the referenced DOR screening guidelines.

2.2.1 SERVICE CONDITIONS INSIDE CONTAINMENT FOR A LOSS-OF-COOLANT ACCIDENT (DOR Guidelines Section 4.1)

For pressurized water reactors (PWRs), the DOR Guidelines state that the containment temperature and pressure conditions as a function of time should be based on the most recent NRC-approved service conditions specified in the Final Safety Analysis Report (FSAR) or other licensee documentation. In the specific case of pressure-suppression type containments, the following minimum high temperature conditions may be used: (1) boiling water reactor (BWR) drywells -- 340°F for 6 hours and (2) PWR ice condenser lower compartments -- 340°F for 3 hours. As stated in Supplement 2 to IE Bulletin 79-01B [30], "these values are a screening device, per the Guidelines, and can be used in lieu of a plant-specific profile, provided that expected pressure and humidity conditions as a function of time are accounted for."

Service conditions should bound those expected for coolant and steam line breaks inside containment with due consideration given to analytical uncertainties. The steam line break condition should include superheated conditions, the peak temperature, and subsequent temperature/pressure profiles as functions of time. If containment spray is to be used, the impact of the spray on required equipment should be assessed.

The adequacy of a plant-specific profile depends on the assumptions and design considerations at the time the profiles were developed. The DOR Guidelines and NUREG-0588 provide guidance and considerations required to determine if the calculated plant-specific temperature/pressure profiles encompass the LOCA and HELB accidents inside containment.

2.2.2 SUBMERGENCE

(DOR Guidelines Section 4.1, Subitem 3; and Section 4.3.2, Subitem 3)

Equipment submergence (inside or outside containment) should be addressed where the possibility exists that submergence of equipment may result from HELBs or other postulated occurrences. Supplement 2 to IE Bulletin 79-01B [30] provides the following additional criterion: If the equipment satisfies the guidance and other requirements of the DOR Guidelines or NUREG-0588 for the LOCA and HELB accidents, and the licensee demonstrates that its failure will not adversely affect any safety-related function or mislead the operator after submergence, the equipment can be considered exempt from the submergence portion of the qualification requirements.

2.2.3 EQUIPMENT LOCATED IN AREAS NORMALLY MAINTAINED AT ROOM CONDITIONS (DOR Guidelines Section 4.3.3)

Supplement 2 of IE Bulletin 79-01B [30] permits deferment of the review of environmental qualification for all safety-related equipment items located in plant areas where the equipment is not exposed to the direct effects of a HELB or to nuclear radiation emanating from circulation of fluids containing radioactive substances. At the licensee's option, the review may be deferred until after February 1, 1981.

By June 30, 1982, all safety-related electrical equipment potentially exposed to a harsh environment in nuclear generating stations licensed to operate on or before June 30, 1982 shall be qualified to either the DOR Guidelines or NUREG-0588 (as applicable). Safety-related electrical equipment is that required to bring the plant to a cold shutdown condition and to mitigate the consequences of the accident. It is the responsibility of the licensee to evaluate the qualification of safety-related electrical equipment to function in environmental extremes not associated with accident conditions and to document it in a form that will be available for the NRC to audit. Qualification to assure functioning in mild environments must be completed by June 30, 1982.

2.2.4 SIMULATED SERVICE CONDITIONS AND TEST DURATION (DOR Guidelines Section 5.2.1)

The Guidelines require that the test chamber environment envelop the required service conditions for a time equal to the period from the initiation of the accident until the service conditions return to normal. Supplement 2 to IE Bulletin 79-01B [30] provides the following additional criterion:

"Equipment designed to perform its safety-related function within a short time into an event must be qualified for a period of at least 1 hour in excess of the time assumed in the accident analysis. The staff has indicated that time is the most significant factor in terms of the margins required to provide an acceptable confidence level that a safety-related function will be completed. The 1-hour qualification requirement is based on the acceptance of a type test for a single unit and the spectrum of accidents (small and large breaks) bounded by the single test."

2.2.5 DEFERMENT OF QUALIFICATION REVIEW

Supplement 3 to IE Bulletin 79-01B [31] permits the submittal of qualification documentation regarding TMI Action Plan equipment and the equipment required to achieve and maintain a cold shutdown condition to be delayed as follows:

- o "Qualification information for installed TMI Action Plan equipment must be submitted by February 1, 1981.

- o Qualification information for future TMI Action Plan equipment (ref. NUREG-0737, when issued), which requires NRC pre-implementation review, must be submitted with the pre-implementation review data.
- o Qualification information for TMI Action Plan equipment currently under NRC review should be submitted as soon as possible.
- o Qualification information for TMI Action Plan equipment not yet installed which does not require pre-implementation review should be submitted to NRC for review by the implementation date.
- o The qualification information for equipment required to achieve and maintain a Cold Shutdown condition ... will not be submitted later than February 1, 1981."

2.2.6 TEST SEQUENCE (DOR Guidelines Section 5.2.3)

Supplement 2 to IE Bulletin 79-01B [30] provides the following additional criteria:

"Sequential testing requirements are specified in NUREG-0588 and the DOR Guidelines. Licensees must follow the test requirements of the applicable document.

1. If the test has been completed without aging in sequence, justification for such a deviation must be submitted.
2. If testing of a given component has been scheduled but not initiated, the test sequence/program should be modified to include aging.
3. Test programs in progress should be evaluated regarding the ability to comply by incorporating aging in the proper sequence. These would then fall in the first or second category."

2.2.7 RADIATION (DOR Guidelines Sections 4.1.2, 4.2.2, and 4.3.2, Subitem 2)

Supplement 2 to IE Bulletin 79-01B [30] provides the following additional criteria:

"Both the DOR Guidelines and NUREG-0588 are similar in that they provide the methods for determining the radiation source term when considering

LOCA events inside containment (100% noble gases/50% iodine/1% particulates). These methods consider the radiation source term resulting from an event which completely depressurizes the primary system and releases the source term inventory to the containment.

NUREG-0578 provides the radiation source term to be used for determining the qualification doses for equipment in close proximity to recirculating fluid systems inside and outside of containment as a result of LOCA. This method considers a LOCA event in which the primary system may not depressurize and the source term inventory remains in the coolant.

NUREG-0588 also provides the radiation source term to be used for qualifying equipment following non-LOCA events both inside and outside containment (10% noble gases/10% iodine/0% particulates).

When developing radiation source terms for equipment qualification, the Licensee must ensure consideration is given to those events which provide the most bounding conditions. The following table summarizes these considerations:

	<u>LOCA</u>	<u>Non-LOCA HELB</u>
Outside Containment	NUREG-0578 (100/50/1 in RCS) (*)	NUREG-0588 (10/10/0 in RCS)
Inside Containment	<u>Larger of</u> NUREG-0588 (100/50/1 in containment)	NUREG-0588 (10/10/0 in RCS)
	or NUREG-0578 (100/50/1 in RCS)	

Gamma equivalents may be used when consideration of the contributions of beta exposure has been included in accordance with the guidance given in the DOR Guidelines and NUREG-0588. Cobalt 60 is one acceptable gamma radiation source for environmental qualification of safety-related equipment. Cesium 137 may also be used."

* The numbers in parentheses represent % noble gases/% iodine/% particulates. RCS means reactor coolant system.

3. METHODOLOGY USED BY FRC

The Licensee, Commonwealth Edison Company, identified an extensive list of safety-related electrical equipment* items in various locations of Quad Cities Nuclear Power Station Unit 1 in its submittals to the NRC. FRC analyzed the Licensee's listing and grouped all identical or generically identical equipment items located within plant areas that are exposed to the same environmental service conditions. This analysis resulted in a reduced listing containing 148 different equipment items that formed the basis for the review. In this report, the term "equipment item" refers to a specific type of electrical equipment, designated by manufacturer and model, which is representative of all identical or generically identical equipment in a plant area exposed to the same environmental service conditions (e.g., Flow Transmitter, Fischer & Porter, Model 10B2496, located within containment). Appendix A contains the environmental service conditions for each location, Appendix B contains the tabulation of the equipment item groupings (the tabulation does not include equipment covered by the evaluation deferment described in Section 2.2.3 of this report), and Appendix C lists the plant systems identified by the Licensee as being essential to safety.

IE Bulletin 79-01B required the licensees to:

- o provide a master list that identifies the safety systems and Class 1E electrical equipment required to function during and subsequent to an accident and to maintain the plant in a safe condition
- o identify the environmental service conditions
- o identify the maximum submergence levels
- o provide written evidence (System Component Evaluation Work Sheets) of the environmental qualification of the equipment identified in the master list to demonstrate the capability of the equipment to function under postulated accident conditions

*In this report, the term "safety-related electrical equipment" refers to the equipment defined by the NRC Guidelines referenced in Section 2.1.

- o evaluate the qualification documentation using the DOR Guidelines and NUREG-0588; and, for equipment not having adequate qualification, to identify plans and schedules for establishing qualification
- o submit a Licensee Event Report (LER) for Class 1E electrical equipment determined to be unqualified.

The responses to IE Bulletin 79-01B were requested by the NRC under provisions of 10CFR50.54(f), "Conditions of Licenses," which requires the licensees to submit written statements, signed under oath. To provide assurance that the licensees satisfy the requirements of IE Bulletin 79-01B and to provide a basis for the NRC Safety Evaluation Report (SER), FRC was requested to develop this Technical Evaluation Report (TER) by assessing the licensees' responses in relation to the general requirements of the DOR Guidelines as augmented by the supplements to IE Bulletin 79-01B.

The results and conclusions contained in this report are valid assuming that the Licensee's analyses of test reports referenced in the Licensee submittal are correct. Review of test reports was not within the scope of FRC's assignment. However, the NRC staff will audit selected analyses and test reports, incorporating the results of the reviews with the conclusions of the TERS, when developing the plant-specific SERs.

Each equipment item listed in Appendix B was assigned to one of the NRC categories defined in Table 3-1 after review of the associated System Component Evaluation Work Sheet provided by the Licensee.

Topics not within the scope of the FRC evaluation are:

- o completeness of the licensee's listing of safety-related equipment
- o acceptability of licensee-provided environmental service conditions
- o acceptability of licensee-stated positions concerning safety systems or component function
- o review and acceptability of qualification test reports and other qualification documentation.

The NRC Office of Inspection and Enforcement established a program to conduct an onsite verification inspection of selected Class 1E equipment to verify proper installation of equipment, overall interface integrity, location

with respect to flood level for equipment inside containment, and manufacturer's nameplate data. The manufacturer and model number from the nameplate data were to be compared to information given in the System Component Evaluation Work Sheets of the licensee's report. The specific details of this site inspection are documented in an internal NRC Memorandum [35]. The information in this report will be used by the NRC in developing the plant-specific SER.

Table 3-1. NRC CATEGORIES AND DEFINITIONS

- o NRC Category I
EQUIPMENT THAT SATISFIES THE GENERAL REQUIREMENTS OF THE DCR GUIDELINES
AND IE BULLETIN 79-01B

This category includes equipment items for which the System Component Evaluation Work Sheets are judged to be in compliance with IE Bulletin 79-01B, its supplements, and the general requirements of the DCR Guidelines. For these equipment items, the licensee's System Component Evaluation Work Sheets indicate that the requirements of IE Bulletin 79-01B have been satisfied, assuming that the licensee's analyses of qualification documentation are complete and correct.

- o NRC Category II
EQUIPMENT THAT THE LICENSEE WILL MODIFY OR RELOCATE

This category includes equipment items that the licensee has stated will be modified or relocated in order to comply with the DCR Guidelines requirements.

- o NRC Category III
EQUIPMENT THAT THE LICENSEE BELIEVES TO BE EXEMPT FROM QUALIFICATION

This category includes equipment items that the licensee believes to be exempt from qualification on the basis that (1) the equipment does not provide a safety function (i.e., should not have been included in the master list of safety-related equipment submitted by the licensee), or (2) the specific safety-related function of the equipment can be accomplished by some other designated equipment that is fully qualified.

(Continued)

Table 3-1 (Cont.)

o NRC Category IV

EQUIPMENT THAT HAS QUALIFICATION TESTING SCHEDULED BUT NOT COMPLETED

This category includes equipment items that the licensee has determined to be deficient or inadequate with respect to qualification. However, the licensee has stated that the equipment item is scheduled to be tested by a designated date.

o NRC Category V

EQUIPMENT THAT DOES NOT SATISFY ONE OR MORE OF THE GENERAL REQUIREMENTS OF THE DOR GUIDELINES AND IE BULLETIN 79-01B

This category includes equipment items judged to be deficient or inadequate with respect to the general requirements of the DOR Guidelines and IE Bulletin 79-01B based on a review of the licensee's System Component Evaluation Work Sheets.

o NRC Category VI

EQUIPMENT FOR WHICH QUALIFICATION IS DEFERRED

This category includes equipment items that have been addressed by the licensee in the equipment environmental qualification submittals; however, the qualification review of this equipment has been deferred by the NRC in accordance with criteria presented in Sections 2.2.3 and 2.2.5 of this report.

4. TECHNICAL EVALUATION

General observations concerning the Licensee's approach to qualification are included in Section 4.1. Sections 4.2 through 4.7 identify the equipment items* placed in each of the major NRC qualification categories in accordance with FRC's technical evaluation of the Licensee's documentation. The results of the evaluation are summarized in Section 4.8.

4.1 METHODOLOGY USED BY THE LICENSEE

This section includes observations concerning the Licensee's methodology and procedures, as described in Reference 33, for complying with the requirements of IE Bulletin 79-01B.

4.1.1 COMPLETENESS OF EQUIPMENT LIST

In Section 4.2 of Reference 33, the Licensee states:

The QCNPS FSAR and emergency procedures were reviewed to identify the engineered safety feature systems required to mitigate the consequences of the postulated accidents discussed in Section 4.1. These systems are needed to achieve reactor shutdown, containment isolation, reactor core cooling, and containment and reactor heat removal, and to prevent the release of radioactive materials into the environment in amounts in excess of the guidelines of 10 CFR 100.

FRC believes that the Licensee's approach is appropriate. However, the following situations may result in the need for the Licensee to increase the number of equipment items requiring full qualification because they are exposed to harsh environmental service conditions (see Section 4.1.2):

- o Other HELB accidents may need to be considered.

*In this report, the term "equipment item" refers to a specific type of electrical equipment, designated by manufacturer and model, which is representative of all identical or generically identical equipment in a plant area exposed to the same environmental conditions (e.g., Flow Transmitter, Fischer & Porter, Model 10B2496, located within containment).

- o Temperature or nuclear radiation exposures may be more severe than assumed in this analysis because assumed operating time is not long enough, or other assumptions did not conform to the Guidelines requirements.
- o Equipment was assumed to be exempt from qualification.

The Licensee has not indicated that the submittal of qualification information for equipment installed in response to the TMI Action Plan and to accomplish cold shutdown has been deferred (see Section 2.2.5). No equipment is specifically identified on the master list as being required for these purposes.

4.1.2 ENVIRONMENTAL SERVICE CONDITIONS

4.1.2.1 GENERAL COMMENTS

In Section 4.1 of Reference 33, the Licensee states:

Where components, because of their location, could be subjected to differing environments for the various accidents, the most severe environmental conditions were utilized for qualification....Where qualification could not be demonstrated for the entire spectrum of conditions simultaneously, components were evaluated for the conditions associated with each individual accident. Environmental conditions are based on the specific accidents for which the components must function.

PRC concurs that this is the proper approach, but a review of the equipment data sheets indicates that it was not always followed. Also, the Licensee often considered only the environment that exists during the first minute (more or less) of an accident, rather than a period of one hour plus expected operating time, as is required by the Guidelines and Supplement 2 to IE Bulletin 79-01B.

The Licensee also describes the following approach to application of design basis event (DBE) conditions to equipment:

Components which are exposed to harsh environments during accidents for which they are not required to function do not require qualification for these environments. Where qualification testing is to be performed, testing will be performed for each postulated environment separately.

PRC considers that all safety-related equipment having the potential for common-mode failures due to environmental stresses must be qualified if any

such failure would adversely affect connected circuits. Equipment that has no active function during a DBE cannot be exempted from qualification for this reason only. In addition, qualification for a short operating period would not be sufficient if equipment failures occurring after a minimum required operating period would adversely affect connected circuits. FRC notes that short operating periods are described for some of the equipment listed in the Licensee's submittal. It is not obvious that the environments specified would remain as described if the additional 1 hour of operating time required by the Guidelines (see Section 2.2.4 of this report) were added to the stated operating time. For many equipment items, the environmental service conditions during the first hour following an accident are much more severe than those listed by the Licensee (for the first minute) as requirements for which qualification must be demonstrated.

4.1.2.2 TEMPERATURE/PRESSURE/HUMIDITY

The Licensee states the following:

Inside the Drywell

For the LOCA/HELB inside the containment, worst case environmental conditions are established by the LOCA resulting from a double-ended recirculation line break.

Outside the Drywell, Subject to HELB

For a HELB outside the containment, Special Report No. 12 identifies the high energy lines and the location of postulated breaks.

Nonharsh Areas

Plant areas which are not covered in the above referenced Appendix C tables are considered nonharsh environmental areas with respect to HELB and post-LOCA radiation. These areas are either maintained in a suitable environmental condition by safety-related heating, ventilating, and air conditioning (HVAC) equipment, or are considered nonharsh because they are controlled to less than 104°F prior to the postulated accidents and are relatively large open areas with no large motors or other equivalent heat sources.

Where environmental conditions are maintained by HVAC equipment, the HVAC system is provided with redundant components and/or backup power supply for reliable operation. Safety-related HVAC systems are provided for the following areas:

- a. Control room, cable spreading room, battery rooms, computer room, and electrical equipment room
- b. Standby diesel generator room
- c. HPCI room
- d. Residual heat removal corner rooms
- e. Core spray/RCIC corner rooms.

Environments were considered nonharsh when the temperature was controlled to 104°F or less and the maximum integrated radiation dose was less than 5×10^4 rads. Areas where infrequent temperature extremes up to 120°F could occur, and temperature variations are not a result of the postulated accidents are considered as mild environments. Equipment in these areas functions normally in the same environment as postulated for post-accident conditions. For nonharsh and mild environments, qualification data is not required.

FRC considers the Licensee's approach to be less conservative than permitted by the Guidelines:

1. Inside the Drywell. The Licensee has provided no information to justify the statement that LOCA conditions are more severe than MSLB conditions. Supplement 2 to IE Bulletin 79-01B requires that the Licensee consider a full spectrum of MSLB events (see Section 2.2.1 of this report).
2. It is not clear that all HELB accidents have been considered, as is required by Supplement 2 to IE Bulletin 79-01B.
3. Nonharsh Areas. Power plant equipment is usually designed for an environment of 50-104°F, 30-70% RH, and negligible radiation dose. These operating ranges are not intended to indicate that the equipment is expected to fail if the temperature rises to 105°F, but rather that performance may be questionable if the temperature rises above 105°F and the equipment is exposed to high humidity and radiation dose rates. For individual equipment items with a maximum specified operating temperature of 120°F, FRC concurs that this is a nonharsh environment, provided that the elevated temperature is not a result of a DBE.

4.1.2.3 NUCLEAR RADIATION

The Licensee states:

The QCNPS FSAR does not provide integrated radiation dose inside the drywell. Studies were performed to establish the integrated doses inside

the drywell for a postulated LOCA. The integrated doses for 1 day, 30 days, and 1 year are provided in Appendix C (Appendix A of this report). The study methodology is described in Section 4.3.5. Radiation doses are evaluated for actual equipment operating times.

Outside the Drywell, Post-LOCA Radiation Exposures

Integrated doses have been calculated for areas outside the drywell. Doses were established for 1 day, 30 days, and 1 year exposure. Integrated doses of less than 5×10^4 rads during a component's service life are evaluated as nonharsh environmental conditions. Integrated doses of 5×10^4 rads and greater are evaluated as harsh environmental conditions. Appendix C provides integrated doses as a function of exposure time for areas containing components identified in Appendixes B.1 and B.2.

Radiation Study Methodology

A radiation study was performed to establish integrated doses to equipment following a postulated LOCA. The core fission product inventory was based on General Electric document "Radiation Source Information for NUREG-0578 Implementation, Computer Run Identified as SNUMB 7007S" dated November 1979.

The fission products were diluted into the appropriate fluid media as follows:

<u>Fluid</u>	<u>Noble Gases (%)</u>	<u>Halogens (%)</u>	<u>Other (%)</u>
Suppression pool liquid	50	-	1
Reactor coolant liquid	100	50	1
Containment atmosphere	100	25	-
Reactor steam	100	25	-

Dilution of the fission products was considered using the fluid volume as the dilution media.

For components located inside the drywell, only gamma doses were considered if the component was enclosed in a nonorganic material (e.g., valve motor actuators in metal enclosures). The gamma dose was established based on immersion of the component in the gaseous drywell atmosphere for the time which the component must remain functional. For components enclosed in organic material (e.g., cable), beta radiation doses were calculated. Where components enclosed in organic materials are installed in metal enclosures (e.g., cable in conduit or flex-conduit), beta radiation will be neglected. Inspections have been

performed in the Quad Cities Unit 2 drywell, confirming that all equipment and cable is enclosed in nonorganic materials. Beta doses have therefore not been considered.

For components located outside the drywell, source terms were established for piping systems containing reactor steam, reactor coolant liquid, suppression pool liquid, and containment atmosphere. Since the piping wall thickness is sufficient to shield against beta radiation, only gamma radiation need be considered. Each Class 1E component was located with respect to the piping systems containing post-LCCA radioactive fluids. The integrated dose was established based on the piping source term, distance from pipe to component, and component operating time. Where a component could receive doses from more than one piping system, the doses were added to derive a total dose. Appendix C (Appendix A of this report), Table C-3, provides integrated doses as a function of time calculated 1 foot from the greatest single source in each major plant area.

PRC notes that certain electronic equipment items, such as process parameter transmitters, may experience performance degradation at radiation dose levels lower than 50 krd. Appendix C to the Guidelines indicates radiation damage threshold values in the 1- to 10-krd range for some electronic subcomponents. For other types of electrical equipment which do not contain electronic components, noticeable degradation is not expected to occur below 50 krd.

Use of actual operating times less than 1 hour, as noted above and implemented throughout the equipment data sheets in Reference 33, to determine nuclear radiation dose levels for qualification does not comply with the Guidelines requirement that equipment subject to harsh environments be qualified for operating time plus 1 hour. The Licensee should reevaluate the equipment radiation dose values (both inside and outside containment) to assure conformance with the DOR Guidelines requirements.

4.1.3 AGING AND QUALIFIED LIFE

The Licensee states the following:

In this study, the need to consider aging is based on the evaluation of component design and application. The effects of aging have also been considered based on Enclosure 4 to NRC Bulletin 79-01B, "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors" and NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment."

a. Components Located Inside the Drywell

The environmental conditions inside the drywell are defined as harsh (Sections 4.3.1 and 4.3.4) and hence the effects of thermal and radiation aging are evaluated for all Class 1E electrical components.

b. Components Located Outside the Drywell

1. Radiation Aging

The components which are located outside the drywell and steam tunnel are exposed to insignificant amounts of radiation during normal operating conditions. The effects of radiation aging are therefore not considered in the qualification evaluation of these components.

Under postulated accident conditions some components may be exposed to greater than 5×10^4 rads (integrated radiation dose). The effects of this short-term radiation exposure are considered in the qualification evaluation.

Components located inside the steam tunnel are evaluated for radiation aging.

2. Thermal Aging

Most areas outside the drywell are maintained in a suitable environmental condition by safety-related HVAC equipment. The normal maximum environmental design temperature is 104°F, which in this study is defined as a nonharsh environment (Section 4.3.4). Thermal aging for these components is not required since the normal and post-accident environments are nonharsh. In addition, temperature extremes (up to 120°F) may occur in some plant areas. However, these conditions would result only during periods of extreme outdoor temperatures. Equipment designed and installed per industry standards would be capable of satisfactory operation without exhibiting age-related degradation due to these temperature extremes. Therefore, the effects of thermal aging are not considered for components located in areas where the maximum ambient temperature is maintained at 120°F or below.

Review of the Licensee's System Component Evaluation Work Sheets (SCEWS) indicates that the Licensee has not complied with the Guidelines requirements

concerning the evaluation of aging degradation and determination of qualified life. In most instances the SCEWS shows "Not Required" opposite the parameter "Aging." In other cases the parameters used in the pre-aging exposure of the qualification test program are shown, but there is no assessment of the adequacy of this exposure or its interpretation in terms of qualified life.

The DOR Guidelines require that the Licensee:

- o establish (numerically) the qualified life for all equipment items containing components susceptible to degradation due to heat and nuclear radiation
- o implement programs to review detailed surveillance and maintenance records to assure that equipment that exhibits age-related degradation is identified and replaced (or modified) as necessary.

Qualified life is the maximum time period of normal service, under specified conditions, for which it can be demonstrated that, at the end of the period, the equipment is still able to perform its specified safety function(s) for applicable design basis events. The qualified life may be contingent on implementation of a specified maintenance program. It is acceptable for the qualified life of some subcomponents of an equipment item to be less than the qualified life of the item itself, provided a program for replacement of such components at intervals not exceeding their qualified lifetimes is specified and fulfilled. The qualified life of an equipment item may be changed during its installed life when justified by new information that permits a reanalysis of the qualification program.

Establishing the qualified life for equipment is a technically challenging task because of the paucity of information concerning degradation of materials and components under long-term exposure to the environmental service conditions in a nuclear power generating station. As is discussed more fully in Reference 36, with the possible exception of certain simple materials, there is no rigorous basis for establishing qualified lifetimes for periods approaching an installed lifetime of 40 years. Furthermore, additional information regarding possible long-term synergistic effects of temperature, humidity, nuclear radiations, etc., is extremely limited.

PRC believes it is fundamentally unsound to specify that the qualified life shall be 40 years (or any given value) for every safety-related equipment item in the plant, and then to attempt to prove that this "requirement" is met. The Guidelines do not require that the qualified life be shown to be 40 years (or any other value). Rather, they require that each Licensee provide evidence that the safety functions of the equipment in the plant can be performed adequately at all times. A conservative qualified life value should be established for each equipment item, and surveillance testing (necessary to monitor performance and identify degradation) should be performed to determine the need for maintenance or replacement. In this way, the qualified life value of an equipment item can be extended as new information is gained.

The Licensee should review the qualified life values and the present installed life of the equipment in accordance with the DOR Guidelines to determine a replacement schedule for each equipment item (or subcomponents thereof). These schedules may be revised as new information becomes available.

4.2 NRC Category I
EQUIPMENT THAT SATISFIES THE GENERAL REQUIREMENTS OF THE DOR GUIDELINES
AND IE BULLETIN 79-01B

This category includes equipment items for which the System Component Evaluation Work Sheets are judged to be in compliance with IE Bulletin 79-01B, its supplements, and the general requirements of the DOR Guidelines. For these equipment items, the Licensee's System Component Evaluation Work Sheets indicate that the requirements of IE Bulletin 79-01B have been satisfied, assuming that the Licensee's analyses of qualification documentation are complete and correct.

For Quad Cities Nuclear Power Station Unit 1, no equipment is assigned to this category.

4.3 NRC Category II
EQUIPMENT THAT THE LICENSEE WILL MODIFY OR RELOCATE

This category includes equipment items that the Licensee has stated will be modified or relocated in order to comply with the DCR Guidelines requirements.

4.3.1 Equipment Item No. 99
480 V Motor Control Center Located in the Reactor Building
General Electric Model 7700
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

This equipment is subjected to harsh radiation only, and will be relocated and/or shielded to reduce the radiation exposure to a non-harsh level. Although qualification data is not available, continued operation is justified for the following reasons:

- a. Radiation doses were calculated using conservative non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. Actual doses would therefore be less than those calculated using such conservative assumptions.
- b. Dose to this equipment is caused by only one loop of a redundant piping system. Operator actions taken to shut down redundant systems will further reduce exposure to this equipment.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of the DCR Guidelines are not satisfied. However, the Licensee stated that the equipment will be modified or relocated in order to achieve qualification.

4.3.2 Equipment Item No. 108
DC Distribution Panel Located in the Reactor Building
Cutler Hammer, Model Not Stated
(Licensee reference not cited)

The Licensee stated:

This equipment is subjected to harsh radiation only, and will be relocated and/or shielded to reduce the radiation exposure to a non-harsh level. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. Radiation doses were calculated using conservative non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. Actual doses would therefore be less than those calculated using such conservative assumptions.
- b. Dose to this equipment is caused by only one loop of a redundant piping system. Operator action taken to shut down redundant systems will further reduce exposure to this equipment.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of the DOR Guidelines are not satisfied. However, the Licensee stated that the equipment will be shielded or relocated in order to achieve qualification.

4.3.3 Equipment Item No. 139
 Local Control Panels Located in the Reactor Building
 Harlo, Model DWG D12971 SH.30
 (Licensee reference not cited)

The Licensee makes the following statements and commitments:

This equipment is subjected to harsh radiation only, and will be reevaluated and/or shielded to reduce the radiation exposure to a non-harsh level. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases that occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also, actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of the DOR Guidelines are not satisfied. However, the Licensee stated that the equipment will be shielded or relocated in order to achieve qualification.

4.4 NRC Category III

EQUIPMENT THAT THE LICENSEE BELIEVES TO BE EXEMPT FROM QUALIFICATION

This category includes equipment items that the Licensee believes to be exempt from qualification on the basis that (1) the equipment does not provide a safety function (i.e., should not have been included in the master list of safety-related equipment submitted by the Licensee), or (2) the specific safety-related function of the equipment can be accomplished by some other designated equipment that is fully qualified.

For Quad Cities Nuclear Power Station Unit 1, no equipment is assigned to this category.

4.5 NRC Category IV

EQUIPMENT THAT HAS QUALIFICATION TESTING SCHEDULED BUT NOT COMPLETED

This category includes equipment items that the Licensee has determined to be deficient or inadequate with respect to qualification. However, the Licensee has stated that the equipment item is scheduled to be tested by a designated date.

For Quad Cities Nuclear Power Station Unit 1, no equipment is assigned to this category.

4.6 NRC Category V
EQUIPMENT THAT DOES NOT SATISFY ONE OR MORE OF THE GENERAL REQUIREMENTS
OF THE DOR GUIDELINES AND IE BULLETIN 79-01B

This category includes equipment items judged to be deficient or inadequate with respect to the general requirements of the DOR Guidelines and IE Bulletin 79-01B based on a review of the Licensee's System Component Evaluation Work Sheets.

4.6.1 Equipment Item No. 1
Temperature Switches Located in the RWCU Room
Manufacturer and Model Not Stated
(Licensee reference not cited)

The Licensee notes that, where these temperature switches are used for leak detection in the RWCU room, conditions are normally non-harsh. Immediately following a leak, the temperature will increase. As soon as the leak occurs, the switches will function, initiating system isolation within 1 minute.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.2 Equipment Item No. 2
Electric Motors Driving Pumps Located in the Corner Rooms
General Electric Models 5K6338XC23A and 5K6336XC193
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

A contract will be issued for service to qualify this equipment by analysis and/or testing, failing which the appropriate equipment or parts thereof will be replaced with qualified components. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions.

Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated. During the time available after stabilization of core cooling, additional coolant injection paths could be established, if necessary, to assure long-term cooling.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.3 Equipment Item No. 10

Pressure Switches Located in the NW and SW Corner Rooms
Mercontrol Model DA-7043-804
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

The equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reason:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated. During the time available after stabilization of core cooling, additional coolant injection paths could be established, if necessary, to assure long-term cooling.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.4 Equipment Item No. 13

Motorized Valve Actuator Located in the Drywell
Limitorque Model SMB-1 with Reliance ac Motor
(Licensee Reference 7)

The Licensee makes the following statements and commitments:

The equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reason:

This valve is located inside drywell and is normally open. Following a postulated accident, it would remain open to allow steam flow to the HCPI turbine. Valve operation would only be required to isolate the HPCI steam line. Three additional valves are located on this steam line outside drywell to isolate the steam line. Since the harsh environment inside drywell is associated with an accident which would not affect environments or HPCI steam line pipe integrity outside drywell, the three outside drywell valves would be capable of isolating the steam line.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has referenced a test report indicating that none of the required environmental service parameters are enveloped. Also, the Licensee considers that an evaluation of aging degradation is not required for this equipment. As noted in Section 4.1.3, FRC believes this is not in conformance with the Guidelines requirements.

4.6.5 Equipment Item No. 14

Motorized Valve Actuator Located in the Torus Area
Limitorque Model SMB-1 with Peerless dc Motor
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has referenced a test report indicating that the required environmental service parameters were not enveloped with respect to the temperature and pressure exposures. It is noted that the nuclear radiation dose cited on the data sheet (10 krd) is not consistent with the value cited for this location in Appendix A. Also, the Licensee considers that an evaluation of aging degradation is not required for this equipment. As noted in Section 4.1.3, FRC believes this is not in conformance with the Guidelines requirements.

4.6.6 Equipment Item No. 22

Temperature Switches Located in the HPCI Room
United Electric Controls Model 88B
(Licensee reference not cited)

The Licensee states that these temperature switches detect an HPCI steam line break and, in the event of a leak, these switches will function and isolate the HPCI steam line. The Licensee concludes that, since the

temperature associated with this event is within the range of routine calibration, additional qualification data is not required.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.7 Equipment Item No. 36
Solenoid Valve Located Inside Drywell
Allied Controls-Gould Models 320X-39 and 320X-30
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

This equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. These components are designed as redundant pairs, each separated from the other with only one subjected to a harsh environment.
- b. These components complete their function in a very short period of time and would not experience significant effects of increased environmental conditions in this short time period.
- c. These components undergo periodic functional testing to verify operability. This testing would identify age related degradation.
- d. These components or identical components remain functional during the June 5, 1970 depressurization incident at Dresden Unit 2.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.8 Equipment Item Nos. 37 and 38
Safety and Electromagnet Relief Valves and Solenoids
Located Inside the Drywell
37: Dresser Industries Model C5450-3
38: Dresser Industries Model 1325VX
(Licensee Reference 15)

The Licensee makes the following statements:

The number of actuations which this component was subjected to during the test is considerably larger than the number of actuations during 12 days

following the accident. Therefore, this component is considered qualified for the required operating time.

Although this test report did not utilize saturated atmosphere for testing, this component did operate through the saturated atmosphere of the June 5, 1970 depressurization incident at Dresden 2, and is therefore considered qualified.

The electrical components associated with this relief valve are enclosed in a metal enclosure which opens from the bottom only. Spray therefore could not affect operation of this equipment.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has referenced a test report indicating that the required environmental service parameters were not enveloped with respect to spray, nuclear radiation dose, and test duration. Also, the Licensee considers that an evaluation of aging degradation is not required for this equipment. As noted in Section 4.1.3, FRC believes this is not in conformance with the Guidelines requirements.

- 4.6.9 Equipment Item No. 58
 Motorized Valve Actuator Located in the Steam Tunnel
 Limitorque Model SMB-00 with Peerless dc Motor
 (Licensee reference not cited)

The Licensee makes the following statements and commitments:

Additional vendor information is being sought to resolve outstanding environmental qualification items. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. Radiation doses were calculated using conservative non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. Actual doses would therefore be less than those calculated using such conservative assumptions.
- b. Other equipment similar in design to this equipment has successfully been qualified for environments in excess of the calculated requirement for this equipment.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.10 Equipment Item No. 43
 Pressure Switch Located in the SE Corner Room
 Static-O-Ring Model 12NN-KK213-VX
 (Licensee reference not cited)

The Licensee makes the following statements and commitments:

This equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated. During the time available after stabilization of core cooling, additional coolant injection paths could be established, if necessary, to assure long-term cooling.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.11 Equipment Item No. 56
 Differential Pressure Indicating Switches Located in the NE and SE
 Corner Rooms
 Barton Model 289
 (Licensee reference not cited)

The Licensee makes the following statements and commitments:

This equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to

radiation exposure, the shut down redundant system could be activated. During the time available after stabilization of core cooling. Additional coolant injection paths could be established, if necessary, to assure long-term cooling.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.12 Equipment Item No. 160
Differential Pressure Switches Located in the NE Corner Room
Barton, Model Not Stated
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

This equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated. During the time available after stabilization of core cooling. Additional coolant injection paths could be established, if necessary, to assure long-term cooling.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.13 Equipment Item No. 141
Temperature Element Located Inside the Torus
Pall Trinity Micro 14-T-2H
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

A contract will be issued for services to qualify this equipment by analysis and/or testing, failing which the appropriate equipment or parts

thereof will be replaced with qualified components. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. Actual doses would therefore be less than those calculated using such conservative assumptions.

Other equipment similar in design to this equipment has successfully been qualified for environments in excess of the calculated requirement for this equipment.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.14 Equipment Item No. 72

Electric Motors Driving Fans Located in the Corner Rooms
General Electric Models SK213AK2476 and SK184AL2151
(Licensee reference not cited)

This equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases that occur several hours after the postulated accident. During this time, action will be taken to shutdown redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also, actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated. During the time available after stabilization of core cooling, additional coolant injection paths could be established, if necessary, to assure long-term cooling.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.15 Equipment Item No. 81
 Motorized Valve Actuator Located in the RWCU Room
 Limitorque Model SMB with Peerless dc Motor
 (Licensee reference not cited)

The Licensee makes the following statements and commitments:

Additional vendor information is being sought to resolve outstanding environmental qualification items. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. These components are designed as redundant pairs, each separated from the other with only one subjected to a harsh environment.
- b. These components complete their function in a very short period of time and would not experience significant effects of increased environmental conditions in this short time period.
- c. These components undergo periodic functional testing to verify operability this testing would identify age related degradation.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.16 Equipment Item No. 69
 Pressure Switches Located in the Reactor Building
 Static-O-Ring Model 12N-AA5-PP
 (Licensee reference not cited)

The Licensee makes the following statements and commitments:

This equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. Radiation doses were calculated using conservative non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. Actual doses would therefore be less than those calculated using such conservative assumptions.
- b. Dose to this equipment is caused by only one loop of a redundant piping system. Operator action taken to shut down redundant systems will further reduce exposure to this equipment.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.17 Equipment Item No. 90
Level Indicating Switches Located in the Reactor Building
Yarway Models 4418C and 4419CE
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

This equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shutdown redundant system could be activated. During the time available after stabilization of core cooling. Additional coolant injection paths could be established, if necessary to assure long-term cooling.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.18 Equipment Item No. 7
Pressure Transmitters Located in the NW and SW Corner Rooms
General Electric Models GE/MAC 551, 4532K11001
(Licensee Reference 21)

The Licensee makes the following statements and commitments:

A contract will be issued for service to qualify this equipment by analysis and/or testing, failing which the appropriate equipment or parts thereof will be replaced with qualified components. Although qualification data is not available, continued station operation is justified for the following reason:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated. During the time available after stabilization of core cooling, additional coolant injection paths could be established, if necessary, to assure long-term cooling.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has referenced a test report indicating that the required environmental service parameters were not enveloped with respect to nuclear radiation dose and test duration. Also, the Licensee considers that an evaluation of aging degradation is not required for this equipment. As noted in Section 4.1.3, FRC believes this is not in conformance with the Guidelines requirements.

4.6.19 Equipment Item No. 8

Flow Transmitters Located in the NW and SW Corner Rooms
General Electric Type 553, 4532K43001
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

A contract will be issued for service to qualify this equipment by analysis and/or testing, failing which the appropriate equipment or parts thereof will be replaced with qualified components. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated. During the time available after stabilization of core cooling, additional coolant injection paths could be established, if necessary, to assure long-term cooling.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.20 Equipment Item No. 9
Flow Switches Located in the NW and SW Corner Rooms
Barton Model 289
(Licensee Reference 22)

The Licensee makes the following statements and commitments:

A contract will be issued for service to qualify this equipment by analysis and/or testing, failing which the appropriate equipment or parts thereof will be replaced with qualified components. Although qualification data is not available, continued station operation is justified for the following reason:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated. During the time available after stabilization of core cooling, additional coolant injection paths could be established, if necessary, to assure long-term cooling.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has referenced a test report indicating that the required environmental service parameters were not enveloped with respect to nuclear radiation dose. Also, the Licensee considers that an evaluation of aging degradation is not required for this equipment. As noted in Section 4.1.3, FRC believes this is not in conformance with the Guidelines requirements.

- 4.6.21 Equipment Item No. 54
Flow Transmitters Located in the NE and SE Corner Rooms
General Electric Model GE/MAC 553
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

A contract will be issued for services to qualify this equipment by analysis and/or testing, failing which the appropriate equipment or parts thereof will be replaced with qualified components. Although qualification data is not available, continued station operation is justified for the following reason:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated. During the time available after stabilization of core cooling, additional coolant injection paths could be established, if necessary, to assure long-term cooling.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.22 Equipment Item No. 57
Pressure Switches Located in the NE and SE Corner Rooms
Mercoild Model GN-L-3
(Licensee reference not cited)

The Licensee makes the following statement and commitments:

A contract will be issued for services to qualify this equipment by analysis and/or testing, failing which the appropriate equipment or parts thereof will be replaced with qualified components. Although qualification data is not available, continued station operation is justified for the following reason:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures

to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated. During the time available after stabilization of core cooling, additional coolant injection paths could be established, if necessary, to assure long-term cooling.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of 10 CFR 50.103 (a) and (b) are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.23 Equipment Item No. 3
 Motorized Valve Actuators Located in the NW and SW Corner Rooms
 Limitorque Model SMB-0-25 with Peerless ac Motor
 (Licensee Reference 20)

Review of the Licensee's System Component Evaluation Work Sheet indicates that a test report is referenced which envelops the environmental service parameters. However, the Licensee has not complied with the Guidelines requirements concerning the evaluation of aging degradation and determination of qualified life (see Section 4.1.3).

- 4.6.24 Equipment Item Nos. 4 and 49
 Motorized Valve Actuators Located in the Reactor Building
 Limitorque Model SMB-0-15 with Peerless ac Motors
 (Licensee Reference 20)

Review of the Licensee's System Component Evaluation Work Sheet indicates that a test report is referenced which envelops the environmental service parameters. However, the Licensee has not complied with the Guidelines requirements concerning the evaluation of aging degradation and determination of qualified life (see Section 4.1.3).

- 4.6.25 Equipment Item No. 5
 Motorized Valve Actuators Located in the Reactor Building
 Limitorque Model SMB-2-40 with Reliance ac Motor
 (Licensee Reference 7)

Review of the Licensee's System Component Evaluation Work Sheet indicates that a test report is referenced which envelops the environmental service

parameters. However, the Licensee has not complied with the Guidelines requirements concerning the evaluation of aging degradation and determination of qualified life (see Section 4.1.3).

4.6.26 Equipment Item No. 6
 Motorized Valve Actuators Located in the Torus Area
 Limitorque Model SMB-000 with Reliance ac Motor
 (Licensee Reference 7)

The Licensee makes the following statements and commitments:

Additional vendor information is being sought to resolve outstanding environment qualification items. Although qualification data is not available for radiation, continued station operation is justified for the following reason:

This valve opens on low flow to provide a minimum flow line. Should the valve fail in the open position, coolant injection would be reduced but would still exist. Additionally radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated. During the time available after stabilization of core cooling, additional coolant injection paths could be established, if necessary, to assure long-term cooling.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has referenced a test report indicating that the required environmental service parameters were not enveloped with respect to nuclear radiation dose. Also, the Licensee considers that an evaluation of aging degradation is not required for this equipment. As noted in Section 4.1.3, FRC believes this is not in conformance with the Guidelines requirements.

- 4.6.27 Equipment Item No. 39
 Motorized Valve Actuator Located Inside the Drywell
 Limitorque, Model Not Stated, with Peerless ac Motor
 (Licensee References 20 and 24)

The Licensee makes the following statements and commitments:

The test procedure required saturated atmosphere. Additional vendor information is being sought to resolve outstanding environmental qualification items, but humidity was not measured during the test. The test used saturated steam for temperature. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. These components are designed as redundant pairs, each separated from the other with only one subjected to a harsh environment.
- b. These components complete their function in a very short period of time and would not experience significant effects of increased environmental conditions in this short time period.
- c. These components undergo periodic functional testing to verify operability. This testing would identify age related degradation.
- d. These components or identical components remained functional during the June 5, 1970 depressurization incident at Dresden Unit 2.

Review of the Licensee's System Component Evaluation Work Sheet indicates that a test report is referenced which envelops the environmental service parameters. However, the Licensee has not complied with the Guidelines requirements concerning the evaluation of aging degradation and determination of qualified life (see Section 4.1.3).

- 4.6.28 Equipment Item No. 42
 Temperature Switches Located in the Steam Tunnel
 Fenwal Model 17002-40
 (Licensee reference not cited)

The Licensee notes that these sensors are used to detect a main steam line break in the steam tunnel and complete their function within 1 minute. The Licensee also notes that periodic calibration is sufficient to demonstrate equipment capability to function under accident conditions.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.29 Equipment Item No. 44
 Motorized Valve Actuators Located in the NE and SE Corner Rooms
 Limitorque Model SMB with Peerless ac Motors
 (Licensee Reference 20)

Review of the Licensee's System Component Evaluation Work Sheet indicates that a test report is referenced which envelops the environmental service parameters. However, the Licensee has not complied with the Guidelines requirements concerning the evaluation of aging degradation and determination of qualified life (see Section 4.1.3).

- 4.6.30 Equipment Item No. 45
 Motorized Valve Actuators Located in the NE and SE Corner Rooms
 Limitorque Model SMB-2-60, Motor Not Identified
 (Licensee reference not cited)

The Licensee states the following with regard to qualification for nuclear radiation dose:

Either Reliance or Peerless ac motors are used in this station. The Reliance ac motor is qualified for 2.0 E07 rads while Peerless ac motors are qualified for 2.0 E08. The lower number is used as the worst case.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced a test report or other evidence of qualification. The required environmental service parameters were not enveloped with respect to nuclear radiation.

- 4.6.31 Equipment Item No. 46
 Motorized Valve Actuators Located in the Torus Area
 Limitorque Models SMB-000-5, SMB-3-100, SMB-0-10, and SMB-4T-150
 (Licensee Reference 20)

Review of the Licensee's System Component Evaluation Work Sheet indicates that a test report is referenced which envelops the environmental service parameters. However, the Licensee has not complied with the Guidelines requirements concerning the evaluation of aging degradation and determination of qualified life (see Section 4.1.3).

- 4.6.32 Equipment Item No. 47
Motorized Valve Actuators Located in the NE and SE Corner Rooms
Limitorque Models SMB-2-40, -0, and -1
(Licensee Reference 7)

Review of the Licensee's System Component Evaluation Work Sheet indicates that a test report is referenced which envelops the environmental service parameters. However, the Licensee has not complied with the Guidelines requirements concerning the evaluation of aging degradation and determination of qualified life (see Section 4.1.3).

- 4.6.33 Equipment Item No. 50
Motorized Valve Actuators Located in the Torus Area
Limitorque Models SMB-5T-150 and SMB-2-60 with Reliance ac Motors
(Licensee Reference 7)

The Licensee makes the following statements and commitments:

Additional vendor information is being sought to resolve outstanding environmental qualification items. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. Existing qualification data is within a factor of 2 of the calculated radiation dose.
- b. Radiation doses were calculated using conservative non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. Actual doses would therefore be less than those calculated using such conservative assumptions.
- c. Other equipment similar in design to this equipment has successfully been qualified for environments in excess of the calculated requirement for this equipment.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has referenced a test report indicating that the required environmental service parameters were not enveloped with respect to nuclear radiation dose. Also, the Licensee considers that an evaluation of aging degradation is not required for this equipment. As noted in Section 4.1.3, FRC believes this is not in conformance with the Guidelines requirements.

4.6.34 Equipment Item No. 52
Motorized Valve Actuators Located Inside the Drywell
Limitorque Models SMB-3 and SMB with Reliance ac Motors
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

Additional vendor information is being sought to resolve outstanding environmental qualification items. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. These components or similar items have been partially tested for environmental conditions.
- b. These components remained functional during the June 5, 1970 depressurization incident at Dresden Unit 2. This incident resulted in harsh environmental conditions.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.35 Equipment Item No. 53
Pressure Transmitters Located in the NE and SE Corner Rooms
General Electric Model GE/MAC 551
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

A contract will be issued for services to qualify this equipment by analysis and/or testing, failing which the appropriate equipment or parts thereof will be replaced with qualified components. Although qualification data is not available, continued station operation is justified for the following reason:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated. During the time available after stabilization of core cooling, additional coolant injection paths could be established, if necessary, to assure long-term cooling.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.36 Equipment Item No. 80
Motorized Valve Actuators Located in the Drywell
Limatorque SMB-1-40, SMB with Peerless ac Motor
(Licensee References 20 and 24)

Review of the Licensee's System Component Evaluation Work Sheet indicates that a test report is referenced which envelops the environmental service parameters. However, the Licensee has not complied with the Guidelines requirements concerning the evaluation of aging degradation and determination of qualified life (see Section 4.1.3).

- 4.6.37 Equipment Item No. 83
Motorized Valve Actuators Located in the Torus Area and Within the Drywell
Limatorque Model SMB-000-5 with Peerless ac Motor
(Licensee References 20 and 24)

Review of the Licensee's System Component Evaluation Work Sheet indicates that a test report is referenced which envelops the environmental service parameters. However, the Licensee has not complied with the Guidelines requirements concerning the evaluation of aging degradation and determination of qualified life (see Section 4.1.3).

- 4.6.38 Equipment Item No. 113
Temperature Switches Located in the NW Corner Room
Fenwal Model 17002-40
(Licensee Reference 27)

The Licensee stated:

This temperature switch is used to detect an RCIC steam line break. As soon as a break occurs, this switch will function isolating the RCIC steam line, by detecting high temperature. This would occur in less than one minute. One minute was conservatively assumed. Periodic calibration is sufficient to demonstrate component capability to function under accident environmental temperature conditions.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has referenced a test report indicating that the required environmental service parameters were not enveloped with respect to steam exposure. Also, the Licensee considers that an evaluation of aging degradation is not required for this equipment. As noted in Section 4.1.3, FRC believes this is not in conformance with the Guidelines requirements.

4.6.39 Equipment Item No. 109
Motorized Valve Actuators Located Inside the Drywell
Limitorque Models SMB-2 and SMB-000
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

Additional vendor information is being sought to resolve outstanding environmental qualification items. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. These components or similar items have been partially tested for environmental conditions.
- b. These components remained functional during the June 5, 1970 depressurization incident at Dresden Unit 2. This incident resulted in harsh environmental conditions.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.40 Equipment Item No. 110
Motor Operated Valves Located in the Torus Area
Limitorque Model SMB-2-40 with Reliance ac Motor
(Licensee Reference 7)

Review of the Licensee's System Component Evaluation Work Sheet indicates that a test report is referenced which envelops the environmental service parameters. However, the Licensee has not complied with the Guidelines requirements concerning the evaluation of aging degradation and determination of qualified life (see Section 4.1.3).

- 4.6.41 Equipment Item No. 121
Electric Cable Located Inside the Drywell
Simplex, Rubber Insulation/PVC Jacket
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

A contract will be issued for services to qualify this equipment by analysis and/or testing, failing which the appropriate equipment or parts thereof will be replaced with qualified components. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. These components or similar items have been partially tested for environmental conditions.
- b. These components remained functional during the June 3, 1970 depressurization incident at Dresden Unit 2. This incident resulted in harsh environmental conditions.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.42 Equipment Item No. 126
Electric Cable Located Outside the Drywell
General Electric, Butyl Rubber Insulation/PVC Jacket; Cross-Linked Polyethylene Insulation/Neoprene Jacket; Rubber Insulation/Hypalon Jacket
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

A contract will be issued for services to qualify this equipment by analysis and/or testing, failing which the appropriate equipment or parts thereof will be replaced with qualified components. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. Of the plant areas which could experience harsh pressure, temperature, and humidity, only the steam tunnel, isolation condenser pipe chase, torus compartment (near postulated HPCI break only), and RWCU rooms contain equipment which must function in 1 minute or less. Once equipment functions are completed, there would be no further active function required. In all cases except the torus compartment, the only cables entering the potential harsh environment area would terminate in that area. In the case of the torus compartment, other cabling could be in the vicinity of the HPCI line

break; however, the torus compartment is so large that the harsh environment would dissipate almost instantly with valve closure. Radiation is not concurrent with other harsh conditions.

- b. Radiation doses were calculated using conservative non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. Actual doses would be less than those calculated using such conservative assumptions. In addition, harsh radiation is not concurrent with pressure, temperature, and humidity; therefore, although some material degradation may occur due to radiation, stress factors are not present to accelerate damage. Finally, most of the materials utilized for this cable are currently utilized and have demonstrated the ability to withstand the radiation levels for which they must be qualified.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.43 Equipment Item No. 127
Cable Located Within the Drywell
General Electric, Polyethylene Insulation/PVC Jacket
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

A contract will be issued for services to qualify this equipment by analysis and/or testing, failing which the appropriate equipment or parts thereof will be replaced with qualified components. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. These components or similar items have been partially tested for environmental conditions.
- b. These components remained functional during the June 3, 1970 depressurization incident at Dresden Unit 2. This incident resulted in harsh environmental conditions.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.44 Equipment Item No. 128
Electric Cable, Location Not Stated
Simplex, Butyl Rubber Insulation/PVC Jacket
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

A contract will be issued for services to qualify this equipment by analysis and/or testing, failing which the appropriate equipment or parts thereof will be replaced with qualified components. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. Of the plant areas which could experience harsh pressure, temperature, and humidity, only the steam tunnel, isolation condenser pipe chase, torus compartment (near postulated HPCI break only), and RWCU rooms contain equipment which must function in 1 minute or less. Once equipment functions are completed, there would be no further active function required. In all cases except the torus compartment, the only cables entering the potential harsh environment area would terminate in that area. In the case of the torus compartment, other cabling could be in the vicinity of the HPCI line break; however, the torus compartment is so large that the harsh environment would dissipate almost instantly with valve closure. Radiation is not concurrent with other harsh conditions.
- b. Radiation doses were calculated using conservative non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. Actual doses would be less than those calculated using such conservative assumptions. In addition, harsh radiation is not concurrent with pressure, temperature, and humidity; therefore, although some material degradation may occur due to radiation, stress factors are not present to accelerate damage. Finally, most of the materials utilized for this cable are currently utilized and have demonstrated the ability to withstand the radiation levels for which they must be qualified.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.45 Equipment Item No. 129
Electric Cable Located Outside Drywell
Simplex, Anhydrex XX Plastex Insulation and Jacket
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

A contract will be issued for services to qualify this equipment by analysis and/or testing, failing which the appropriate equipment or parts thereof will be replaced with qualified components. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. Of the plant areas which could experience harsh pressure, temperature, and humidity, only the steam tunnel, isolation condenser pipe chase, torus compartment (near postulated HPCI break only), and RWCU rooms contain equipment which must function in 1 minute or less. Once equipment functions are completed, there would be no further active function required. In all cases except the torus compartment, the only cables entering the potential harsh environment area would terminate in that area. In the case of the torus compartment, other cabling could be in the vicinity of the HPCI line break; however, the torus compartment is so large that the harsh environment would dissipate almost instantly with valve closure. Radiation is not concurrent with other harsh conditions.
- b. Radiation doses were calculated using conservative non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. Actual doses would be less than those calculated using such conservative assumptions. In addition, harsh radiation is not concurrent with pressure, temperature, and humidity; therefore, although some material degradation may occur due to radiation, stress factors are not present to accelerate damage. Finally, most of the materials utilized for this cable are currently utilized and have demonstrated the ability to withstand the radiation levels for which they must be qualified.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.46 Equipment Item No. 120
Electric Cable Located Outside the Drywell
Simplex, Poly Nylon Insulated Shield and Plaster Jacket
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

A contract will be issued for services to qualify this equipment by analysis and/or testing, failing which the appropriate equipment or parts thereof will be replaced with qualified components. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. Of the plant areas which could experience harsh pressure, temperature, and humidity, only the steam tunnel, isolation condenser pipe chase, torus compartment (near postulated HPCI break only), and RWCU rooms contain equipment which must function in 1 minute or less. Once equipment functions are completed, there would be no further active function required. In all cases except the torus compartment, the only cables entering the potential harsh environment area would terminate in that area. In the case of the torus compartment, other cabling could be in the vicinity of the HPCI line break; however, the torus compartment is so large that the harsh environment would dissipate almost instantly with valve closure. Radiation is not concurrent with other harsh conditions.
- b. Radiation doses were calculated using conservative non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. Actual doses would be less than those calculated using such conservative assumptions. In addition, harsh radiation is not concurrent with pressure, temperature, and humidity; therefore, although some material degradation may occur due to radiation, stress factors are not present to accelerate damage. Finally, most of the materials utilized for this cable are currently utilized and have demonstrated the ability to withstand the radiation levels for which they must be qualified.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.47 Equipment Item No. 132
Electric Air Heater Located in the Reactor Building
E. L. Wiegand, Model Not Stated
(Licensee reference not cited)

The Licensee makes the following statements and commitments.

This equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.48 Equipment Item No. 134
Electric Motor Driving Exhaust Fan Located in the Reactor Building
New York Blower Model E4966
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

This equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.49 Equipment Item No. 135
Flow Transmitter Located in the Reactor Building
Leeds & Northrup Model 1912-3-21-0-0000-0300-0300
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

This equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shutdown redundant system could be activated.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.50 Equipment Item No. 136
Flow Transmitter Located in the Reactor Building
Foxboro Model 15A-1
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

This equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shutdown redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.51 Equipment Item No. 137
Flow Switches Located in the Reactor Building
Mercooid Models DA-533-3 and DA-533-2R1
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

This equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reason:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.52 Equipment Item No. 138
Temperature Switch Located in the Reactor Building
Chromalox, Model Not Stated
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

This equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative, non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also, actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shutdown redundant system could be activated.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.53 Equipment Item No. 140
Solenoid Valve Located in the Reactor Building
Versa/ASCO Model VWS-23028320A23
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

This equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative non-mechanistic models. Mechanistic release models would result in radiation releases that occur several hours after the postulated accident. During this time, action will be taken to shut down redundant systems beyond those needed for coolant injection. This would result in radiation exposures to only one of two redundant equipment trains. Also, actual doses would be less than those calculated using such conservative assumptions. Finally, should the operating equipment suffer degradation due to radiation exposure, the shut down redundant system could be activated.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.54 Equipment Item No. 131
Position Switch Located Inside the Drywell
NAMCO Model EA-080111100
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

This switch was inaccessible for inspection. The manufacturer and model number will be established during the next outage permitting entry to the drywell. If the component is not qualified, a replacement part with qualification data will be purchased and installed during the first outage after received on site.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.55 Equipment Item No. 123
Electrical Penetrations Located in the Drywell
GE-NEBS, Model Not Stated
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

Additional vendor information is being sought to resolve outstanding environmental qualification items. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. These components or similar items have been partially tested for environmental conditions.
- b. These components remained functional during the June 5, 1970 depressurization incident at Dresden Unit 2. This incident resulted in harsh environmental conditions.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.56 Equipment Item No. 130
Terminal Blocks Located in the Drywell
Allen Bradley, Model Not Stated
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

This equipment will be replaced by qualified equipment. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. These components or similar items have been partially tested for environmental conditions.
- b. These components remained functional during the June 5, 1970 depressurization incident at Dresden Unit 2. This incident resulted in harsh environmental conditions.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

- 4.6.57 Equipment Item No. 119
Electric Cable Located Outside the Drywell
General Electric Vulkene No. SI 57275
(Licensee reference not cited)

The Licensee makes the following statements and commitments:

A contract will be issued for services to qualify this equipment by analysis and/or testing, failing which the appropriate equipment or parts thereof will be replaced with qualified components. Although qualification data is not available, continued station operation is justified for the following reasons:

- a. Of the plant areas which could experience harsh pressure, temperature, and humidity, only the steam tunnel, isolation condenser pipe chase, torus compartment (near postulated HPCI break only), and RWCU rooms contain equipment which must function in 1 minute or less. Once equipment functions are completed, there would be no further active function required. In all cases except the torus compartment, the only cables entering the potential harsh environment area would terminate in that area. In the case of the torus compartment, other cabling could be in the vicinity of the HPCI line break; however, the torus compartment is so large that the harsh environment would dissipate almost instantly with valve closure. Radiation is not concurrent with other harsh conditions.
- b. Radiation doses were calculated using conservative non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. Actual doses would be less than those calculated using such conservative assumptions. In addition, harsh radiation is not concurrent with pressure, temperature, and humidity; therefore, although some material degradation may occur due to radiation, stress factors are not present to accelerate damage. Finally, most of the materials utilized for this cable are currently utilized and have demonstrated the ability to withstand the radiation levels for which they must be qualified.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.6.58 Equipment Item No. 111
Solenoid Valves Located in the Torus Area
Versa Models VPS-2502 and VGS-4522/VGS-4422
(Licensee reference not cited)

The Licensee states:

This equipment will be replaced with qualified equipment. Although qualification data is not available, continued station operation is justified for the following reasons:

Radiation doses were calculated using conservative non-mechanistic models. Mechanistic release models would result in radiation releases which occur several hours after the postulated accident. Actual doses would therefore be less than those calculated using such conservative assumptions. An alternate flow path is available to relieve torus vacuum in the event these components should fail.

Review of the Licensee's System Component Evaluation Work Sheet indicates that the requirements of IE Bulletin 79-01B are not satisfied. The Licensee has not referenced qualification documentation for this item.

4.7 NRC Category VI
EQUIPMENT FOR WHICH QUALIFICATION IS DEFERRED

This category includes equipment items which have been addressed by the Licensee in the equipment environmental qualification submittals; however, the qualification review of this equipment has been deferred by the NRC in accordance with criteria presented in Sections 2.2.3 and 2.2.5 of this report.

4.7.1 Equipment Item No. 19
Differential Pressure Indicating Switches Located
in the Reactor Building
Barton Model 288
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

4.7.2 Equipment Item No. 24
Pressure Switch Located in the Reactor Building
Barksdale Model B2T-AL2SS
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

4.7.3 Equipment Item No. 68
Pressure Switch Located in the Reactor Building
Static-O-Ring Model 12N-AA5-PP
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.4 Equipment Item No. 142
Damper Located in the HVAC Equipment Room
Manufacturer and Model Not Stated
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.5 Equipment Item No. 76
Level Switches Located in Diesel Room
Magnetrol Model A-103F-EP/VP
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.6 Equipment Item No. 74
Electric Motor Driving Fan Located in the Diesel Room
Manufacturer and Model Not Stated
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.7 Equipment Item No. 75
Electric Motor Driving Pump Located in the Diesel Room
General Electric Model 5K182BL315, Type K
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.8 Equipment Item No. 77
Solenoid Valve Located in the Diesel Room
ASCO Model 8111C39
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

4.7.9 Equipment Item No. 94

Diesel Auxiliary Control Panel Located in the Diesel Room
Ideal Electric and Manufacturing Model S.O. No. 267777
(Licensee reference not cited)

The Licensee states:

FSAR Section 10.10 and Special Report No. 12, Rev. 1, February 1975. Qualification for the environment due to a feedwater line break is not required since three diesels are available to provide emergency ac power. FSAR Section 8.2.3.1 describes the system arrangement for the standby ac power system. As a minimum, one diesel generator can be made available to provide emergency power to the affected unit assuming the HELB causes failure of the adjacent diesel and a single active failure of a second diesel unit.

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

4.7.10 Equipment Item No. 95

Excitation Cabinets Located in the Diesel Room
Electromotive Div. of GM Model 9474
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.11 Equipment Item No. 96
Diesel Generator Located in the Diesel Room
Electromotive Div. of GM, Model Not Stated
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.12 Equipment Item No. 100
Engine Control Panel Located in the Diesel Room
Electromotive Div. of GM, Model Not Stated
(Licensee reference not cited)

The Licensee states:

FSAR Section 10.10 and Special Report No. 12, Rev. 1, February 1975. Qualification for the environment due to a feedwater line break is not required since three diesels are available to provide emergency ac power. FSAR Section 8.2.3.1 describes the system arrangement for the standby ac power system. As a minimum, one diesel generator can be made available to provide emergency power to the affected unit assuming the HELB causes failure of the adjacent diesel and a single active failure of a second diesel unit.

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The

Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.13 Equipment Item No. 102
D/G Secondary Control Panel Located in the Diesel Room
Ideal Electric S.O. No. 267777
(Licensee reference not cited)

The Licensee states:

FSAR Section 10.10 and special Report No. 12, Rev. 1, February 1975. Qualification for the environment due to a feedwater line break is not required since three diesels are available to provide emergency ac power. FSAR Section 8.2.3.1 describes the system arrangement for the standby ac power system. As a minimum, one diesel generator can be made available to provide emergency power to the affected unit assuming the HELB causes failure of the adjacent diesel and a single active failure of a second diesel unit.

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.14 Equipment Item No. 103
D/G Neutral Grounding Panel Located in the Diesel Room
General Electric Model 208419-68P, #KVA-5
(Licensee reference not cited)

The Licensee states:

FSAR Section 10.10 and Special Report No. 12, Rev. 1, February 1975. Qualification for the environment due to a feedwater line break is not required since three diesels are available to provide emergency ac power. FSAR Section 8.2.3.1 describes the system arrangement for the standby ac power system. As a minimum, one diesel generator can be made

available to provide emergency power to the affected unit assuming the HELB causes failure of the adjacent diesel and a single active failure of a second diesel unit.

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.15 Equipment Item No. 104
 Battery Chargers Located in the Battery Charger Room
 Gould Models GRF240T100X, GRF120T100X, and GRF24S25F30X
 (Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.16 Equipment Item No. 105
 250 V dc Motor Control Center Located
 in the Battery Charger Room
 Cutler Hammer Model 6002H347B
 (Licensee Reference 25)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore,

qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

4.7.17 Equipment Item No. 106
Batteries Located in the Battery Charger Room
Gould Models FPS-25, FPR-13, and DPR-9
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

4.7.18 Equipment Item No. 107
dc Distribution Panel Located in the Battery Charger Room
Cutler Hammer, Model Not Stated
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the

elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.19 Equipment Item No. 11
Stop Valve Located in the HPCI Room
Manufacturer Not Stated, Model 178250H02D4
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.20 Equipment Item No. 12
Motorized Valve Actuators Located in the HPCI Room
Limitorque Model SMB with Peerless dc Motors
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.21 Equipment Item No. 15
Motorized Valve Actuators Located in the HPCI Room
Limitorque Model SMB with Peerless dc Motors
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.22 Equipment Item No. 16
Motorized Valve Actuators Located in the Steam Tunnel
Limitorque Model SMB with Peerless dc Motor
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.23 Equipment Item No. 17
Motorized Valve Located in the HPCI Room
Limitorque Model SMB with Reliance dc Motor
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore,

qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

4.7.24 Equipment Item No. 13
Solenoid Valves Located in the HPCI Room
ASCO Model 830281F
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

4.7.25 Equipment Item No. 20
Flow Transmitter Located in the HPCI Room
General Electric Model GE/MAC 553, 4532K13001
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii)

the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.26 Equipment Item No. 21
Pressure Transmitter Located in the HPCI Room
General Electric Model 4532K11001
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.27 Equipment Item No. 23
Pressure Transmitter Located in the HPCI Room
General Electric Models GE/MAC 551, 50-551032CAAY1
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied, and has provided no qualification documentation.

- 4.7.28 Equipment Item No. 25
Electric Motor Driving Turbine Gland Seal Condensate Drain Pump
Located in the HPCI Room
General Electric Model 58225A3525
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.29 Equipment Item No. 26
Electric Motor Driving Gland Steam Exhaust Fan Located in the HPCI Room
General Electric Model 5BC74AB2193
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.30 Equipment Item No. 27
Motor Speed Changer Located in the HPCI Room
General Electric Model GE5BC26AC389
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.31 Equipment Item No. 28
Motor Gear Unit Located in the HPCI Room
General Electric Model 5CD14019A111620
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.32 Equipment Item No. 29
Electric Motor Driving Oil Pump Located in the HPCI Room
General Electric Models 5CD218E252 and 5CD326E758
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore,

qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

4.7.33 Equipment Item No. 30
HPCI Motor Control Signal Converter Located in the HPCI Room
General Electric Model 357513TC108
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

4.7.34 Equipment Item No. 31
Level Switch Located in the HPCI Room
Mercooid Model 123-2
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the

elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.35 Equipment Item No. 32
Level Switch Located in the Torus Area
Magnetrol Model 291
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.36 Equipment Item No. 33
Flow Switch Located in the HPCI Room
Barton Model 289
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.37 Equipment Item No. 34
Pressure Switch Located in the HPCI Room
Static-O-Ring Model 6NN-AA21-VPR
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this

approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either situation applies and has provided no qualification documentation.

- 4.7.38 Equipment Item No. 35
Pressure Switches Located in the HPCI Room
Barksdale D2H-M150SS
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.39 Equipment Item No. 40
Motor Operated Valve Located in the Steam Tunnel
Limitorque Model SMB-00-7.5 with Peerless dc Motor
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The

Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.40 Equipment Item No. 41
Differential Pressure Indicating Switches Located in the Reactor Building
Barton Model 278
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.41 Equipment Item No. 48
Motorized Valve Actuator Located in the SE Corner Room
Limatorque, Model Not Stated
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.42 Equipment Item No. 51
Motorized Valve Actuator Located in the Torus Area
Limatorque Model SMB with Peerless dc Motor
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.43 Equipment Item No. 55
Level Switches Located in the RHR Pump Room
Magnetrol Model 249C-X-EP-SIMD4DC
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore,

qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

4.7.44 Equipment Item No. 59

RHR Service Water Pump Motors Located in the RHR Pump Room
General Electric Model SK921167A31
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

4.7.45 Equipment Item No. 61

Room Coolers Located in the RHR Pump Room
Manufacturer and Model Not Stated
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the

elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.46 Equipment Item No. 62
Solenoid Valves Located in the Torus Area
ASCO Model HT8316B14
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.47 Equipment Item No. 143
Position Switches Located in the RWCU Room
Manufacturer and Model Not Stated
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.48 Equipment Item Nos. 63 and 64
Solenoid Valves Located in the Reactor Building
Versa Models
63: VPS-2402, VGS-4422
64: VPS-2401/VPS-4422, VGS-4532/VPS-2402, VPS-2302
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.49 Equipment Item No. 65
Solenoid Valves Located in the Reactor Building
ASCO Models 8302026F, HT8316B14, HT831614
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.50 Equipment Item No. 66
Motorized Valve Actuator Located in the SE and NW Corner Rooms
Limatorque, Model Not Stated
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.51 Equipment Item No. 70
Position Switch Located in the Reactor Building and Torus Area
NAMCO Model Mark II D1200-G
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.52 Equipment Item No. 67
Motor Operated Valve Located in the Reactor Building
Limatorque Model SMB-000
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.53 Equipment Item No. 71
Electric Motor Driving Pumps Located in the RHR Pump Room
General Electric Model 5K365AK169
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.54 Equipment Item No. 73
Room Cooler Fan Located in the HPCI Room
Buffalo Forge Model G123-HV, Type 15747
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.55 Equipment Item No. 78
Solenoid Ball Valves Located in the Reactor Building
General Pneumatic Model 608KW106
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time

that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.56 Equipment Item No. 79
Squib Shear Valves Located in the Reactor Building
Pyrodyne, Model Not Stated
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.57 Equipment Item No. 82
Solenoid Valves Located in the Torus Area
ASCO Model HT831614
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.58 Equipment Item No. 84
Solenoid Valves Located in the Reactor Building
ASCO Models HVA-90-405-2A, HVA-96-082A, WPBLX831636, and HVA-96-081A
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.59 Equipment Item No. 85
Level Switches Located in the Reactor Building
Magnetrol Model 402
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time

that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.60 Equipment Item No. 86
 Solenoid Valve Located in the Reactor Building
 ASCO, Model Not Stated
 (Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.61 Equipment Item No. 87
 Solenoid Valve Located in the Reactor Building
 ASCO Model SN-681055
 (Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.62 Equipment Item No. 88
 Pressure Switches Located in the Reactor Building
 Barksdale Models B2T-M12SS and B2T-A12SS
 (Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.63 Equipment Item No. 89
 Level Indicating Switches Located in the Reactor Building
 Yarway Models 4418C and 4418CE
 (Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time

that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.64 Equipment Item No. 91
Differential Pressure Indicating Switches Located in the Reactor
Building and NE/SE Corner Rooms
Barton Model 288
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.65 Equipment Item No. 92
Radiation Detector Located in the Turbine Building
General Electric Model DWG 194X927GI
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.66 Equipment Item No. 93
Solenoid Valves Located in the Reactor Building
Versa/Barksdale Models VPS-2402 and VGS-4422//DLH-A150SS
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this

approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

4.7.67 Equipment Item No. 97
Switchgear Located in the Reactor Building
General Electric Models AME 4.76-250 and AKD-5
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

4.7.68 Equipment Item No. 98
480 V Motor Control Center Located in the Reactor Building
General Electric Model 7700
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.69 Equipment Item No. 101
 4 kV Non-segregated Bus Located in the Turbine Building
 Manufacturer and Model Not Stated
 (Licensee reference not cited)

The Licensee states:

FSAR Section 10.10 and Special Report No. 12. Rev. 1, Feb. 1975. Qualification for the environment due to a feedwater line break is not required since three diesels are available to provide emergency ac power. FSAR Section 8.2.3.1 describes the system arrangement for the standby ac power system. As a minimum, one diesel generator can be made available to provide emergency power to the affected unit assuming the HELB causes failure of the adjacent diesel and a single active failure of a second diesel unit.

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.70 Equipment Item No. 112
 Differential Pressure Indicating Switches
 Located in the NW Corner Room
 Barton Model 288
 (Licensee reference 26)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.71 Equipment Item No. 114
Pressure Switches Located in the NW Corner Room
Barksdale Model B2T-A12SS
(Licensee Reference 28)

The Licensee states:

This pressure switch is used to detect an RCIC steam line break. As soon as a break occurs, this switch will function, isolating the RCIC steam line. This would occur in less than one minute.

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.72 Equipment Item No. 117
Position Switch Located in the RWCU Room
NAMCO Model Mark II D1200G
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.73 Equipment Item No. 122
Solenoid Valves Located in the NW Corner Room
ASCO Model 830281F
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.74 Equipment Item No. 133
Motorized Damper Actuators Located in the Reactor Building
Limitorque Model SMB
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time

that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.75 Equipment Item No. 145
 120 V ac Reactor Protection Bus Located in the Electrical
 Equipment Room
 General Electric Type NAB, Style 2A, Plant H
 (Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.76 Equipment Item No. 146
 120/240 V ac Bus Located in the Electrical Equipment Room
 Cutler Hammer Model 6CP655505
 (Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.77 Equipment Item No. 147
 120/240 V ac Bus MMG Set Located in the Electrical Equipment Room
 General Electric Model 5LS4404A22Y30
 (Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

4.7.78 Equipment Item No. 116
Electric Motor Driving Supply Air Fan Located
Above the Control Room
Trane Co. Model 30 No. KALF575A
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

4.7.79 Equipment Item No. 115
Electrical Motor Driving Return Air Fan Located
Above the Control Room
Joy Mfg. Model 38-21-1750
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

4.7.80 Equipment Item No. 118
Solenoid Valves Located in the HVAC Equipment Room
Manufacturer and Model Not Stated
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

4.7.81 Equipment Item No. 124
Water Chillers Located in the HVAC Equipment Room
Trane Co. Model 3E5H80
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.82 Equipment Item No. 125
Electric Motor Driving Chilled Water Pump Located in the
HVAC Room
Ingersoll-Rand Model 0469-4154
(Licensee reference not cited)

Review of the Licensee's System Component Evaluation Work Sheet indicates that this equipment is located in a nonharsh area prior to and during the time that it performs its safety function. Therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3.

- 4.7.83 Equipment Item No. 144
Level Switches Located in the Turbine Building
Magnetrol Model 291-SP
(Licensee Reference 23)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii) the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

- 4.7.84 Equipment Item No. 148
250 dc Motor Control Center Located in the Reactor Building
Cutler Hammer Model 6002H347B
(Licensee reference not cited)

The Licensee indicates that the maximum temperature in this plant location is 120°F and regards this as a nonharsh condition; therefore, qualification review can be deferred in accordance with criteria presented in Section 2.2.3. However, as noted in Section 4.1.2, FRC considers that this approach does not conform to the requirements of the Guidelines unless (i) the equipment has been designed to operate in this ambient temperature, or (ii)

the duration of the temperature excursion above 104°F is so short that the elevated ambient temperature cannot affect the equipment's operation. The Licensee has not provided any information to show that either condition is satisfied and has provided no qualification documentation.

4.3 SUMMARY OF THE EVALUATION

The following tabulations represent a summary of the results of the equipment environmental qualification evaluation conducted by FRC in accordance with the methodology presented in Section 3.

Table 4-1 shows the number of equipment items assigned to each NRC qualification category as a result of the evaluation.

Table 4-2 consists of Equipment Environmental Qualification Summary Forms for each equipment item, identifying compliance with the qualification requirements defined in Section 3. The following designations are used:

- X = A deficiency with respect to compliance with a Guidelines requirement. Deficiencies result in equipment items categorized as unqualified or qualification not established.
- O = Assignment to NRC qualification category.
- R = Replacement of the equipment by the Licensee is planned.
- * = Either replacement of the equipment or qualification by analysis or test is planned by the Licensee.

Table 4-1
NUMBER OF EQUIPMENT ITEMS IN EACH QUALIFICATION CATEGORY

<u>NRC Category</u>	<u>Category Definition</u>	<u>Number of Equipment Items</u>
I	Equipment That Satisfies the General Requirements of the DOR Guidelines and IE Bulletin 79-01B	0
II	Equipment That the Licensee Will Modify or Relocate	3
III	Equipment That the Licensee Believes To Be Exempt from Qualification	0
IV	Equipment That Has Qualifi- cation Testing Scheduled But Not Completed	0
V	Equipment That Does Not Satisfy One or More of the General Requirements of the DOR Guidelines and IE Bulletin 79-01B	60
VI	Equipment for Which Qualification is Deferred	<u>85</u>
		148

Table 4-2


 Franklin Research Center A Division of The Franklin Institute The Benjamin Franklin Parkway, Phila., Pa. 19103	PROJECT TASK 4004.12		REACTOR TYPE BWR	PLANT NAME Quad Cities 1	PAGE 1															
	PROJECT 22G-C5417-01			UTILITY CECO																
	DOCKET 50-254		NRC TAG 42478	DATE/ENGINEER 5-11-81 HCL																
	EQUIPMENT ENVIRONMENTAL QUALIFICATION IEB-79-018																			
SUMMARY REVIEW		EQUIPMENT ITEM NUMBER																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
GUIDELINE REQUIREMENTS		DESIGNATIONS: X = DEFICIENCY L = LIMITING CONDITION																		
EVIDENCE OF QUALIFICATION		X	X	X	X	X	X	X	X	X	X			X	X					
RELATIONSHIP TO TEST SPECIMEN																				
AGING DEGRADATION EVALUATED				X	X	X	X	X	X	X	X			X	X					
QUALIFIED LIFE ESTABLISHED				X	X	X	X	X	X	X	X			X	X					
PROGRAM TO IDENTIFY AGING				X	X	X	X	X	X	X	X			X	X					
QUAL. FOR STEAM EXPOSURE																				
PEAK TEMPERATURE ADEQUATE														X	X					
PEAK PRESSURE ADEQUATE														X	X					
TEST DURATION ADEQUATE								X												
REQUIRED PROFILE ENVELOPED														X	X					
QUAL. FOR SUBMERGENCE																				
QUAL. FOR CHEMICAL SPRAY														X						
QUAL. FOR RADIATION							X	X	X	X	X			X						
BETA RADIATION CONSIDERED																				
TEST SEQUENCE																				
TEST DURATION (1 HOUR = FUNCTION)																				
QUALIFICATION CATEGORY		O = CATEGORY DESIGNATION																		
I - SCEWS SATISFY GUIDELINES																				
II - QUAL. PENDING MODIFICATION																				
III - EXEMPT FROM QUAL.																				
IV - QUAL. TEST SCHEDULED																				
V - SCEWS DO NOT SATISFY GUIDELINES		O	O	O	O	O	O	O	O	O	O	O		O	O					
VI - REVIEW IS DEFERRED														O	O		O	O	O	O
REPLACEMENT SCHEDULED		*						*	*	*	R			R						

Table 4-2 (Cont.)


 Franklin Research Center A Division of The Franklin Institute The Benjamin Franklin Parkway, Phila. Pa. 19103	FRC TASK	REACTOR TYPE	PLANT NAME	PAGE																
	4004.12	BWR	Quad Cities 1	2																
	PROJECT	UTILITY																		
	02G-C5417-01	CECO																		
EQUIPMENT ENVIRONMENTAL QUALIFICATION	DOCKET	NRC TAC	DATE/ENGINEER																	
IES-79-01B	30-154	42478	6-11-81 YC																	
SUMMARY REVIEW	EQUIPMENT ITEM NUMBER																			
	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	
GUIDELINE REQUIREMENTS (DESIGNATIONS: X - DEFICIENCY, L - LIMITING CONDITION)																				
EVIDENCE OF QUALIFICATION	X																	X	X	X
RELATIONSHIP TO TEST SPECIMEN																				
AGING DEGRADATION EVALUATED																		X	X	
QUALIFIED LIFE ESTABLISHED																		X	X	
PROGRAM TO IDENTIFY AGING																		X	X	
QUAL. FOR STEAM EXPOSURE																		X	X	
PEAK TEMPERATURE ADEQUATE																				
PEAK PRESSURE ADEQUATE																				
TEST DURATION ADEQUATE																		X	X	
REQUIRED PROFILE ENVELOPED																				
QUAL. FOR SUBMERGENCE																				
QUAL. FOR CHEMICAL SPRAY																		X	X	
QUAL. FOR RADIATION																		X	X	
BETA RADIATION CONSIDERED																				
TEST SEQUENCE																				
TEST DURATION (1 HOUR - FUNCTION)																				
QUALIFICATION CATEGORY O - CATEGORY DESIGNATION																				
I - SCEWS SATISFY GUIDELINES																				
II - QUAL. PENDING MODIFICATION																				
III - EXEMPT FROM QUAL.																				
IV - QUAL. TEST SCHEDULED																				
V - SCEWS DO NOT SATISFY GUIDELINES																		O	O	O
VI - REVIEW IS DEFERRED																		O	O	O
REPLACEMENT SCHEDULED																			R	

Table 4-2 (Cont.)


 Franklin Research Center A Division of The Franklin Institute The Benjamin Franklin Parkway, Phila., Pa. 19103	FRC TASK 4004.12		REACTOR TYPE BWR	PLANT NAME Quad Cities 1	PAGE 3
	PROJECT 02G-C5417-01		UTILITY CECO		
	DOCKET 50-254		NRC TAC 42478	DATE/ENGINEER 3-11-81 AL	
EQUIPMENT ENVIRONMENTAL QUALIFICATION IEB-79-01B					
SUMMARY REVIEW		EQUIPMENT ITEM NUMBER			
		39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57			
GUIDELINE REQUIREMENTS		(DESIGNATIONS: X = DEFICIENCY, L = LIMITING CONDITION)			
EVIDENCE OF QUALIFICATION	X	X	X	X	X
RELATIONSHIP TO TEST SPECIMEN					
AGING DEGRADATION EVALUATED	X		X	X	X
QUALIFIED LIFE ESTABLISHED	X		X	X	X
PROGRAM TO IDENTIFY AGING	X		X	X	X
QUAL. FOR STEAM EXPOSURE					
PEAK TEMPERATURE ADEQUATE					
PEAK PRESSURE ADEQUATE					
TEST DURATION ADEQUATE					
REQUIRED PROFILE ENVELOPED					
QUAL. FOR SUBMERGENCE					
QUAL. FOR CHEMICAL SPRAY					
QUAL. FOR RADIATION					X
BETA RADIATION CONSIDERED					
TEST SEQUENCE					
TEST DURATION (1 HOUR + FUNCTION)					
QUALIFICATION CATEGORY		O - CATEGORY DESIGNATION			
I - SCEWS SATISFY GUIDELINES					
II - QUAL. PENDING MODIFICATION					
III - EXEMPT FROM QUAL.					
IV - QUAL. TEST SCHEDULED					
V - SCEWS DO NOT SATISFY GUIDELINES	O		O	O	O
VI - REVIEW IS DEFERRED	O	O		O	O
REPLACEMENT SCHEDULED		R			R

Table 4-2 (Cont.)


 Franklin Research Center A Division of The Franklin Institute The Benjamin Franklin Parkway, Phila. Pa. 19103	FRC TASK 4004.12		REACTOR TYPE BWR		PLANT NAME Quad Cities 1		PAGE 4		
	PROJECT 02G-C5417-01				UTILITY CECO				
EQUIPMENT ENVIRONMENTAL QUALIFICATION IEB-79-01B		DOCKET 50-254		NRC TAC 42478		DATE/ENGINEER 6-11-81 HCL			
SUMMARY REVIEW		EQUIPMENT ITEM NUMBER 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76							
GUIDELINE REQUIREMENTS		(DESIGNATIONS: X = DEFICIENCY, L = LIMITING CONDITION)							
EVIDENCE OF QUALIFICATION		X		X		X		X	
RELATIONSHIP TO TEST SPECIMEN									
AGING DEGRADATION EVALUATED									
QUALIFIED LIFE ESTABLISHED									
PROGRAM TO IDENTIFY AGING									
QUAL. FOR STEAM EXPOSURE									
PEAK TEMPERATURE ADEQUATE									
PEAK PRESSURE ADEQUATE									
TEST DURATION ADEQUATE									
REQUIRED PROFILE ENVELOPED									
QUAL. FOR SUBMERGENCE									
QUAL. FOR CHEMICAL SPRAY									
QUAL. FOR RADIATION									
BETA RADIATION CONSIDERED									
TEST SEQUENCE									
TEST DURATION (1 HOUR = FUNCTION)									
QUALIFICATION CATEGORY		O = CATEGORY DESIGNATION							
I - SCREWS SATISFY GUIDELINES									
II - QUAL. PENDING MODIFICATION									
III - EXEMPT FROM QUAL.									
IV - QUAL. TEST SCHEDULED									
V - SCREWS DO NOT SATISFY GUIDELINES		O		O		O		O	
VI - REVIEW IS DEFERRED		O		O		O		O	
REPLACEMENT SCHEDULED		R		R		R		R	

Table 4-2 (Cont.)



 Franklin Research Center A Division of The Franklin Institute The Science Center, Philadelphia, PA 19103	FRC TASK	REACTOR TYPE	PLANT NAME	PAGE																
	4004.12	SWR	Quad Cities I	5																
	PROJECT	UTILITY																		
	02G-C5417-01	CECO																		
EQUIPMENT ENVIRONMENTAL QUALIFICATION	DOCKET	NRC TAG	DATE/ENGINEER																	
IEB-75-01B	50-254	42478	6-11-81 JZL																	
SUMMARY REVIEW	EQUIPMENT ITEM NUMBER																			
	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	
GUIDELINE REQUIREMENTS	DESIGNATIONS: X = DEFICIENCY L = LIMITING CONDITION																			
EVIDENCE OF QUALIFICATION			X	X		X										X				
RELATIONSHIP TO TEST SPECIMEN																				
AGING DEGRADATION EVALUATED			X			X														
QUALIFIED LIFE ESTABLISHED			X			X														
PROGRAM TO IDENTIFY AGING			X			X														
QUAL. FOR STEAM EXPOSURE																				
PEAK TEMPERATURE ADEQUATE																				
PEAK PRESSURE ADEQUATE																				
TEST DURATION ADEQUATE																				
REQUIRED PROFILE ENVELOPED																				
QUAL. FOR SUBMERGENCE																				
QUAL. FOR CHEMICAL SPRAY																				
QUAL. FOR RADIATION																				
BETA RADIATION CONSIDERED																				
TEST SEQUENCE																				
TEST DURATION (1 HOUR + FUNCTION)																				
QUALIFICATION CATEGORY	O - CATEGORY DESIGNATION																			
I - SCRAMS SATISFY GUIDELINES																				
II - QUAL. PENDING MODIFICATION																				
III - EXEMPT FROM QUAL.																				
IV - QUAL. TEST SCHEDULED																				
V - SCRAMS DO NOT SATISFY GUIDELINES						O	O		O							O				
VI - REVIEW IS DEFERRED	O	O	O				O		O	O	O	O	O	O	O	O	O	O	O	O
REPLACEMENT SCHEDULED																R				

Table 4-2 (Cont.)

 Franklin Research Center A Division of The Franklin Institute The Benjamin Franklin Parkway, Phila., Pa. 19106	FRC TASK 4004.10		REACTOR TYPE BWR	PLANT NAME Quad Cities 1	PAGE 6
	PROJECT 02G-C5417-01			UTILITY CECO	
	DOCKET 30-254	NRC TAG 42478		DATE/ENGINEER 6-11-81 JAL	
	EQUIPMENT ENVIRONMENTAL QUALIFICATION IEB-79-01B				
SUMMARY REVIEW		EQUIPMENT ITEM NUMBER			
		96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114			
GUIDELINE REQUIREMENTS		(DESIGNATIONS: X = DEFICIENCY, L = LIMITING CONDITION)			
EVIDENCE OF QUALIFICATION		X X X X X			
RELATIONSHIP TO TEST SPECIMEN					
AGING DEGRADATION EVALUATED		X X			
QUALIFIED LIFE ESTABLISHED		X X			
PROGRAM TO IDENTIFY AGING		X X			
QUAL. FOR STEAM EXPOSURE		X			
PEAK TEMPERATURE ADEQUATE					
PEAK PRESSURE ADEQUATE					
TEST DURATION ADEQUATE					
REQUIRED PROFILE ENVELOPED					
QUAL. FOR SUBMERGENCE					
QUAL. FOR CHEMICAL SPRAY					
QUAL. FOR RADIATION					
BETA RADIATION CONSIDERED					
TEST SEQUENCE					
TEST DURATION (1 HOUR = FUNCTION)					
QUALIFICATION CATEGORY		O = CATEGORY DESIGNATION			
I - SCEWS SATISFY GUIDELINES					
II - QUAL. PENDING MODIFICATION		O O			
III - EXEMPT FROM QUAL.					
IV - QUAL. TEST SCHEDULED					
V - SCEWS DO NOT SATISFY GUIDELINES		O O O O			
VI - REVIEW IS DEFERRED		O O O O O O O O O O O O			
REPLACEMENT SCHEDULED		R			

5. CONCLUSIONS

The tabulations presented in Section 4.8 represent a summary of the results of the equipment environmental qualification (EEQ) evaluation conducted by FRC in accordance with the methodology presented in Section 3. The evaluations are based on the available qualification documentation provided by the Licensee, complemented in several cases by other relevant technical information. The major deficiencies that have been identified are shown in the Equipment Environmental Qualification Summary Forms (Table 4-2). The review has shown that qualification documentation for many equipment items is inadequate or non-existent, and that additional information is essential.

The DCR Guidelines require the Licensee to have ongoing programs to review surveillance and maintenance records to assure that safety-related equipment that exhibits age-related degradation be identified and, if necessary, replaced. No evidence of such programs was included in the Licensee's submittal.

6. REFERENCES

1. FSAR Section 10.10
2. Bechtel Radiation Study
3. FSAR Table 8.2.3
4. FSAR Figures 5.2.15 and 5.2.16
5. FSAR Section 6.2.3.2
6. Special Report No. 12, Rev. 1, February 1975
7. Limitorque 600461-B0003 Qualification Test Report
8. Limitorque 600426-B0009
9. F-C2232-01
10. F-C3441
11. DV-145C3006 Qualification Design Verification
12. FSAR Section 6.2.7.2
13. FSAR Table 5.2.1
14. FSAR Section 6.2.4.2.2
15. PEP #42963 Test Dresser Relief Valve Actuator
16. FSAR Section 6.5
17. FSAR Section 6.2.3.2
18. Report Section 4.4
19. Report Section 4.3.6
20. Report WCAP 7410-L, Test on Limitorque Valve Motor Operators
21. GE Test Report No. 145C3006, Qualification Design Verification File
22. GE Test Report No. DV-1453008, Qualification Design Verification File
23. GE Test Report No. 159C4361 and Wyle Test Report No. 43235-1
24. Report No. 338164 (F-C2485-01) Tests of Limitorque Valve Operator
25. Report No. F-C3781, Franklin Institute Research Laboratories
26. GE Test Report No. DV-145C3009, Qualification Design Verification File ITT Barton Rep.
27. GE Test Report No. DV-145C3004, Qualification Design Verification File ITT

28. GE Test Report No. DV-145C3010, Qualification Design Verification and AETL Report 596-0398
29. Letter from G. Lainas, NRC, to A. Schwencer, NRC, February 19, 1980. Subject: Electrical Equipment Environmental Qualification, including DOR Guidelines.
30. Letter from N. C. Moseley, NRC, to B. H. Grier, J. P. O'Reilly, J. G. Keppler, K. V. Seyfrit, R. H. Engelken, NRC, September 29, 1980. Subject: IE Supplement No. 2 to Bulletin 79-01B, Environmental Qualification of Class 1E Equipment.
31. Letter from N. C. Moseley, NRC, to B. H. Grier, J. P. O'Reilly, J. G. Keppler, K. V. Seyfrit, R. H. Engelken, NRC, October 24, 1980. Subject: IE Supplement No. 3 to Bulletin 79-01B, Environmental Qualification of Class 1E Equipment.
32. U.S. NRC Memorandum and Order (CLI-80-21) pursuant to the Petition for Emergency and Remedial Relief filed with the NRC on November 4, 1977.
33. Commonwealth Edison Company, "Response to NRC IE Bulletin 79-01B Environmental Qualification of Class 1E Equipment for Quad Cities 1 and 2," Revision 1, November 1, 1980.
34. NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," December 1979.
35. Memorandum for V. D. Thomas, NRC, through D. W. Hayes, NRC, from J. Hughes, NRC, Subject: Screening Review of Licensee Responses to IE Bulletin 79-01B and Summary of Inspections of Installed Systems at Quad Cities Unit 1 and 2 Facility - Docket No. 50-254; April 14, 1980.
36. S. P. Carfagno and R. J. Gibson, "A Review of Equipment Aging Theory and Technology," Electric Power Research Institute Report NP-1358, September 1980.

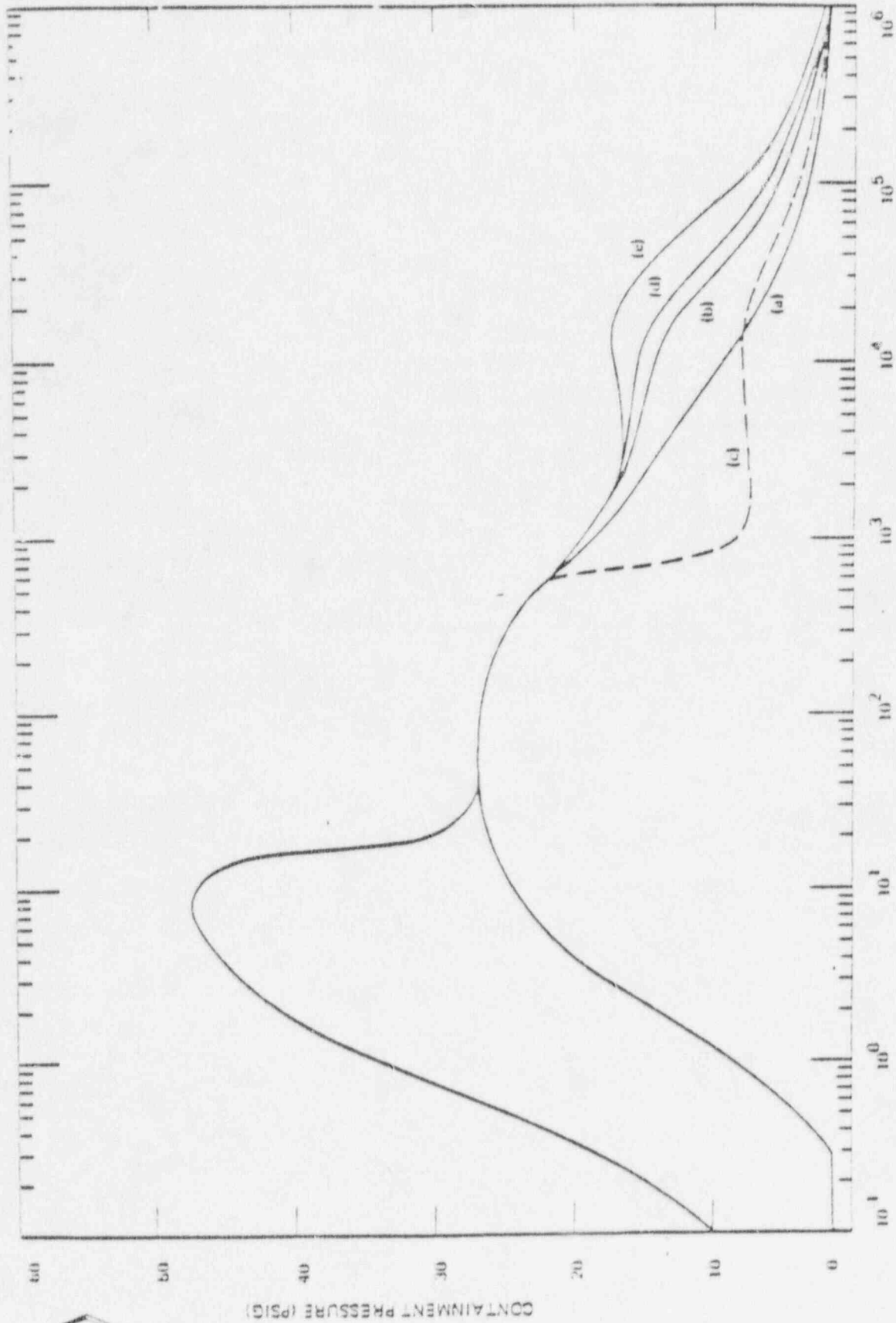
APPENDIX A - ENVIRONMENTAL SERVICE CONDITIONS

The Licensee has provided detailed information (33) concerning environmental zones and expected environmental service conditions in all locations within the plant. Figures A-1 and A-2 show the inside-containment profile envelopes provided by the Licensee. The plant's containment spray system uses demineralized water rather than a chemical spray solution. This is considered in the Licensee's analysis.

The specific environmental service conditions corresponding to plant zones are shown in Tables A-1 through A-3.

The Licensee states that, where environmental conditions are maintained by HVAC equipment, the HVAC system is provided with redundant components and/or a backup power supply for reliable operation. Safety-related HVAC systems are provided for the following areas:

- a. control room, cable spreading room, battery room, computer room, and electrical equipment room
- b. standby diesel generator room
- c. HPCI room
- d. corner rooms.



TIME AFTER ACCIDENT (SECONDS)

Figure A-1. Containment Pressure Following Design Basis LOCA

FIGURE SUPPLIED
BY THE LICENSEE

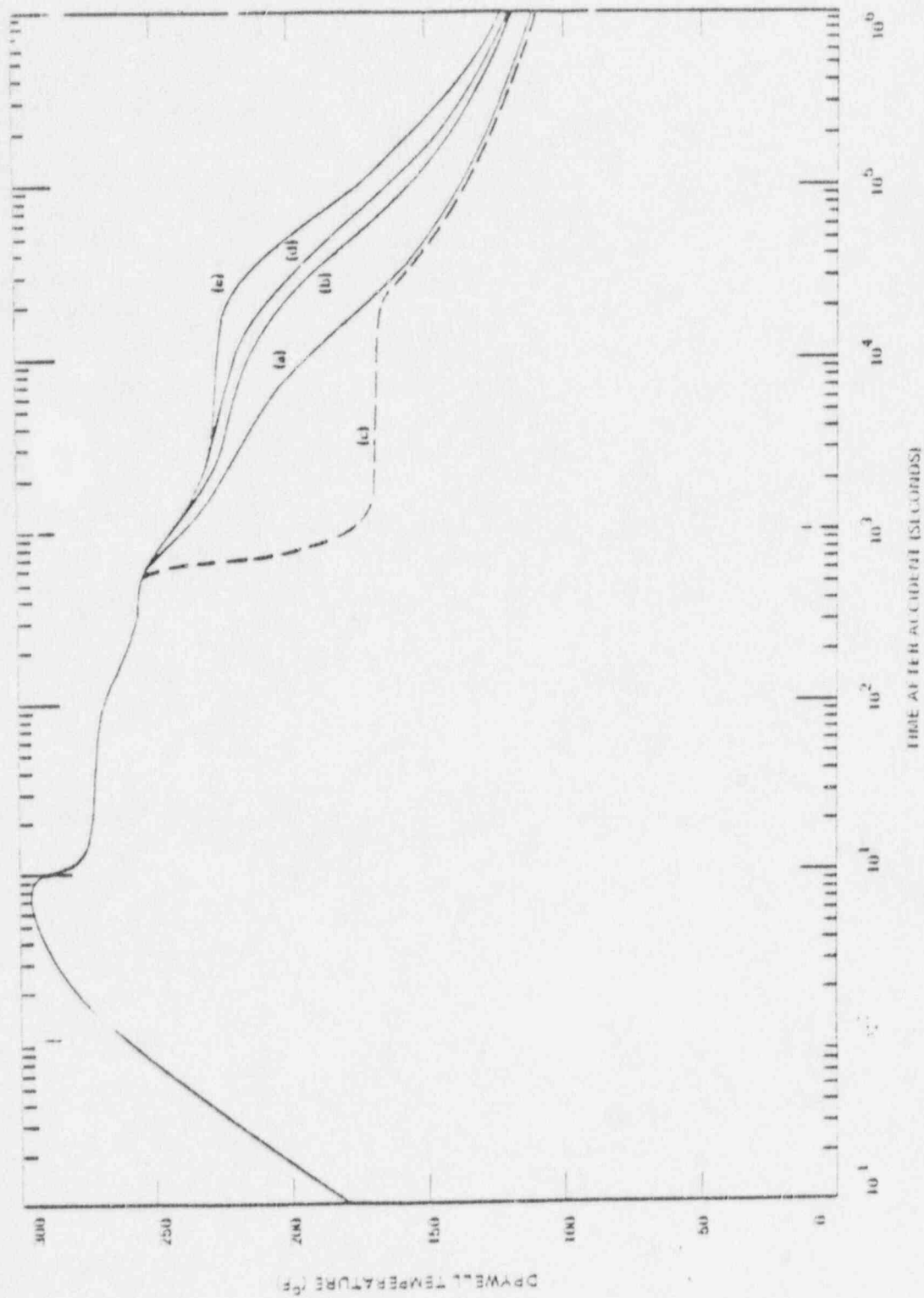


Figure A-2. Drywell Temperature Following Design Basis LOCA

FIGURE SUPPLIED
BY THE LICENSEE

Table A-1

MAXIMUM ENVIRONMENTAL CONDITIONS INSIDE THE DRYWELL
FOLLOWING THE POSTULATED LOCA/HELB

<u>Temperature</u>	<u>Pressure</u>	<u>Relative Humidity</u>	<u>Containment Spray</u>	<u>Gamma Radiation</u>	<u>Submergence Elevation</u>
281F	63 psia	100%	Deminerlized water	1 day- 4.3×10^7 rads 30 day- 1.0×10^8 rads 1 year- 1.1×10^8 rads	583'-0"

FIGURE SUPPLIED
BY THE LICENSEE

Table A-2

MAXIMUM ENVIRONMENTAL CONDITIONS
 OUTSIDE THE DRYWELL FOLLOWING THE
 POSTULATED HELB ACCIDENTS

Area	Pipe Break	Maximum Pressure (psia)	Maximum Temperature (°F)	Relative Humidity (%)
Torus compartment (region of postulated line break)	HPCI steam RCIC Steam	27.0	242	100
Core spray/RCIC room	RCIC steam	Not evaluated - Equipment in this room not required for RCIC steam line break		
Steam tunnel	Main steam Feedwater RCIC steam	27.0	242	100
RWCU heat exchanger and holding pump room	RWCU	Not evaluated - Only two containment isolation valves required to function. Qualification will meet conservatively assumed inside drywell conditions.		
High-pressure heater bay	Main steam Feedwater	Not evaluated - No equipment which is required to function is located in this area.		
Turbine building el 615'-6" north of Column G, between Columns 9 and 11 and 15 and 16	Main steam	Not evaluated - No equipment which is required to function is located in this area.		

FIGURE SUPPLIED
 BY THE LICENSEE

Table A-2 (continued)

Area	Pipe Break	Maximum Pressure (psia)	Maximum Temperature (°F)	Relative Humidity (%)
Reactor feed pump room	Feedwater	Not evaluated - No equipment which is required to function is located in this room.		
Turbine building el 595'-0" area south of Unit 1 pump room and north of Unit 2 pump room	Feedwater	Not evaluated - No equipment which is required to function is located in this area.		
Diesel generator room	Feedwater	Not evaluated - Qualification for the environment due to a postulated feedwater line break is not required since three diesels are available to provide emergency ac power.		

FIGURE SUPPLIED
BY THE LICENSEE

Table A-3

RADIATION ENVIRONMENTAL CONDITIONS OUTSIDE
 DRYWELL FOLLOWING THE POSTULATED LOCA
 MAXIMUM RADIATION SOURCES

Area	Source*	Integrated Dose Levels (rads)		
		1 Day	30 Days	1 Year
Torus	SP	1.5×10^7	3.2×10^7	3.9×10^7
Residual heat removal corner rooms	SP	2.4×10^5	9.4×10^5	1.7×10^6
HPCI room	MS	6.6×10^6	1.6×10^7	1.7×10^7
Core spray/RCIC rooms	MS	6.6×10^6	1.6×10^7	1.7×10^7
Steam tunnel	MS	3.1×10^5	8.5×10^5	1.6×10^6
Reactor building el 595'-0"	RW	2.5×10^6	7.8×10^6	1.4×10^7
Reactor building el 623'-0"	CA	6.8×10^5	1.6×10^6	1.6×10^6
Reactor building el 647'-6"	CA	6.8×10^5	1.6×10^6	1.6×10^6
Reactor building el 666'-6"	CA	6.8×10^5	1.6×10^6	1.6×10^6

* SP = Supression pool liquid
 RW = Reactor water
 MS = Reactor steam
 CA = Containment airborne

**FIGURE SUPPLIED
 BY THE LICENSEE**

APPENDIX B - LISTING OF SAFETY-RELATED ELECTRICAL EQUIPMENT

This appendix lists groupings of safety-related electrical equipment for Quad Cities Nuclear Generating Station Unit 1. Equipment item numbers in the list are used in the Equipment Environmental Qualification Summary Forms and in the equipment qualification discussions in Section 4. The list was generated from the Licensee's System Component Evaluation Work Sheets (SCEWS) in Reference 33. For each item, the list identifies the manufacturer and model number, plant location, SCEWS number, applicable qualification references, and TER section where the item is discussed.



<u>ITEM NO.</u>	<u>EQUIPMENT ITEM DESCRIPTION</u>	<u>LOCATION</u>	<u>SCREWS NO.</u>	<u>QUALIFICATION REFERENCES</u>	<u>TER SECTION NO.</u>
1	Temperature Switches Manufacturer and Model Not Stated	RWCU Room	1-6	None	4.6.1
2	Electric Motor Driving Pumps General Electric 5K6338XC23A 5K6336XC193	Corner Rooms	7-9 190-193	None	4.6.2
3	Motorized Valve Actuator Limitorque/Peerless ac Motors SMB-0-25	NW and SW Corner Rooms	10-12	20	4.6.23
4	Motorized Valve Actuator Limitorque/Peerless ac Motors SMB-0-15	Reactor Building	13-14	20	4.6.24
5	Motorized Valve Actuator Limitorque/Reliance ac Motors SMB-2-40, SMB	Reactor Building	15-18, 142-143	7	4.6.25
6	Motorized Valve Actuator Limitorque/Reliance ac Motors SMB-000	Torus Area	19-21	7	4.6.26
7	Pressure Transmitters General Electric GE/Mac 551 4532K11001	NW and SW Corner Rooms	22-24	21	4.6.18
8	Flow Transmitters General Electric Type 553 4532K-43001	NW and SW Corner Rooms	25-27	None	4.6.19
9	Flow Switches Barton 289	NW and SW Corner Rooms	28-30	22	4.6.20

<u>ITEM NO.</u>	<u>EQUIPMENT ITEM DESCRIPTION</u>	<u>LOCATION</u>	<u>SCEWS NO.</u>	<u>QUALIFICATION REFERENCES</u>	<u>TER SECTION NO.</u>
10	Pressure Switches Mercontrol DA-7043-804	NW and SW Corner Rooms	31-34	None	4.6.3
11	Stop Valve Manufacturer Not Stated 178250H02D4	HPCI Room	35	None	4.7.19
12	Motorized Valve Actuator Limitorque/Peerless dc Motors SMB-2 SMB-3 SMB-4 SMB-000	HPCI Room	36,43,44,46, 52	None	4.7.20
13	Motorized Valve Actuator Limitorque/Reliance ac Motor SMB-1	Drywell	37,38	7	4.6.4
14	Motorized Valve Actuator Limitorque/Peerless dc Motor SMB-1	Torus Area	39	None	4.6.5
15	Motorized Valve Actuator Limitorque/Peerless dc Motor SMB-0 SMB-000	HPCI Room	40,49,50,51	None	4.7.21
16	Motorized Valve Actuator Limitorque/Peerless dc Motor SMB-1-80 SMB-00	Steam Tunnel	41,42, 466, 467	None	4.7.22



<u>ITEM NO.</u>	<u>EQUIPMENT ITEM DESCRIPTION</u>	<u>LOCATION</u>	<u>SCEWS NO.</u>	<u>QUALIFICATION REFERENCES</u>	<u>TER SECTION NO.</u>
17	Motorized Valve Actuator Limitorque/Reliance dc Motor SMB-0	HPCI Room	45	None	4.7.23
18	Solenoid Valve ASCO 830281F	HPCI Room	47-48, 53-54	None	4.7.24
19	Differential Pressure Indicating Switch Barton 288	Reactor Building	55-56	None	4.7.1
20	Flow Transmitter General Electric GE/Mac 553 4532K13001	HPCI Room	57	None	4.7.25
21	Pressure Transmitter General Electric GE/Mac 551 4532K11001	HPCI Room	58	None	4.7.26
22	Temperature Switches United Electric Controls 88B	HPCI Room	59-68	None	4.6.6
23	Pressure Transmitter General Electric GE/Mac 551 50-551032CAAY1	HPCI Room	69	21	4.7.27
24	Pressure Switches Barksdale B2T-A12SS	Reactor Building	70-72	None	4.7.2
25	Electric Motor Driving Turbine Gland Seal Condensate Drain Pump General Electric 58225A3525	HPCI Room	73	None	4.7.28

<u>ITEM NO.</u>	<u>EQUIPMENT ITEM DESCRIPTION</u>	<u>LOCATION</u>	<u>SCEWS NO.</u>	<u>QUALIFICATION REFERENCES</u>	<u>TER SECTION NO.</u>
26	Electric Motor Driving Gland Steam Exhaust Fan General Electric 5BC74AB2193	HPCI Room	74	None	4.7.29
27	Motor Speed Changer General Electric GE5BC26AC389	HPCI Room	75	None	4.7.30
28	Motor Gear Unit General Electric 5CD14019A11620	HPCI Room	76	None	4.7.31
29	Electric Motors Driving Oil Pump General Electric 5CD218E252 5CD326E758	HPCI Room	77,78	None	4.7.32
30	HPCI Motor Control Signal Converter General Electric 3S7513TC108	HPCI Room	79	None	4.7.33
31	Level Switch Mercoid 123-2	HPCI Room	80	None	4.7.34
32	Level Switches Magnetrol 291	Torus Area	85,86	None	4.7.35
33	Flow Switch Barton 289	HPCI Room	87	None	4.7.36
34	Pressure Switch Static-O-Ring 6NN-AA21-VRR	HPCI Room	88	None	4.7.37
35	Pressure Switches Barksdale D2H-M150SS	HPCI Room	89-90	None	4.7.38

<u>ITEM NO.</u>	<u>EQUIPMENT ITEM DESCRIPTION</u>	<u>LOCATION</u>	<u>SCEWS NO.</u>	<u>QUALIFICATION REFERENCES</u>	<u>TER SECTION NO.</u>
36	Solenoid Valves Allied Controls-Gould 320X-39, 320X-30	Drywell	91-96	None	4.6.7
37	Safety Relief Valve and Solenoid Dresser Industries C5450-5	Drywell	97,98	15	4.6.8
38	Electromagnetic Relief Valves and Solenoid Valves Dresser Industries 1525VX	Drywell	99-102	15	4.6.8
39	Motorized Valve Actuator Limitorque/Peerless ac Motor Model Not Stated	Drywell	103-104	20,24	4.6.27
40	Motorized Valve Actuator Limitorque/Peerless dc Motor SMB-00-7.5	Steam Tunnel	105,106	None	4.7.39
41	Differential Pressure Indicating Switches Barton 278	Reactor Building	107-116	None	4.7.40
42	Temperature Switches Fenwal 17002-40	Steam Tunnel	117-126	None	4.6.28
43	Pressure Switch Static-O-Ring 12NN-KX213-VX	SE Corner Room	235-237	None	4.6.10
44	Motorized Valve Actuator Limitorque/Peerless ac Motor SMB-0-13 SMB-2-60 SMB-2-40	NE and SE Corner Rooms	127-129	20	4.6.29

<u>ITEM NO.</u>	<u>EQUIPMENT ITEM DESCRIPTION</u>	<u>LOCATION</u>	<u>SCREWS NO.</u>	<u>QUALIFICATION REFERENCES</u>	<u>TER SECTION NO.</u>
45	Motorized Valve Actuators Limitorque/Motor Not Identified SMB-2-60	NE and SE Corner Rooms	130-132	None	4.6.30
46	Motorized Valve Actuator Limitorque/Peerless ac Motor SMB-000-5 SMB-4T-150 SMB-3-100 SMB-0-10	Torus Area	135-136, 147-148, 152-155	20	4.6.31
47	Motorized Valve Actuator Limitorque/Reliance ac Motor SMB-2-40 SMB-0 SMB-1	NE and SE Corner Rooms	133-134, 137-138, 194-197	7	4.6.32
48	Motorized Valve Actuator Limitorque/Peerless ac Motor Model Not Stated	SE Corner Room	139	None	4.7.41
49	Motorized Valve Actuator Limitorque/Peerless ac Motors SMB-0-15	Reactor Building	140-141	20	4.6.24
50	Motorized Valve Actuator Limitorque/Reliance ac Motors SMB-3T-150 SMB-2-60	Torus Area	144-146, 149-151	7	4.6.33
51	Motorized Valve Actuator Limitorque/Peerless dc Motor SMB	Torus Area	156	None	4.7.42

<u>ITEM NO.</u>	<u>EQUIPMENT ITEM DESCRIPTION</u>	<u>LOCATION</u>	<u>SCWS NO.</u>	<u>QUALIFICATION REFERENCES</u>	<u>TER SECTION NO.</u>
52	Motorized Valve Actuator Limitorque/Reliance ac Motor SMB-3 SMB	Drywell	161-162, 157-158	None	4.6.34
53	Pressure Transmitters General Electric GE/Mac 551	NE and SE Corner Rooms	163-165, 186-189	None	4.6.35
54	Flow Transmitters General Electric GE/Mac 553	NE and SE Corner Rooms	166-170	None	4.6.21
55	Level Switches Magnetrol 249C-X-EP-SIMD4DC	RHR Pump Rooms	171-173	None	4.7.43
56	Differential Pressure Indicating Switches Barton 299	NE and SE Corner Rooms	174-176	None	4.6.11
57	Pressure Switch Mercoild GN-L-3	NE and SE Corner Rooms	177-182	None	4.6.22
58	Motorized Valve Actuators Limitorque/Peerless dc Motor SMB-00	Steam Tunnel	159,160	None	4.6.9
59	RHR Service Water Pump Motor General Electric 5K8211167A31	RHR Service Water Pump Room	183-185	None	4.7.44
60	Differential Pressure Switches Barton Model Not Stated	NE Corner Room	198-200	None	4.6.12
61	Room Cooler Manufacturer and Model Not Stated	RHR Pump Room	201-203	None	4.7.45

<u>ITEM NO.</u>	<u>EQUIPMENT ITEM DESCRIPTION</u>	<u>LOCATION</u>	<u>SCEWS NO.</u>	<u>QUALIFICATION REFERENCES</u>	<u>TER SECTION NO.</u>
62	Solenoid Valves ASCO HT9316B14	Torus Area	205-206, 208,226	None	4.7.46
63	Solenoid Valves Versa VPS-2402 VGS-4422	Torus Area	207,209, 210,213	None	4.7.48
64	Solenoid Valve Versa VPS-2401/VPS-4422 VGS-4532/VPS-2402 VPS-2302	Reactor Building	211-212, 217	None	4.7.48
65	Solenoid Valves ASCO 8302026F HT931614 HT9316B14 831614	Reactor Building	214-216, 221-225	None	4.7.49
66	Motorized Valve Actuator Limiterque/Peerless dc Motor Model Not Stated	SE and NW Corner Rooms	204,483, 490	None	4.7.50
67	Motorized Valve Actuator Limiterque/Motor Not Identified SMB-000	Reactor Building	227	None	4.7.52
68	Pressure Switches Static-O-Ring 12N-AA5-PP	Reactor Building	228-234	None	4.7.3
69	Pressure Switches Static-O-Ring 12N-AA5-PP	Reactor Building	247-250	None	4.6.16
70	Position Switch NAMCO Mark II D1200-G	Reactor Building Torus Area	238-242, 325-328, 342-344	None	4.7.51

<u>ITEM NO.</u>	<u>EQUIPMENT ITEM DESCRIPTION</u>	<u>LOCATION</u>	<u>SCEWS NO.</u>	<u>QUALIFICATION REFERENCES</u>	<u>TER SECTION NO.</u>
71	Electric Motor Driving Pumps General Electric 5K365AK169	RHR Pump Room	286-287	None	4.7.53
72	Electric Motors Driving Fans General Electric 5K213AK2476 5K184AL2151	Corner Rooms	288-290, 292-294	None	4.6.14
73	Room Cooler Fan Buffalo Forge G123-HV Type 15747	HPCI Room	291	None	4.7.54
74	Electric Motor Driving Fan Manufacturer and Model Not Stated	Diesel Room	295-296	None	4.7.6
75	Electric Motor Driving Pump General Electric 5K182BL315 Type K	Diesel Room	297-298	None	4.7.7
76	Level Switch Magnetrol A-103F-EP/VP	Diesel Room	299,302-303	None	4.7.5
77	Solenoid Valve ASCO 8211C89	Diesel Room	300-301	None	4.7.8
78	Solenoid Ball Valves General Pneumatic 608KWL06	Reactor Building	304-307	None	4.7.55
79	Squib Shear Valves Pyrodyne Model Not Stated	Reactor Building	308-311	None	4.7.56
80	Motorized Valve Actuator Limitorque/Peerless ac Motor SMB-1-40, SMB	Drywell	312-313, 464-465	20,24	4.6.36

<u>ITEM NO.</u>	<u>EQUIPMENT ITEM DESCRIPTION</u>	<u>LOCATION</u>	<u>SCEWS NO.</u>	<u>QUALIFICATION REFERENCES</u>	<u>TER SECTION NO.</u>
81	Motorized Valve Actuator Limitorque/Peerless dc Motor SMB	RWCU Room	314-315	None	4.6.15
82	Solenoid Valves ASCO BT931614	Torus Area	316-319	None	4.7.57
83	Motorized Valve Actuator Limitorque/Peerless ac Motor SMB-000-5	Torus Area and Inside Drywell	322-324	20,24	4.6.37
84	Solenoid Valves ASCO HVA-90-405-2A WPBLK331636 HVA-96-082A HVA-96-081A	Reactor Building	331-334, 338-341, 345-346	None	4.7.58
85	Level Switches Magnetrol 402	Reactor Building	335-337	None	4.7.59
86	Solenoid Valve ASCO Model Not Stated	Reactor Building	320	None	4.7.60
87	Solenoid Valve ASCO SN-681055	Reactor, Building	321	None	4.7.61
88	Pressure Switch Barksdale B2T-M12SS B2T-A12SS	Reactor Building	347-351, 365-367, 369,370	None	4.7.62
89	Level Indicating Switches Yarway 4413C 4413CE	Reactor Building	352-353, 357-361	None	4.7.63

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90	Level Indicating Switches Yarway 4418C t 4418CE	Reactor Building	354-356, 362-364	None	4.6.17
91	Differential Pressure Indicating Switch Barton 288	Reactor Building and NE/SE Corner Rooms	371-378	None	4.7.64
92	Radiation Detector General Electric DWG 194X927GI	Turbine Building	391-392	None	4.7.65
93	Solenoid Valve Versa/Barksdale VPS2402/ VGS4422//DLH-A150SS	Reactor Building	393-395	None	4.7.66
94	Diesel Auxiliary Control Panel Ideal Electric & Manufacturing S.O. No. 267777	Diesel Room	404-406	None	4.7.9
95	Excitation Cabinet Electromotive Div. of GM 9474	Diesel Room	407-409	None	4.7.10
96	Diesel Generator Electromotive Div. of GM Model Not Stated	Diesel Rooms	410-412	None	4.7.11
97	Switchgear General Electric AMH 4.76-250 AKD-5	Reactor Building	413-416	None	4.7.67
98	480 V Motor Control Center General Electric 7700	Reactor Building	417-419	None	4.7.68

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99	480 V Motor Control Center General Electric 7700	Reactor Building	436-441	None	4.3.1
100	Engine Control Panel Electromotive Div. of GM Model Not Stated	Diesel Room	425-427	None	4.7.12
101	4 kV Non-segregated Bus Manufacturer and Model Not Stated	Turbine Building	428-429	None	4.7.69
102	D/G Secondary Control Panel Ideal Electric S.O. No. 267777	Diesel Room	430-432	None	4.7.13
103	D/G Neutral Grounding Panel General Electric 208419-68P #KVA-5	Diesel Room	433-435	None	4.7.14
104	Battery Charger Gould GRF240T100X GRF120T100X GRF24S25F30X	Battery Charger Room	442-443, 449-450, 458-461	None	4.7.15
105	250 V dc Motor Control Center Cutler Hammer 6002H347B	Battery Charger Room	444-445	25	4.7.16
106	DC Battery Gould FPS-25 FPR-13 DPR-9	Battery Charger Room	448,451, 456-457	None	4.7.17
107	DC Distributor Panel Cutler Hammer Model Not Stated	Battery Charger Room	452-453, 462-463	None	4.7.18

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108	DC Distribution Panel Cutler Hammer Model Not Stated	Boiler Building	454-455	None	4.3.2
109	Motorized Valve Actuator Limitorque/Reliance ac Motor SMB-2 SMB-000	Drywell	379-387	None	4.6.39
110	Motorized Valve Actuator Limitorque/Reliance ac Motor SMB-2-40	Steam Tunnel	329,330	7	4.6.40
111	Solenoid Valves Versa VPS 2502 VGS 4522/VGS 4422	Torus Area	218-220	None	4.6.58
112	Differential Pressure Indicating Switch Barton 298	NW Corner Room	470-472	26	4.7.70
113	Temperature Switches Penwal 17002-40	NW Corner Room	473-482	27	4.6.38
114	Pressure Switch Barksdale B2T-A12SS	NW Corner Room	484-487	28	4.7.71
115	Electric Motor Driving Return Air Fan Joy Mfg. 38-21-1750	Above Control Room	397	None	4.7.79
116	Electric Motor Driving Supply Air Fan Trane Co. SO No. KALF575A	Above Control Room	396	None	4.7.78

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117	Position Switch NAMCO Mark II D1200G	RWCU Room	390	None	4.7.72
118	Solenoid Valve Manufacturer and Model Not Stated	HVAC Equipment Room	403	None	4.7.80
119	Cable General Electric Vulkene #SI 57275	Outside Drywell	505-506	None	4.6.57
120	Cable Simplex Poly Nylon Insulated Shield and Plastex Jacket	Outside Drywell	507-514	None	4.6.46
121	Cable, Jacket Simplex Rubber Insulation, PVC Jacket	Inside Drywell	503-504	None	4.6.41
122	Solenoid Valve ASCO 830281F	NW Corner Room	468,469, 488-489	None	4.7.73
123	Electrical Penetration GE-NEBS Model Not Stated	Drywell	517-520	None	4.6.55
124	Water Chillers Trane Co. 3E5H80	HVAC Equipment Room	401	None	4.7.81
125	Electric Motor Driving Chilled Water Pump Ingersoll-Rand 0469-4154	HVAC Equipment Room	402	None	4.7.82
126	Cable General Electric Butyl Rubber Insulation, PVC Jacket; Cross Link Polyethylene	Outside Drywell	491-492, 499-502, 515-516	None	4.6.42

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126	(Continued) Insulation, Neoprene Jacket; Rubber Insulation, Hypalon Jacket				
127	Cable General Electric Polyethylene Insulation, PVC Jacket	Inside Drywell	497-498	None	4.6.43
128	Electric Cable Simplex Polyvinyl Chloride Jacket and Butyl Rubber Insulation	Not Stated	493-494	None	4.6.44
129	Electric Cable Simplex Anhydrex XX Plastic Insulation and Jacket	Outside Drywell	495-496	None	4.6.45
130	Terminal Blocks Allen Bradley Model Not Stated	Inside Drywell	521-524	None	4.6.56
131	Position Switch NAMCO EA-08011100	Drywell	388-389	None	4.6.54
132	Electric Air Heater E. L. Wiegand Model Not Stated	Reactor Building	251-253	None	4.6.47
133	Motorized Damper Actuators Limitorque SMB	Reactor Building	254-259, 263-264	None	4.7.74
134	Exhaust Fan New York Blower E4966	Reactor Building	260-262	None	4.6.48
135	Flow Transmitter Leeds & Northrup 1912-3-21-0-0000- 0300-0300	Reactor Building	263-267	None	4.6.49

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136	Flow Transmitter Foxboro 15A-1	Reactor Building	268-270	None	4.6.50
137	Flow Switch Mercoïd DA-533-3 DA-533-2R1	Reactor Building	271-273, 277-279	None	4.6.51
138	Temperature Switches Chromalox Model Not Stated	Reactor Building	274-276	None	4.6.52
139	Local Control Panel Havlo DVG D12971 SH.30	Reactor Building	280-282	None	4.3.3
140	Solenoid Valve Versa/ASCO VVS-2302/ 8320A23	Reactor Building	283-285	None	4.6.53
141	Temperature Element Pall Trinity Micro 14-T-2H	Inside Torus	243-246	None	4.6.13
142	Damper Manufacturer and Model Not Stated	HVAC Equipment Room	398-400	None	4.7.4
143	Position Switch Manufacturer and Model Not Stated	RWCU Room	368	None	4.7.47
144	Level Switches Mangetrol 291-SP	Turbine Building	81-84	23	4.7.83
145	120 V ac Reactor Protection Bus General Electric Type NAB, Style 2A Plant H	Electrical Equipment Room	420-421	None	4.7.75

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146	120/240 V ac Bus Cutler Hammer 6CP635505	Electrical Equipment Room	422-423	None	4.7.76
147	120/240 V ac Bus MMG Set General Electric 5LS4404A22Y30	Electrical Equipment Room	424	None	4.7.77
148	250 Volt dc Motor Control Center Culter Hammer 6002H347B	Reactor Building	446,447	None	4.7.84

APPENDIX C - SAFETY SYSTEMS FOR WHICH ENVIRONMENTAL
QUALIFICATION IS TO BE ADDRESSED

The Licensee submitted the following list of safety-related systems that must function in order to mitigate the consequences of a design basis accident. This information was included in the Licensee's November 1, 1980 response [33] to IE Bulletin 79-01B.

- o Reactor Protection System
- o Core Spray System
- o High-Pressure Coolant Injection System
- o Auto Depressurization System/Main Steam System
- o Residual Heat Removal/Containment Spray System
- o Pressure Suppression System
- o Standby Gas Treatment System
- o Service Water System
- o Diesel Oil Piping System
- o Containment Isolation System*
- o Control Rod Drive Hydraulic System
- o Reactor (Nuclear Boiler) Recirculation System
- o Process Radiation Monitoring System
- o Reactor Building Ventilation System
- o Control Room, HVAC
- o Standby Alternating Current Power
- o Standby Direct Current Power
- o Reactor Core Isolation Cooling System (RCIC)
- o General Use Electrical Equipment

*Containment isolation includes all components, in various systems, that perform the containment isolation function.