TECHNICAL EVALUATION REPORT

REVIEW OF LICENSEES' RESOLUTION OF OUTSTANDING ISSUES FROM NRC EQUIPMENT ENVIRONMENTAL QUALIFICATION SAFETY EVALUATION REPORTS (F-11 and B-60)

INDIANA AND MICHIGAN ELECTRIC COMPANY
DONALD C. COOK NUCLEAR PLANT UNIT 1 VOL. 1 OF 2

NRC DOCKET NO. 50-315

NRC TAC NO. 42460

NRC CONTRACT NO. NRC-03-79-118

FRC PROJECT C5257

FRC ASSIGNMENT 13

FRC TASK 497

Prepared by

Franklin Research Center
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Prepared for

Nuclear Regulatory Commission
Washington, D.C. 20555

Lead NRC Engineer: N. B. Le
P. Shemanski

October 28, 1982

Franklin Research Center
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The Benjamin Franklin Parkway, Phila., Pa. 19103 (215) 448-1000

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FOREWORD

This Technical Evaluation Report was prepared by Franklin Research Center under a contract with the U.S. Nuclear Regulatory Commission (Office of Nuclear Reactor Regulation, Division of Operating Reactors) for technical assistance in support of NRC operating reactor licensing actions. The technical evaluation was conducted in accordance with criteria established by the NRC.

IDENTIFICATION OF PROPRIETARY INFORMATION

Some of the information in this technical evaluation report was obtained from manufacturers' proprietary test reports. All proprietary test reports are identified as such in Section 6, References, of this report. Checksheets in Section 4 containing proprietary information have been replaced with a checksheet page stating that the proprietary information has been removed.

1. INTRODUCTION

1.1 PURPOSE OF THE EVALUATION

The purpose of this report is to:

- o evaluate licensees' resolutions of outstanding issues related to safety-related electrical equipment environmental qualification (EEQ) discussed in the Nuclear Regulatory Commission (NRC) Safety Evaluation Reports (SERs) in accordance with NRC criteria. The objective is to identify all cases where a licensee's response has not resolved the significant qualification issues.
- o evaluate licensees' qualification documentation of safety-related electrical equipment located in harsh environments in accordance with criteria established by the NRC and to identify (1) equipment for which 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 for which qualification documentation is deficient, i.e., does not give reasonable assurance that the equipment is capable of performing its specified safety function.
- o evaluate licensees' qualification documentation of safety-related electrical equipment located in harsh environments required for TMI Lessons Learned Implementation. The objective is to evaluate qualification documentation of equipment within the scope of IE Bulletin 79-01B, Supplement 3 (item 2) [6],* in accordance with criteria established by the NRC in a manner identical to the evaluation of all other safety-related electrical equipment.

1.2 SCOPE OF THE EVALUATION

The scope of this report is limited to the evaluation of environmental qualification of electrical equipment that must function to mitigate the consequences of a loss-of-coolant accident (LOCA) or high energy line break (HELB) and whose environment is adversely affected by that event.

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

With respect to TMI Action Plan Implementation, the scope of this report is limited to those sections of NUREG-0737 [2] applicable to equipment having an installation implementation date of January 1, 1981. Where applicable, a review is to be performed on installed equipment with implementation dates after January 1, 1981 if adequately identified by the Licensee.

The NRC has determined that the evaluation of environmental qualification of equipment items (1) located in plant areas whose environment is not adversely affected by the design basis event (DBE) (e.g., equipment located in "mild" environments) or (2) required to achieve and maintain cold shutdown, is not to be included within the scope of this report. However, where the Licensee has identified these equipment items in the EEQ submittals to the NRC, these items have been listed in NRC evaluation Category III.b in this report (see Section 3 of this report for definition of NRC evaluation categories).

Qualification aspects not included within the scope of this evaluation are:

- o seismic and dynamic 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 subjected to the outdoor environment
- o equipment protection against fire hazards
- o equipment protection against missiles
- o equipment located in plant areas whose environment is not adversely affected by the design basis event
- o equipment required to achieve and maintain cold shutdown.

1.3 GENERIC ISSUE BACKGROUND

Safety-related electrical equipment must be capable of performing design safety functions under all normal, abnormal, and accident conditions. 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.

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 LOCA, main steam line break (MSLB) inside the reactor containment, or a HELB outside the reactor containment (such as a main steam or feedwater line break). In addition, depending on specific plant design features, other postulated HELB locations may be associated with:

- o the chemical and volume control system (CVCS) letdown line
- o the steam supply piping to
  - the auxiliary feedwater (AFW) pump turbine
  - the reactor core isolation cooling (RCIC) pump turbine
  - the high pressure core injection (HPCI) pump turbine
  - the isolation condenser
- o steam generator blowdown.

The NRC criteria for reviewing the safety of nuclear power generating stations include the requirement that the qualification of safety-related electrical equipment be substantiated by auditable documentation of the program that establishes the ability of the equipment to function as specified in the station design. This report is restricted to a technical evaluation of the equipment's ability to function in harsh environments resulting from DBEs.

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, 334-80, 381-77, 382-80, 535-79, 627-80, 649-80, and 650-79. NRC NUREG documents 0413 and 0588 have been developed to address this topic. In particular, NUREG-0588 (published for comment in December 1979 and reissued as Revision 1 in July 1981) 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 IE 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 I, 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 (1) 10CFR50 Appendix A, General Design Criteria 1, 2, and 23 and (2) 10CFR50 Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants, Criteria III, "Design Control," and XI, "Test Control." These requirements are applicable to safety-related equipment located outside as well as inside containment.

The NRC staff has evaluated the licensees' equipment qualification programs 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 SERs 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 November 1977, the Union of Concerned Scientists petitioned the NRC Commissioners to upgrade current standards for the environmental qualification of safety-related electrical equipment in operating plants. Subsequently, 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 initiate reviews to 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) 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 threshold 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 licensees' responses indicated certain deficiencies within the scope of equipment addressed, definition of harsh environments, and adequacy of support documentation. It became apparent that generic criteria were needed for evaluating 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" [4]. (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 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.

In October 1979, the NRC awarded Franklin Research Center a contract to provide assistance in the "Review and Evaluation of Licensing Actions for Operating Reactors," which included an assignment for review of equipment environmental qualification documentation under SEP Topic III-12. The assignment was to review equipment environmental qualification documentation and to present the results in the form of a Technical Evaluation Report for the 11 oldest plants (included in the SEP review). The plants included within the assignment were the Palisades, Oyster Creek, Ginna, Haddam Neck, Yankee Rowe, LaCrosse, and Big Rock Point plants and Zion Station Units 1 and 2, Indian Point Units 2 and 3, Millstone Unit 1, Dresden Unit 2, and San Onofre Unit 1. (This assignment was completed in April 1981.)

On January 14, 1980, the NRC Office of Inspection and Enforcement issued the DOR 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 DOR 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 HELBs (inside and outside containment) in addition to equipment aging and submergence. The NRC advised the licensees that the criteria contained in the DOR Guidelines would be used in its review of licensee submittals; NUREG-0588 would be used as a guide in cases where the DOR Guidelines do not provide sufficient detail.

In early February 1980, the NRC decided that Indian Point Units 2 and 3 and Zion Station 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 DOR 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 DOR 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" [4], 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 23, 1980, the NRC issued Memorandum and Order CLI-80-21 [7], 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 SERs 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 Memorandum and Order established the DOR Guidelines and NUREG-0588 as acceptable interpretations of the General

Design Criteria for an interim period. Rulemaking was proposed for the purpose of establishing a permanent interpretation of the General Design Criteria.

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 a contract to provide assistance in the equipment environmental qualification review for 13 of the plants whose licensees responded to IE Bulletin 79-01B. The assignment 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. The objective of this Technical Evaluation Report was to review the licensees' submittals to determine if safety-related electrical equipment was reviewed for environmental qualification in accordance with the DOR Guidelines and NUREG-0588 as required by IE Bulletin 79-01B. The NRC was to perform an audit of the qualification documentation references as part of its Safety Evaluation Program. If discrepancies were found, the audit was to be extended. The plants included within this assignment were Nine Mile Point Unit 1, Millstone Unit 2, Salem Unit 1, Browns Ferry Units 1, 2, and 3, Brunswick Units 1 and 2, Hatch Units 1 and 2, Dresden Unit 3, and Quad Cities Units 1 and 2. (This assignment was completed in June 1981.)

In mid-1981, the NRC issued SERs on environmental qualification of safety-related electrical equipment to licensees of all operating plants.

Where additional qualification information was required, the licensees were directed to respond to the NRC within 90 days of receipt of the SER.

In May 1981, under the licensing action assistance contract, NRC authorized Franklin Research Center to proceed with the review and evaluation of the environmental qualification of safety-related electrical equipment located in harsh environments, required for TMI Lessons Learned Implementation on 71 operating plants.

In July 1981, the NRC conducted extensive meetings with the nuclear industry to address concerns and questions regarding qualification of safety-related equipment. In addition, the NRC provided licensees with detailed information with respect to the format and expected content of the licensees' 90-day responses to the NRC SERs. Draft outlines of the following proposed programs were also presented to the industry: environmental qualification of equipment located in "mild" environments, seismic and dynamic qualification, and environmental qualification of mechanical equipment.

On September 23, 1981, the NRC Commissioners considered a petition (SECY-81-486) to extend the deadline for actions to be taken by licensees to achieve environmental qualification of all safety-related equipment. On September 30, 1981, the NRC Commissioners extended this deadline to the second refueling outage after March 31, 1982.

In October 1981, the NRC authorized Franklin Research Center to include within the scope of the existing EEQ assignment (TMI Lessons Learned Implementation Equipment) the evaluation of licensees' resolutions of outstanding issues related to equipment environmental qualification discussed in the NRC SERs in accordance with NRC criteria. The assignment was to review the qualification documentation and to present the results in the form of a Technical Evaluation Report for 71 operating plants. (This report was developed within the scope of this assignment.)

On January 7, 1982, the NRC Commissioners approved the issuance of the proposed rule, "Environmental Qualification of Electric Equipment for Nuclear Power Plants," for public comment. The proposed rule was published in the Federal Register (Volume 47, No. 13) dated January 20, 1982.

In February 1982, Proposed Revision 1 to Regulatory Guide 1.89, "Environmental Qualification of Electric Equipment for Nuclear Power Plants," was issued for public comment. This regulatory guide was issued to (1) reflect current NRC positions on equipment qualification and (2) provide guidelines for meeting the NRC Commissioners proposed rule on equipment qualification.

The final rule, "Environmental Qualification of Electric Equipment for Nuclear Power Plants," was subsequently issued on April 16, 1982 by the NRC (to be published in the Federal Register) to clarify and strengthen the criteria for environmental qualification of electrical equipment. The final rule is to be incorporated into 10CFR50 as Section 50.49, "Environmental Qualification of Electric Equipment for Nuclear Power Plants." The significant features of the rule are:

- Requalification of electrical equipment in accordance with the rule will not be required for equipment qualified or being qualified in accordance with the DOR Guidelines and IE Bulletin 79-01B or NUREG-0588, provided the qualification program commenced within 90 days after the effective date of the rule.
- The requirement to qualify equipment needed to complete one path of achieving and maintaining a cold shutdown condition has been deleted.
- A new section has been added, covering the qualification of equipment located in mild environments.
- The Commission deadline for actions to be taken by licensees to achieve environmental qualification of all safety-related equipment is extended to the second refueling outage after March 31, 1982.

On April 20, 1982, the NRC staff issued Generic Letter No. 82-09 [23] to all licensees, presenting the NRC's position and clarification of certain aspects of the environmental qualification requirements.

1.4 SPECIFIC ISSUE BACKGROUND

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 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 threshold 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.

On January 14, 1980, the NRC Office of Inspection and Enforcement issued the DOR 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. This Bulletin cited the DOR Guidelines as the criteria to be used in evaluating the adequacy of the safety-related electrical equipment qualification.

The NRC 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.

The NRC Office of Inspection and Enforcement performed (1) a preliminary evaluation of the Licensee's response, documented in a technical evaluation report (TER), and (2) an onsite verfication inspection (June 16-17, 1980) of selected safety-related electrical equipment. The engineered safety features actuation, air-recirculation, and containment isolation systems were inspected at Unit 1; the containment spray system was inspected at Unit 2. The inspection at both units verified proper installation of equipment, overall interface integrity, and manufacturers' nameplate data. The manufacturer's

name and model number from the nameplate data were compared to information given in the Component Evaluation Work Sheets (CES) of the Licensee's report. The site inspection is documented for Units 1 and 2 in an onsite inspection report (from D. W. Hayes to E. L. Jordan, dated July 1, 1980). No deficiencies were noted.

On October 31, 1980 [1], Indiana and Michigan Electric Company provided the NRC with an equipment environmental qualification submittal in response to IE Bulletin 79-01B for the D. C. Cook Nuclear Plant Unit 1.

On February 3, 1981 [8], Indiana and Michigan Electric Company submitted to the NRC further equipment environmental qualification information in response to IE Bulletin 79-01B.

On May 28, 1981 [9], Indiana and Michigan Electric Company submitted to the NRC additional information in response to IE Bulletin 79-01B.

The NRC issued a Safety Evaluation Report (SER) to Indiana and Michigan Electric on May 26, 1981 [10].

Requests for information [61, 62, 63, 64, 65] were transmitted to the NRC by FRC to obtain qualification documentation referenced by the Licensee in its submittals, TMI Action Plan information, and correlations to NUREG-0737 [2].

By letter dated September 23, 1981 [12], Indiana and Michigan Electric transmitted to the NRC a response to the SER.

In References 14, 24, 25, and 54, Indiana and Michigan Electric provided responses to the FRC requests for additional information.

2. NRC CRITERIA FOR ENVIRONMENTAL QUALIFICATION

2.1 CRITERIA PROVIDED BY THE NRC

The screening guidelines used to evaluate the electrical equipment environmental qualification program were:

- DOR Guidelines, "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors," November 1979 [4]
- NUREG-0588, Revision 1, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," July 1981 [3].

Other appropriate references used in the review of the licensees' electrical equipment environmental qualification submittals are:

- IE Bulletin 79-01B, "Environmental Qualification of Class 1E Equipment," January 14, 1980; Supplement No. 1, February 29, 1980; Supplement No. 2, September 29, 1980; and Supplement No. 3, October 24, 1980 [21, 22, 5, 6]
- NUREG-0737, "Clarification of TMI Action Plan Requirements," November 1980 [2]. This document is applicable for the selection of equipment for the evaluation of the environmental qualification of safety-related electrical equipment located in harsh environments required for TMI Lessons Learned Implementation. The scope of the review is limited to equipment associated with specific sections of NUREG-0737 which have an installation implementation date of January 1, 1981. Where applicable, a review is to be performed on installed equipment with implementation dates after January 1, 1981 if adequately identified by the licensee.

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 screening guidelines.

2.2.1 Requirements and Applicable Criteria

Items 3 and 17 of Supplement 2 to IE Bulletin 79-01B [5] describe the application of the DOR Guidelines and NUREG-0588 to operating reactors (ORs),

near term operating license applicants (NTOLs), and construction permit applicants (CPs). The qualification requirements and applicable criteria are stated as follows:

[Question 3]

"Define the requirements and applicable criteria for ORs, NTOLs, and OLs. Specifically address the NTOLs whose CP SER is prior to July 1974 and after July 1974. Can a CP whose SER is prior to 1974 use the DOR guidelines?"

[NRC Answer to Question 3]

"Table 1 describes the application of each document. All operating reactors as of May 23, 1980, will be evaluated against the DOR guidelines. In cases where the DOR guidelines do not provide sufficient detail, but NUREG-0588 Category II does, NUREG-0588 will be used.

TABLE 1

REQUIREMENTS

ORs	OLs		CPs
DOR GUIDELINES	CP SER Before 7/1/74	CP SER After 7/1/74	
USE NUREG-0588 AS NECESSARY	NUREG-0588 (CAT. II)	NUREG-0588 (CAT. I)	NUREG-0588 (CAT. I) or NEW RULE WHEN IN EFFECT

REPLACEMENT COMPONENTS
USE NUREG-0588 (CAT. I)

All plants licensed after May 23, 1980, shall conform to NUREG-0588. In accordance with Regulatory Guide 1.89, all such operating licenses for facilities whose construction permit SER is dated July 1, 1974 or later, are to be reviewed against IEEE Std. 323-1974. Thus, for these licensees, the operating license applicant is to qualify equipment to the Category I column in NUREG-0588. For operating licenses issued after May 23, 1980, whose construction permit SER is dated before July 1, 1974, the operating license applicant is to qualify equipment to at least Category II column of NUREG-0588; unless the licensee made commitment in the construction permit record to use the 1974 standard, or unless the operating licensee application record indicates that the 1974 standard is to be used, in such cases Column I of NUREG-0588 is to be used.

While there are differences between the Category II column of NUREG-0588 and the DOR guidelines, the differences are in details and in the

optional part of the documents. The minimum requirements set forth by these documents are general and compatible. Thus, the minimum standards set by either of the two documents are equally applicable to ORs and NTOLs."

[Question 17]

"Define the requirements for 'replacement parts.' Are they the same for 'spare' parts? Clearly discuss the alternatives for existing inventories of parts/components. If equipment is ordered to meet IEEE Std. 323-1974 standard but lead time exceeds June 1982, can we use IEEE Std. 323-1971 qualified components in the interim?"

[NRC Answer to Question 17]

"The requirements for 'replacement' and 'spare' parts are the same for the purposes of complying with the Commission order and memorandum. After May 1980, all parts used to replace presently installed parts shall be qualified to Category I of NUREG-0588 'unless there are sound reasons to the contrary.' Nonavailability and/or the fact that the part to be used as a replacement is a spare part purchased prior to May 23, 1980, and is in stock are among the factors to be considered in weighing whether there are 'sound reasons to the contrary.' All replacement parts shall as a minimum conform to the requirements described in the answer to question 3. Justification for deviation from Category I of NUREG-0588 shall be documented by the licensee and records shall be available for audit, upon request by the NRC."

2.2.2 Application of Requirements and Criteria to TMI Lessons Learned Implementation Equipment

The NRC requested an evaluation of the environmental qualification of safety-related electrical equipment located in harsh environments required for TMI Lessons Learned Implementation in accordance with criteria established by the NRC in a manner identical to the evaluation of all other safety-related electrical equipment. Additionally, Item 21 of Supplement 2 to IE Bulletin 79-01B [5] states:

"TMI Lessons Learned instrumentation will be considered in the February 1, 1981 SER. This equipment is subject to the same requirements as other safety-related electrical equipment. The guidance and requirements of NUREG-0588 referenced daughter standards, and Reg Guides will be used by the staff in assessing the adequacy of the qualification information."

Item 2 of Supplement 3 to IE Bulletin 79-01B [6] states:

"IEB 79-01B required a 90 day response which was due in mid-April 1980. Supplement 1 (Feb. 1980) informed licensees that equipment which was

'planned' to be installed as a result of lessons learned need not be addressed in that response. Some of this equipment has since been installed. Supplement #2 (Q.5, Q.21) identified that the staff position was that equipment which is installed should be treated in a manner similar to all other safety-related electrical equipment and be addressed in the November 1, 1980 submittal. This position represents no change in staff position regarding the scope of the review. However, since the staff position on this issue was unclear the following will apply:

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

b. 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.

c. Qualification information for TMI Action Plan equipment currently under NRC review should be submitted as soon as possible.

d. 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."

2.2.3 Equipment Not in the Scope of the Qualification Review

Supplement 2 of IE Bulletin 79-01B [5] 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 high energy line break (HELB) or to nuclear radiation emanating from circulation of fluids containing radioactive substances. Supplement 3 of IE Bulletin 79-01B [6] permits deferment of the review of environmental qualification for all equipment required to achieve and maintain the plant in a cold shutdown condition. Supplements 2 and 3 of 79-01B originally permitted deferment until after February 1, 1981 of the qualification review of equipment located in a mild environment or required to achieve and maintain the plant in a cold shutdown condition. Since the issuance of Supplements 2 and 3, the NRC has determined that the review of environmental qualification for this equipment is not within the scope of the present review program.

2.2.4 Clarification of Qualification Requirements

2.2.4.1 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 [5], "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 loss-of-coolant accident (LOCA) and HELB accidents inside containment.

2.2.4.2 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 [5] 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.

2.2.4.3 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 [5] 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."

2.2.4.4 Test Sequence
(DOR Guidelines Section 5.2.3)

Supplement 2 to IE Bulletin 79-01B [5] 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 programs would then fall in the first or second category."

2.2.4.5 Radiation
(DOR Guidelines Sections 4.1.2, 4.2.2, and 4.3.2, Subitem 2)

Supplement 2 to IE Bulletin 79-01B [5] 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:

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

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

Gamma equivalents may be used when consideration of the contibutions 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."

2.2.5 Additional Clarification of Qualification Requirements

The NRC has worked with a number of licensees, at their requests, to provide further clarification on environmental qualification requirements. On January 20, 1982, the NRC issued Generic Letter No. 82-09 [23] presenting staff positions on certain aspects of the qualification requirements. Generic Letter No. 82-09 states:

"1. Operator Display Instrumentation

Q. Given the interrelated activities associated with display instrumentation (e.g., NUREG-0700, NUREG-0799, proposed Regulatory Guide 1.97 and Equipment Qualification efforts), what display instrumentation referenced in emergency operating procedures must be identified in licensee submittal to the NRC?

A. All display instrumentation referenced in the emergency procedures need not be identified. The NRC requires that licensees need only identify and have available qualification documentation on those operator display instruments which are safety-related (see Question 2). If licensees have previously supplied a listing of all display instrumentation referenced in emergency procedures, licensees may identify (such as by the use of an *) which of those instruments are safety-related. The staff will defer review of the basis for this safety-related classification until other NRC activities[1] have been implemented. When these other activities are implemented, additional instruments presently not requiring qualification may require upgrading to a safety-related status and/or may require qualification. Licensees will be required at that time to qualify this instrumentation in accordance with the following criteria:

- For new or upgraded instrumentation with a required operation date prior to the equipment qualification deadline, qualification must be accomplished by the equipment qualification deadline.

[1]Such activities include preparation of new emergency procedures (NUREG-0799), control room design reviews (NUREG-0700), and upgrading of accident monitoring instrumentation (Reg. Guide 1.97 and NUREG-0737).

- For new or upgraded instrumentation with a required operation date after the equipment qualification deadline, qualification must be accomplished prior to equipment operation and plant acceptance.

2. Safety-Related Equipment

Q. For Equipment Qualification purposes, what constitutes all safety-related electrical equipment?

A. The Commission, in CLI-80-21, required the environmental qualification of only safety-related electrical equipment. Identification of the safety-related equipment installed at specific plants can be obtained from FSARs, Technical Specifications and other docketed correspondence setting forth NRC requirements or licensee commitments. Identification of safety-related equipment installed in harsh environments at specific plants must be supplied by the licensee. The necessity for upgrading nonsafety-related system to safety-related status will be the subject of other NRC reviews.

3. Replacement Parts

Q. Please clarify the NRC requirements on replacement parts.

A. In CLI-80-21, the Commission stated that unless there were sound reasons to the contrary, replacement equipment should be qualified to the standards set forth in Category I of NUREG-0588. The Commission's position was designed to promote the policy of upgrading the environmental qualification and reliability of installed safety-related electrical equipment. To meet this overall goal, licensees must institute internal policy practices consistent with the Commission's statement.

Situations may arise in which upgrading to NUREG-0588, Category I of replacement equipment qualified to NUREG-0588, Category II or the DOR Guidelines will not be compatible with overall station safety and performance goals. Licensees must review such situations on a case-by-case basis and determine that 'sound reasons to the contrary' do, in fact, exist which warrant the use of replacement equipment (not necessarily in-kind) qualified to the DOR Guidelines or NUREG-0588, Category II. For equipment located in a harsh environment, licensees' procedures must provide for documentation and substantiation of such determinations.

Conditions which reflect sound reasons why qualification standards for replacement of equipment in a harsh environment need not be upgraded to NUREG-0588, Category I include the following:

1. The licensee has replacement equipment in stock that meets the DOR Guidelines or NUREG-0588, Category II, and procurement actions regarding such replacement equipment had commenced prior to May 23, 1980.

2. Replacement equipment qualified to the NUREG-0588, Category I standards does not exist.

3. Replacement equipment qualified to the NUREG-0588, Category I standards is not available to meet installation and operation schedules. Equipment qualified to the DOR Guidelines or NUREG-0588, Category II may be used for an interim period until Category I equipment is obtained and an outage of sufficient duration is available for replacement. Justification for use of the non-Category I qualified replacement equipment beyond this interim period must be submitted to the NRC for approval prior to the end of the interim period and in sufficient time for reasonable NRC review.

4. Replacement equipment qualified to NUREG-0588, Category I standards would require significant plant modifications to accommodate its use.

5. Operating performance and reliability data for the Category I equipment indicates poor overall equipment performance. For example, mean time to failure is significantly shorter for the Category I replacement equipment.

6. The use of replacement equipment qualified to NUREG-0588, Category I standards has a significant probability of creating human factor problems that will negatively affect plant safety and performance, e.g., (1) knowledge, skills and ability of existing plant staff require significant upgrading to operate or maintain the specific Category I replacement equipment; (2) the use of equipment qualified to Category I standards creates a one-of-a-kind application; or (3) maintenance, surveillance or calibration activities are unnecessarily complex.

5. <u>Submergence Outside Containment</u>

Q. For equipment qualification purposes, what are the staff requirements concerning submergence of equipment outside containment?

A. The Staff requires that the licensee submit documentation on the qualification of safety-related equipment that could be submerged due to a high energy line break outside containment.

6. Radiation

Q. Is the staff screening value of 4×10^7 rads applicable to all operating reactors?

A. No. This screening value is applicable only to PWRs with dry type containments. However, for PWRs with dry type containments, the licensee may choose to use plant specific analysis instead of the screening value. For plants with other containment types, the licensee must use plant specific analysis.

Acceptable to the Staff for equipment qualification purposes are radiation values developed as part of the plant licensing process provided that they are based on the TID14844 source terms and are conservatively performed. In order to assure that the methodologies are appropriate, the Staff requests two component specific sample calculations (one for inside and one for outside containment), and a brief written description of each of the methodologies used, their application and associated conservatisms. Such sample calculations and a statement by the licensee that the values of radiation exposure of components so derived are appropriate for environmental qualification of equipment will satisfy the Staff's concern on the 'Radiation Specification Value' used during the qualification reviews.

7. Containment Service Conditions

Q. Must the Staff value (identified in the SERs) of T_{SAT} for PWRs and T_{SAT} + 20°F for BWRs be used as the maximum in-containment temperature for the purpose of equipment qualification?

A. No. The Staff will accept the use of these values. However, an acceptable alternative to the NRC staff's temperature criterion used for the service conditions must base that service condition on the FSAR analysis or other NRC approved analysis, provided that the specific analysis, or a summary of that analysis, together with reference to the previous NRC acceptance of the analysis is submitted by the licensee. In addition, some of the information in the associated safety evaluation may require clarification.

8. One Hour Minimum Operating Time

Q. The Staff has previously indicated that certain exceptions to the one hour minimum operating time rule are permitted. Can further clarification be provided?

A. With regard to plants subject to the qualification requirements of the DOR Guidelines or Category II of NUREG-0588, for those pieces of equipment tested prior to May 23, 1980, the test data and analysis may be used to qualify the equipment to the required operating time plus an appropriate margin. The one hour margin requirement need not be applied. However, subsequent failures should be shown not to be detrimental to plant safety.

The one hour time margin rule is not applicable to equipment whose safety function is performed prior to significant changes in the environment at the equipment location.

9. Aging

Q. Must a qualified life be developed for all safety-related electrical equipment located in harsh environments?

A. Section 7 of the DOR Guidelines and Section 4.2, Category II of NUREG-0588, do not require a qualified life to be established for all safety-related electrical equipment located in harsh environments. A qualified life, in accordance with the provisions in IEEE 323-1974, is required for equipment, including replacement parts, qualified to Category I of NUREG-0588 that is located in a harsh environment.

An acceptable method for addressing in-service degradation is through a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers recommendations. These elements of the program lead to an understanding on a device specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and materials application are sufficiently simple and the necessary data are available to allow a meaningful application.

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs, and that information should be incorporated into the system component evaluation worksheets (SCEWS). For other equipment, the aging column in the SCEWS should be marked 'No Known Susceptibility'."

3. METHODOLOGY USED FOR THE EVALUATION

3.1 INTRODUCTION

As discussed in Section 1.3 of this report, the NRC issued Safety Evaluation Reports (SERs) on environmental qualification of safety-related equipment to licensees of all operating plants in mid-1981.

The SERs identified various equipment qualification deficiencies as indicated below:

LEGEND: DESIGNATION FOR DEFICIENCY

- R - Radiation
- T - Temperature
- QT - Qualification Time
- RT - Required Time
- P - Pressure
- H - Humidity
- CS - Chemical Spray
- A - Material Aging Evaluation, Replacement Schedule, Ongoing Equipment Surveillance
- S - Submergence
- (R) - Licensee has committed to replace equipment
- M - Margin
- I - HELB Evaluation Outside Containment Not Completed
- QM - Qualification Method
- RPN - Equipment Relocation or Replacement, Adequate Schedule Not Provided
- EXN - Exempted Equipment Justification Inadequate
- SEN - Separate Effects Qualification Justification Inadequate
- QI - Qualification Information Being Developed
- RPS - Equipment Relocation or Replacement Schedule Provided

The SERs directed licensees to "either provide documentation of the missing qualification information which demonstrates that safety-related equipment meets the DOR Guidelines or NUREG-0588 requirements or commit to a corrective action (re-qualification, replacement [etc.]) to establish qualification by June 30, 1982." Licensees were required to respond to the NRC within 90 days of receipt of the SER.

As stated in Section 1.1, the purpose of this report is (1) to evaluate licensees' resolutions of outstanding issues related to safety-related electrical equipment environmental qualification (EEQ) discussed in the NRC's SERs in accordance with NRC criteria, and (2) to evaluate licensees' qualification documentation of safety-related electrical equipment, including

TMI Lessons Learned Implementation equipment, located in harsh environments in accordance with criteria established by the NRC (see Section 2 of this report). The methodology used to evaluate (1) the Licensee's response to the NRC SER and (2) the equipment environmental qualification is presented herein.

3.2 METHODOLOGY

The Licensee, Indiana and Michigan Electric Company, provided a response to the SER and additional qualification information in its submittals [12, 14, 24, 25, 54] to the NRC for the D. C. Cook Nuclear Power Plant Unit 1.

The following bases provided by the NRC were used to determine the relative completeness of the Licensee's submittals:

- Determine whether the Licensee provided specific responses to the SER concerns.
- Determine whether the Licensee proposed corrective actions and a schedule for completion of the actions.
- Determine whether the Licensee addressed the NRC's concern for margin with respect to the containment environmental conditions.
- Determine whether the Licensee revised the environmental parameters.
- Determine whether the Licensee's System Component Evaluation Work Sheets (SCEWS) were updated to correct deficiencies and add supplemental information.
- Determine whether the Licensee provided justifications for interim operation for all unqualified equipment.
- Determine whether the Licensee addressed aging and incorporated the results into the equipment maintenance program.

The extensive list of safety-related electrical equipment* in various locations of the plant identified by the Licensee was analyzed, and all identical equipment located within plant areas that are exposed to the same environmental service conditions was grouped together and designated an

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

"equipment item." 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 equipment in a plant area exposed to the same environmental service conditions (e.g., Flow Transmitter, Fischer & Porter, Model 10B2496, located within containment). This analysis resulted in a reduced listing of equipment (equipment items) that formed the basis for the review.

Appendix A contains the environmental service conditions for each location. Appendix B contains the tabulation of the equipment items, locations, function, plant identification numbers, required operating time, and applicable qualification documentation references. Appendix C lists the plant systems identified by the Licensee and the NRC as being essential to safety.

Each item in the list of safety-related electrical equipment items was reviewed in relation to:

- the Licensee's response to the SER concerns
- technical information received from the Licensee as a result of requests for additional information (Appendix E)
- technical data derived from the Licensee's submittal
- NRC DOR Guidelines or NUREG-0588 Revision 1 criteria
- the Licensee's definition of harsh service environments (Appendix A)
- documentation cited by the Licensee as evidence of qualification
- applicable and available qualification documentation associated with the overall equipment environmental qualification program
- the Licensee's analysis and/or justification of qualification
- Licensee-proposed corrective action for qualification deficiencies
- the Licensee's equipment/part replacement schedules
- the Licensee's technical arguments concerning the adequacy of equipment, based on system operational considerations
- the Licensee's rationale concerning exemption of equipment from qualification.

Topics not within the scope of the evaluation are:

- o completeness of the Licensee's listing of safety-related equipment
- o acceptability of Licensee-provided environmental service conditions.

The NRC requested an evaluation of the environmental qualification of safety-related electrical equipment located in harsh environments required for TMI Lessons Learned Implementation. The objective is to evaluate qualification documentation of equipment within the scope of IE Bulletin 79-01B, Supplement 3 (item 2), in accordance with criteria established by the NRC (see Section 2 of this report) in a manner identical to the evaluation of all other safety-related electrical equipment. The scope of this review is limited to TMI Action Plan equipment associated with those sections of NUREG-0737 which have an equipment installation implementation date of January 1, 1982 (sections are identified below). Where applicable, a review was to be performed on installed equipment with implementation dates after January 1, 1981 if adequately identified by the licensee.

II.B.3 (ALL/1-1-81) Post-Accident Sampling Capability of Reactor Coolant and Containment

II.D.3 (ALL/1-1-81) Direct Indication of Relief and Safety Valve Position

II.E.1.2 (PWR/1-1-81) Auxiliary Feedwater System Automatic Initiation and Flow Indication

II.E.3.1 (PWR/1-1-81) Emergency Power Supply for Pressurizer Heaters (Safety-Grade Interfaces)

II.E.4.1 (ALL/7-1/81) Dedicated Hydrogen Penetrations

II.E.4.2 (ALL/1-1-81) Containment Isolation Dependability

II.F.2 (PWR/1-1-81) Instrumentation for Detection of Inadequate Core Cooling

II.G.1 (PWR/1-1-81) Emergency Power for Pressurizer Equipment (Safety-Grade Interfaces)

II.K.2.10 (PWR/B&W/7-1-81) Safety-Grade Anticipatory Reactor Trip

II.K.3.9 (PWR/W/1-1-81) PID Controller Modification (If Hardware Change Involved)

II.K.3.12 (PWR/W/1-1-81) Anticipatory Reactor Trip upon Turbine Trip

II.K.3.13 (PWR/GE/7-1-81) Separation of HPCI and RCIC Initiation Signals

II.K.3.15 (BWR/GE/7-1-81) Prevention of Spurious Isolation of HPCI and RCIC Systems

II.K.3.19 (BWR/GE/7-1-81) Interlock on Recirculation Pump Loop

II.K.3.21 (BWR/GE/7-1-18) Restart of Core Spray and LPCI Systems (If Hardware Changed Out)

II.K.3.27 (BWR/GE/7-1-81) Provide Common Reference Level for Vessel Level Instrumentation (If Hardware Changed Out)

Licensees whose plants were included within the NRC Systematic Evaluation Program received a Technical Evaluation Report (TER) in addition to the SER. The TER was based on a review of equipment environmental qualification documentation associated with the Licensee's EEQ submittals. The qualification deficiencies identified in the SER were derived from the TER. Plants included within this program were the Palisades, Oyster Creek, Ginna, Haddam Neck, Yankee Rowe, LaCrosse, and Big Rock Point plants and Zion Station Units 1 and 2, Indian Point Units 2 and 3, Millstone Unit 1, Dresden Unit 2, and San Onofre Unit 1. For these plants, the evaluation presented herein is based on (1) the result of the initial TER, (2) the Licensee's response to the NRC SER and the TER, and (3) the Licensee's updated EEQ submittal(s).

TERs were also developed for the following plants: Nine Mile Point Unit 1, Millstone Unit 2, Salem Unit 1, Browns Ferry Units 1, 2, and 3, Brunswick Units 1 and 2, Hatch Units 1 and 2, Dresden Unit 3, and Quad Cities Units 1 and 2. The objective of those TERs was to review the Licensee's submittals to determine if safety-related electrical equipment was reviewed for environmental qualification by the Licensee in accordance with the DOR Guidelines and NUREG-0588 as required by IE Bulletin 79-01B. For these 13 plants and all other plants, excluding the 14 plants associated with the Systematic Evaluation Program, the evaluation presented herein is based solely on (1) the Licensee's response to the NRC SER and (2) the Licensee's revised EEQ submittal(s).

This technical evaluation was conducted to identify (1) whether the Licensee provided an adequate response to the SER concerns (and TER concerns,

where applicable), (2) major deficiencies within the equipment qualification program, and (3) whether the Licensee proposed adequate corrective actions to resolve qualification deficiencies and provided a schedule for completion of the corrective actions. The TER was written primarily to address deviations from the NRC criteria and requirements. Technical data or test results that satisfy the qualification criteria are not discussed herein.

The evaluation presented in Section 4 of this report includes completed equipment environmental qualification review checksheets (partially handwritten) which compile both the technical information necessary to conduct the review and the results of the evaluation. Parameters listed on these checksheets were derived from the appropriate NRC screening criteria. The evaluation of each equipment item includes several checksheet pages. Only those checksheet pages necessary to complete the evaluation for each equipment item are included in this report. A complete listing of the checksheet pages is shown on the bottom of Checksheet 1a, reproduced here as Figure 3-1.

The checksheets contain the following information:

- Equipment item information (see Figure 3-1), for example:

  Solenoid Valve Located in Turbine Building (Area #7)
  Automatic Switch Co. (ASCO) Model LB8300B61U
  Actuates Feedwater Control Valves (V-4269, V-4270)
  Licensee Reference 839
  Required Operating Time: Short term (SI signal)
  TER Checksheet No. 1
  Reference 59, Section 4.5.2.6
  Licensee Submittal: Page 9 [62]; Table 3, Page 1 [1]; SCEW 1

- Qualification deficiencies identified in the SER (see Figure 3-1)
- Licensee's response to the SER
- Licensee's statements and rationale for qualification
- Licensee's corrective action and replacement schedule
- Evaluation of qualification including identification of all deficiencies
- Evaluation of system considerations presented by the Licensee as a rationale for excluding equipment from qualification.

The results of the evaluation are summarized on Checksheet 2 (Equipment Environmental Qualification Summary Form) for each equipment item. Checksheet

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. ___

Equipment Item No. 1
Solenoid Valves Located in Turbine Building (Area #7)
Automatic Switch Co. (ASCO) Model LB8300B61U
Actuates Feedwater Control Valves (V-4269, V-4270)
Licensee Reference 1617
Required Operating Time: Short term (SI signal)
TER Checksheet No. 1
Reference 59, Section 4.5.2.6
Licensee Submittal: Page 9 [62]; Table 3, Page 1 [1]; FRC SCEW 1

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, 3b, 3c, 3d
System Consideration Review	4a, 4b, 4c, 4d, 4e, 4f
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j
Installed TMI Lessons Learned Implementation Equipment Summary	6a, 6b
Maintenance and Replacement Schedule Summary	7a, 7b, 7c

Figure 3-1. Sample Checksheet Page 1a
"Equipment Item"

2 specifically identifies any qualification deficiencies determined by the evaluation and identifies the NRC qualification category to which the equipment item was assigned. A sample Checksheet 2 is presented in Figure 3-2.

All information was reviewed for conformance to the NRC criteria referenced in Section 2 of this report. As requested by the NRC, all applicable and available qualification documentation associated with the overall Equipment Environmental Qualification (EEQ) program was used by the reviewers, whether referenced by the Licensee or not.

Upon completion of the review for each equipment item, an overall evaluation of the component and a specific conclusion with respect to its qualification was developed. Based on the evaluation, each equipment item was assigned to one of the generic qualification categories provided by the NRC. The NRC category descriptions are presented in Section 3.3 of this report.

3.3 NRC QUALIFICATION CATEGORIES AND DEFINITIONS

- NRC Category I.a
  EQUIPMENT THAT SATISFIES ALL APPLICABLE REQUIREMENTS OF THE DOR GUIDELINES OR NUREG-0588, OR HAS ACCEPTABLE DEVIATIONS FROM THE DOR/NUREG CRITERIA

  This category includes equipment items which are fully acceptable on the basis that all applicable criteria defined in the DOR Guidelines or NUREG-0588 are (1) satisfied and the equipment has been found to be qualified or (2) sufficient information has been presented to determine that deviations from the criteria are acceptable or insignificant.

- NRC Category I.b
  EQUIPMENT FOR WHICH DEVIATIONS FROM THE DOR GUIDELINES OR NUREG-0588 ARE JUDGED CONDITIONALLY ACCEPTABLE PROVIDED THAT SPECIFIC MODIFICATIONS ARE MADE

  This category includes equipment items that do not satisfy one or more of the applicable criteria defined in the DOR Guidelines or NUREG-0588; however, the Licensee has stated that specific modifications will be made on or before a designated date. This equipment is considered by NRC to be conditionally acceptable provided that the specific modifications are made by the Licensee. When the modifications are completed as proposed, the Licensee states that the equipment will satisfy all applicable NRC requirements. Examples of specific modifications are (1) replacement of unqualified equipment with qualified equipment, (2) equipment hardware

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. ___

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	___
Adequate Similarity Between Equipment and Test Specimen Established	___
Aging Degradation Evaluated Adequately	___
Qualified Life or Replacement Schedule Established (If Required)	___
Program Established to Identify Aging Degradation	___
Criteria Regarding Aging Simulation Satisfied (If Required)	___
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	___
o Peak Pressure Adequate	___
o Duration Adequate	___
o Required Profile Enveloped Adequately	___
o Steam Exposure (If Required) Adequate	___
Criteria Regarding Spray Satisfied	___
Criteria Regarding Submergence Satisfied	___
Criteria Regarding Radiation Satisfied	___
Criteria Regarding Test Sequence Satisfied	___
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	___
Criteria Regarding Functional Testing Satisfied	___
Criteria Regarding Instrument Accuracy Satisfied	___
Test Duration Margin (1 hour + Function Time) Satisfied	___
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	___

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	___
I.b	Equipment Qualification Pending Modification	___
II.a	Equipment Qualification Not Established	___
II.b	Equipment Not Qualified	___
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	___
III.a	Equipment Exempt From Qualification	___
III.b	Equipment Not in the Scope of the Qualification Review	___
IV	Documentation Not Made Available	___

Figure 3-2. Sample Checksheet Page 2

"Equipment Environmental Qualification Summary Form"

modification, (3) equipment relocation above submergence level, (4) relocation or shielding of equipment from radiation source, (5) verification of qualification by additional testing, (6) equipment relocation to a mild environment, and (7) qualification testing of equipment in progress.

- NRC Category II.a
  EQUIPMENT FOR WHICH QUALIFICATION DOCUMENTATION IS INSUFFICIENT TO ESTABLISH THAT THE EQUIPMENT IS OR IS NOT QUALIFIED IN ACCORDANCE WITH THE DOR GUIDELINES OR NUREG-0588

  The qualification of equipment items in this category, in accordance with the requirements of the DOR Guidelines or NUREG-0588, is significantly deficient or inconclusive based upon review of (1) the documentation provided by the Licensee or (2) applicable and available qualification documentation associated with the overall equipment environmental qualification program. The qualification documentation indicates significant deficiencies, which can be categorized as follows: (1) appropriate documentation reflecting qualification has not been cited and made available for review by the Licensee and there is no knowledge of applicable documentation; (2) the Licensee is awaiting qualification from the equipment vendor; or (3) the qualification documentation indicates significant deficiencies; however, where testing was conducted, no reported failures or severe anomalies were observed which would unquestionably affect the ability of the equipment to perform its design basis safety function(s).

- NRC Category II.b
  EQUIPMENT THAT IS UNQUALIFIED

  This category includes equipment items whose qualification documentation has been judged to be seriously deficient based upon review of (1) the documentation provided by the Licensee, or (2) applicable and available qualification documentation associated with the overall equipment environmental qualification program. The qualification documentation indicates serious deficiencies reported during testing; for example, severe anomalies or failure of the test specimen, which could affect the ability of the equipment to perform its safety function. NRC has requested immediate written notification when an equipment item is placed in this category during the course of the review.

- NRC Category II.c
  EQUIPMENT THAT SATISFIES ALL APPLICABLE REQUIREMENTS OF THE DOR GUIDELINES OR NUREG-0588 WITH THE EXCEPTION OF QUALIFIED LIFE

  This category includes equipment items that are acceptable on the basis that all applicable criteria defined in the DOR Guidelines or NUREG-0588 are satisfied with the exception of the qualified life criterion. The Licensee (1) has not evaluated qualified life or replacement schedule, (2) has not adequately evaluated qualified life or replacement schedule, or (3) has not adequately intepreted qualified life in terms of calendar time. [Note: The component replacement schedule discussed in Section 7.0 of the

DOR Guidelines is, in effect, a qualified life. It is not essential to use the term "qualified life," but the replacement schedule must be justified.]

o NRC Category III.a
EQUIPMENT THAT IS EXEMPT FROM QUALIFICATION

This category includes equipment items that are 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 equipment list 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 and satisfies the single failure criterion. In addition, any failure of the exempt equipment must not mislead the operator or degrade the ability of qualified equipment to perform its required safety-related function.

o NRC Category III.b
EQUIPMENT NOT IN THE SCOPE OF THE QUALIFICATION REVIEW

This category includes equipment items addressed by the Licensee in the equipment environmental qualification submittals which are (1) required to achieve and maintain the plant in a cold shutdown condition or (2) located in a mild environment. Supplement 2 of IE Bulletin 79-01B 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 high energy line break (HELB) or to nuclear radiation emanating from circulation of fluids containing radioactive substances. Supplement 3 of IE Bulletin 79-01B permits deferment of the review of environmental qualification for all equipment required to achieve and maintain the plant in a cold shutdown condition. Supplements 2 and 3 of IE Bulletin 79-01B originally permitted deferment until after February 1, 1981 of the qualification review of equipment located in a mild environment or required to achieve and maintain the plant in a cold shutdown condition. Since the issuance of Supplements 2 and 3, the NRC has determined that the review of environmental qualification for this equipment is not within the scope of this report.

o NRC Category IV
EQUIPMENT FOR WHICH QUALIFICATION DOCUMENTATION HAS NOT BEEN MADE AVAILABLE FOR REVIEW

This category includes equipment items for which qualification documentation in accordance with the requirements of the DOR Guidelines or NUREG-0588 has been cited by the Licensee as evidence of qualification; however, this documentation has not been made available for review. Therefore, a conclusion cannot be reached with respect to qualification of this equipment.

3.4 IMPLEMENTATION GUIDE FOR FULFILLING NRC CRITERIA

The NRC has requested that a detailed implementation guide for fulfilling NRC criteria be prepared as part of this assignment. The implementation guide will present a fully detailed discussion of the principal qualification criteria presented in the DOR Guidelines and NUREG-0588. The primary emphasis will be to clarify technical points, eliminate possible misconceptions, and clearly provide definitive guidance to enable licensees to understand and resolve, in an expeditious manner, qualification deficiencies identified as a result of this TER. The implementation guide (TER-C5257-532) has been prepared and issued to the NRC. The implementation guide is either appended to this TER or will be forwarded to the Licensee by the NRC under a separate letter. The Licensee is encouraged to review that document.

4. TECHNICAL EVALUATION

4.1 INTRODUCTION

The technical evaluation presented in this section represents the equipment environmental qualification (EEQ) assessment for each equipment item listed in Appendix B in accordance with the methodology presented in Section 3 of this report. The evaluations were conducted to identify any major deficiencies within the Licensee's equipment qualification program and to determine whether the Licensee (1) provided an adequate response to the SER concerns, (2) proposed adequate corrective actions to resolve qualification deficiencies, and (3) provided a schedule for completion of the corrective actions.

The evaluations are based on the available qualification documentation provided by the Licensee, complemented in several cases by other relevant technical information. The major qualification deficiencies that have been identified and the results of the evaluation are shown in the Equipment Environmental Qualification Summary Forms (Tables 4-1, 4-2, 4-3, and 4-4) presented in Section 4.2.

Observations concerning the Licensee's qualification methodology presented in response to the NRC SER are presented in Section 4.3.

Technical evaluations of the environmental qualification of the equipment items are presented in Section 4.4.

4.2 SUMMARY OF THE EVALUATION

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

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

Table 4-2 summarizes the number of equipment items found to have a specific qualification deficiency.

Table 4-3 summarizes the number of equipment items for which the Licensee has proposed a specific corrective action to resolve a qualification deficiency.

Table 4-4 consists of Equipment Environmental Qualification Summary Forms for the equipment items, identifying (1) compliance with the qualification requirements defined in Section 2, (2) the resultant NRC qualification category, and (3) the Licensee-proposed corrective action.

TABLE 4-1

NUMBER OF EQUIPMENT ITEMS IN EACH QUALIFICATION CATEGORY

NRC CATEGORY	CATEGORY DESCRIPTION	NUMBER OF EQUIPMENT ITEMS
I.A	EQUIPMENT QUALIFIED [EQUIPMENT ITEM NO(S).: 58, 59]	2
I.B	EQUIPMENT QUALIFICATION PENDING MODIFICATION [EQUIPMENT ITEM NO(S).: 43, 57, 62, 84,101]	5
II.A	EQUIPMENT QUALIFICATION NOT ESTABLISHED [EQUIPMENT ITEM NO(S).: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 36, 37, 38, 39, 40, 44, 48, 51, 52, 54, 55, 56, 60, 61, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 78, 79, 81, 82, 83, 85, 86, 89, 90, 95, 96, 97, 98, 99, 100,102]	68
II.B	EQUIPMENT NOT QUALIFIED	0
II.C	EQUIPMENT SATISFIES ALL REQUIREMENTS EXCEPT QUALIFIED LIFE OR REPLACEMENT SCHEDULE JUSTIFIED [EQUIPMENT ITEM NO(S).: 26, 27, 28, 30, 31, 32, 34, 49, 53, 77, 87, 88, 92,103]	14
III.A	EQUIPMENT EXEMPT FROM QUALIFICATION [EQUIPMENT ITEM NO(S).: 33, 35, 45, 50]	4
III.B	EQUIPMENT NOT IN THE SCOPE OF THE REVIEW [EQUIPMENT ITEM NO(S).: 25, 29, 41, 42, 46, 47]	6
IV	DOCUMENTATION NOT MADE AVAILABLE [EQUIPMENT ITEM NO(S).: 80, 91, 93, 94]	4
	TOTAL	103

TABLE 4-2

QUALIFICATION DEFICIENCY SUMMARY

NRC REQUIREMENT	NUMBER OF DEFICIENT EQUIPMENT ITEMS
1. DOCUMENTED EVIDENCE OF QUALIFICATION ADEQUATE	32
[EQUIPMENT ITEM NO(S).: 10, 11, 12, 14, 18, 19, 20, 21, 22, 23, 24, 43, 50, 51, 57, 60, 61, 62, 63, 64, 65, 66, 67, 69, 71, 72, 73, 74, 75, 76, 78, 84]	
2. ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN ESTABLISHED	35
[EQUIPMENT ITEM NO(S).: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16, 17, 44, 55, 65, 68, 70, 79, 81, 82, 83, 85, 86, 89, 90, 95, 96, 97, 99,100,101,102]	
3. AGING DEGRADATION EVALUATED ADEQUATELY	65
[EQUIPMENT ITEM NO(S).: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 30, 31, 32, 34, 36, 37, 38, 39, 40, 44, 48, 49, 52, 53, 54, 56, 65, 68, 70, 77, 81, 82, 83, 85, 86, 87, 89, 90, 92, 95, 96, 97, 98, 99,100,101,102,103]	
4. QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED (IF REQUIRED)	65
[EQUIPMENT ITEM NO(S).: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 30, 31, 32, 34, 36, 37, 38, 39, 40, 44, 48, 49, 52, 53, 54, 56, 65, 68, 70, 81, 82, 83, 85, 86, 87, 88, 89, 90, 92, 95, 96, 97, 98, 99,100,101,102,103]	
5. PROGRAM ESTABLISHED TO IDENTIFY AGING DEGRADATION	7
[EQUIPMENT ITEM NO(S).: 10, 11, 12, 13, 14, 24, 77, 77]	
6. CRITERIA REGARDING AGING SIMULATION (IF REQUIRED)	14
[EQUIPMENT ITEM NO(S).: 15, 24, 49, 52, 53, 54, 65, 68, 70, 81, 82, 83, 98,103]	

Table 4-2 (Cont.)

QUALIFICATION DEFICIENCY SUMMARY

NRC REQUIREMENT	NUMBER OF DEFICIENT EQUIPMENT ITEMS
7. CRITERIA REGARDING TEMPERATURE/PRESSURE EXPOSURE:	
A. - PEAK TEMPERATURE ADEQUATE [EQUIPMENT ITEM NO(S).: 15, 24]	2
B. - PEAK PRESSURE ADEQUATE [EQUIPMENT ITEM NO(S).: 24]	1
C. - DURATION ADEQUATE [EQUIPMENT ITEM NO(S).: 15, 24]	2
D. - REQUIRED PROFILE ENVELOPED ADEQUATELY [EQUIPMENT ITEM NO(S).: 15, 24, 98]	3
E. - STEAM EXPOSURE (IF REQUIRED) ADEQUATE [EQUIPMENT ITEM NO(S).: 15, 48]	2
8. CRITERIA REGARDING SPRAY SATISFIED [EQUIPMENT ITEM NO(S).: 1, 5, 18, 19, 21, 23]	6
9. CRITERIA REGARDING SUBMERGENCE SATISFIED [EQUIPMENT ITEM NO(S).: 2, 3, 22, 38, 40, 56]	6
10. CRITERIA REGARDING RADIATION SATISFIED [EQUIPMENT ITEM NO(S).: 2, 6, 14, 24, 81]	5
11. CRITERIA REGARDING TEST SEQUENCE SATISFIED	0
12. CRITERIA REGARDING TEST FAILURES OR SEVERE ANOMALIES (IF ANY) SATISFIED [EQUIPMENT ITEM NO(S).: 52, 54]	2
13. CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED [EQUIPMENT ITEM NO(S).: 18, 19, 20, 21, 22, 23]	6
14. CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED [EQUIPMENT ITEM NO(S).: 18, 19, 20, 21, 22, 23, 36, 37, 38, 39, 40, 56]	12

Table 4-2 (Cont.)

QUALIFICATION DEFICIENCY SUMMARY

NRC REQUIREMENT	NUMBER OF DEFICIENT EQUIPMENT ITEMS
15. TEST DURATION MARGIN (1 HOUR + FUNCTION TIME) SATISFIED---	0
16. CRITERIA REGARDING MARGINS SATISFIED (NUREG-0588, CAT. 1)-	0

TABLE 4-3

LICENSEE CORRECTIVE ACTION SUMMARY

CORRECTIVE ACTION DESCRIPTION	NUMBER OF EQUIPMENT ITEMS
1. EQUIPMENT REPLACEMENT WITH QUALIFIED EQUIPMENT [EQUIPMENT ITEM NO(S).: 57, 62]	2
2. EQUIPMENT MODIFICATION	0
3. EQUIPMENT RELOCATION ABOVE SUBMERGENCE LEVEL	0
4. RELOCATE OR SHIELD EQUIPMENT FROM RADIATION SOURCE	0
5. VERIFY QUALIFICATION BY ADDITIONAL TESTING/ANALYSIS [EQUIPMENT ITEM NO(S).: 43]	1
6. EQUIPMENT RELOCATION TO A MILD ENVIRONMENT	0
7. QUALIFICATION TESTING OF EQUIPMENT IN PROGRESS	0
8. OTHER (FOR DETAILED DESCRIPTION SEE SPECIFIC EQUIPMENT ITEMS) [EQUIPMENT ITEM NO(S).: 84]	1
SCHEDULE FOR COMPLETION OF CORRECTIVE ACTION(S) HAS BEEN PROVIDED (SEE SPECIFIC EQUIPMENT ITEM FOR COMPLETION DATE) [EQUIPMENT ITEM NO(S).: 43]	1

Table 4-4

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

	FRC EQUIPMENT ITEM NUMBERS															
	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	
NRC REQUIREMENTS (DESIGNATION: X = DEFICIENCY)																
1. DOCUMENTED EVIDENCE OF QUALIFICATION ADEQUATE										X	X	X		X		
2. ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN ESTABLISHED	X	X	X	X	X	X	X	X	X	X	X	X	X			
3. AGING DEGRADATION EVALUATED ADEQUATELY	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4. QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED (IF REQUIRED)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5. PROGRAM ESTABLISHED TO IDENTIFY AGING DEGRADATION										X	X	X	X	X		
6. CRITERIA REGARDING AGING SIMULATION SATISFIED (IF REQUIRED)															X	
7. CRITERIA REGARDING TEMPERATURE/PRESSURE EXPOSURE:																
A. - PEAK TEMPERATURE ADEQUATE															X	
B. - PEAK PRESSURE ADEQUATE																
C. - DURATION ADEQUATE															X	
D. - REQUIRED PROFILE ENVELOPED ADEQUATELY															X	
E. - STEAM EXPOSURE (IF REQUIRED) ADEQUATE															X	
8. CRITERIA REGARDING SPRAY SATISFIED	X				X											
9. CRITERIA REGARDING SUBMERGENCE SATISFIED		X	X	X												
10. CRITERIA REGARDING RADIATION SATISFIED		X				X								X		
11. CRITERIA REGARDING TEST SEQUENCE SATISFIED																
12. CRITERIA REGARDING TEST FAILURES OR SEVERE ANOMALIES (IF ANY) SATISFIED																
13. CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED																
14. CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED																
15. TEST DURATION MARGIN (1 HOUR + FUNCTION TIME) SATISFIED																
16. CRITERIA REGARDING MARGINS SATISFIED (NUREG-0588, CAT. 1)																
NRC QUALIFICATION CATEGORY (DESIGNATION: X = CATEGORY)																
I.A EQUIPMENT QUALIFIED																
I.B EQUIPMENT QUALIFICATION PENDING MODIFICATION																
II.A EQUIPMENT QUALIFICATION NOT ESTABLISHED	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
II.B EQUIPMENT NOT QUALIFIED																
II.C EQUIPMENT SATISFIES ALL REQUIREMENTS EXCEPT QUALIFIED LIFE OR REPLACEMENT SCHEDULE JUSTIFIED																
III.A EQUIPMENT EXEMPT FROM QUALIFICATION																
III.B EQUIPMENT NOT IN THE SCOPE OF THE REVIEW																
IV DOCUMENTATION NOT MADE AVAILABLE																
CORRECTIVE ACTION SPECIFIED (DESIGNATION: X = ACTION SPECIFIED)																
1. EQUIPMENT REPLACEMENT WITH QUALIFIED EQUIPMENT																
2. EQUIPMENT MODIFICATION																
3. EQUIPMENT RELOCATION ABOVE THE SUBMERGENCE LEVEL																
4. RELOCATE OR SHIELD EQUIPMENT FROM RADIATION SOURCE																
5. VERIFY QUALIFICATION BY ADDITIONAL TESTING/ANALYSIS																
6. EQUIPMENT RELOCATION TO A MILD ENVIRONMENT																
7. QUALIFICATION TESTING OF EQUIPMENT IN PROGRESS																
8. OTHER (___SEE SPECIFIC EQUIPMENT ITEM IF CHECKED___)																
SCHEDULE FOR COMPLETION OF CORRECTIVE ACTION(S) HAS BEEN PROVIDED																

Table 4-4 (Cont.)

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

	FRC EQUIPMENT ITEM NUMBERS																	
	016	017	018	019	020	021	022	023	024	025	026	027	028	029	030	1		
NRC REQUIREMENTS (DESIGNATION: X = DEFICIENCY)																		
1. DOCUMENTED EVIDENCE OF QUALIFICATION ADEQUATE			X	X	X	X	X	X										
2. ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN ESTABLISHED	X	X																
3. AGING DEGRADATION EVALUATED ADEQUATELY	X	X	X	X	X	X	X	X	X	X			X	X	X		X	
4. QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED (IF REQUIRED)	X	X	X	X	X	X	X	X	X	X			X	X	X		X	
5. PROGRAM ESTABLISHED TO IDENTIFY AGING DEGRADATION									X									
6. CRITERIA REGARDING AGING SIMULATION SATISFIED (IF REQUIRED)									X									
7. CRITERIA REGARDING TEMPERATURE/PRESSURE EXPOSURE:																		
A. - PEAK TEMPERATURE ADEQUATE									X									
B. - PEAK PRESSURE ADEQUATE									X									
C. - DURATION ADEQUATE									X									
D. - REQUIRED PROFILE ENVELOPED ADEQUATELY									X									
E. - STEAM EXPOSURE (IF REQUIRED) ADEQUATE																		
8. CRITERIA REGARDING SPRAY SATISFIED			X	X		X		X										
9. CRITERIA REGARDING SUBMERGENCE SATISFIED							X											
10. CRITERIA REGARDING RADIATION SATISFIED									X									
11. CRITERIA REGARDING TEST SEQUENCE SATISFIED																		
12. CRITERIA REGARDING TEST FAILURES OR SEVERE ANOMALIES (IF ANY) SATISFIED																		
13. CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED			X	X	X	X	X	X										
14. CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED			X	X	X	X	X	X										
15. TEST DURATION MARGIN (1 HOUR + FUNCTION TIME) SATISFIED																		
16. CRITERIA REGARDING MARGINS SATISFIED (NUREG-0588, CAT. 1)																		
NRC QUALIFICATION CATEGORY (DESIGNATION: X = CATEGORY)																		
I.A EQUIPMENT QUALIFIED																		
I.B EQUIPMENT QUALIFICATION PENDING MODIFICATION																		
II.A EQUIPMENT QUALIFICATION NOT ESTABLISHED	X	X	X	X	X	X	X	X	X	X			X	X	X		X	
II.B EQUIPMENT NOT QUALIFIED																		
II.C EQUIPMENT SATISFIES ALL REQUIREMENTS EXCEPT QUALIFIED LIFE OR REPLACEMENT SCHEDULE JUSTIFIED											X	X	X	X			X	
III.A EQUIPMENT EXEMPT FROM QUALIFICATION																		
III.B EQUIPMENT NOT IN THE SCOPE OF THE REVIEW										X					X			
IV DOCUMENTATION NOT MADE AVAILABLE																		
CORRECTIVE ACTION SPECIFIED (DESIGNATION: X = ACTION SPECIFIED)																		
1. EQUIPMENT REPLACEMENT WITH QUALIFIED EQUIPMENT																		
2. EQUIPMENT MODIFICATION																		
3. EQUIPMENT RELOCATION ABOVE THE SUBMERGENCE LEVEL																		
4. RELOCATE OR SHIELD EQUIPMENT FROM RADIATION SOURCE																		
5. VERIFY QUALIFICATION BY ADDITIONAL TESTING/ANALYSIS																		
6. EQUIPMENT RELOCATION TO A MILD ENVIRONMENT																		
7. QUALIFICATION TESTING OF EQUIPMENT IN PROGRESS																		
8. OTHER (___SEE SPECIFIC EQUIPMENT ITEM IF CHECKED___)																		
SCHEDULE FOR COMPLETION OF CORRECTIVE ACTION(S) HAS BEEN PROVIDED																		

Table 4-4 (Cont.)

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS (DESIGNATION: X = DEFICIENCY)	FRC EQUIPMENT ITEM NUMBERS														
	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045
1. DOCUMENTED EVIDENCE OF QUALIFICATION ADEQUATE													X		
2. ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN ESTABLISHED														X	
3. AGING DEGRADATION EVALUATED ADEQUATELY	X	X		X		X	X	X	X	X				X	
4. QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED (IF REQUIRED)	X	X		X		X	X	X	X	X				X	
5. PROGRAM ESTABLISHED TO IDENTIFY AGING DEGRADATION															
6. CRITERIA REGARDING AGING SIMULATION SATISFIED (IF REQUIRED)															
7. CRITERIA REGARDING TEMPERATURE/PRESSURE EXPOSURE:															
A. - PEAK TEMPERATURE ADEQUATE															
B. - PEAK PRESSURE ADEQUATE															
C. - DURATION ADEQUATE															
D. - REQUIRED PROFILE ENVELOPED ADEQUATELY															
E. - STEAM EXPOSURE (IF REQUIRED) ADEQUATE															
8. CRITERIA REGARDING SPRAY SATISFIED															
9. CRITERIA REGARDING SUBMERGENCE SATISFIED								X		X					
10. CRITERIA REGARDING RADIATION SATISFIED															
11. CRITERIA REGARDING TEST SEQUENCE SATISFIED															
12. CRITERIA REGARDING TEST FAILURES OR SEVERE ANOMALIES (IF ANY) SATISFIED															
13. CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED															
14. CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED						X	X	X	X	X					
15. TEST DURATION MARGIN (1 HOUR + FUNCTION TIME) SATISFIED															
16. CRITERIA REGARDING MARGINS SATISFIED (NUREG-0588, CAT. 1)															
NRC QUALIFICATION CATEGORY (DESIGNATION: X = CATEGORY)															
I.A EQUIPMENT QUALIFIED															
I.B EQUIPMENT QUALIFICATION PENDING MODIFICATION													X		
II.A EQUIPMENT QUALIFICATION NOT ESTABLISHED						X	X	X	X	X				X	
II.B EQUIPMENT NOT QUALIFIED															
II.C EQUIPMENT SATISFIES ALL REQUIREMENTS EXCEPT QUALIFIED LIFE OR REPLACEMENT SCHEDULE JUSTIFIED	X	X		X											
III.A EQUIPMENT EXEMPT FROM QUALIFICATION			X		X										X
III.B EQUIPMENT NOT IN THE SCOPE OF THE REVIEW											X	X			
IV DOCUMENTATION NOT MADE AVAILABLE															
CORRECTIVE ACTION SPECIFIED (DESIGNATION: X = ACTION SPECIFIED)															
1. EQUIPMENT REPLACEMENT WITH QUALIFIED EQUIPMENT															
2. EQUIPMENT MODIFICATION															
3. EQUIPMENT RELOCATION ABOVE THE SUBMERGENCE LEVEL															
4. RELOCATE OR SHIELD EQUIPMENT FROM RADIATION SOURCE															
5. VERIFY QUALIFICATION BY ADDITIONAL TESTING/ANALYSIS													X		
6. EQUIPMENT RELOCATION TO A MILD ENVIRONMENT															
7. QUALIFICATION TESTING OF EQUIPMENT IN PROGRESS															
8. OTHER (___SEE SPECIFIC EQUIPMENT ITEM IF CHECKED___)															
SCHEDULE FOR COMPLETION OF CORRECTIVE ACTION(S) HAS BEEN PROVIDED													X		

Table 4-4 (Cont.)

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

	FRC EQUIPMENT ITEM NUMBERS																
	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060		
NRC REQUIREMENTS (DESIGNATION: X = DEFICIENCY)																	
1. DOCUMENTED EVIDENCE OF QUALIFICATION ADEQUATE					X	X						X			X		
2. ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN ESTABLISHED										X							
3. AGING DEGRADATION EVALUATED ADEQUATELY			X	X			X	X	X		X						
4. QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED (IF REQUIRED)			X	X			X	X	X		X						
5. PROGRAM ESTABLISHED TO IDENTIFY AGING DEGRADATION																	
6. CRITERIA REGARDING AGING SIMULATION SATISFIED (IF REQUIRED)				X			X	X	X								
7. CRITERIA REGARDING TEMPERATURE/PRESSURE EXPOSURE:																	
A. - PEAK TEMPERATURE ADEQUATE																	
B. - PEAK PRESSURE ADEQUATE																	
C. - DURATION ADEQUATE																	
D. - REQUIRED PROFILE ENVELOPED ADEQUATELY																	
E. - STEAM EXPOSURE (IF REQUIRED) ADEQUATE			X														
8. CRITERIA REGARDING SPRAY SATISFIED																	
9. CRITERIA REGARDING SUBMERGENCE SATISFIED											X						
10. CRITERIA REGARDING RADIATION SATISFIED																	
11. CRITERIA REGARDING TEST SEQUENCE SATISFIED																	
12. CRITERIA REGARDING TEST FAILURES OR SEVERE ANOMALIES (IF ANY) SATISFIED							X		X								
13. CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED																	
14. CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED											X						
15. TEST DURATION MARGIN (1 HOUR + FUNCTION TIME) SATISFIED																	
16. CRITERIA REGARDING MARGINS SATISFIED (NUREG-0588, CAT. 1)																	
NRC QUALIFICATION CATEGORY (DESIGNATION: X = CATEGORY)																	
I.A EQUIPMENT QUALIFIED													X	X			
I.B EQUIPMENT QUALIFICATION PENDING MODIFICATION												X					
II.A EQUIPMENT QUALIFICATION NOT ESTABLISHED			X			X	X		X	X	X				X		
II.B EQUIPMENT NOT QUALIFIED																	
II.C EQUIPMENT SATISFIES ALL REQUIREMENTS EXCEPT QUALIFIED LIFE OR REPLACEMENT SCHEDULE JUSTIFIED				X				X									
III.A EQUIPMENT EXEMPT FROM QUALIFICATION					X												
III.B EQUIPMENT NOT IN THE SCOPE OF THE REVIEW	X	X															
IV DOCUMENTATION NOT MADE AVAILABLE																	
CORRECTIVE ACTION SPECIFIED (DESIGNATION: X = ACTION SPECIFIED)																	
1. EQUIPMENT REPLACEMENT WITH QUALIFIED EQUIPMENT												X					
2. EQUIPMENT MODIFICATION																	
3. EQUIPMENT RELOCATION ABOVE THE SUBMERGENCE LEVEL																	
4. RELOCATE OR SHIELD EQUIPMENT FROM RADIATION SOURCE																	
5. VERIFY QUALIFICATION BY ADDITIONAL TESTING/ANALYSIS																	
6. EQUIPMENT RELOCATION TO A MILD ENVIRONMENT																	
7. QUALIFICATION TESTING OF EQUIPMENT IN PROGRESS																	
8. OTHER (___SEE SPECIFIC EQUIPMENT ITEM IF CHECKED___)																	
SCHEDULE FOR COMPLETION OF CORRECTIVE ACTION(S) HAS BEEN PROVIDED																	

Table 4-4 (Cont.)

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

	FRC EQUIPMENT ITEM NUMBERS														
	061	062	063	064	065	066	067	068	069	070	071	072	073	074	075
NRC REQUIREMENTS (DESIGNATION: X = DEFICIENCY)															
1. DOCUMENTED EVIDENCE OF QUALIFICATION ADEQUATE	X	X	X	X	X	X	X		X		X	X	X	X	X
2. ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN ESTABLISHED					X			X		X					
3. AGING DEGRADATION EVALUATED ADEQUATELY					X			X		X					
4. QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED (IF REQUIRED)					X			X		X					
5. PROGRAM ESTABLISHED TO IDENTIFY AGING DEGRADATION															
6. CRITERIA REGARDING AGING SIMULATION SATISFIED (IF REQUIRED)					X			X		X					
7. CRITERIA REGARDING TEMPERATURE/PRESSURE EXPOSURE:															
A. - PEAK TEMPERATURE ADEQUATE															
B. - PEAK PRESSURE ADEQUATE															
C. - DURATION ADEQUATE															
D. - REQUIRED PROFILE ENVELOPED ADEQUATELY															
E. - STEAM EXPOSURE (IF REQUIRED) ADEQUATE															
8. CRITERIA REGARDING SPRAY SATISFIED															
9. CRITERIA REGARDING SUBMERGENCE SATISFIED															
10. CRITERIA REGARDING RADIATION SATISFIED															
11. CRITERIA REGARDING TEST SEQUENCE SATISFIED															
12. CRITERIA REGARDING TEST FAILURES OR SEVERE ANOMALIES (IF ANY) SATISFIED															
13. CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED															
14. CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED															
15. TEST DURATION MARGIN (1 HOUR + FUNCTION TIME) SATISFIED															
16. CRITERIA REGARDING MARGINS SATISFIED (NUREG-0588, CAT. 1)															
NRC QUALIFICATION CATEGORY (DESIGNATION: X = CATEGORY)															
I.A EQUIPMENT QUALIFIED															
I.B EQUIPMENT QUALIFICATION PENDING MODIFICATION		X													
II.A EQUIPMENT QUALIFICATION NOT ESTABLISHED	X		X	X	X	X	X	X	X	X	X	X	X	X	X
II.B EQUIPMENT NOT QUALIFIED															
II.C EQUIPMENT SATISFIES ALL REQUIREMENTS EXCEPT QUALIFIED LIFE OR REPLACEMENT SCHEDULE JUSTIFIED															
III.A EQUIPMENT EXEMPT FROM QUALIFICATION															
III.B EQUIPMENT NOT IN THE SCOPE OF THE REVIEW															
IV DOCUMENTATION NOT MADE AVAILABLE															
CORRECTIVE ACTION SPECIFIED (DESIGNATION: X = ACTION SPECIFIED)															
1. EQUIPMENT REPLACEMENT WITH QUALIFIED EQUIPMENT		X													
2. EQUIPMENT MODIFICATION															
3. EQUIPMENT RELOCATION ABOVE THE SUBMERGENCE LEVEL															
4. RELOCATE OR SHIELD EQUIPMENT FROM RADIATION SOURCE															
5. VERIFY QUALIFICATION BY ADDITIONAL TESTING/ANALYSIS															
6. EQUIPMENT RELOCATION TO A MILD ENVIRONMENT															
7. QUALIFICATION TESTING OF EQUIPMENT IN PROGRESS															
8. OTHER (___SEE SPECIFIC EQUIPMENT ITEM IF CHECKED___)															
SCHEDULE FOR COMPLETION OF CORRECTIVE ACTION(S) HAS BEEN PROVIDED															

Table 4-4 (Cont.)

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

	FRC EQUIPMENT ITEM NUMBERS															
	076	077	078	079	080	081	082	083	084	085	086	087	088	089	090	
NRC REQUIREMENTS (DESIGNATION: X = DEFICIENCY)																
1. DOCUMENTED EVIDENCE OF QUALIFICATION ADEQUATE	X		X						X							
2. ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN ESTABLISHED				X		X	X	X		X	X			X	X	
3. AGING DEGRADATION EVALUATED ADEQUATELY		X				X	X	X		X	X	X		X	X	
4. QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED (IF REQUIRED)						X	X	X		X	X	X	X	X	X	
5. PROGRAM ESTABLISHED TO IDENTIFY AGING DEGRADATION		X														
6. CRITERIA REGARDING AGING SIMULATION SATISFIED (IF REQUIRED)						X	X	X								
7. CRITERIA REGARDING TEMPERATURE/PRESSURE EXPOSURE:																
A. - PEAK TEMPERATURE ADEQUATE																
B. - PEAK PRESSURE ADEQUATE																
C. - DURATION ADEQUATE																
D. - REQUIRED PROFILE ENVELOPED ADEQUATELY																
E. - STEAM EXPOSURE (IF REQUIRED) ADEQUATE																
8. CRITERIA REGARDING SPRAY SATISFIED																
9. CRITERIA REGARDING SUBMERGENCE SATISFIED																
10. CRITERIA REGARDING RADIATION SATISFIED						X										
11. CRITERIA REGARDING TEST SEQUENCE SATISFIED																
12. CRITERIA REGARDING TEST FAILURES OR SEVERE ANOMALIES (IF ANY) SATISFIED																
13. CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED																
14. CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED																
15. TEST DURATION MARGIN (1 HOUR + FUNCTION TIME) SATISFIED																
16. CRITERIA REGARDING MARGINS SATISFIED (NUREG-0588, CAT. 1)																
NRC QUALIFICATION CATEGORY (DESIGNATION: X = CATEGORY)																
I.A EQUIPMENT QUALIFIED																
I.B EQUIPMENT QUALIFICATION PENDING MODIFICATION									X							
II.A EQUIPMENT QUALIFICATION NOT ESTABLISHED	X		X	X		X	X	X		X	X			X	X	
II.B EQUIPMENT NOT QUALIFIED																
II.C EQUIPMENT SATISFIES ALL REQUIREMENTS EXCEPT QUALIFIED LIFE OR REPLACEMENT SCHEDULE JUSTIFIED		X										X	X			
III.A EQUIPMENT EXEMPT FROM QUALIFICATION																
III.B EQUIPMENT NOT IN THE SCOPE OF THE REVIEW																
IV DOCUMENTATION NOT MADE AVAILABLE					X											
CORRECTIVE ACTION SPECIFIED (DESIGNATION: X = ACTION SPECIFIED)																
1. EQUIPMENT REPLACEMENT WITH QUALIFIED EQUIPMENT																
2. EQUIPMENT MODIFICATION																
3. EQUIPMENT RELOCATION ABOVE THE SUBMERGENCE LEVEL																
4. RELOCATE OR SHIELD EQUIPMENT FROM RADIATION SOURCE																
5. VERIFY QUALIFICATION BY ADDITIONAL TESTING/ANALYSIS																
6. EQUIPMENT RELOCATION TO A MILD ENVIRONMENT																
7. QUALIFICATION TESTING OF EQUIPMENT IN PROGRESS																
8. OTHER (___SEE SPECIFIC EQUIPMENT ITEM IF CHECKED___)									X							
SCHEDULE FOR COMPLETION OF CORRECTIVE ACTION(S) HAS BEEN PROVIDED																

Table 4-4 (Cont.)

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

	FRC EQUIPMENT ITEM NUMBERS													
	091	092	093	094	095	096	097	098	099	100	101	102	103	
NRC REQUIREMENTS (DESIGNATION: X = DEFICIENCY)														
1. DOCUMENTED EVIDENCE OF QUALIFICATION ADEQUATE														
2. ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN ESTABLISHED					X	X	X		X	X	X	X		
3. AGING DEGRADATION EVALUATED ADEQUATELY		X			X	X	X	X	X	X	X	X	X	
4. QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED (IF REQUIRED)		X			X	X	X	X	X	X	X	X	X	
5. PROGRAM ESTABLISHED TO IDENTIFY AGING DEGRADATION														
6. CRITERIA REGARDING AGING SIMULATION SATISFIED (IF REQUIRED)								X					X	
7. CRITERIA REGARDING TEMPERATURE/PRESSURE EXPOSURE:														
A. - PEAK TEMPERATURE ADEQUATE														
B. - PEAK PRESSURE ADEQUATE														
C. - DURATION ADEQUATE														
D. - REQUIRED PROFILE ENVELOPED ADEQUATELY								X						
E. - STEAM EXPOSURE (IF REQUIRED) ADEQUATE														
8. CRITERIA REGARDING SPRAY SATISFIED														
9. CRITERIA REGARDING SUBMERGENCE SATISFIED														
10. CRITERIA REGARDING RADIATION SATISFIED														
11. CRITERIA REGARDING TEST SEQUENCE SATISFIED														
12. CRITERIA REGARDING TEST FAILURES OR SEVERE ANOMALIES (IF ANY) SATISFIED														
13. CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED														
14. CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED														
15. TEST DURATION MARGIN (1 HOUR + FUNCTION TIME) SATISFIED														
16. CRITERIA REGARDING MARGINS SATISFIED (NUREG-0588, CAT. 1)														
NRC QUALIFICATION CATEGORY (DESIGNATION: X = CATEGORY)														
I.A EQUIPMENT QUALIFIED														
I.B EQUIPMENT QUALIFICATION PENDING MODIFICATION											X			
II.A EQUIPMENT QUALIFICATION NOT ESTABLISHED					X	X	X	X	X	X		X		
II.B EQUIPMENT NOT QUALIFIED														
II.C EQUIPMENT SATISFIES ALL REQUIREMENTS EXCEPT QUALIFIED LIFE OR REPLACEMENT SCHEDULE JUSTIFIED		X											X	
III.A EQUIPMENT EXEMPT FROM QUALIFICATION														
III.B EQUIPMENT NOT IN THE SCOPE OF THE REVIEW														
IV DOCUMENTATION NOT MADE AVAILABLE	X		X	X										
CORRECTIVE ACTION SPECIFIED (DESIGNATION: X = ACTION SPECIFIED)														
1. EQUIPMENT REPLACEMENT WITH QUALIFIED EQUIPMENT														
2. EQUIPMENT MODIFICATION														
3. EQUIPMENT RELOCATION ABOVE THE SUBMERGENCE LEVEL														
4. RELOCATE OR SHIELD EQUIPMENT FROM RADIATION SOURCE														
5. VERIFY QUALIFICATION BY ADDITIONAL TESTING/ANALYSIS														
6. EQUIPMENT RELOCATION TO A MILD ENVIRONMENT														
7. QUALIFICATION TESTING OF EQUIPMENT IN PROGRESS														
8. OTHER (___SEE SPECIFIC EQUIPMENT ITEM IF CHECKED___)														
SCHEDULE FOR COMPLETION OF CORRECTIVE ACTION(S) HAS BEEN PROVIDED														

4.3 METHODOLOGY USED BY THE LICENSEE

This section includes observations concerning the Licensee's qualification methodology presented in the response [12] to the NRC SER.

4.3.1 Completeness of Safety-Related Equipment List

Section 3.1 of the NRC SER [10] identified the following concern:

"Display instrumentation which provides information for the reactor operators to aid them in the safe handling of the plant was not specifically identified by the licensee. A complete list of all display instrumentation mentioned in the LOCA and HELB emergency procedures must be provided. Equipment qualification information in the form of summary sheets should be provided for all components of the display instrumentation exposed to harsh environments. Instrumentation which is not considered to be safety related but which is mentioned in the emergency procedure should appear on the list. For these instruments, (1) justification should be provided for not considering the instrument safety related and (2) assurance should be provided that its subsequent failure will not mislead the operator or adversely affect the mitigation of the consequences of the accident. The environmental qualification of post-accident sampling and monitoring and radiation monitoring equipment is closely related to the review of the TMI Lessons-Learned modifications and will be performed in conjunction with that review.

The licensee identified 125 items of equipment in Unit 1 and 137 items in Unit 2 which were assessed by the staff. Because Units 1 and 2 are nearly identical (except that (1) main steam and narrow range RCS temperature transmitters are not part of Unit 2's engineered safeguards actuation and (2) Unit 1 does not have a dedicated post-accident monitoring system), the review can be performed as one. Differences in the units will be identified by a parenthetical expression, with the applicable unit number enclosed."

In response to this concern, the Licensee stated [12]:

"Section 3.1 of the SER required that '...a complete list of all display instrumentation mentioned in the LOCA and HELB emergency procedures...' be included in this submittal. The attached lists provide the requested information.

In a number of instances, the procedure(s) call for verification of functions automatically performed through the Reactor Protection System/ Engineered Safety Features Actuation System (RPS/ESFAS) logic without making reference to specific display instrumentation. It should be pointed out that the procedure(s) which call for verification of these automatic functions also call for manual actions to effect completion of the functions if there is any doubt that they are not performed

automatically. This instrumentation is summarized in Table 1. In performing these verifications, operators are instructed to consult multiple plant parameters.

The remaining display instrumentation referenced in the LOCA and (or) MSLB procedures is contained in Table 2 with three exceptions, as noted below:

(1) The MSLB procedure makes reference to trends in indicated wide-range steam generator water level. The wide-range level channels perform no safeguards or reactor trip function and serve as backup indication to the narrowrange level channels. As noted in our response to FSAR question 7.29, the narrow range level channels perform the same function as the wide-range devices which are excluded from the Table.

(2) Reference is made in the LOCA procedure to monitoring the Auxiliary Building Radiation Monitors to detect potential ECCS leakage during the recirculation mode. The monitors could be subjected to an adverse environment following a HELB outside containment but serve no safety related function for such an event.

(3) The LOCA procedure calls for verification that power is available to the pressurizer PORV block valves. Instrumentation is provided in 600V safety buses from which the block valves are powered. In addition, valve position indication lights effectively provide an indication of power availability."

It is concluded that the Licensee has provided a satisfactory response to the NRC concern. See Appendix C of this TER for further details.

4.3.2 Containment Spray System

Section 3.2 of the NRC SER [10] identified the following concern:

"On this basis, the staff has assumed, unless otherwise noted, that the analysis for developing the environmental envelopes for D. C. Cook Units 1 and 2, relative to the temperature, pressure, and the containment spray caustics, has been performed in accordance with the requirements stated above. The staff has reviewed the qualification documentation to ensure that the qualification specifications envelope the conditions established by the licensee. In addition, the staff assumed, and requires the licensee to verify, that the containment spray system is not subjected to a disabling single-component failure. Equipment submergence has also been addressed where the possibility exists that flooding of equipment may result from HELBs."

The Licensee did not provide a general response to this concern. Specific items are addressed on individual SCEW sheets.

4.3.3 Environmental Service Conditions

4.3.3.1 Temperature, Pressure, and Humidity Conditions Inside Containment

Section 3.3 of the NRC SER [10] identified the following concern:

"The licensee has provided the results of the accident analysis as follows:

		Max Temp (°F)	Max Press (psig)	Humidity (%)
LOCA	Lower Compartment	241	10	100
	Upper Compartment	130	8	100
MSLB	Lower Compartment	328	9.9	100
	Upper Compartment	158	8.1	100

The staff has concluded that the minimum temperature profile for equipment qualification purposes should include a margin to account for analytical uncertainties in the calculated temperature profiles for postulated accidents. The licensee's minimum temperature profile for qualification purposes is based on a conservative MSLB analytical model that results in temperatures higher than what might realistically be expected and is acceptable.

The staff has also concluded that, for the equipment which is qualified for the LOCA environment only, use of the steam saturation temperature corresponding to the total building pressure (partial pressure of steam plus partial pressure of air) versus time will provide an acceptable margin for a postulated LOCA environmental effect on equipment.

The licensee's specified temperature (service condition) of 241°F for the lower compartment during a LOCA satisfies the above requirement and is therefore acceptable. However, the specified temperature (service condition) of 130°F for the upper compartment does not satisfy the above requirement. A saturation temperature corresponding to pressure profile (234°F peak temperature at 8 psig) should be used instead. The staff also requires that, for equipment in the upper compartment which is used for the MSLB, the same service conditions as for LOCA conditions in the upper compartment should be used. The licensee should update his equipment summary tables to reflect this change. If there is any equipment that does not meet the staff position, the licensee must either provide justification that the equipment will perform its intended function under the specified conditions or propose corrective action."

The Licensee did not provide a general response to this concern. Specific items are addressed on individual SCEW sheets.

Since the Licensee is responsible for identifying the environments, the parameters identified by the Licensee have been used in the evaluations contained in this Technical Evaluation Report. These parameters are reproduced in Appendix A.

4.3.3.2 Temperature, Pressure, and Humidity Conditions Outside Containment

Section 3.4 of the NRC SER [10] stated:

"The licensee has provided the temperature, pressure, humidity and applicable environment associated with an HELB outside containment. The following area outside containment has been addressed:

(1) Auxiliary building

The staff has verified that the parameters identified by the licensee for the MSLB are acceptable."

4.3.3.3 Nuclear Radiation Dose (Inside and Outside Containment)

Section 3.8 of the NRC SER [10] identified the following concern:

"The licensee has provided values for the radiation levels postulated to exist following a LOCA. The application and methodology employed to determine these values were presented to the licensee as part of the NRC staff criteria contained in the DOR guidelines, in NUREG-0588, and in the guidance provided in IEB-79-01B, Supplement 2. Therefore, for this review, the staff has assumed that, unless otherwise noted, the values provided have been determined in accordance with the prescribed criteria. The staff review determined that the values to which equipment was qualified enveloped the requirements identified by the licensee.

The values required by the licensee inside containment are an integrated dose of 4×10^4 to 1.5×10^8 rads. The radiation service condition provided by the licensee is lower than provided in the DOR guidelines (4×10^7 rads) for gamma and beta radiation. The licensee is requested to either provide justification for using the lower service condition or use the service condition provided in the DOR guidelines for both gamma and beta radiation. If the former option is chosen, then the analysis--including the basis, assumptions, and a sammple calculation--should be provided.

A required value outside containment of 1.7×10^7 rads has been used by the licensee to specify limiting radiation levels within the auxiliary building. This value appears to consider the radiation levels influenced by the source term methodology associated with post-LOCA recirculation fluid lines and is therefore acceptable."

The Licensee did not provide a general response to this concern but did state the following [11]:

"Radiation

Inside Containment Integrated Dose - 1 Year

submerged: 60 MRads (core meltdown source)
not submerged: 150 MRads (core meltdown source)

(taken from Westinghouse letter
No. AEW-729; rather conservative values)"

Specific items are addressed on individual SCEW sheets.

4.3.4 Chemical Spray

Section 3.6 of the NRC SER [10] identified the following concern:

"The licensee's FSAR value for the chemical concentration is 2000 ppm boric acid solution; however, the exact volume percent and pH values were not provided by the licensee. Therefore, for the purpose of this review, the effects of chemical spray will be considered unresolved. The staff will review the licensee's response when it is submitted and discuss the resolution in a supplemental report."

In response to this concern, the Licensee stated [12]:

"As noted in Section 3/4 6.2.2 of the Cook Plant Technical Specification bases, limits are imposed on the volume and concentration of sodium hydroxide (NaOH) in the spray additive tank. This ensures a pH value between 8.5 and 11.0 for the solution recirculated within containment following a design basis LOCA. Parametric studies performed varying NaOH addition rate, ECCS flow rate, ice inventory, ice melt, and auxiliary feedwater flow (applicable only to the MSLB) have verified that these limits will be maintained following a HELB inside containment. A summary of this study is provided in Table 1. As noted in the Technical Specification bases, this pH band minimizes the evolution of iodine and the effects of chloride and caustic stress corrosion on mechanical systems and components. The pH used for environmental qualification testing of safety-related components inside containment falls within this pH range except for the components noted below.

The Limitorque motor operators for the following valves were subjected to an environment with a pH of 7.67 during qualification testing:

Unit No. 1	Unit No. 2
IMO-51, 52, 53, 54	IMO-51, 52, 53, 54
IMO-128	IMO-128
ICM-129, 111	ICM-129, 111
QCM-250	QCM-250
ICM-305, 306	ICM-305, 306

Valves IMO-51, 52, 53, and 54 are in the boron injection lines to each respective RCS loop. These valves are normally open during power operation and receive a signal to open following a Safety Injection. Cook safety analysis does not assume that any safety-related function is performed by these valves. Although the motor operators for these valves would reasonably be expected to remain operational when subjected to an environment with a pH between 8.5 and 11.0, their failure to do so in such an environment does not adversely impact any safety analysis conclusions.

IMO-128 and ICM-129 are the two in-series valves in the normal RHR letdown line and ICM-111 is in the normal RHR cooldown return line. These valves are not part of the ECCS and serve no safety function other than to maintain RCS isolation when pressure is above the RHR design pressure. These valves are normally closed during operation. Although the motor operators for these valves would reasonably be expected to remain operational when subjected to an environment with a pH between 8.5 and 11.0, their failure to do so in such an environment does not adversely impact any safety analysis conclusions.

Valve QCM-250 is the inboard containment isolation valve on the reactor coolant pump seal water return line. (Redundant isolation of the seal water return line is provided by valve QCM-350 in-series with QCM-250 and located outside containment.) Both of these valves are automatically closed as part of the Phase A Containment Isolation initiated by the RPS/ESFAS and neither is required to change position following a design basis accident. Although the motor operator for valve QCM-250 would reasonably be expected to remain operational when subjected to an adverse environment with a pH between 8.5 and 11.0, failure to do so does not adversely impact any safety analysis conclusions.

Valves ICM-305 and 306 are the sump recirculation line isolation valves. These valves are located outside containment and are not subjected to a post accident environment.

The cable between the terminal block and the solenoid on valve VCR-21 in Unit No. 1 (a containment isolation valve in the ice condenser glycol refrigeration system) was subjected to a pH between 8.0 and 8.5 during environmental qualification testing. Although the cable would reasonably be expected to remain operational when subjected to an adverse environment with a pH between 8.5 and 11.0, failure of the cable would result in deenergizing the solenoid and closure of VCR-21. In any case, VCR-21 would be automatically closed on a Phase A Containment Isolation signal and the hypothetical cable failure discussed above would be meaningless and would not adversely impact any safety analysis conclusions.

Note: The pH range 9.0 to 11.0 specified on the applicable qualification summary sheets should be 8.5 to 11.0 to correspond with Technical Specification bases B 3/4 6.2.2 (Unit 2 reference).

Table 1

Long-Term sump pH for various HELBs inside containment

HELB	Major Assumptions	Long Term Sump pH
Large LOCA	- 50% ice melt - RCS initially at 500 ppm boron - BIT, RWST, SA tank, and Accumulators injected	9.0
Large LOCA	- 100% ice melt - RCS initially at 500 ppm boron - BIT, RWST, SA tank, and Accumulators injected	8.8
Large LOCA	- 100% ice melt - RCS initially at 0 ppm boron - BIT, RWST, SA tank, and Accumulators injected	9.4
Large LOCA	- 100% ice melt - RCS initially at 1400 ppm boron - BIT, RWST, SA tank, and Accumulators injected	9.2
Small LOCA	- Time dependent ice melt - RCS initially at 0 ppm boron - BIT, RWST, SA tank injected	9.6
Small LOCA	- Time dependent ice melt - RCS initially at 1400 ppm boron - BIT, RWST, SA tank injected	9.4

Table 1 (Cont.)

HELB	Major Assumptions	Long Term Sump pH
MSLB	- 75% ice melted instantaneously and 25% over 60 min - spray flow rate 3,200 gpm and NaOH addition rate 20 gpm	9.48 (at 200 Min)
MSLB	- 75% ice melted instantaneously and 25% over 60 min - spray flow rate 6,400 gpm and NaOH addition rate 100 gpm	9.48 (at 60 Min)

Acronyms

HELB - high energy line break
RCS - reactor coolant system
BIT - boron injection tank
RWST - refueling water storage tank
SA - spray additive (NaOH tank)"

It is concluded that the Licensee has provided a satisfactory response to the NRC concern.

4.3.5 Submergence

Section 3.5 of the NRC SER [10] identified the following concern:

"The maximum submergence levels have been established and assessed by the licensee. Unless otherwise noted, the staff assumed for this review that the methodology employed by the licensee is in accordance with the appropriate criteria as established by Commission Memorandum and Order CLI-80-21.

The licensee's value for maximum submergence is at elevation 614 ft 0 in. Equipment below this level has been identified by the licensee, along with the proposed corrective action. The licensee identified 29 safety-related electrical components for Unit 1 and 35 for Unit 2 as having the potential for becoming submerged after a postulated event. Most of these components are electrical cables (power, control, instrument) inside floodup tubes. However, no evidence of environmental qualification of these floodup tubes was provided by the licensee. Furthermore, some electrical penetrations, transmitters, cable terminations, and valve motor operators have the potential of being submerged. The licensee stated that the components in question perform their function immediately after the accident, long before they are submerged, and are not required

to operate after a LOCA. The staff considers that a component can be exempt from submergence qualification if the licensee can provide an assessment of the failure modes associated with the submergence of the component. The licensee should also provide assurance that the subsequent failure of this component will not adversely affect any other safety functions or mislead an operator. Additionally, the licensee should discuss operating time, across the spectrum of events, in relation to the time of submergence. If the results of the licensee's assessment are acceptable, then this component may be exempt from the submergence parameter of qualification.

It is not clear from the information submitted that submergence of safety-related electrical equipment outside of containment was addressed. The licensee should address this area more specifically in the 90-day response and upgrade the CES as appropriate."

In response to this concern, the Licensee stated [12]:

"We have determined that the reference made to the flood-up tubes in the Cook SER can be ascribed to the fact that the NRC reviewer did not have enough information on the function of a flood-up tube. In order to enable the NRC to make a more appropriate evaluation, we are providing a generic description of the flood-up tubes and their functions.

The function of the electrical penetration flood-up tubing is to provide additional protection to the Kapton insulated conductors of selected instrumentation, control and power circuits. This protection is afforded by providing a barrier around the conductors which prevents mechanical damage and immersion of the conductors in buffered boric acid solution following a postulated LOCA.

The flood-up tubing installed in Cook Units 1 and 2 was qualified by analysis performed by EDS Nuclear, Inc. Results of the work were documented in a report dated January 25, 1980, Report No. 02-0120-1022, Rev. 1. It was concluded in the report that the mounting attachments of the flood-up tubes were found to be adequate to support the tubing under both the OBE and DBE conditions.

The electrical flood-up tubing is made of corrugated type 321 stainless steel supplied by Flexonics Division of UOP, Inc. and is identified as Type 400 M, 1" nominal inside diameter and medium wall thickness. The recommended working pressures for the tubing are:

43 psi @ 70°F, 41.7 psi @ 150°F, 40.4 psi @ 200°F.

The maximum pressure differential the flood-up tube would experience during containment flooding, subsequent to a design basis event is estimated to be about 8 psi. This pressure is a result of the static pressure head from the highest flood-up elevation (elev. 614 feet) to the lowest penetration (elev. 596 feet). On the basis of our evaluation of

the performance of flood-up tubes, we believe that they will maintain their structural integrity and serve their intended function subsequent to a LOCA or a Steam Line Break Accident."

It is concluded that the Licensee has provided a satisfactory response to the NRC concern.

4.3.6 Aging and Qualified Life

Section 3.7 of the NRC SER [10] identified the following concern:

"The DOR Guidelines, section 7, does not require a qualified life to be established for all safety related electrical equipment, however the following actions are required:

1. Detailed comparison of existing equipment to the materials identified in Appendix C of the DOR guidelines. The first supplement to IEB-79-01B requires the licensees to utilize the table and identify any additional materials as a result of their effort.

2. Establish an ongoing program to review surveillance and maintenance records to identify potential age related degradations.

3. Establish component maintenance and replacement schedules which include considerations of aging characteristics of the installed components.

The licensee identified a number of equipment items for which a specific qualified life was established (for examples, 5 years, 15 years, or 40 years). In its assessment of these submittals, the staff did not review the adequacy of the methodology nor the basis used to arrive at these values; the staff has assumed that the established values are based on state-of-the-art technology and are acceptable.

For this review, however, the staff requires that the licensee submit supplemental information to verify and identify the degree of conformance to the above requirements. The response should include all the equipment identified as required to maintain functional operability in harsh environments.

The licensee indicated that this phase of the response is outstanding and that the review is in progress. The staff will review the licensee's response when it is submitted and discuss its evaluation in a supplemental report."

In response to this concern, the Licensee stated [12]:

"Aging information has not been included in the summary sheets. We are currently pursuing the development of an aging proram as per the recently provided guidance of the NRC as contained in our SER and discussed during the Washington meeting."

The Licensee has responded to the NRC concern; however, it cannot be determined whether the concern has been resolved until the actual program details are evaluated.

4.4 EQUIPMENT ENVIRONMENTAL QUALIFICATION EVALUATION

The evaluation presented in this section of the report includes, for each equipment item, completed equipment environmental qualification review checksheets (partially handwritten) which present both the technical information necessary to conduct the review and the results of the evaluation.

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! EQUIPMENT ENVIRONMENTAL QUALIFICATION !
!    EQUIPMENT ITEM CHECKSHEET INDEX    !
!              D.C. COOK 1              !
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FRC ITEM NO.	COMPONENT	MANUFACTURER	MODEL NUMBER	LOCATION
1	MOTORIZED VALVE ACTUATOR	LIMITORQUE	SMB000	CONTAINMENT
2	MOTORIZED VALVE ACTUATOR	LIMITORQUE	SMB00	CONTAINMENT
3	MOTORIZED VALVE ACTUATOR	LIMITORQUE	SMB; SIZES 1, 00, 2	CONTAINMENT
4	MOTORIZED VALVE ACTUATOR	LIMITORQUE	SMB1	CONTAINMENT
5	MOTORIZED VALVE ACTUATOR	LIMITORQUE	SMB00	CONTAINMENT
6	MOTORIZED VALVE ACTUATOR	LIMITORQUE	SMB2	CONTAINMENT EXTENSION
7	MOTORIZED VALVE ACTUATOR	LIMITORQUE	NOT STATED	OUTSIDE CONTAINMENT
8	MOTORIZED VALVE ACTUATOR	LIMITORQUE	NOT STATED	OUTSIDE CONTAINMENT
9	MOTORIZED VALVE ACTUATOR	LIMITORQUE	NOT STATED	OUTSIDE CONTAINMENT
10	ELECTRIC MOTOR	WESTINGHOUSE	5009P24	OUTSIDE CONTAINMENT
11	ELECTRIC MOTOR	WESTINGHOUSE	5009H	OUTSIDE CONTAINMENT
12	ELECTRIC MOTOR	WESTINGHOUSE	5808 Z	OUTSIDE CONTAINMENT
13	ELECTRIC MOTOR	WESTINGHOUSE	TRDP	CONTAINMENT
14	ELECTRIC MOTOR	RELIANCE ELECTRIC	FRAME # 5810P	OUTSIDE CONTAINMENT
15	HYDROGEN RECOMBINER	WESTINGHOUSE	NOT STATED	CONTAINMENT
16	ELECTRICAL PENETRATION	CONAX	EA2 THRU EP14	CONTAINMENT
17	ELECTRICAL PENETRATION	CONAX	EP1	CONTAINMENT
18	RTD	SOSTMAN	11901B	CONTAINMENT
19	RTD	ROSEMOUNT	176KS	CONTAINMENT
20	RTD	SOSTMAN	11834B	CONTAINMENT
21	RTD	ROSEMOUNT	176KF	CONTAINMENT
22	RTD	SOSTMAN	11834B	CONTAINMENT
23	RTD	ROSEMOUNT	176KF	CONTAINMENT
24	LUBRICANT	MOBIL	MOBILUX EP2	INSIDE AND OUTSIDE CONTAINMENT
25	LUBRICANT	MOBIL	MOBILUX 2	AUXILIARY BUILDING, ELEV. 571'0"
26	LUBRICANT	MOBIL	DTE OIL MEDIUM	AUXILIARY BUILDING, ELEV. 573'0"
27	LUBRICANT	MOBIL	DTE OIL HEAVY MEDIUM	AUXILIARY BUILDING, ELEV. 587'0"
28	LUBRICANT	MOBIL	MOBILUX 2	AUXILIARY BUILDING, ELEV. 573'0"
29	LUBRICANT	MOBIL	DTE 797 OIL	AUXILIARY BUILDING, ELEV. 609'6"
30	LUBRICANT	MOBIL	DTE 797	AUXILIARY BUILDING, ELEV. 587'0"
31	LUBRICANT	MOBIL	MOBILUX 2	AUXILIARY BUILDING, ELEV. 573'0"
32	LUBRICANT	MOBIL	DTE OIL HEAVY MEDIUM	AUXILIARY BUILDING, ELEV. 587'0"
33	PRESSURE TRANSMITTER	FOXBORO	E11GMHSHD1	OUTSIDE CONTAINMENT
34	PRESSURE TRANSMITTER	FOXBORO	E11GKHSAE1 MCA	OUTSIDE CONTAINMENT
35	PRESSURE TRANSMITTER	FOXBORO	E11GMHSAE1	OUTSIDE CONTAINMENT
36	PRESSURE TRANSMITTER	ITT BARTON	763	CONTAINMENT
37	PRESSURE TRANSMITTER	ITT BARTON	763	CONTAINMENT
38	D/P TRANSMITTER	ITT BARTON	764	CONTAINMENT
39	D/P TRANSMITTER	ITT BARTON	764	CONTAINMENT
40	D/P TRANSMITTER	ITT BARTON	764	CONTAINMENT
41	D/P TRANSMITTER	FOXBORO	E13DMHSAM1	OUTSIDE CONTAINMENT
42	D/P TRANSMITTER	ITT BARTON	332	OUTSIDE CONTAINMENT
43	D/P TRANSMITTER	FOXBORO	E13DMHMID	OUTSIDE CONTAINMENT
44	D/P TRANSMITTER	FOXBORO	E13DMHSAM1	OUTSIDE CONTAINMENT
45	D/P TRANSMITTER	FOXBORO	E13DMHSAM1MCA	CONTAINMENT
46	D/P TRANSMITTER	TAYLOR	304TD00212	OUTSIDE CONTAINMENT
47	D/P SWITCH	ITT BARTON	289A199	OUTSIDE CONTAINMENT
48	LIMIT SWITCH	LANCO	EA180	CONTAINMENT
49	ELECTRICAL CABLE, CONTROL	GENERAL ELECTRIC	ND	INSIDE AND OUTSIDE CONTAINMENT

EQUIPMENT ENVIRONMENTAL QUALIFICATION
EQUIPMENT ITEM CHECKSHEET INDEX
D.C. COOK 1

FRC ITEM NO.	COMPONENT	MANUFACTURER	MODEL NUMBER	LOCATION
50	TRANSDUCER, E/P	FISHER CONTROLS	546	OUTSIDE CONTAINMENT
51	TRANSDUCER, E/P	FISHER CONTROLS	546	OUTSIDE CONTAINMENT
52	ELECTRICAL CABLE, CONTROL	CONTINENTAL WIRE	ND	INSIDE AND OUTSIDE CONTAINMENT
53	ELECTRICAL CABLE, CONTROL	CONTINENTAL WIRE	ND	OUTSIDE CONTAINMENT
54	ELECTRICAL CABLE, CONTROL	CONTINENTAL WIRE	ND	INSIDE AND OUTSIDE CONTAINMENT
55	ELECTRICAL CABLE, POWER	OKONITE	ND	CONTAINMENT
56	PRESSURE TRANSMITTER	ITT BARTON	763	CONTAINMENT
57	SOLENOID VALVE	ASCO	HP8300C58RU/HT8300B58RU	OUTSIDE CONTAINMENT
58	SOLENOID VALVE	ASCO	NP8316654V	CONTAINMENT
59	SOLENOID VALVE	ASCO	NP831654V	CONTAINMENT
60	SOLENOID VALVE	ASCO	HT8316B17	OUTSIDE CONTAINMENT
61	RADIATION MONITOR	WESTINGHOUSE	1101	CONTAINMENT
62	PRESSURE SWITCH	MERCOID	DA7031153	OUTSIDE CONTAINMENT
63	ELECTRICAL TERMINATION	ND	ND	CONTAINMENT
64	ELECTRICAL TERMINATION	ND	ND	OUTSIDE CONTAINMENT
65	ELECTRICAL TERMINATION	ND	ND	CONTAINMENT
66	ELECTRICAL TERMINATION	ND	ND	OUTSIDE CONTAINMENT
67	ELECTRICAL TERMINATION	ND	ND	CONTAINMENT
68	ELECTRICAL TERMINATION	ND	XLPE SPLICED TO XLPE	CONTAINMENT
69	ELECTRICAL TERMINATION	ND	ND	OUTSIDE CONTAINMENT
70	ELECTRICAL TERMINATION	ND	KAPTON SPLICED TO KAPTON	CONTAINMENT
71	ELECTRICAL TERMINATION	ND	ND	OUTSIDE CONTAINMENT
72	ELECTRICAL TERMINATION	ND	ND	CONTAINMENT
73	ELECTRICAL TERMINATION	ND	ND	CONTAINMENT
74	ELECTRICAL TERMINATION	ND	VARIOUS	OUTSIDE CONTAINMENT
75	ELECTRICAL TERMINATION	ND	ND	CONTAINMENT
76	ELECTRICAL TERMINATION	ND	ND	CONTAINMENT
77	ELECTRICAL TERMINATION	ND	ND	CONTAINMENT
78	PENETRATION TERMINATION	ND	ND	CONTAINMENT
79	ELECTRICAL TERMINATION	ND	ND	INSIDE AND OUTSIDE CONTAINMENT
80	ELECTRICAL TERMINATION	ND	ND	OUTSIDE CONTAINMENT
81	ELECTRICAL TERMINATION	ND	ND	INSIDE AND OUTSIDE CONTAINMENT
82	ELECTRICAL TERMINATION	ND	KAPTON SPLICED TO KAPTON	CONTAINMENT
83	ELECTRICAL TERMINATION	ND	ND	OUTSIDE CONTAINMENT
84	ELECTRICAL TERMINATION	ND	ND	OUTSIDE CONTAINMENT
85	ELECTRICAL CABLE, POWER	ANACONDA WIRE AND CABLE	ND	INSIDE AND OUTSIDE CONTAINMENT
86	ELECTRICAL CABLE, POWER	ANACONDA WIRE AND CABLE	ND	INSIDE AND OUTSIDE CONTAINMENT
87	ELECTRICAL CABLE, POWER	ANACONDA WIRE AND CABLE	ND	OUTSIDE CONTAINMENT
88	ELECTRICAL CABLE, POWER	OKONITE	ND	OUTSIDE CONTAINMENT
89	ELECTRICAL CABLE, POWER	OKONITE	ND	INSIDE AND OUTSIDE CONTAINMENT
90	ELECTRICAL CABLE, INSTRUMENT	OKONITE	ND	OUTSIDE CONTAINMENT
91	ELECTRICAL CABLE, POWER	ESSEX INTERNATIONAL	ND	INSIDE AND OUTSIDE CONTAINMENT
92	ELECTRICAL CABLE, POWER	ESSEX INTERNATIONAL	ND	OUTSIDE CONTAINMENT
93	ELECTRICAL CABLE, POWER	KERITE	ND	CONTAINMENT
94	ELECTRICAL CABLE, POWER	KERITE	ND	INSIDE AND OUTSIDE CONTAINMENT
95	ELECTRICAL CABLE, POWER	CYPRUS	ND	INSIDE AND OUTSIDE CONTAINMENT
96	ELECTRICAL CABLE, INSTRUMENT	CONTINENTAL WIRE	ND	OUTSIDE CONTAINMENT
97	ELECTRICAL CABLE, INSTRUMENT	SAMUEL MOORE	ND	INSIDE AND OUTSIDE CONTAINMENT
98	ELECTRICAL CABLE, INSTRUMENT	BOSTON INSULATED WIRE	ND	INSIDE AND OUTSIDE CONTAINMENT
99	ELECTRICAL CABLE, INSTRUMENT	BOSTON INSULATED WIRE	ND	INSIDE AND OUTSIDE CONTAINMENT
100	ELECTRICAL CABLE, INSTRUMENT	CERRO WIRE & CABLE	ND	INSIDE AND OUTSIDE CONTAINMENT
101	ELECTRICAL CABLE, INSTRUMENT	ROCKBESTOS	ND	INSIDE AND OUTSIDE CONTAINMENT
102	ELECTRICAL CABLE, POWER	ANACONDA WIRE AND CABLE	ND	OUTSIDE CONTAINMENT
103	ELECTRICAL CABLE, CONTROL	GENERAL ELECTRIC	ND	OUTSIDE CONTAINMENT

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 1

EQUIPMENT ITEM NO. 1
MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT
LIMITORQUE MODEL SMB000
REQUIRED OPERATING TIME: 1 HOUR
TER CHECKSHEET NO. 1
LICENSEE REFERENCE(S): 662, 639
FUNCTION (PLANT ID): CONTAINMENT AIR RECIRCULATION BACKDRAFT DAMPERS (VMO-101, -102)
LICENSEE SUBMITTAL: SCEW(S): V4-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, (A), S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 1

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (~~has~~/has ~~not~~) provided a response to the SER concerns.

X The Licensee (~~has~~/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 1

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	X
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

See Evaluation on Page 5f.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 1

LICENSEE RESPONSE TO NRC SER

from [12] page V4-1,

"NOTE A. VALVE LOCATION IS NOT SUBJECTED TO DIRECT CAUSTIC SPRAY IMPINGEMENT."

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 1

NOTES: "X" DENOTES APPROPRIATE NOTES

X 1. The Licensee has not provided documentation from the manufacturer which establishes similarity between the installed equipment and the test specimen in the referenced document(s). (NOTE A)

X 2. The Licensee has not identified the class of the insulation system used for the motor in the motorized valve actuator.

X 3. The Licensee has not identified whether or not this motorized valve actuator incorporates a motor-brake assembly.

X 4. The Licensee has not identified the class of the insulation system used for the motor-brake assembly (if applicable).

X 5. The Licensee has not identified the motor manufacturer for this motorized valve actuator.

X 6. The Licensee has not identified the manufacturer of the motor-brake assembly (if applicable).

X 7. The Licensee has not identified the type of current used in the motorized valve actuator.

X 8. The Licensee has not identified the type of current used in the motor-brake assembly (if applicable).

X 9. The Licensee has not established a qualified life estimate for this motorized valve actuator based on technically justifiable methods and conservative assumptions. (NOTE B)

____ 10. The Licensee has stated that the only harsh parameter that this motorized valve actuator is exposed to is radiation.

____ 11. Since radiation is stated to be the only harsh parameter and considering the extensive radiation testing of the motors used in this type of motorized valve actuator, the specified radiation dose of _____ is considered to be of sufficiently low value as to not affect this equipment item. This equipment item is considered qualified for this parameter.

____ 12. The Licensee has committed to replace this equipment item. The Licensee has stated the following:

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 1

NOTES:

A. If the Licensee can establish similarity between the installed and tested equipment, the following is noted:

1. The test report cited by the Licensee as evidence of qualification was for outside containment applications. This test did not include chemical spray.
2. With respect to chemical spray, the Licensee has stated that the, "Valve location is not subject to direct caustic spray impingment." ([12], SCEW V4-1) However, this statement is not sufficient to qualify this device for this environmental parameter. The effects of chemical deposition resulting from exposure to a caustic atmosphere must be addressed, in addition to direct impingment. Significant problems have arisen in tests of Limitorque MVA's as a result of chemical attack.

B. The Licensee has provided no informa-

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 1

NOTES:

tion with respect to Thermal aging of This equipment item, we has a qualified life estimate been calculated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 2

EQUIPMENT ITEM NO. 2
MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT
LIMITORQUE MODEL SMB00
REQUIRED OPERATING TIME: 1 HOUR
TER CHECKSHEET NO. 2
LICENSEE REFERENCE(S): 1620
FUNCTION (PLANT ID): RCP SEAL WATER CONTAINMENT ISOLATION (QCM-250)
LICENSEE SUBMITTAL: SCEW(S): V5-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A S (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 2

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (~~has~~/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 2

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	X
Criteria Regarding Radiation Satisfied	X
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

See Evaluation on Page 5f.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 2

LICENSEE RESPONSE TO NRC SER

from [12], page V5-1

"NOTE B - This VALVE CLOSES within 15 sec. (Tech. Spec. Table 3.6-1) of receiving a Phase A CONTAINMENT ISOLATION SIGNAL, therefore it is NOT EXPOSED TO A RADIATION DOSE SIGNIFICANTLY BEYOND ITS NORMAL ENVIRONMENT AND DOES NOT REQUIRE RADIATION QUALIFICATION

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 2

NOTES: "X" DENOTES APPROPRIATE NOTES

X 1. The Licensee has not provided documentation from the manufacturer which establishes similarity between the installed equipment and the test specimen in the referenced document(s). (NOTE A)

X 2. The Licensee has not identified the class of the insulation system used for the motor in the motorized valve actuator.

X 3. The Licensee has not identified whether or not this motorized valve actuator incorporates a motor-brake assembly.

X 4. The Licensee has not identified the class of the insulation system used for the motor-brake assembly (if applicable).

X 5. The Licensee has not identified the motor manufacturer for this motorized valve actuator.

X 6. The Licensee has not identified the manufacturer of the motor-brake assembly (if applicable).

X 7. The Licensee has not identified the type of current used in the motorized valve actuator.

X 8. The Licensee has not identified the type of current used in the motor-brake assembly (if applicable).

X 9. The Licensee has not established a qualified life estimate for this motorized valve actuator based on technically justifiable methods and conservative assumptions. (NOTE B)

____ 10. The Licensee has stated that the only harsh parameter that this motorized valve actuator is exposed to is radiation.

____ 11. Since radiation is stated to be the only harsh parameter and considering the extensive radiation testing of the motors used in this type of motorized valve actuator, the specified radiation dose of _____ is considered to be of sufficiently low value as to not affect this equipment item. This equipment item is considered qualified for this parameter.

____ 12. The Licensee has committed to replace this equipment item. The Licensee has stated the following:

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 2

NOTES:

A. The licensee has stated that this equipment does not require radiation qualification. However, this device is required to operate for a LOCA and, therefore, should be qualified for radiation. The total dose that it is required to be qualified for is: normal 40 year dose + 1 hour + op. time integrated accident dose (4.0×10^6 R) + appropriate margin.

B. The licensee has provided no information with respect to thermal aging for this equipment item, nor has a qualified life estimate been calculated.

C. The licensee's System Component Evaluation Worksheet (SCEW) indicates that this equipment item becomes submerged. The licensee has cited a communication from J. Tillinghast (AEP) to K. Kniel (NRC) dated 9-29-75. This document

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 2

NOTES:

has not been made available for review, and, therefore, its contents are unknown. The licensee should provide assurance that this device will remain functional for 1 hour + operating time in the event of a LOCA ~~and~~ with the equipment becoming submerged. The licensee could also show that the equipment does not become submerged until some time after it is required to function and that the failure due to the device becoming submerged will not produce deleterious results (i.e. a containment isolation valve opening as a result of an electrical short circuit

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 3

EQUIPMENT ITEM NO. 3
MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT
LIMITORQUE MODEL SMB; SIZES 1, 00, 2
REQUIRED OPERATING TIME: 1 HOUR
TER CHECKSHEET NO. 3
LICENSEE REFERENCE(S): 1620, 1064, 639
FUNCTION (PLANT ID): ECCS INJECTION AND RHR NORMAL COOLING VALVES (IMO-51, -52, -53, -54, -128; ICM-111, -129)
LICENSEE SUBMITTAL: SCEW(S): V1-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 3

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (~~has~~/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 3

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	X
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

See Evaluation on Page 5f.

LICENSEE RESPONSE TO NRC SER

from [12], page V1-1

with respect to submergence,

"See Also FSAR App. Q response to question 40.10 and letter from J. Tillinghart (AEP) to K. Kniel (NRC) dated 9-29-75 (Item 4)."

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 3

NOTES: "X" DENOTES APPROPRIATE NOTES

X 1. The Licensee has not provided documentation from the manufacturer which establishes similarity between the installed equipment and the test specimen in the referenced document(s). (NOTE A)

X 2. The Licensee has not identified the class of the insulation system used for the motor in the motorized valve actuator.

X 3. The Licensee has not identified whether or not this motorized valve actuator incorporates a motor-brake assembly.

X 4. The Licensee has not identified the class of the insulation system used for the motor-brake assembly (if applicable).

X 5. The Licensee has not identified the motor manufacturer for this motorized valve actuator.

X 6. The Licensee has not identified the manufacturer of the motor-brake assembly (if applicable).

X 7. The Licensee has not identified the type of current used in the motorized valve actuator.

X 8. The Licensee has not identified the type of current used in the motor-brake assembly (if applicable).

X 9. The Licensee has not established a qualified life estimate for this motorized valve actuator based on technically justifiable methods and conservative assumptions. (NOTE B)

____ 10. The Licensee has stated that the only harsh parameter that this motorized valve actuator is exposed to is radiation.

____ 11. Since radiation is stated to be the only harsh parameter and considering the extensive radiation testing of the motors used in this type of motorized valve actuator, the specified radiation dose of _____ is considered to be of sufficiently low value as to not affect this equipment item. This equipment item is considered qualified for this parameter.

____ 12. The Licensee has committed to replace this equipment item. The Licensee has stated the following:

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 3

NOTES:

A. The Licensee's System Component Evaluation Worksheet (SCEW) indicates that this equipment item becomes submerged. The Licensee has cited a letter from T. Tillinghast (AEP) to K. Kniel (NRC) dated 9-29-75. This document has not been made available for review and, therefore, its contents are unknown. The Licensee should provide assurance that this device will remain functional for 1 hour + operating time in the event of a LOCA with the equipment becoming submerged. The Licensee could also show that the equipment does not become submerged until sometime after it is required to function and that its failure due to the device becoming submerged will not produce deleterious results (i.e. a containment isolation valve opening as a result of an electrical short circuit.

B. The Licensee has provided no informa-

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 3

NOTES:

tion with respect to thermal aging for this equipment item, nor has a qualified life estimate been calculated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 4

EQUIPMENT ITEM NO. 4
MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT
LIMITORQUE MODEL SMB1
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 4
LICENSEE REFERENCE(S): 706, 639
FUNCTION (PLANT ID): SWITCHOVER TO HOT LEG INJECTION (IMO-315, -316, -325, -326)
LICENSEE SUBMITTAL: SCEW(S): V2-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, 5g, ~~5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 4

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (~~has~~/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 4

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

See Evaluation on Page 5f.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 4

LICENSEE RESPONSE TO NRC SER

No specific response has been provided by The Licensee, nor have any relevant notes been identified on page V2-1 of reference [12].

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 4

NOTES: "X" DENOTES APPROPRIATE NOTES

X 1. The Licensee has not provided documentation from the manufacturer which establishes similarity between the installed equipment and the test specimen in the referenced document(s).

X 2. The Licensee has not identified the class of the insulation system used for the motor in the motorized valve actuator.

X 3. The Licensee has not identified whether or not this motorized valve actuator incorporates a motor-brake assembly.

X 4. The Licensee has not identified the class of the insulation system used for the motor-brake assembly (if applicable).

X 5. The Licensee has not identified the motor manufacturer for this motorized valve actuator.

X 6. The Licensee has not identified the manufacturer of the motor-brake assembly (if applicable).

X 7. The Licensee has not identified the type of current used in the motorized valve actuator.

X 8. The Licensee has not identified the type of current used in the motor-brake assembly (if applicable).

X 9. The Licensee has not established a qualified life estimate for this motorized valve actuator based on technically justifiable methods and conservative assumptions. (NOTE A)

____ 10. The Licensee has stated that the only harsh parameter that this motorized valve actuator is exposed to is radiation.

____ 11. Since radiation is stated to be the only harsh parameter and considering the extensive radiation testing of the motors used in this type of motorized valve actuator, the specified radiation dose of _____ is considered to be of sufficiently low value as to not affect this equipment item. This equipment item is considered qualified for this parameter.

____ 12. The Licensee has committed to replace this equipment item. The Licensee has stated the following:

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 4

NOTES:

A. The licensee has provided no information with respect to thermal aging for this equipment item, nor has a qualified life estimate been calculated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

EQUIPMENT ITEM NO. 5
MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT
LIMITORQUE MODEL SMB00
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 5
LICENSEE REFERENCE(S): 662, 639
FUNCTION (PLANT ID): PRESSURIZER PORV BLOCK VALVES (NMO-151, -152, -153)
LICENSEE SUBMITTAL: SCEW(S): V9-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (~~has~~/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	X
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

See Evaluation on Page 5f.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

LICENSEE RESPONSE TO NRC SER

from [12], page V9-1,

"NOTE A - Valve LOCATION IS NOT SUBJECT TO DIRECT CAUSTIC SPRAY IMPINGEMENT."

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NOTES: "X" DENOTES APPROPRIATE NOTES

X 1. The Licensee has not provided documentation from the manufacturer which establishes similarity between the installed equipment and the test specimen in the referenced document(s). (NOTE A)

X 2. The Licensee has not identified the class of the insulation system used for the motor in the motorized valve actuator.

X 3. The Licensee has not identified whether or not this motorized valve actuator incorporates a motor-brake assembly.

X 4. The Licensee has not identified the class of the insulation system used for the motor-brake assembly (if applicable).

X 5. The Licensee has not identified the motor manufacturer for this motorized valve actuator.

X 6. The Licensee has not identified the manufacturer of the motor-brake assembly (if applicable).

X 7. The Licensee has not identified the type of current used in the motorized valve actuator.

X 8. The Licensee has not identified the type of current used in the motor-brake assembly (if applicable).

X 9. The Licensee has not established a qualified life estimate for this motorized valve actuator based on technically justifiable methods and conservative assumptions. (NOTE B)

____ 10. The Licensee has stated that the only harsh parameter that this motorized valve actuator is exposed to is radiation.

____ 11. Since radiation is stated to be the only harsh parameter and considering the extensive radiation testing of the motors used in this type of motorized valve actuator, the specified radiation dose of _____ is considered to be of sufficiently low value as to not affect this equipment item. This equipment item is considered qualified for this parameter.

____ 12. The Licensee has committed to replace this equipment item. The Licensee has stated the following:

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NOTES:

A. If the Licensee can establish similarity between the installed and tested equipment, the following is noted:

1. The test report cited by the Licensee as evidence of qualification was for outside containment applications. This test did not include chemical spray.
2. With respect to chemical spray, the Licensee has stated that the, "Valve location is not subject to direct caustic spray impingment." ([12], SCEW V4-1) However, this statement is not sufficient to qualify this device for this environmental parameter. The effects of chemical deposition resulting from exposure to a caustic atmosphere must be addressed, in addition to direct impingment. Significant problems have arisen in tests of Limitorque MVA's as a result of chemical attack.

B. The Licensee has provided no informa-

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NOTES:

tion with respect to Thermal aging of This equipment item, use has a qualified life estimate been calculated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 6

EQUIPMENT ITEM NO. 6
MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT EXTENSION
LIMITORQUE MODEL SMB2
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 6
LICENSEE REFERENCE(S): 1620
FUNCTION (PLANT ID): RHR SUCTION FROM CONTAINMENT SUMP (ICM-305, -306)
LICENSEE SUBMITTAL: SCEW(S): V10-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, (A), S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, 5g, ~~5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 6

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (~~has~~/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b ~~Modification~~
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 6

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	X
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

See Evaluation on Page 5f.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 6

LICENSEE RESPONSE TO NRC SER

from [12], page V10-1,

"NOTE B. - These are Westinghouse supplied valves, insulation Class H, specified for nuclear service inside containment. Limit switch material for These valves is white melamine, a radiation resistant material. We are continuing to seek information."

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 6

NOTES: "X" DENOTES APPROPRIATE NOTES

X 1. The Licensee has not provided documentation from the manufacturer which establishes similarity between the installed equipment and the test specimen in the referenced document(s). (NOTE A)

___ 2. The Licensee has not identified the class of the insulation system used for the motor in the motorized valve actuator.

X 3. The Licensee has not identified whether or not this motorized valve actuator incorporates a motor-brake assembly.

X 4. The Licensee has not identified the class of the insulation system used for the motor-brake assembly (if applicable).

X 5. The Licensee has not identified the motor manufacturer for this motorized valve actuator.

X 6. The Licensee has not identified the manufacturer of the motor-brake assembly (if applicable).

X 7. The Licensee has not identified the type of current used in the motorized valve actuator.

X 8. The Licensee has not identified the type of current used in the motor-brake assembly (if applicable).

X 9. The Licensee has not established a qualified life estimate for this motorized valve actuator based on technically justifiable methods and conservative assumptions. (NOTE B)

___ 10. The Licensee has stated that the only harsh parameter that this motorized valve actuator is exposed to is radiation.

___ 11. Since radiation is stated to be the only harsh parameter and considering the extensive radiation testing of the motors used in this type of motorized valve actuator, the specified radiation dose of _____ is considered to be of sufficiently low value as to not affect this equipment item. This equipment item is considered qualified for this parameter.

___ 12. The Licensee has committed to replace this equipment item. The Licensee has stated the following:

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 6

NOTES:

A. The Licensee's statement concerning the radiation qualification of this equipment item (see page 3a) is insufficient to establish qualification for radiation. The Licensee has stated that they are continuing to seek information.

B. The Licensee has provided no information with respect to thermal aging of this equipment item, nor has a qualified life estimate been calculated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 7

EQUIPMENT ITEM NO. 7
MOTORIZED VALVE ACTUATOR LOCATED OUTSIDE CONTAINMENT
LIMITORQUE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 7
LICENSEE REFERENCE(S): 662
FUNCTION (PLANT ID): VARIOUS (VARIOUS)
LICENSEE SUBMITTAL: SCEW(S): V6-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, 5g, ~~5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 7

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (~~has~~/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 7

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

See Evaluation on Page 5f.

LICENSEE RESPONSE TO NRC SER

NOTE ON VALVE MOTOR OPERATORS

1. Outside containment valves (potentially subject to radiation because they are in or near long term post-LOCA recirculation lines) for which we presently have no radiation qualification are listed below. We are writing the Limitorque Corporation to request information on the insulation materials used in the valve operator motors.

VALVE	COMMENT
ICM-311 321	These valves would only be operated if the RHR spray system was employed. The RHR spray system is a back up containment pressure suppression system and the Cook safety analysis as reported in the FSAR demonstrates that it is not needed for LOCA or HELB mitigation.
IMO-340 350 360 361 362	These valves are used during the switchover from the ECC injection phase to ECC recirculation. However, the sequence of their operation as defined in the emergency operating procedures limits the time of their exposure prior to their operation to only a very short time.
IMO-910 911	These valves are used to terminate the suction of the charging pumps from the RWST once ECC switch-over to recirculation has been accomplished. They are protected against exposure to post-LOCA recirculation flow by a check valve.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 7

NOTES: "X" DENOTES APPROPRIATE NOTES

X 1. The Licensee has not provided documentation from the manufacturer which establishes similarity between the installed equipment and the test specimen in the referenced document(s). (NOTE A, B)

X 2. The Licensee has not identified the class of the insulation system used for the motor in the motorized valve actuator.

X 3. The Licensee has not identified whether or not this motorized valve actuator incorporates a motor-brake assembly.

X 4. The Licensee has not identified the class of the insulation system used for the motor-brake assembly (if applicable).

X 5. The Licensee has not identified the motor manufacturer for this motorized valve actuator.

X 6. The Licensee has not identified the manufacturer of the motor-brake assembly (if applicable).

X 7. The Licensee has not identified the type of current used in the motorized valve actuator.

X 8. The Licensee has not identified the type of current used in the motor-brake assembly (if applicable).

X 9. The Licensee has not established a qualified life estimate for this motorized valve actuator based on technically justifiable methods and conservative assumptions. (NOTE C)

____ 10. The Licensee has stated that the only harsh parameter that this motorized valve actuator is exposed to is radiation.

____ 11. Since radiation is stated to be the only harsh parameter and considering the extensive radiation testing of the motors used in this type of motorized valve actuator, the specified radiation dose of _____ is considered to be of sufficiently low value as to not affect this equipment item. This equipment item is considered qualified for this parameter.

____ 12. The Licensee has committed to replace this equipment item. The Licensee has stated the following:

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 7

NOTES:

A. The Licensee's System Component Evaluation Worksheet (SCEW) provides no information with respect to the following areas:

MODEL NUMBER, SYSTEMS

PLANT ID#'S, FUNCTION, SERVICE

Because of this, an exact correlation to the NRC SER is not possible. The identified NRC deficiencies were assumed. Also, this equipment cannot be correlated to the list on page 3a, which has identified possible problems due to radiation.

B. The Licensee has not provided Fig 0-27, however, the peak temperature and pressure (230°F for 10 sec and 11.5 psig for 1 sec.) have been identified for the item on SCEW CP10-1 [12]

C. The Licensee has provided no information with respect to thermal aging for this equipment item, nor has a qualified life estimate been calculated

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 8

EQUIPMENT ITEM NO. 8
MOTORIZED VALVE ACTUATOR LOCATED OUTSIDE CONTAINMENT
LIMITORQUE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 8
LICENSEE REFERENCE(S): 1620, 1064
FUNCTION (PLANT ID): VARIOUS (VARIOUS)
LICENSEE SUBMITTAL: SCEW(S): V7-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, (A), S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, 5g, ~~5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 8

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (~~has~~/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 8

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

See EVALUATION ON PAGE 5f.

LICENSEE RESPONSE TO NRC SER

NOTE ON VALVE MOTOR OPERATORS

1. Outside containment valves (potentially subject to radiation because they are in or near long term post-LOCA recirculation lines) for which we presently have no radiation qualification are listed below. We are writing the Limitorque Corporation to request information on the insulation materials used in the valve operator motors.

VALVE	COMMENT
ICM-311 321	These valves would only be operated if the RHR spray system was employed. The RHR spray system is a back up containment pressure suppression system and the Cook safety analysis as reported in the FSAR demonstrates that it is not needed for LOCA or HELB mitigation.
IMO-340 350 360 361 362	These valves are used during the switchover from the ECC injection phase to ECC recirculation. However, the sequence of their operation as defined in the emergency operating procedures limits the time of their exposure prior to their operation to only a very short time.
IMO-910 911	These valves are used to terminate the suction of the charging pumps from the RWST once ECC switch-over to recirculation has been accomplished. They are protected against exposure to post-LOCA recirculation flow by a check valve.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 8

NOTES: "X" DENOTES APPROPRIATE NOTES

X 1. The Licensee has not provided documentation from the manufacturer which establishes similarity between the installed equipment and the test specimen in the referenced document(s). (NOTE A, B)

X 2. The Licensee has not identified the class of the insulation system used for the motor in the motorized valve actuator.

X 3. The Licensee has not identified whether or not this motorized valve actuator incorporates a motor-brake assembly.

X 4. The Licensee has not identified the class of the insulation system used for the motor-brake assembly (if applicable).

X 5. The Licensee has not identified the motor manufacturer for this motorized valve actuator.

X 6. The Licensee has not identified the manufacturer of the motor-brake assembly (if applicable).

X 7. The Licensee has not identified the type of current used in the motorized valve actuator.

X 8. The Licensee has not identified the type of current used in the motor-brake assembly (if applicable).

X 9. The Licensee has not established a qualified life estimate for this motorized valve actuator based on technically justifiable methods and conservative assumptions. (NOTE C)

____ 10. The Licensee has stated that the only harsh parameter that this motorized valve actuator is exposed to is radiation.

____ 11. Since radiation is stated to be the only harsh parameter and considering the extensive radiation testing of the motors used in this type of motorized valve actuator, the specified radiation dose of _____ is considered to be of sufficiently low value as to not affect this equipment item. This equipment item is considered qualified for this parameter.

____ 12. The Licensee has committed to replace this equipment item. The Licensee has stated the following:

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 8

NOTES:

A. The Licensee's System Component Evaluation Worksheet (SCEW) provides no information with respect to the following areas:

MODEL NUMBER, SYSTEMS

PLANT ID#'S, FUNCTION, SERVICE

Because of this, an exact correlation to the NRC SER is not possible. The identified NRC deficiencies were assumed. Also, this equipment cannot be correlated to the list on page 3a, which has identified possible problems due to radiation.

B. The Licensee has not provided Fig O-27, however, the peak temperature and pressure (230°F for 10 sec and 11.5 psig for 1 sec.) have been identified for the item on SCEW CP10-1 [12]

C. The Licensee has provided no information with respect to thermal aging for this equipment item, nor has a qualified life estimate been calculated

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 9

EQUIPMENT ITEM NO. 9
MOTORIZED VALVE ACTUATOR LOCATED OUTSIDE CONTAINMENT
LIMITORQUE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 9
LICENSEE REFERENCE(S): 663, 38
FUNCTION (PLANT ID): VARIOUS (VARIOUS)
LICENSEE SUBMITTAL: SCEW(S): V8-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, (T), QT, RT, P, H, CS, (A), S, (R), M, I, (QM), RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, 5g, ~~5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 9

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (~~has~~/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 9

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

See Evaluation on Page 5f.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 9

LICENSEE RESPONSE TO THE NRC SER

NOTE ON VALVE MOTOR OPERATORS

1. Outside containment valves (potentially subject to radiation because they are in or near long term post-LOCA recirculation lines) for which we presently have no radiation qualification are listed below. We are writing the Limitorque Corporation to request information on the insulation materials used in the valve operator motors.

VALVE	COMMENT
ICM-311 321	These valves would only be operated if the RHR spray system was employed. The RHR spray system is a back up containment pressure suppression system and the Cook safety analysis as reported in the FSAR demonstrates that it is not needed for LOCA or HELB mitigation.
IMO-340 350 360 361 362	These valves are used during the switchover from the ECC injection phase to ECC recirculation. However, the sequence of their operation as defined in the emergency operating procedures limits the time of their exposure prior to their operation to only a very short time.
IMO-910 911	These valves are used to terminate the suction of the charging pumps from the RWST once ECC switch-over to recirculation has been accomplished. They are protected against exposure to post-LOCA recirculation flow by a check valve.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 9

NOTES: "X" DENOTES APPROPRIATE NOTES

X 1. The Licensee has not provided documentation from the manufacturer which establishes similarity between the installed equipment and the test specimen in the referenced document(s). (NOTE A, B)

X 2. The Licensee has not identified the class of the insulation system used for the motor in the motorized valve actuator.

X 3. The Licensee has not identified whether or not this motorized valve actuator incorporates a motor-brake assembly.

X 4. The Licensee has not identified the class of the insulation system used for the motor-brake assembly (if applicable).

X 5. The Licensee has not identified the motor manufacturer for this motorized valve actuator.

X 6. The Licensee has not identified the manufacturer of the motor-brake assembly (if applicable).

X 7. The Licensee has not identified the type of current used in the motorized valve actuator.

X 8. The Licensee has not identified the type of current used in the motor-brake assembly (if applicable).

X 9. The Licensee has not established a qualified life estimate for this motorized valve actuator based on technically justifiable methods and conservative assumptions. (NOTE C)

____ 10. The Licensee has stated that the only harsh parameter that this motorized valve actuator is exposed to is radiation.

____ 11. Since radiation is stated to be the only harsh parameter and considering the extensive radiation testing of the motors used in this type of motorized valve actuator, the specified radiation dose of _____ is considered to be of sufficiently low value as to not affect this equipment item. This equipment item is considered qualified for this parameter.

____ 12. The Licensee has committed to replace this equipment item. The Licensee has stated the following:

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 9

NOTES:

A. The Licensee's System Component Evaluation Worksheet (SCEW) provides no information with respect to the following areas:

MODEL NUMBER, SYSTEMS

PLANT ID#'S, FUNCTION, SERVICE

Because of this, an exact correlation to the NRC SER is not possible. The identified NRC deficiencies were assumed. Also, this equipment cannot be correlated to the list on page 3a, which has identified possible problems due to radiation.

B. The Licensee has not provided Fig 0-27, however, the peak temperature and pressure (230°F for 10 sec and 11.5 psig for 1 sec.) have been identified for the item on SCEW CP10-1 [1,2]

C. The Licensee has provided no information with respect to thermal aging for this equipment item, nor has a qualified life estimate been calculated

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 10

EQUIPMENT ITEM NO. 10
ELECTRIC MOTOR LOCATED OUTSIDE CONTAINMENT
WESTINGHOUSE MODEL 5009P24
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 10
LICENSEE REFERENCE(S): 606
FUNCTION (PLANT ID): RESIDUAL HEAT REMOVAL PUMP MOTOR (PP-035)
LICENSEE SUBMITTAL: SCEW(S): M1-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 10

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 10

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	X
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 10

NOTES:

This motor requires qualification for radiation exposure (1.66×10^7 R) and thermal aging. The licensee has referenced WCAP-7829 [606] as evidence of qualification but has not provided any information linking the installed motors to the referenced report. Information such as insulation type (Thermolastic epoxy?), insulation class, motor to lead material/method, grease type (bearing lube) or rated horsepower was not stated. Therefore, these motors are classified II.a Qualification not established.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 11

EQUIPMENT ITEM NO. 11
ELECTRIC MOTOR LOCATED OUTSIDE CONTAINMENT
WESTINGHOUSE MODEL 5009H
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 11
LICENSEE REFERENCE(S): 606
FUNCTION (PLANT ID): SAFETY INJECTION PUMP MOTOR (PP-026)
LICENSEE SUBMITTAL: SCEW(S): M1-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 11

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 11

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	X
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 11

NOTES:

This motor requires qualification for radiation exposure (1.66×10^7 R) and thermal aging. The licensee has referenced WCAP-7829 [6006] as evidence of qualification but has not provided any information linking the installed motors to the referenced report. Information such as insulation type (Thermolastic epoxy?), insulation class, motor to lead material/method, grease type (bearing lube) or rated horsepower was not stated. Therefore, these motors are classified II.a Qualification not established.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 12

EQUIPMENT ITEM NO. 12
ELECTRIC MOTOR LOCATED OUTSIDE CONTAINMENT
WESTINGHOUSE MODEL 5808 Z
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 12
LICENSEE REFERENCE(S): 606
FUNCTION (PLANT ID): CENTRIFUGAL CHARGING PUMP MOTOR (PP-050)
LICENSEE SUBMITTAL: SCEW(S): M1-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 12

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 12

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	X
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 12

NOTES:

This motor requires qualification for radiation exposure (1.66×10^7 R) and thermal aging. The licensee has referenced WCAP-7829 [606] as evidence of qualification but has not provided any information linking the installed motors to the referenced report. Information such as insulation type (Thermoset epoxy?), insulation class, motor to lead material/method, grease type (bearing lube) or rated horsepower was not stated. Therefore, these motors are classified II.a Qualification not established.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 13

EQUIPMENT ITEM NO. 13
ELECTRIC MOTOR LOCATED IN THE CONTAINMENT
WESTINGHOUSE MODEL TBDP
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 13
LICENSEE REFERENCE(S): 606, 639, 38
FUNCTION (PLANT ID): FAN MOTOR (HV-CEQ-1, -2)
LICENSEE SUBMITTAL: SCEW(S): F1-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 13

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

X The Licensee (~~has~~/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 13

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	X
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 13

Licensee Response to the NRC SER

Qualified by Westinghouse Corp. Test Reports: WCAP-7829, April, 1972.

Type of Test: Sequential: Irradiation
Steam
Chemical Spray

Test Profile (for motor without heat exchanger)

324°F, 80 psig for 4 hrs.
250°F, 16 psig for 7 days

Test Profile (for motor with heat exchanger)

320°F, 75 psig for 24 hrs.
250°F, 16 psig for 168 hrs.

Chemical Spray: 1.43 weight percent boric acid
PH=9.5 with Na OH

Irradiation: .5 Mrad/hr., 200 Mrads.

See page 33 of WCAP-7829 for Test Profile summary.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 13

NOTES:

These motors require qualification for exposure to steam/pressure, radiation (1.5×10^8 R), and chemical spray in addition to thermal aging. The licensee has cited WCAP-7829 as evidence of qualification.

- The referenced report does not discuss the effects of thermal aging on the bearing lubricant, insulation system or motor to lead splice.

- The peak temperature attained in the test does not envelope the plant specific MSLB peak of 325°F. However the difference is insignificant when examined with respect to the test duration and numerous exposures to high temperature steam.

Although the tested motors would be qualified (except for aging) for the plant-specific environment, the licensee has not established that the installed motors are similar to those tested. To establish qualification the licensee should determine:

- the enclosure type
- the bearing lubricant
- the stator insulation type/construction
- the motor to lead splice/materials
- the lead cable type/insulation and a jacket

and compare them to that tested in referenced report.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 14

EQUIPMENT ITEM NO. 14
ELECTRIC MOTOR LOCATED OUTSIDE CONTAINMENT
RELIANCE ELECTRIC MODEL FRAME # 5810P
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 14
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): CONTAINMENT SPRAY PUMP MOTOR (PP-009)
LICENSEE SUBMITTAL: SCEW(S): M2 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, 5g, ~~5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 14

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 14

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	X
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	X
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 14

NOTES:

These motors require qualification for radiation exposure and thermal aging. Although the licensee has not cited any qualification documents PGR #'s 4647, 4648, 4649 and PSR #'s 52, 53, and 55 where submitted in response to a request for additional information.

- Reference 51 is a letter from Reliance Electric which states that the installed motors have no documented radiation withstandability.

- Reference 50 is an American Electric Power Service Corporation letter which discusses a comparison of the installed motors to those constructed with RBI, Nuclear Enduroseal, insulation that have a stated radiation damage threshold in excess of 1×10^8 R.

- The accident + normal radiation dose these motors will be exposed to is 1.7×10^7 R. The magnet wire coating - Polyester Amide-Imide [51] - has a radiation damage threshold less than 10^6 R [50]. This value does not envelope the 40 yr + accident dose. The licensee has not established a replacement schedual and has not discussed these motors with respect to maintenance and surveillance.

continued →

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 14

NOTES:

- These motors have a different insulation system than that tested in NUC-12 [4647, 4648, 4649], [51] and therefore cannot be qualified with respect to aging by this report.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

EQUIPMENT ITEM NO. 15
HYDROGEN RECOMBINER LOCATED IN THE CONTAINMENT
WESTINGHOUSE, MODEL NOT STATED
REQUIRED OPERATING TIME: 3 MONTHS
TER CHECKSHEET NO. 15
LICENSEE REFERENCE(S): 1573, 639, 38
FUNCTION (PLANT ID): HYDROGEN RECOMBINER (HR-1, -2)
LICENSEE SUBMITTAL: SCEW(S): H1-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified ~~and/or will function when exposed~~ to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

X The Licensee (~~has~~/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	X
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	X
o Peak Pressure Adequate	
o Duration Adequate	X
o Required Profile Enveloped Adequately	X
o Steam Exposure (If Required) Adequate	X
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

LICENSEE RESPONSE TO NRC SER

Qualified by Westinghouse report WCAP-7709-L, supplement 2 of Sept. 1973.

Type of Test: Separate, seismic steam/chem. spray gamma radiation.

Test Profile:

Horizontal (side-to-side) force = 2g
(back-to-back) force = 2g
Vertical force = 1.33g
Frequencies = 1 through 35 Hz

.33 to .80 Mrads/hr
200-220 Mrads

Assumed saturated steam.
(310°F, 77 psia for 4 hrs
) 259°F, 35 psia for 20 hrs
(228°F, 20 psia for 1 hr

Chemical Spray: Sodium thiosulfate 2500 ppm boron as boric acid with Na OH added for a PH = 10.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

Checksheets 5f, 5g and 5h have been removed due to the proprietary nature of information contained therein.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 16

EQUIPMENT ITEM NO. 16
ELECTRICAL PENETRATION LOCATED IN THE CONTAINMENT
CONAX MODEL EA2 THRU EP14
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 16
LICENSEE REFERENCE(S): 3827, 3828, 3837, 3838
FUNCTION (PLANT ID): ELECTRICAL CONTINUITY THROUGH CONTAINMENT WALL
LICENSEE SUBMITTAL: SCEW(S): EP02-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	7a, 7b, 7c

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 16

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified ~~and/or~~ will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 16

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 16

NOTES:

2100 WALDEN AVENUE
BUFFALO, NEW YORK 14225

Conax Corp.

REV	DAT

MAR 3 1978

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MAR - 6 1978

SPECIAL 340°F ENVIRONMENTAL

PENETRATION TEST

QA DOC. INDEX
SER.: E0001
DATE: 6 E 77
REVISIONS
1. EDS 766
2.
3.
4.
5.
REF. EE
EXP.

PREPARED BY _____ DATE 6-8-77
W. C. Scott - Test Engineer

APPROVED BY _____ DATE
R. J. Bishop - Chief Engineer

_____ DATE
K. H. Shotwell - N. P. Division Manager

_____ DATE

DONALD C. COOK NUCLEAR PLANT
ACCEPTED FOR Q/A BY. ELECTRIC
GENERATION SECTION AEPSC. N. Y.
ACCEPTED BY: _____
DATE: 03 15 78
FILE: EE/45 Conax Corp

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 16

NOTES:

CONAX CORPORATION
2300 WALDEN AVENUE
BUFFALO, NEW YORK 14225

GENITR
Conax

No. IPS-137

REV.	DATE

TEST UNIT
P3 = NVP
= 100K MVP

QA DOC. INDEX
SER.: EQ0003
DATE 11/15/77
KEYWORDS
1. IPS 137
2.
3.
4.
5.
REF. EE
EXP.

B

PROTOTYPE QUALIFICATION REPORT

FOR

ELECTRICAL PENETRATIONS

FOR

C. N. DE ALMARAZ NUCLEAR POWER PLANT

Units 1 and 2

PREPARED BY W. C. Scott DATE 11-15-77
W. C. Scott - Test Engineer

APPROVED BY W S Rautio DATE 11-15-77
W. S. Rautio - N. P. Division Manager

DATE

DATE

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 16

NOTES:

The Licensee has cited two test reports on penetrations but has not provided documentation which establish that the testing applies to the penetrations installed in D.C.Cook plant. If such relationship can be established, then a qualified life should be determined.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 17

EQUIPMENT ITEM NO. 17
ELECTRICAL PENETRATION LOCATED IN THE CONTAINMENT
CONAX MODEL EP1
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 17
LICENSEE REFERENCE(S): 3828, 3837, 3838
FUNCTION (PLANT ID): ELECTRICAL CONTINUITY THROUGH CONTAINMENT WALL
LICENSEE SUBMITTAL: SCEW(S): EP01-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 7

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified ~~and~~/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 27

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

For evaluation, refer to item 16.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 18

EQUIPMENT ITEM NO. 18
RTD LOCATED IN THE CONTAINMENT
SOSTMAN MODEL 11901B
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 18
LICENSEE REFERENCE(S): 687
FUNCTION (PLANT ID): REACTOR COOLANT TEMPERATURE NORMAL AND ACCIDENT MONITORING (NTR-110, 120, 130, 140, 210, 220, 230, 240)
LICENSEE SUBMITTAL: SCEW(S): I-28 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, (T) (QT) RT, P, H, (CS) (A) S, (R), (M) I, (QM) RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 18

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 18

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	X
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	X
Criteria Regarding Instrument Accuracy Satisfied	X
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 18

Checksheets 5a thru 5h have been removed due to the proprietary nature of information contained therein.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 19

EQUIPMENT ITEM NO. 19
RTD LOCATED IN THE CONTAINMENT
ROSEMOUNT MODEL 176KS
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 19
LICENSEE REFERENCE(S): 687
FUNCTION (PLANT ID): REACTOR COOLANT TEMPERATURE NORMAL AND ACCIDENT MONITORING (NTR-110, 120, 130, 140, 210, 220, 230, 240)
LICENSEE SUBMITTAL: SCEW(S): I-28 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 12

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/[redacted]) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 19

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	X
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	X
Criteria Regarding Instrument Accuracy Satisfied	X
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 19

Checksheets 5a thru 5j have been removed due to the proprietary nature of information contained therein.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 20

EQUIPMENT ITEM NO. 20
RTD LOCATED IN THE CONTAINMENT
SOSTMAN MODEL 11834B
REQUIRED OPERATING TIME: 10 SECONDS
TER CHECKSHEET NO. 20
LICENSEE REFERENCE(S): 687, 639
FUNCTION (PLANT ID): REACTOR COOLANT TEMPERATURE ACTUATION AND NORMAL MONITOR (NTP-111, 121, 131, 141, 211, 221, 231, 241)
LICENSEE SUBMITTAL: SCEW(S): I26 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, (T), (QT), RT, P, H, (CS), (A), S, (R), (M), I, (QM), RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 20

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 20

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	X
Criteria Regarding Instrument Accuracy Satisfied	X
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

See equipment item no. 18 for detailed evaluation.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 21

EQUIPMENT ITEM NO. 21
RTD LOCATED IN THE CONTAINMENT
ROSEMOUNT MODEL 176KF
REQUIRED OPERATING TIME: 10 SECONDS
TER CHECKSHEET NO. 21
LICENSEE REFERENCE(S): 687, 639
FUNCTION (PLANT ID): REACTOR COOLANT TEMPERATURE ACTUATION AND NORMAL MONITOR (NTP-111, 121, 131, 141, 211, 221, 231, 241)
LICENSEE SUBMITTAL: SCEW(S): I25 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 21

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 21

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	X
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	X
Criteria Regarding Instrument Accuracy Satisfied	X
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

See equipment item no. 19 for detailed evaluation.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 22

EQUIPMENT ITEM NO. 22
RTD LOCATED IN THE CONTAINMENT
SOSTMAN MODEL 11834B
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 22
LICENSEE REFERENCE(S): 687
FUNCTION (PLANT ID): REACTOR COOLANT TEMPERATURE/IN PLACE SPARES (NTP-110, 120, 130, 140, 210, 220, 230, 240)
LICENSEE SUBMITTAL: SCEW(S): I-27 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
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Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 22

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 22

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	X
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	X
Criteria Regarding Instrument Accuracy Satisfied	X
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

See equipment item no. 18 for detailed evaluation.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 23

EQUIPMENT ITEM NO. 23
RTD LOCATED IN THE CONTAINMENT
ROSEMOUNT MODEL 176KF
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 23
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): REACTOR COOLANT TEMPERATURE/IN PLACE SPARES (NTP-110, 120, 130, 140, 210, 220, 230, 240)
LICENSEE SUBMITTAL: SCEW(S): I-27 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

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Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 23

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 23

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	X
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	X
Criteria Regarding Instrument Accuracy Satisfied	X
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

See equipment item no. 19 for detailed evaluation.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 24

EQUIPMENT ITEM NO. 24
LUBRICANT LOCATED INSIDE AND OUTSIDE CONTAINMENT
MOBIL MODEL MOBILUX EP2
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 24
LICENSEE REFERENCE(S): 639, 18, 19
FUNCTION (PLANT ID): VALVE OPERATOR MOTORS LUBRICANT
LICENSEE SUBMITTAL: SCEW(S): G1-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, 5g, ~~5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 24

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

X The Licensee (~~has~~/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 24

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	X
Criteria Regarding Aging Simulation Satisfied (If Required)	X
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	X
o Peak Pressure Adequate	X
o Duration Adequate	X
o Required Profile Enveloped Adequately	X
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	X
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 24

B. Grease enclosed in a container will not be subjected to direct caustic spray impingement

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 24

NOTES:

(1) PSR #19, "Letter of 4/17/80 from J.M. Allen (Mobil Oil Corp) to Allen Feibelman (AEP)," states that the lubricant types, including (a) Mobil DTE 797, (b) Mobil DTE Named Oils, (c) Mobil Vapretec Light, (d) Mobilux 1,2 and (e) Mobilux EP 0,1,2, are suitable for radiation doses up to 10^8 rad. This letter, together with a technical description for Mobilux EP 0,1,2 are cited by the Licensee as the bases for qualification of this equipment item to the temperature, pressure and humidity requirements. PSR #19 does not address the latter environments and therefore is not an applicable data source. The Mobil tech sheet provides a discussion on the environmental, performance and physical characteristics of Mobilux EP 0,1,2 greases and is essentially a specification delineating the environmental and performance ratings for the greases. No supporting documentation was provided by the Licensee to substantiate the stated capabilities for the greases. Therefore, the tech sheet has been judged to be inadequate as the basis for qualification to the specified temperature, pressure and humidity requirements.

(2) PSR #18, "Letter of 6/7/71 from W.F. Hergreuter (Customer Service Lab.) to A.H. Staffan (Boston Edison Co.)" states that Mobilux EP2 would be satisfactory for exposure up to 2.4×10^8 rads. A summary of the results of radiation exposure of a sample of Mobilux EP2 to 1.2×10^8 rads, 2.4×10^8 rads and 3.6×10^8 rads

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 24

NOTES:

Note (2) continued

was included as an attachment to the letter. The summary provides the results of exposure to the latter radiation levels in terms of changes in physical characteristics. However, the Licensee did not provide any correlation regarding the impact of these changes on the performance of the equipment items employing the grease. Therefore, in the absence of this information, no conclusion regarding the qualification status of the grease could be made. It is to be further noted that the Licensee cites PSR #18 as the data source for qualification of the grease for an operating time of >1 year. PSR #18 addresses only radiation exposure.

(3) The Licensee provided no documentation concerning the aging characteristics or life for this equipment item. Further, no corrective action regarding periodic inspection/replacement of the grease was provided.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 25

EQUIPMENT ITEM NO. 25
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 571'0"
MOBIL MODEL MOBILUX 2
REQUIRED OPERATING TIME: 500 HOURS
TER CHECKSHEET NO. 25
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): ESSENTIAL SERVICE WATER PUMP/LUBRICATION (PP-007)
LICENSEE SUBMITTAL: SCEW(S): G2 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	7~~a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 25

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 25

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	____
Adequate Similarity Between Equipment and Test Specimen Established	____
Aging Degradation Evaluated Adequately	____
Qualified Life or Replacement Schedule Established (If Required)	____
Program Established to Identify Aging Degradation	____
Criteria Regarding Aging Simulation Satisfied (If Required)	____
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	____
o Peak Pressure Adequate	____
o Duration Adequate	____
o Required Profile Enveloped Adequately	____
o Steam Exposure (If Required) Adequate	____
Criteria Regarding Spray Satisfied	____
Criteria Regarding Submergence Satisfied	____
Criteria Regarding Radiation Satisfied	____
Criteria Regarding Test Sequence Satisfied	____
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	____
Criteria Regarding Functional Testing Satisfied	____
Criteria Regarding Instrument Accuracy Satisfied	____
Test Duration Margin (1 hour + Function Time) Satisfied	____
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	____

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	____
I.b	Equipment Qualification Pending Modification	____
II.a	Equipment Qualification Not Established	____
II.b	Equipment Not Qualified	____
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	____
III.a	Equipment Exempt From Qualification	____
III.b	Equipment Not in the Scope of the Qualification Review	X
IV	Documentation Not Made Available	____

mild environment

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 25

Pump manufacturer recommends the following greases:

Shell Oil Co. – Darina EP #2
Mobil Oil Co – Mobilux EP #2
Phillips Petroleum Co. – Philube EP #2
Std. Oil of Ca. – Chevron Industrial Grease – Heavy
Union Oil Co – Royal Unoba #2
Texaco Inc – Multifak #2
Atlantic Richfield Oil Co – Recolube #2 MP

AEP uses Mobilux No. 2 grease.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 26

EQUIPMENT ITEM NO. 26
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 573'0"
MOBIL MODEL DTE OIL MEDIUM
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 26
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): CONTAINMENT SPRAY PUMP MOTOR/LUBRICATION (PP-009)
LICENSEE SUBMITTAL: SCEW(S): G3 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 26

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 26

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	X
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 26

NOTES:

(1) PSR #19, "Letter of 4/17/80 from J.M. Allen (Mobil Oil Corp.) to Allen Feibelman (AEP)" states that the lubricant types, including (a) Mobil DTE 797, (b) Mobil DTE Named Oils, (c) Mobil Vapratec Light, (d) Mobilux 1, 2 and (e) Mobilux EP 0, 1, 2, are suitable for radiation doses up to 10^8 rads. This letter was cited by the Licensee as the basis for radiation and temperature qualification for this equipment item. PSR #19 does not address the thermal environment and therefore is not an applicable data source. Regarding the thermal capability of the lubricant, the Licensee provides the ratings of the lubricant, i.e. continuous service temperature and flash point, as its qualified temperature. No supporting documentation for substantiating the stated capabilities for temperature and radiation was provided by the Licensee. Further, the Licensee did not provide any correlation regarding the impact of characteristic deviations, resulting from exposure to the environments, on the performance of the equipment employing the lubricant.

(2) The Licensee provided no documentation concerning the aging characteristics or life for this equipment item. Further, no corrective action regarding periodic inspection or replacement of the lubricant was provided.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 27

EQUIPMENT ITEM NO. 27
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 587'0"
MOBIL MODEL DTE OIL HEAVY MEDIUM
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 27
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): SAFETY INJECTION PUMP MOTOR/LUBRICATION (PP-026)
LICENSEE SUBMITTAL: SCEW(S): G8 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, (A), S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

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Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 27

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 27

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	X
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 27

Motor manufacturer recommends oil with viscosity of 180 to 220 SSU @ 100°F. } AEP uses Mobil D.T.E. Oil Heavy Medium.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 27

NOTES:

(1) PSR #19, "Letter of 4/17/80 from J.M. Allen (Mobil Oil Corp.) to Allen Feibelman (AEP)" states that the lubricant types, including (a) Mobil DTE 797, (b) Mobil DTE Named Oils, (c) Mobil Vapratec Light, (d) Mobilux 1, 2 and (e) Mobilux EP 0, 1, 2, are suitable for radiation doses up to 10^8 rads. This letter was cited by the licensee as the basis for radiation and temperature qualification for this equipment item. PSR #19 does not address the thermal environment and therefore is not an applicable data source. Regarding the thermal capability of the lubricant, the licensee provides the ratings of the lubricant, i.e. continuous service temperature and flash point, as its qualified temperature. No supporting documentation for substantiating the stated capabilities for temperature and radiation were provided by the licensee. Further, the licensee did not provide any correlation regarding the impact of characteristic deviations, resulting from exposure to the environments, on the performance of the equipment employing the lubricant.

(2) The licensee provided no documentation concerning the aging characteristics or life for this equipment item. Further, no corrective action regarding periodic inspection or replacement of the lubricant was provided.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 28

EQUIPMENT ITEM NO. 28
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 573'0"
MOBIL MODEL MOBILUX 2
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 28
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): CONTAINMENT SPRAY PUMP MOTOR/LUBRICATION (PP-009)
LICENSEE SUBMITTAL: SCEW(S): G4 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, (A), S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

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Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 28

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 28

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	X
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 28

NOTES:

(1) PSR #19, "Letter of 4/17/80 from J.M. Allen (Mobil Oil Corp.) to Allen Feibelman (AEP)" states that the lubricant types, including (a) Mobil DTE 797, (b) Mobil DTE Named Oils, (c) Mobil Vapratec Light, (d) Mobilux 1, 2 and (e) Mobilux EP 0, 1, 2, are suitable for radiation doses up to 10^8 rads. This letter was cited by the licensee as the basis for radiation and temperature qualification for this equipment item. PSR #19 does not address the thermal environment and therefore is not an applicable data source. Regarding the thermal capability of the lubricant, the licensee provides the ratings of the lubricant; i.e. continuous service temperature and drop point, as its qualified temperature. No supporting documentation for substantiating the stated capabilities for temperature and radiation were provided by the licensee. Further, the licensee did not provide any correlation regarding the impact of characteristic deviations, resulting from exposure to the environments, on the performance of the equipment employing the lubricant.

(2) The licensee provided no documentation concerning the aging characteristics or life for this equipment item. Further, no corrective action regarding periodic inspection or replacement of the lubricant was provided.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 29

EQUIPMENT ITEM NO. 29
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 609'6"
MOBIL MODEL DTE 797 OIL
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 29
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): COMPONENT COOLING WATER PUMP/LUBRICATION (PP-010)
LICENSEE SUBMITTAL: SCEW(S): G5 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

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Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 29

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 29

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	____
Adequate Similarity Between Equipment and Test Specimen Established	____
Aging Degradation Evaluated Adequately	____
Qualified Life or Replacement Schedule Established (If Required)	____
Program Established to Identify Aging Degradation	____
Criteria Regarding Aging Simulation Satisfied (If Required)	____
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	____
o Peak Pressure Adequate	____
o Duration Adequate	____
o Required Profile Enveloped Adequately	____
o Steam Exposure (If Required) Adequate	____
Criteria Regarding Spray Satisfied	____
Criteria Regarding Submergence Satisfied	____
Criteria Regarding Radiation Satisfied	____
Criteria Regarding Test Sequence Satisfied	____
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	____
Criteria Regarding Functional Testing Satisfied	____
Criteria Regarding Instrument Accuracy Satisfied	____
Test Duration Margin (1 hour + Function Time) Satisfied	____
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	____

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	____
I.b	Equipment Qualification Pending Modification	____
II.a	Equipment Qualification Not Established	____
II.b	Equipment Not Qualified	____
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	____
III.a	Equipment Exempt From Qualification	____
III.b	Equipment Not in the Scope of the Qualification Review	X
IV	Documentation Not Made Available	____

mild environment

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 29

Pump Manufacturer recommends oil with characteristics:

Oil Characteristic	Naptheme Base	Paraffin Base
Flash Point	300°F, min	360°F, min
Saybolt Viscosity 100°F	150 sec, min 200 sec, max	140 sec, min 185 sec, max
Pour Point	50°F max	30°F, max

AEP uses Mobil D.T.E 797 Oil, a paraffinic oil which meets mfgr specifications.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 30

EQUIPMENT ITEM NO. 30
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 587'0"
MOBIL MODEL DTE 797
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 30
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): SAFETY INJECTION PUMP/LUBRICATION (PP-026)
LICENSEE SUBMITTAL: SCEW(S): G7 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

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Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 30

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 30

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	X
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 30

Pump manufacturer recommends high grade turbine oil with a viscosity of 150 SSU @ 100°F. } AEP uses Mobil DTE 797 oil which meets listed spec.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 30

NOTES:

(1) PSR #19, "Letter of 4/17/80 from J.M. Allen (Mobil Oil Corp.) to Allen Feibelman (AEP)" states that the lubricant types, including (a) Mobil DTE 797, (b) Mobil DTE Named Oils, (c) Mobil Vapratec Light, (d) Mobilux 1, 2 and (e) Mobilux EP 0, 1, 2, are suitable for radiation doses up to 10^8 rads. This letter was cited by the Licensee as the basis for radiation and temperature qualification for this equipment item. PSR #19 does not address the thermal environment and therefore is not an applicable data source. Regarding the thermal capability of the lubricant, the Licensee provides the ratings of the lubricant, i.e.

flash point temperature , , ; as its qualified temperature. No supporting documentation for substantiating the stated capabilities for temperature and radiation was provided by the Licensee. Further, the Licensee did not provide any correlation regarding the impact of characteristic deviations, resulting from exposure to the environments, on the performance of the equipment employing the lubricant.

(2) The Licensee provided no documentation concerning the aging characteristics or life for this equipment item. Further, no corrective action regarding periodic inspection or replacement of the lubricant was provided.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 31

EQUIPMENT ITEM NO. 31
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 573'0"
MOBIL MODEL MOBILUX 2
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 31
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): RHR PUMP MOTOR/LUBRICATION (PP-035)
LICENSEE SUBMITTAL: SCEW(S): G9 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 31

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 31

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	X
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 31

Motor Manufacturer recommends Westinghouse Grease #55272-BA } AEP uses Mobilux No. 2 Grease, recommended by Mobil as a suitable substitute.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 31

NOTES:

(1) PSR #19, "Letter of 4/17/80 from J.M. Allen (Mobil Oil Corp.) to Allen Feibelman (AEP)" states that the lubricant types, including (a) Mobil DTE 797, (b) Mobil DTE Named Oils, (c) Mobil Vaprotec Light, (d) Mobilux 1, 2 and (e) Mobilux EP 0, 1, 2, are suitable for radiation doses up to 10^8 rads. This letter was cited by the licensee as the basis for radiation and temperature qualification for this equipment item. PSR #19 does not address the thermal environment and therefore is not an applicable data source. Regarding the thermal capability of the lubricant, the licensee provides the ratings of the lubricant, i.e. continuous service temperature and drop point, as its qualified temperature. No supporting documentation for substantiating the stated capabilities for temperature and radiation were provided by the licensee. Further, the licensee did not provide any correlation regarding the impact of characteristic deviations, resulting from exposure to the environments, on the performance of the equipment employing the lubricant.

(2) The licensee provided no documentation concerning the aging characteristics or life for this equipment item. Further, no corrective action regarding periodic inspection or replacement of the lubricant was provided.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 32

EQUIPMENT ITEM NO. 32
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 587'0"
MOBIL MODEL DTE OIL HEAVY MEDIUM
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 32
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): CCW PUMP/LUBRICATION (PP-050)
LICENSEE SUBMITTAL: SCEW(S): G10 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

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System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 32

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 37

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	X
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 32

Pump manufacturer recommends using high grade mineral oil of the turbine type, having viscosity of 150-250 SSU @ 100°F.

Motor manufacturer recommends bearing oil with a viscosity of 200 SSU @ 100°F

Gear case manufacturer recommends oil with viscosity of 180-200 SSU @ 110°F

AEP uses Mobil O.T.E Oil Heavy Medium.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 32

NOTES:

(1) PSR #19, "Letter of 4/17/80 from J.M. Allen (Mobil Oil Corp.) to Allen Feibelman (AEP)" states that the lubricant types, including (a) Mobil DTE 797, (b) Mobil DTE Named Oils, (c) Mobil Vapratec Light, (d) Mobilux 1, 2 and (e) Mobilux EP 0, 1, 2, are suitable for radiation doses up to 10^8 rads. This letter was cited by the licensee as the basis for radiation and temperature qualification for this equipment item. PSR #19 does not address the thermal environment and therefore is not an applicable data source. Regarding the thermal capability of the lubricant, the licensee provides the ratings of the lubricant, i.e. continuous service temperature and flash point, as its qualified temperature. No supporting documentation for substantiating the stated capabilities for temperature and radiation was provided by the licensee. Further, the licensee did not provide any correlation regarding the impact of characteristic deviations, resulting from exposure to the environments, on the performance of the equipment employing the lubricant.

(2) The licensee provided no documentation concerning the aging characteristics or life for this equipment item. Further, no corrective action regarding periodic inspection or replacement of the lubricant was provided.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 33

EQUIPMENT ITEM NO. 33
PRESSURE TRANSMITTER LOCATED OUTSIDE CONTAINMENT
FOXBORO MODEL E11GMHSHD1
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 33
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): FIRST STAGE TURBINE PRESSURE (MPC 253, 254)
LICENSEE SUBMITTAL: SCEW(S): I13, I14 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

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System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 33

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

___ The Licensee (has/has not) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

X The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 33

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	____
Adequate Similarity Between Equipment and Test Specimen Established	____
Aging Degradation Evaluated Adequately	____
Qualified Life or Replacement Schedule Established (If Required)	____
Program Established to Identify Aging Degradation	____
Criteria Regarding Aging Simulation Satisfied (If Required)	____
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	____
o Peak Pressure Adequate	____
o Duration Adequate	____
o Required Profile Enveloped Adequately	____
o Steam Exposure (If Required) Adequate	____
Criteria Regarding Spray Satisfied	____
Criteria Regarding Submergence Satisfied	____
Criteria Regarding Radiation Satisfied	____
Criteria Regarding Test Sequence Satisfied	____
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	____
Criteria Regarding Functional Testing Satisfied	____
Criteria Regarding Instrument Accuracy Satisfied	____
Test Duration Margin (1 hour + Function Time) Satisfied	____
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	____

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	____
I.b	Equipment Qualification Pending Modification	____
II.a	Equipment Qualification Not Established	____
II.b	Equipment Not Qualified	____
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	____
III.a	Equipment Exempt From Qualification	X
III.b	Equipment Not in the Scope of the Qualification Review	____
IV	Documentation Not Made Available	____

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 33

DONALD C. COOK NUCLEAR PLANT UNITS NO. 1 & 2 DOCKETS NO. 50-315 & 50-316 LICENSES NO. DPR-58 & DPR-74

EQUIPMENT DESCRIPTION	ENVIRONMENT PARAMETER	ENVIRONMENT SPEC.	ENVIRONMENT QUAL.	LOCATION SPEC.	LOCATION QUAL.	QUALIFICATION METHOD	OUTSTANDING ITEMS
SYSTEM: MAIN STEAM & FEEDWATER PLANT ID NO: MPC-253 & -254 COMPONENT: PRESSURE TRANSMITTER MANUFACTURER: FOXBORO MODEL NUMBER: E11GM-HSH01 FUNCTION: NORMAL MONITOR FUNCTION ACCURACY: SPEC: DESIGN: SERVICE: FIRST STAGE PRESSURE LOCATION: OUTSIDE CONTAINMENT FLOOD LEVEL ELEV: N/A ABOVE FLOOD LEVEL:	Operating Time	N.O	—	—	—	—	—
	Temperature (°F)						
	Pressure (PSIA)						
	Relative Humidity (%)						
	Chemical Spray	NOT APPLICABLE					
	Radiation (10^8 rads)						
	Aging (years)						
	Submergence	N.O	—	—	—	—	—

*Documentation References:

Notes:

THESE DEVICES WERE INCLUDED IN THE FIRST SUBMITTAL OF IEB 79-01B TO ACCOUNT FOR DEVICES REFERENCED BY MSLS ACCIDENT ANALYSIS. THESE DEVICES ARE NOT REQUIRED EQUIPMENT DUE TO THE Q.022.16 EXCLUSION OF THE HEATSINK DEVICES. THE REFERENCED THESE DEVICES POSSESS A CONDITIONAL LOSS FOR 14 HOURS AFTER THE HEATSINK EXCLUSION OF THE DETECTORS CAUSES EXCLUSION OF THESE DEVICES.

PROD 12, 11, 12
AEP:NRC:00573

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 33

SYSTEM CONSIDERATION REVIEW

The Licensee has stated that this equipment item does not require environmental qualification and/or should be exempted from qualification. The Licensee's rationale has been evaluated and the reasons for concurrence/ ~~non-concurrence~~ with the technical basis of the Licensee's position are presented below.

Reason for Concurrence

X Equipment does not provide a safety function or mitigate the consequences of a design basis accident. Equipment Environmental Qualification is not required by the DOR Guidelines. (NRC Qualification Evaluation Category IIIa)

___ Equipment is not exposed to a harsh environment by the accident it is intended to mitigate. See note (1) on page 4b. (NRC Qualification Evaluation Category IIIb)

___ Backup (equipment/system) is available which completely performs the safety function. The backup (equipment/system) is environmentally qualified and appears to meet single active failure criterion. See note (1) on page 4b. (NRC Qualification Evaluation Category IIIa)

Reason for Non-Concurrence

___ Backup (equipment/system) is not fully capable of performing the intended safety function or accident mitigating function.

___ Backup (equipment/system) is not environmentally qualified and can be exposed to a hostile environment simultaneously with the primary equipment.

___ Backup (equipment/system) is subject to a potentially disabling single active failure.

___ Failure of the primary equipment can compromise the ability of other safety-related equipment to perform its specified safety function.

___ Failure of the primary equipment can result in erroneous indication which could mislead an operator.

___ Requirement for continued functioning throughout the post-accident period necessitates environmental qualification.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 34

EQUIPMENT ITEM NO. 34
PRESSURE TRANSMITTER LOCATED OUTSIDE CONTAINMENT
FOXBORO MODEL E11GMHSAE1 MCA
REQUIRED OPERATING TIME: 5 SECONDS/4 MONTHS
TER CHECKSHEET NO. 34
LICENSEE REFERENCE(S): 3832
FUNCTION (PLANT ID): MAIN STEAM PRESSURE/POST ACCIDENT AND NORMAL MONITOR AND ACTUATION (MPP210, 211, 220, 221, 230, 240, 241)
LICENSEE SUBMITTAL: SCEW(S): I15, I14 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

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System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 34

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (nas/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 34

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	X
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 34

NOTES: The referenced test report states

TABLE 2

Accident Conditions vs. Foxboro Test Conditions

Parameter	Accident Conditions	Tested Conditions
Temperature	< 250°F	318°F
Pressure	< 14.4 psig	75 psig
Radiation	< 6×10^4 rads	> 5×10^7 rads

Radiation test results for the N0148PD 10-50 Ma amplifier from the T3-1068 Foxboro report provide instrument errors at an integrated dose of 1×10^5 rads that are less than ± 0.2%. The Foxboro Report Q-9005 indicates that during exposure to the 318°F, 90 psia conditions instrument errors for the E11GM MCA transmitter were approximately -2 to -5%. Correcting this value to account for ambient pressure change (the transmitter was vented) leads to an error of -9.5 to -12.5%. As can be seen, the errors due to either radiation or steam/temperature/pressure meet the accuracy requirement of + 10% established for this function.

However no ageing evaluation nor qualified life has been established

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 35

EQUIPMENT ITEM NO. 35
PRESSURE TRANSMITTER LOCATED OUTSIDE CONTAINMENT
FOXBORO MODEL E11GMHSAE1
REQUIRED OPERATING TIME: 5 SECONDS/4 MONTHS
TER CHECKSHEET NO. 35
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): MAIN STEAM PRESSURE/POST ACCIDENT AND NORMAL MONITOR AND ACTUATION (MPP-212, 222, 232, 242)
LICENSEE SUBMITTAL: SCEW(S): I16, I15 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	4a, ~~4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 35

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

X The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 13

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	____
Adequate Similarity Between Equipment and Test Specimen Established	____
Aging Degradation Evaluated Adequately	____
Qualified Life or Replacement Schedule Established (If Required)	____
Program Established to Identify Aging Degradation	____
Criteria Regarding Aging Simulation Satisfied (If Required)	____
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	____
o Peak Pressure Adequate	____
o Duration Adequate	____
o Required Profile Enveloped Adequately	____
o Steam Exposure (If Required) Adequate	____
Criteria Regarding Spray Satisfied	____
Criteria Regarding Submergence Satisfied	____
Criteria Regarding Radiation Satisfied	____
Criteria Regarding Test Sequence Satisfied	____
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	____
Criteria Regarding Functional Testing Satisfied	____
Criteria Regarding Instrument Accuracy Satisfied	____
Test Duration Margin (1 hour + Function Time) Satisfied	____
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	____

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	____
I.b	Equipment Qualification Pending Modification	____
II.a	Equipment Qualification Not Established	____
II.b	Equipment Not Qualified	____
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	____
III.a	Equipment Exempt From Qualification	X
III.b	Equipment Not in the Scope of the Qualification Review	____
IV	Documentation Not Made Available	____

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 35

LICENSEE RESPONSE TO NRC SER

1. Notes: THE ARRANGEMENT OF THE DIFFERENTIAL PRESSURE BETWEEN STEAMLINES LOGIC IS SUCH THAT FAILURE OF THESE DEVICES COUPLED WITH A SINGLE FAILURE WILL STILL GENERATE THE ACCIDENT ANALYSIS ASSUMED OPERATION. THEREFORE CONTROL GRADE HARDWARE IS ACCEPTABLE. ACCIDENT ANALYSIS SECTION IS 19.2.5.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 35

SYSTEM CONSIDERATION REVIEW

The Licensee has stated that this equipment item does not require environmental qualification and/or should be exempted from qualification. The Licensee's rationale has been evaluated and the reasons for concurrence/ ~~non-concurrence~~ with the technical basis of the Licensee's position are presented below.

Reason for Concurrence

___ Equipment does not provide a safety function or mitigate the consequences of a design basis accident. Equipment Environmental Qualification is not required by the DOR Guidelines. (NRC Qualification Evaluation Category IIIa)

___ Equipment is not exposed to a harsh environment by the accident it is intended to mitigate. See note (1) on page 4b. (NRC Qualification Evaluation Category IIIb)

X Backup (equipment/system) is available which completely performs the safety function. The backup (equipment/system) is environmentally qualified and appears to meet single active failure criterion. ~~See note (1) on page 4b.~~ (NRC Qualification Evaluation Category IIIa)

Reason for Non-Concurrence

___ Backup (equipment/system) is not fully capable of performing the intended safety function or accident mitigating function.

___ Backup (equipment/system) is not environmentally qualified and can be exposed to a hostile environment simultaneously with the primary equipment.

___ Backup (equipment/system) is subject to a potentially disabling single active failure.

___ Failure of the primary equipment can compromise the ability of other safety-related equipment to perform its specified safety function.

___ Failure of the primary equipment can result in erroneous indication which could mislead an operator.

___ Requirement for continued functioning throughout the post-accident period necessitates environmental qualification.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 36

EQUIPMENT ITEM NO. 36
PRESSURE TRANSMITTER LOCATED IN THE CONTAINMENT
ITT BARTON MODEL 763
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 36
LICENSEE REFERENCE(S): 639, 3836
FUNCTION (PLANT ID): PRESSURIZER PRESSURE/POST ACCIDENT AND NORMAL MONITOR AND ACTUATION (NPP-151, 152, 153)
LICENSEE SUBMITTAL: SCEW(S): I19, I20, I21 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j, 5k, 5l
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 36

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not)~~ provided a response to the SER concerns.

X The Licensee (has/~~has not)~~ specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 36

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	X
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 36

Checksheets 5a thru 5l have been removed due to the proprietary nature of information contained therein.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 37

EQUIPMENT ITEM NO. 37
PRESSURE TRANSMITTER LOCATED IN THE CONTAINMENT
ITT BARTON MODEL 763
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 37
LICENSEE REFERENCE(S): 38
FUNCTION (PLANT ID): PRESSURIZER PRESSURE/LONG TERM MONITORING (NPS-153)
LICENSEE SUBMITTAL: SCEW(S): I24, I25 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, F, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 37

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 37

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	X
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

For detailed evaluation
refer to item 36

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 38

EQUIPMENT ITEM NO. 38
D/P TRANSMITTER LOCATED IN THE CONTAINMENT
ITT BARTON MODEL 764
REQUIRED OPERATING TIME: 5 SECONDS
TER CHECKSHEET NO. 38
LICENSEE REFERENCE(S): 3836
FUNCTION (PLANT ID): MAIN STEAM FLOW/ACTUATION AND NORMAL MONITORING (MFC-110, 111, 120, 121, 130, 131, 140, 141)
LICENSEE SUBMITTAL: SCEW(S): I12 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 38

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 38

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	X
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	X
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

For detailed evaluation refer to item 36.
In addition no data on submergence is available.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 39

EQUIPMENT ITEM NO. 39
D/P TRANSMITTER LOCATED IN THE CONTAINMENT
ITT BARTON MODEL 764
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 39
LICENSEE REFERENCE(S): 3836
FUNCTION (PLANT ID): PRESSURIZER LEVEL/POST ACCIDENT AND NORMAL MONITORING (NLP-151, NLP-152, NLP-153)
LICENSEE SUBMITTAL: SCEW(S): I18 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, (T), (QT), RT, (P), H, (CS), (A), (S), (R), (M), I, (QM), RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 39

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 39

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	X
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

For detailed evaluation refer to item 36

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 40

EQUIPMENT ITEM NO. 40
D/P TRANSMITTER LOCATED IN THE CONTAINMENT
ITT BARTON MODEL 764
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 40
LICENSEE REFERENCE(S): 3836
FUNCTION (PLANT ID): STEAM GENERATOR LEVEL/POST ACCIDENT AND NORMAL MONITORING (BLP-110, 111, 112, 120, 121, 122, 130, 131, 132, 140, 141, 142)
LICENSEE SUBMITTAL: SCEW(S): I1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R) M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 40

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 40

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	X
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	X
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

For detailed evaluation
refer to item 36
In addition there is no data on
submergence

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 41

EQUIPMENT ITEM NO. 41
D/P TRANSMITTER LOCATED OUTSIDE CONTAINMENT
FOXBORO MODEL E13DMHSAM1
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 41
LICENSEE REFERENCE(S): 710
FUNCTION (PLANT ID): RHR FLOW HEAT EXCHANGER OUTLET/MONITORING (IFI-310, 320)
LICENSEE SUBMITTAL: SCEW(S): I11, I10 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	4a, ~~4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 41

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

X The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 41

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	____
Adequate Similarity Between Equipment and Test Specimen Established	____
Aging Degradation Evaluated Adequately	____
Qualified Life or Replacement Schedule Established (If Required)	____
Program Established to Identify Aging Degradation	____
Criteria Regarding Aging Simulation Satisfied (If Required)	____
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	____
o Peak Pressure Adequate	____
o Duration Adequate	____
o Required Profile Enveloped Adequately	____
o Steam Exposure (If Required) Adequate	____
Criteria Regarding Spray Satisfied	____
Criteria Regarding Submergence Satisfied	____
Criteria Regarding Radiation Satisfied	____
Criteria Regarding Test Sequence Satisfied	____
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	____
Criteria Regarding Functional Testing Satisfied	____
Criteria Regarding Instrument Accuracy Satisfied	____
Test Duration Margin (1 hour + Function Time) Satisfied	____
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	____

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	____
I.b	Equipment Qualification Pending Modification	____
II.a	Equipment Qualification Not Established	____
II.b	Equipment Not Qualified	____
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	____
III.a	Equipment Exempt From Qualification	____
III.b	Equipment Not in the Scope of the Qualification Review	X
IV	Documentation Not Made Available	____

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 41

LICENSEE RESPONSE TO NRC SER

DONALD C. COOK NUCLEAR PLANT UNITS NO. 1 & 2 — DOCKETS NO. 50-315 & 50-316 — LICENSES NO. DRR-58 & DPR-74

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.*		QUALIFICATION METHOD	OUTSTANDING ITEMS
ECCS	PARAMETER	SPEC.	QUAL.	SPEC.	QUAL.		
SYSTEM: EMERGENCY CORE COOLING PLANT ID NO: TFI-310, -320 COMPONENT: DIFFERENTIAL PRESSURE TRANSMITTER MANUFACTURER: FOXBORO MODEL NUMBER: E13DM-HSAMI FUNCTION: MONITORING ACCURACY: SPEC: FUNCTIONAL DEMON: ± 6% SERVICE: RHR FLOW HEAT EXCHANGER OUTLET LOCATION: OUTSIDE CONTAINMENT FLOOD LEVEL ELEV: N/A ABOVE FLOOD LEVEL:	Operating Time	4 MONTHS	4 MONTHS	[illegible]	[illegible]	SEPARATE EFFECTS TRANSIENT REVIEW	NONE
	Temperature (°F)	110	180	~~[illegible]~~ 2	[illegible]	ENGINEERING REVIEW	NONE
	Pressure (PSIA)	14.7	14.7	~~[illegible]~~ 2	[illegible] 3	ENGINEERING REVIEW	NONE
	Relative Humidity (%)	90% DRY BULB 76°F WET BULB	NEMA 4 WATERTIGHT	~~[illegible]~~ 2	[illegible] 2	ENGINEERING REVIEW	NONE
	Chemical Spray	NA	NA				NONE
	Radiation (10^6 rads)	~~NA (M)~~ NOTE 1	~~NA (M)~~	~~NA~~ (M)	~~NOTE (M)~~	ENGINEERING REVIEW	NONE
	Aging (years)						
	Submergence	NA	NA				NONE

*Documentation References: UNLESS OTHERWISE NOTED ALL REFERENCES ARE FSAR SECTIONS.
MNTR-111 - FOXBORO GENERAL SPECIFICATION GS-2A-1C1E

Notes: (1) LOCATION OF TRANSMITTER IS OUTSIDE ROOM FOR WHICH RADIATION SOURCE IS GENERATED THEREFORE SHIELDED FROM EFFECT

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 41

SYSTEM CONSIDERATION REVIEW

The Licensee has stated that this equipment item does not require environmental qualification and/or should be exempted from qualification. The Licensee's rationale has been evaluated and the reasons for concurrence/ ~~non-concurrence~~ with the technical basis of the Licensee's position are presented below.

Reason for Concurrence

___ Equipment does not provide a safety function or mitigate the consequences of a design basis accident. Equipment Environmental Qualification is not required by the DOR Guidelines. (NRC Qualification Evaluation Category IIIa)

X Equipment is not exposed to a harsh environment by the accident it is intended to mitigate. ~~See note (1) on page 4b.~~ (NRC Qualification Evaluation Category IIIb)

___ Backup (equipment/system) is available which completely performs the safety function. The backup (equipment/system) is environmentally qualified and appears to meet single active failure criterion. See note (1) on page 4b. (NRC Qualification Evaluation Category IIIa)

Reason for Non-Concurrence

___ Backup (equipment/system) is not fully capable of performing the intended safety function or accident mitigating function.

___ Backup (equipment/system) is not environmentally qualified and can be exposed to a hostile environment simultaneously with the primary equipment.

___ Backup (equipment/system) is subject to a potentially disabling single active failure.

___ Failure of the primary equipment can compromise the ability of other safety-related equipment to perform its specified safety function.

___ Failure of the primary equipment can result in erroneous indication which could mislead an operator.

___ Requirement for continued functioning throughout the post-accident period necessitates environmental qualification.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 42

EQUIPMENT ITEM NO. 42
D/P TRANSMITTER LOCATED OUTSIDE CONTAINMENT
ITT BARTON MODEL 332
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 42
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): RHR FLOW HEAT EXCHANGER OUTLET/MONITORING (IFI-311, 321)
LICENSEE SUBMITTAL: SCEW(S): I12 [12]
FUNCTION (PLANT ID): SIS PUMP DISCHARGE FLOW/MONITORING (IFI-260, 266)
LICENSEE SUBMITTAL: SCEW(S): I9, I10 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QI, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	4a, 4b, ~~4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 42

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

___ The Licensee (has/has not) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

X The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 43

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	____
Adequate Similarity Between Equipment and Test Specimen Established	____
Aging Degradation Evaluated Adequately	____
Qualified Life or Replacement Schedule Established (If Required)	____
Program Established to Identify Aging Degradation	____
Criteria Regarding Aging Simulation Satisfied (If Required)	____
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	____
o Peak Pressure Adequate	____
o Duration Adequate	____
o Required Profile Enveloped Adequately	____
o Steam Exposure (If Required) Adequate	____
Criteria Regarding Spray Satisfied	____
Criteria Regarding Submergence Satisfied	____
Criteria Regarding Radiation Satisfied	____
Criteria Regarding Test Sequence Satisfied	____
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	____
Criteria Regarding Functional Testing Satisfied	____
Criteria Regarding Instrument Accuracy Satisfied	____
Test Duration Margin (1 hour + Function Time) Satisfied	____
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	____

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	____
I.b	Equipment Qualification Pending Modification	____
II.a	Equipment Qualification Not Established	____
II.b	Equipment Not Qualified	____
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	____
III.a	Equipment Exempt From Qualification	____
III.b	Equipment Not in the Scope of the Qualification Review	X
IV	Documentation Not Made Available	____

mild environment

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 43

2 Notes: a. LOCATION OF TRANSMITTER IS OUTSIDE ROOM FOR WHICH RADIATION SOURCE IS GENERATED THEREFORE SHIELDED FROM EFFECT.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 42

SYSTEM CONSIDERATION REVIEW

The Licensee has stated that this equipment item does not require environmental qualification and/or should be exempted from qualification. The Licensee's rationale has been evaluated and the reasons for concurrence/ ~~non-concurrence~~ with the technical basis of the Licensee's position are presented below.

Reason for Concurrence

___ Equipment does not provide a safety function or mitigate the consequences of a design basis accident. Equipment Environmental Qualification is not required by the DOR Guidelines. (NRC Qualification Evaluation Category IIIa)

X Equipment is not exposed to a harsh environment by the accident it is intended to mitigate. See note (1) on page 4b. (NRC Qualification Evaluation Category IIIb)

___ Backup (equipment/system) is available which completely performs the safety function. The backup (equipment/system) is environmentally qualified and appears to meet single active failure criterion. See note (1) on page 4b. (NRC Qualification Evaluation Category IIIa)

Reason for Non-Concurrence

___ Backup (equipment/system) is not fully capable of performing the intended safety function or accident mitigating function.

___ Backup (equipment/system) is not environmentally qualified and can be exposed to a hostile environment simultaneously with the primary equipment.

___ Backup (equipment/system) is subject to a potentially disabling single active failure.

___ Failure of the primary equipment can compromise the ability of other safety-related equipment to perform its specified safety function.

___ Failure of the primary equipment can result in erroneous indication which could mislead an operator.

___ Requirement for continued functioning throughout the post-accident period necessitates environmental qualification.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 42

Reason for Concurrence

___ The equipment's accident mitigating function is completed prior to the onset of the hostile environment. No subsequent functions are necessary. See note (1) below. (NRC Qualification Evaluation Category IIIb)

___ Other (see page___)

___ Resultant NRC Qualification Evaluation Category (IIIa/IIIb)

X Note 1: The Licensee (~~has~~/ has not) stated that failure of the primary equipment will not affect other safety-related equipment or cause an operator to be misled. (See page____)

Reason for Non-Concurrence

___ Although backup equipment is available, it is not technically sound to relinquish defense-in-depth for this function.

___ Backup (equipment/system) is not safety-related.

___ This equipment is necessary for the operator to ensure an ESF system is performing its intended safety function.

___ The rationale presented by the Licensee is not supported by objective technical evidence.

___ Other (see page___)

LICENSEE STATEMENT

See page 3a of this checksheet.

EVALUATION OF LICENSEE STATEMENT

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 43

EQUIPMENT ITEM NO. 43
D/P TRANSMITTER LOCATED OUTSIDE CONTAINMENT
FOXBORO MODEL E13DMHIMID
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 43
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): AUXILIARY FEEDWATER FLOW/MONITORING (FFI-210, 220, 230, 240)
LICENSEE SUBMITTAL: SCEW(S): I5, I4 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	6~~a, 6b~~
Maintenance and Replacement Schedule Summary	7a~~, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 43

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

X The Licensee (has/~~has not~~) proposed a corrective action for this equipment item whose qualification has not been fully established.

X Justification for interim operation (~~has~~/has not) been provided by the Licensee for this equipment item.

X Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
X Verify qualification by additional (testing/~~analysis~~)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

X The Licensee (has/~~has not~~) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action June 1982.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 43

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	X
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 43

Notes: (E) PRESENTLY INSTALLED DEVICES ARE PART OF THE QUALIFICATION TEST PROGRAM FOR UTILITY TRANSMITTER QUALIFICATION GROUP BEING PERFORMED TO MEET THE REQUIREMENTS ON NUREG 0578 ITEM 2.1.7.b. SEE REF: NRC: 00253 DATED OCT. 24 1979.

THESE DEVICES ARE NOT EXPOSED TO LOCA LONG TERM RADIATION EXPOSURE DOSES.

Page I5, I4 [12]

TEST COMPLETION IS ANTICIPATED IN JUNE 1982.

REF: NRC: 00578

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

EQUIPMENT ITEM NO. 44
D/P TRANSMIITER LOCATED OUTSIDE CONTAINMENT
FOXBORO MODEL E13DMHSAH1 (MCA)
REQUIRED OPERATING TIME: 25 SECONDS
TER CHECKSHEET NO. 44
LICENSEE REFERENCE(S): 710
FUNCTION (PLANT ID): MAIN FEEDWATER FLOW/NORMAL MONITOR AND ACTUATION (FCC-210, 211, 220, 221, 230, 231, 240, 241)
LICENSEE SUBMITTAL: SCEW(S): I4, I3 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

(R), (T), QT, RT, (P), H, CS, (A), S, (R), (M), I, (QM), RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

LICENSEE RESPONSE TO NRC SER

Notes: 0.4.2 & 14.2.8 ARE THE ADVERSE ENVIRONMENT GENERATING ACCIDENT ANALYSIS FOR WHICH CREDIT IS ASSUMED FOR OPERATION OF THESE DEVICES.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

Criteria: DOR Guidelines X; NUREG-0588, Cat. I___; NUREG-0588, Cat. II ___.

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
EQUIPMENT DESCRIPTION			
Equipment Type	D/P Transmitter	D/P Transmitter	
Manufacturer's Name (5.2.2/-/-)	Foxboro	Foxboro	
Model Number (5.2.2/-/-)	E13DM-HSAM1 (MCA)	see page 5f.	
Serial Number	Not stated	Not stated	
Features/Mounting (5.2.6/-/-)	Not State	in authors	
Connections/Interfaces (5.2.6/-/-)	Not Stated	Not Stated	
Location/Elevation	outside containment	NA	
Equipment ID No.	see p. 1a	↓	
QUALIFICATION REPORT (8.0/5.0/5.0)			
Report ID Number	WCAP8541	WCAP 8541	
Report Date	7/75	July 1975	
Issued by	NA	Westinghouse	
Prepared for	↓	"	
Referenced Reports		N/A	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)		Test	
QUALIFICATION TEST PROGRAM			
Functional Test Description (5.2.5/2.2.9/2.2.9)		measure shifts & error	
Operating Conditions (-/2.2.10/2.2.10)		not applicable	
Load/Cycles/Voltage/ Current/Freq.		see pg 5f	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)	Not stated	Not stated	
Accuracy (5.2.5/-/-)		see page 5g	
Number of Specimens		see p-5f	
Test Instruments Calibrated		yes	
Safety Function (Active/Passive) (-/2.1.3/2.1.3)	Trip	Not stated	
Test Duration (5.2.1/-/-)	NA	1+ hours	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	126 days	NA	
Required Function Time	25 sec	Back time Steam Functional.	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)			
Test Sequence (NUREG-0588, Cat. I, (-/2.3.1/-)		Not stated	
1. Representative Sample			
2. Baseline Data			
3. Performance Extremes			
4. Thermal Aging			
5. Radiation Aging			
6. Wear Aging			
7. Vibration/Seismic			
8. DBE Exposure			
9. Post-DBE Exposure			
10. Inspection			
Aging (5.2.4, 7.0/4.0/4.0) Thermal Aging/Basis		None	X note 1
Material Aging Evaluation (7.0/-/-)		"	"
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)			
Radiation Aging, Type	N/A.	N/A	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	N/A	N/A	
Radiation Aging, Dose Rate			
Radiation Aging, Method			
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)			
Operational Aging (-/4.2/-)			
Other Age Conditioning (-/4.2/-)			
Qualified Life Claimed/ Established (5.2.4/4.10/-)	not stated	Not Stated	
Normal Ambient Temperature	Not stated		
Normal Ambient Radiation			
Normal Ambient Humidity			
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	DC Cook Program		
On-Going Analysis of Failures and Degradation (7.0/-/-)			
Margin (General) (6.0/3.0/3.0)			
Margin (NUREG-0588, Cat. I) (-/3.2/-) 1. Temperature (+15°F) 2. Pressure (+10%, 10 psig max) 3. Radiation (not required) 4. Time (+10%, +1 hour + function time minimum)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
ACCIDENT CONDITIONS			
LOCA/MSLB/HELB/Uncontrolled (4.1, 4.2, 4.3.1, 4.3.3/ 1.1, 1.2, 1.5/1.1, 1.2, 1.5)	N/A	N/A	
Radiation Type			
Radiation Dose (rd) (4.1.2/1.4/1.4)			
Radiation Dose Rate (rd/hr) Radiation Qual. Method (5.3.1/-/-)			
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)			
Equipment Susceptible to Beta Radiation (4.1.2/-/-)			
Radiation Dose (Normal + Accident) (4.1.2/-/-)			
Plateout Dose Considered (-/1.48/1.48)			
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS			
Rate of Temp./Press. Increase			
Peak: °F/psig/RH/Time	223°F/5psi Not stated	318 F @ 90 psi for 1 hr.	Note 2
Decrease To: °F/psig/RH/Time			
Decrease To: °F/psig/RH/Time			
Decrease To: °F/psig/RH/Time			
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)	N/A	N/A	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)			
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)			
Spray Density (gpm/ft^2)			
Spray Duration			
Submergence Duration (4.1.3/2.2.5/2.2.5)			
In-Leakage Considered (5.2.6, 5.3.2/-/-)			
Time to Submergence			
Dust Environment (-/2.2.11/2.2.11)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

NOTES:

1.0 DESCRIPTION OF ITEMS TESTED

The items tested were:

1.1 E13DM-KAM-2 d/p Transmitters with special modification to meet MCA test requirements. Input range: 0 - 100" H_2O. Output: 10 - 50 mA dc. Supply Voltage: 63 - 95 V dc.

1.2 E11GM-SAB-2 Gauge Pressure Transmitters with special modifications to meet MCA test requirements. Input range: 0 - 100 psi. Output: 10 - 50 mA dc. Supply Voltage: 63 - 95 V dc.

1.3 E11GH Gauge Pressure Transmitter with special modifications to meet MCA test requirements. Input range: 0 - 1000 psi. Output: 10 - 50 mA dc. Supply Voltage: 63 - 95 V dc.

1.4 Modifications required to meet MCA requirements are in Special Instruction Sheet 1-00209 for E13 and E11 transmitters.

2.0 OBJECTIVE

To determine the performance characteristics of the subject transmitters when subjected to an MCA-Air-Steam Environment.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

NOTES:

6.0 TEST RESULTS

6.1 E13DM-KAM2 d/p Transmitters

(Shifts referenced to 80F calibration)

Test Conditions 318F @ 90 psi (steam) 1 hr.

Ref. 80F Unit No.	1	2	3	4	5	6
Output Shift, % @ 50% output	-4.25	-3.33	-0.73	-3.10	-1.43	-2.65
Zero Shift, %	-0.80	-2.73	-0.73	-0.42	-1.45	-1.23
Span Change, %	-8.00	-0.70	<0.10	-2.00	<0.10	-1.64

Test Conditions 288F @ psia (steam) 12 hrs.

Output Shift, % @ 50% output	-4.60	-3.23	-1.10	-4.75	-2.31	-2.32
Zero Shift, %	NT	-2.73	-1.02	-3.40	-2.08	-2.50
Span Change, %	NT	-0.60	<0.10	-1.00	-0.18	+0.13

Test Conditions 80F Return Approximately 13 hrs.

Output Shift, % @ 50% output	+0.10	-0.10	-0.85	+0.10	-1.28	+0.10
Zero Shift, %	+0.40	+0.35	-1.00	<0.10	-0.20	-0.58
Span Change, %	-0.53	+0.55	+0.30	+0.24	-0.85	-0.20

NT -- Not Taken

Note 1 - No preaging was performed and no estimate of qualified life has been established

Note 2 - The test shows the instrument power supply located outside the test chamber. The licensee should establish whether the power supply is subjected to a harsh environment. Since the power supply is usually near the engineered safeguards room it is assumed that the

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44.

NOTES:

some environment would apply and the item would not be qualified

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 45

EQUIPMENT ITEM NO. 45
D/P TRANSMITTER LOCATED IN THE CONTAINMENT
FOXBORO MODEL E13DHHSAH1MCA
REQUIRED OPERATING TIME: 60 MINUTES
TER CHECKSHEET NO. 45
LICENSEE REFERENCE(S): 639, 710
FUNCTION (PLANT ID): BORON INJECTION TANK DISCHARGE FLOW/MONITORING (IFI-51, 52, 53, 54)
LICENSEE SUBMITTAL: SCEW(S): I6, I7, I8 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	4a, ~~4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 45

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

X The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
~~III.b Not in Scope~~
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 45

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	____
Adequate Similarity Between Equipment and Test Specimen Established	____
Aging Degradation Evaluated Adequately	____
Qualified Life or Replacement Schedule Established (If Required)	____
Program Established to Identify Aging Degradation	____
Criteria Regarding Aging Simulation Satisfied (If Required)	____
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	____
o Peak Pressure Adequate	____
o Duration Adequate	____
o Required Profile Enveloped Adequately	____
o Steam Exposure (If Required) Adequate	____
Criteria Regarding Spray Satisfied	____
Criteria Regarding Submergence Satisfied	____
Criteria Regarding Radiation Satisfied	____
Criteria Regarding Test Sequence Satisfied	____
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	____
Criteria Regarding Functional Testing Satisfied	____
Criteria Regarding Instrument Accuracy Satisfied	____
Test Duration Margin (1 hour + Function Time) Satisfied	____
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	____

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	____
I.b	Equipment Qualification Pending Modification	____
II.a	Equipment Qualification Not Established	____
II.b	Equipment Not Qualified	____
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	____
III.a	Equipment Exempt From Qualification	X
III.b	Equipment Not in the Scope of the Qualification Review	____
IV	Documentation Not Made Available	____

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 45

LICENSEE RESPONSE TO NRC SER

Notes: 1. NO SPECIFIC ACCIDENT ANALYSIS TAKES CREDIT FOR ASSUMED OPERATION OF THESE DEVICES. THEIR USE IS REFERENCED BY EMERGENCY OPERATING PROCEDURES.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 415

SYSTEM CONSIDERATION REVIEW

The Licensee has stated that this equipment item does not require environmental qualification and/or should be exempted from qualification. The Licensee's rationale has been evaluated and the reasons for concurrence/~~non-concurrence~~ with the technical basis of the Licensee's position are presented below.

Reason for Concurrence

X Equipment does not provide a safety function or mitigate the consequences of a design basis accident. Equipment Environmental Qualification is not required by the DOR Guidelines. (NRC Qualification Evaluation Category IIIa)

___ Equipment is not exposed to a harsh environment by the accident it is intended to mitigate. See note (1) on page 4b. (NRC Qualification Evaluation Category IIIb)

___ Backup (equipment/system) is available which completely performs the safety function. The backup (equipment/system) is environmentally qualified and appears to meet single active failure criterion. See note (1) on page 4b. (NRC Qualification Evaluation Category IIIa)

Reason for Non-Concurrence

___ Backup (equipment/system) is not fully capable of performing the intended safety function or accident mitigating function.

___ Backup (equipment/system) is not environmentally qualified and can be exposed to a hostile environment simultaneously with the primary equipment.

___ Backup (equipment/system) is subject to a potentially disabling single active failure.

___ Failure of the primary equipment can compromise the ability of other safety-related equipment to perform its specified safety function.

___ Failure of the primary equipment can result in erroneous indication which could mislead an operator.

___ Requirement for continued functioning throughout the post-accident period necessitates environmental qualification.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 46

EQUIPMENT ITEM NO. 46
D/P TRANSMITTER LOCATED OUTSIDE CONTAINMENT
TAYLOR MODEL 304TD00212
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 46
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): CONDENSATE STORAGE TANK LEVEL/MONITORING (CLR-110, 111)
LICENSEE SUBMITTAL: SCEW(S): I3, I2 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
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Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	4a, ~~4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 46

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

___ The Licensee (has/has not) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

X The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 46

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	____
Adequate Similarity Between Equipment and Test Specimen Established	____
Aging Degradation Evaluated Adequately	____
Qualified Life or Replacement Schedule Established (If Required)	____
Program Established to Identify Aging Degradation	____
Criteria Regarding Aging Simulation Satisfied (If Required)	____
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	____
o Peak Pressure Adequate	____
o Duration Adequate	____
o Required Profile Enveloped Adequately	____
o Steam Exposure (If Required) Adequate	____
Criteria Regarding Spray Satisfied	____
Criteria Regarding Submergence Satisfied	____
Criteria Regarding Radiation Satisfied	____
Criteria Regarding Test Sequence Satisfied	____
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	____
Criteria Regarding Functional Testing Satisfied	____
Criteria Regarding Instrument Accuracy Satisfied	____
Test Duration Margin (1 hour + Function Time) Satisfied	____
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	____

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	____
I.b	Equipment Qualification Pending Modification	____
II.a	Equipment Qualification Not Established	____
II.b	Equipment Not Qualified	____
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	____
III.a	Equipment Exempt From Qualification	____
III.b	Equipment Not in the Scope of the Qualification Review	X
IV	Documentation Not Made Available	____

mild environment

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 46

DONALD C. COOK NUCLEAR PLANT UNITS NO. 1 & 2 — DOCKET NO. 50-315 & 50-316 — LICENSES NO. DPR-58 & DPR-74

EQUIPMENT DESCRIPTION	PARAMETER	EQUIPMENT SPEC.	EQUIPMENT QUAL.	CONDITIONS SPEC.	CONDITIONS QUAL.	QUALIFICATION METHOD	OUTSTANDING ITEMS
SYSTEM: AUXILIARY FEEDWATER PLANT ID NO: CLR-110, 5-111 COMPONENT: DIFFERENTIAL PRESSURE TRANSMITTER MANUFACTURER: TAYLOR INSTRUMENT MODEL NUMBER: 309 TD 00 E12 FUNCTION: MONITORING ACCURACY: SPEC: DEMON: SERVICE: CONDENSATE STORAGE TANK LEVEL LOCATION: OUTSIDE CONTAINMENT FLOOD LEVEL ELEV: N/A ABOVE FLOOD LEVEL:	Operating Time						
	Temperature (°F)						
	Pressure (PSIA)						
	Relative Humidity (%)						
	Chemical Spray						
	Radiation (10^5 rads)						
	Aging (years)						
	Submergence						

NOT APPLICABLE

*Documentation reference:

Notes:

Notes: 1 THE TRANSMITTER IS LOCATED SUCH THAT NO SOURCE-TARGET INTERACTION OR HOVERCRAFT IMPACT WILL EFFECT IT. THE SIGNAL LINES ARE SUBJECT TO MSLB AND DBWLB ENVIRONMENTAL HOWEVER, FAILURE OF THE SIGNAL LINE (PNEUMATIC) CAUSES THE SIGNAL TO GO TO ZERO THERBY CAUSING THE OPERATOR TO SWITCH TO AUXILIARY FEEDWATER WHICH SOURCE.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 46

SYSTEM CONSIDERATION REVIEW

The Licensee has stated that this equipment item does not require environmental qualification and/or should be exempted from qualification. The Licensee's rationale has been evaluated and the reasons for concurrence/ ~~non-concurrence~~ with the technical basis of the Licensee's position are presented below.

Reason for Concurrence

___ Equipment does not provide a safety function or mitigate the consequences of a design basis accident. Equipment Environmental Qualification is not required by the DOR Guidelines. (NRC Qualification Evaluation Category IIIa)

X Equipment is not exposed to a harsh environment by the accident it is intended to mitigate. ~~See note (1) on page 4b.~~ (NRC Qualification Evaluation Category IIIb)

___ Backup (equipment/system) is available which completely performs the safety function. The backup (equipment/system) is environmentally qualified and appears to meet single active failure criterion. See note (1) on page 4b. (NRC Qualification Evaluation Category IIIa)

Reason for Non-Concurrence

___ Backup (equipment/system) is not fully capable of performing the intended safety function or accident mitigating function.

___ Backup (equipment/system) is not environmentally qualified and can be exposed to a hostile environment simultaneously with the primary equipment.

___ Backup (equipment/system) is subject to a potentially disabling single active failure.

___ Failure of the primary equipment can compromise the ability of other safety-related equipment to perform its specified safety function.

___ Failure of the primary equipment can result in erroneous indication which could mislead an operator.

___ Requirement for continued functioning throughout the post-accident period necessitates environmental qualification.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 47

EQUIPMENT ITEM NO. 47
D/P SWITCH LOCATED OUTSIDE CONTAINMENT
ITT BARTON MODEL 289A/199
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 47
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): RHR PUMP MINIMUM FLOW CONTROLLER/PUMP PROTECTION (IFC-315, -325)
LICENSEE SUBMITTAL: SCEW(S): I5 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	4a, ~~4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 47

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

X The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 47

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	____
Adequate Similarity Between Equipment and Test Specimen Established	____
Aging Degradation Evaluated Adequately	____
Qualified Life or Replacement Schedule Established (If Required)	____
Program Established to Identify Aging Degradation	____
Criteria Regarding Aging Simulation Satisfied (If Required)	____
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	____
o Peak Pressure Adequate	____
o Duration Adequate	____
o Required Profile Enveloped Adequately	____
o Steam Exposure (If Required) Adequate	____
Criteria Regarding Spray Satisfied	____
Criteria Regarding Submergence Satisfied	____
Criteria Regarding Radiation Satisfied	____
Criteria Regarding Test Sequence Satisfied	____
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	____
Criteria Regarding Functional Testing Satisfied	____
Criteria Regarding Instrument Accuracy Satisfied	____
Test Duration Margin (1 hour + Function Time) Satisfied	____
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	____

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	____
I.b	Equipment Qualification Pending Modification	____
II.a	Equipment Qualification Not Established	____
II.b	Equipment Not Qualified	____
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	____
III.a	Equipment Exempt From Qualification	____
III.b	Equipment Not in the Scope of the Qualification Review	X
IV	Documentation Not Made Available	____

mild environment

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 47

Notes: 1 (a) LOCATION OF PRESSURE SWITCH IS OUTSIDE ROOM CONTAINING RADIATION SOURCE AND IS THEREFORE SHIELDED FROM EFFECT.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 47

SYSTEM CONSIDERATION REVIEW

The Licensee has stated that this equipment item does not require environmental qualification and/or should be exempted from qualification. The Licensee's rationale has been evaluated and the reasons for concurrence/ ~~non-concurrence~~ with the technical basis of the Licensee's position are presented below.

Reason for Concurrence

___ Equipment does not provide a safety function or mitigate the consequences of a design basis accident. Equipment Environmental Qualification is not required by the DOR Guidelines. (NRC Qualification Evaluation Category IIIa)

X Equipment is not exposed to a harsh environment by the accident it is intended to mitigate. ~~See note (1) on page 4b.~~ (NRC Qualification Evaluation Category IIIb)

___ Backup (equipment/system) is available which completely performs the safety function. The backup (equipment/system) is environmentally qualified and appears to meet single active failure criterion. See note (1) on page 4b. (NRC Qualification Evaluation Category IIIa)

Reason for Non-Concurrence

___ Backup (equipment/system) is not fully capable of performing the intended safety function or accident mitigating function.

___ Backup (equipment/system) is not environmentally qualified and can be exposed to a hostile environment simultaneously with the primary equipment.

___ Backup (equipment/system) is subject to a potentially disabling single active failure.

___ Failure of the primary equipment can compromise the ability of other safety-related equipment to perform its specified safety function.

___ Failure of the primary equipment can result in erroneous indication which could mislead an operator.

___ Requirement for continued functioning throughout the post-accident period necessitates environmental qualification.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 48

EQUIPMENT ITEM NO. 48
LIMIT SWITCH LOCATED IN THE CONTAINMENT
NAMCO MODEL EA180
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 48
LICENSEE REFERENCE(S): 639, 898
FUNCTION (PLANT ID): PRESSURIZER PORV'S NRV-151, 152, 153/VALVE POSITION INDICATION
LICENSEE SUBMITTAL: SCEW(S): LS1-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, (RT), P, H, (CS), (A), S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f1, 5f2, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 48

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not)~~ provided a response to the SER concerns.

X The Licensee (has/~~has not)~~ specifically stated that the equipment is qualified and~~/or~~ will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 48

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	X
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 48

es:
to be installed as per NUREG 578

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 48

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

Criteria: DOR Guidelines ___; NUREG-0588, Cat. I X; NUREG-0588, Cat. II ___.

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
EQUIPMENT DESCRIPTION			
Equipment Type	Limit Switch	Limit Switch	
Manufacturer's Name (5.2.2/-/-)	NAMCO	NAMCO Controls	
Model Number (5.2.2/-/-)	EA 180	EA-180, Type 23	
Serial Number	Not stated	EA-180-11302,Rev.-D	
Features/Mounting (5.2.6/-/-)	on Valve	Horizontal in Autoclave	
Connections/Interfaces (5.2.6/-/-)	Not stated	Teflon Tape used to seal conduit threads	X See Note 1
Location/Elevation	Containment	Not Applicable	
Equipment ID No.	see p 1a	Not Applicable	
QUALIFICATION REPORT (8.0/5.0/5.0)			
Report ID Number	No I/D	No Report I/D Number	
Report Date	9/5/78	September 5,1978	
Issued by	ACME Cleveland	ACME CLEVELAND DEVELOPMENT COMPANY	
Prepared for	Not stated	NAMCO CONTROLS	
Referenced Reports		Not Stated	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)		Sequential Test	
QUALIFICATION TEST PROGRAM			
Functional Test Description (5.2.5/2.2.9/2.2.9)		Make/break contact	
Operating Conditions (-/2.2.10/2.2.10) Load/Cycles/Voltage/ Current/Freq.		0.5Amps @ 100 Vdc	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 48

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)	Not stated	Not Stated	
Accuracy (5.2.5/-/-)		Not Stated	
Number of Specimens		One (1)	
Test Instruments Calibrated		Yes	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)	Indicator	Active	
Test Duration (5.2.1/-/-)	N/A	30 days	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	~11.5 days	Not Applicable	
Required Function Time	1 day	Not Applicable	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)	N/A	Inspection/Base line data Heat/Humidity Aging Mechanical Aging Irradiation Seismic testing LOCA Simulation	
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-) 1. Representative Sample 2. Baseline Data 3. Performance Extremes 4. Thermal Aging 5. Radiation Aging 6. Wear Aging 7. Vibration/Seismic 8. DBE Exposure 9. Post-DBE Exposure 10. Inspection			
Aging (5.2.4, 7.0/4.0/4.0) Thermal Aging/Basis	Not stated	200 hours @ 200°F per ANSI draft std N278.2.1	X Note 2
Material Aging Evaluation (7.0/-/-)		Not Stated	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)		Not Stated	
Radiation Aging, Type		Gamma	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 48

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	Not Stated	204 Megarads	*
Radiation Aging, Dose Rate		0.7 Megarads/ hour	
Radiation Aging, Method		Test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)		Not Stated	
Operational Aging (-/4.2/-)		100,000 Actuation Cycles	
Other Age Conditioning (-/4.2/-)		Not Stated	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	Not stated	None Claimed	
Normal Ambient Temperature	Not stated	Not Applicable	
Normal Ambient Radiation		Not Applicable	
Normal Ambient Humidity		Not Applicable	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	D.C. Cook Program	Not Applicable	
On-Going Analysis of Failures and Degradation (7.0/-/-)		Not Applicable	
Margin (General) (6.0/3.0/3.0)	Not Stated	Not Stated/ Not Appicable	
Margin (NUREG-0588, Cat. I) (-/3.2/-) 1. Temperature (+15°F) 2. Pressure (+10%, 10 psig max) 3. Radiation (not required) 4. Time (+10%, +1 hour + function time minimum)		Not Stated	

* Radiation aging and accident doses were combined in a single Exposure prior to the LOCA Simulation.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 48

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
ACCIDENT CONDITIONS			
LOCA/MSLB/HELB/Uncontrolled (4.1, 4.2, 4.3.1, 4.3.3/ 1.1, 1.2, 1.5/1.1, 1.2, 1.5)	LOCA/MSLB	LOCA/MSLB	
Radiation Type	Gamma	Gamma	
Radiation Dose (rd) (4.1.2/1.4/1.4)	2.8×10^7	204 Megarads	*
Radiation Dose Rate (rd/hr)	Not stated	0.7 Megarads per hour	
Radiation Qual. Method (5.3.1/-/-)		Test	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)		Not Applicable	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)		Not Stated	
Radiation Dose (Normal + Accident) (4.1.2/-/-)		Not Stated	
Plateout Dose Considered (-/1.48/1.48)		Not Applicable	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)		Not Applicable	

*Radiation aging and accident doses were combined in a single Exposure prior to the LOCA Simulation.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 48

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS			
Rate of Temp./Press. Increase		11°F/8psi/sec	
Peak: °F/psig/RH/Time	See P5f2	340/115/100/3h4s	
Decrease To: °F/psig/RH/Time		140/-/-/2h4r 340/105/100/3hrs	
Decrease To: °F/psig/RH/Time		320/76/100/2hrs 300/57/100/1hr	
Decrease To: °F/psig/RH/Time		250/25/100/4days 150/10/100/25 days	
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)		Not Applicable	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)	N/A	Test	
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)	2000 ppm B 1.14 wt % Boric Acid pH 9-11 Acid	Boric Acid/water/sodium thiosulfate/sodium hydroxide	
Spray Density (gpm/ft^2)	Not stated	0.15	
Spray Duration		30Days	
Submergence Duration (4.1.3/2.2.5/2.2.5)		Not Applicable	
In-Leakage Considered (5.2.6, 5.3.2/-/-)		Not Applicable	
Time to Submergence		Not Applicable	
Dust Environment (-/2.2.11/2.2.11)		Not Applicable	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 41

NOTES:

1. The report states "The switch was mounted in the chamber in a horizontal position such that the lever shaft pointed upwards. The switch was attached by means of a threaded pipe. Teflon tape was used for sealing the pipe threads.+

+No attempt is made to qualify the connection method. These test procedures are based on the assumption that the user will ensure that no steam enters the unit via this connection during an actual LOCA."

EPS

The licensee has not identified any sealing method

2. The report states

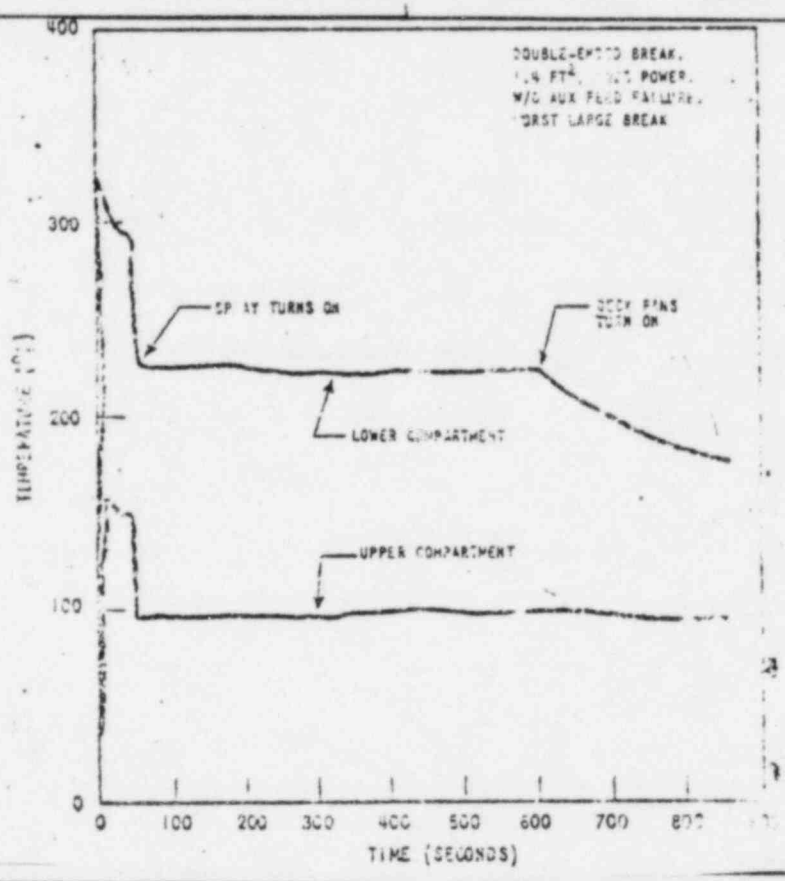
"Heat aging. The heat aging test consisted of holding the unit suspended over water in a tank at a temperature of 200°F for 200 hours.+

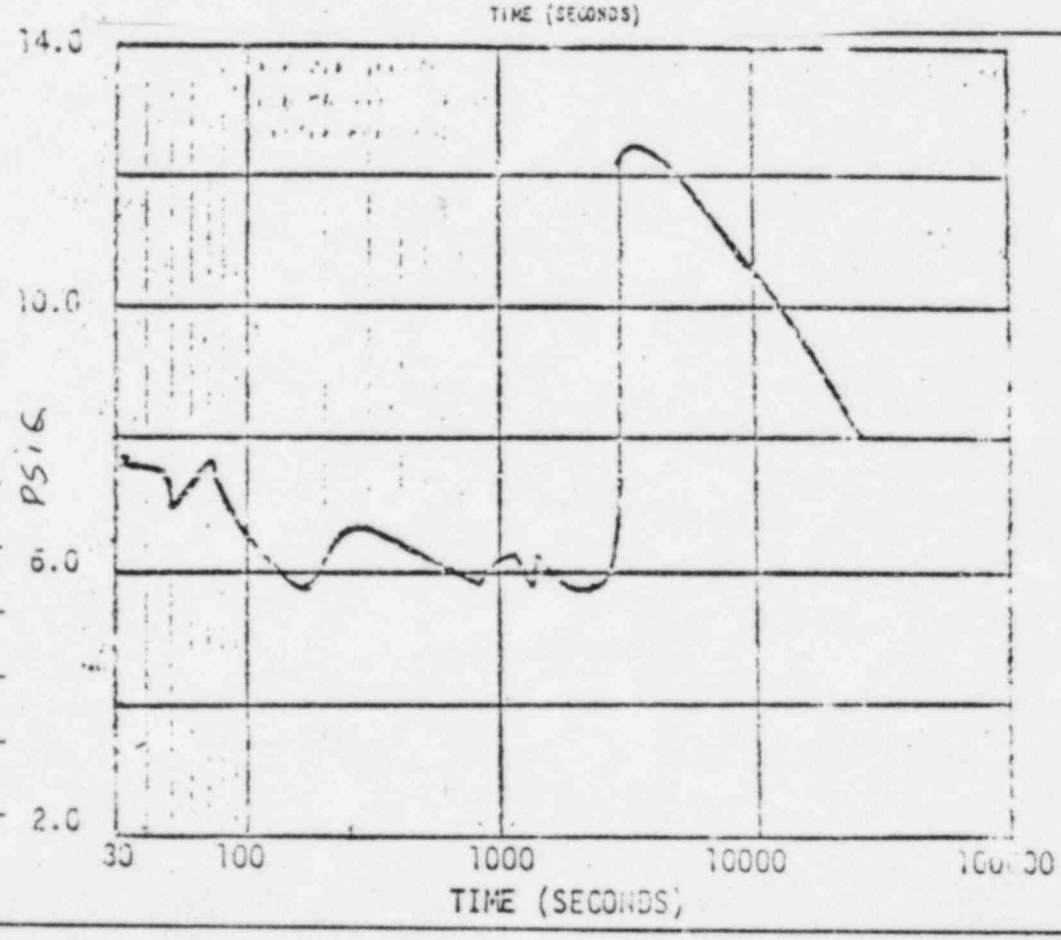
+Heat aging conditions were taken from ANSI Draft Standard N278.2.1 (Draft 3, Rev. 0). The correlation between these conditions and the qualified life is not known.

The licensee has not addressed the life/maintenance schedule for these units.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 48

NOTES:





EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 49

EQUIPMENT ITEM NO. 49
ELECTRICAL CONTROL CABLE LOCATED INSIDE CONTAINMENT
GENERAL ELECTRIC, MODEL NOT STATED
REQUIRED OPERATING TIME: 24 HOURS
TER CHECKSHEET NO. 49
LICENSEE REFERENCE(S): 639, 3829, 26, 27, 29
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): CC8-1, CC6-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

(R), T, (QT), RT, P, H, (CS), (A), (S), (R), (M), I, (QM), RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 49

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/~~or~~ will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 49

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	X
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	X
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 49

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

Criteria: DOR Guidelines X; NUREG-0588, Cat. I___; NUREG-0588, Cat. II ___.

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
EQUIPMENT DESCRIPTION			
Equipment Type	Various	Various see page 5b	
Manufacturer's Name (5.2.2/-/-)	see page 1a		
Model Number (5.2.2/-/-)			
Serial Number			
Features/Mounting (5.2.6/-/-)			
Connections/Interfaces (5.2.6/-/-)		cable splice	
Location/Elevation		in Auxiliary	
Equipment ID No.	see p 1a	Not applicable	
QUALIFICATION REPORT (8.0/5.0/5.0)			
Report ID Number	IPS 348	IPS-348	
Report Date	Not stated	5/17/78	
Issued by	CONAX	CONAX.	
Prepared for	AEP	AEP	
Referenced Reports	N/A	N/A	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)		Test	
QUALIFICATION TEST PROGRAM			
Functional Test Description (5.2.5/2.2.9/2.2.9)		Insulation resistance and Leakage Current	
Operating Conditions (-/2.2.10/2.2.10) Load/Cycles/Voltage/ Current/Freq.		not stated	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 49

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)	N/A	See Section 8.1 on page 5i.	
Accuracy (5.2.5/-/-)		N/A	
Number of Specimens		See Page 5i	
Test Instruments Calibrated		yes	
Safety Function (Active/Passive) (-/2.1.3/2.1.3)	varies	N/A	
Test Duration (5.2.1/-/-)	N/A	4.8 day (116 hrs)	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	~11.5 days	N/A	
Required Function Time	24 hrs	N/A	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)	N/A		
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)		Radiation Steam/Chemical spray	
1. Representative Sample			
2. Baseline Data			
3. Performance Extremes			
4. Thermal Aging			
5. Radiation Aging			
6. Wear Aging			
7. Vibration/Seismic			
8. DBE Exposure			
9. Post-DBE Exposure			
10. Inspection			
Aging (5.2.4, 7.0/4.0/4.0) Thermal Aging/Basis	Not stated	Not stated	X note 1
Material Aging Evaluation (7.0/-/-)		"	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)		"	
Radiation Aging, Type		"	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 49

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	Not stated	See accident Dose (pg 5d)	
Radiation Aging, Dose Rate			
Radiation Aging, Method		test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)		Not stated	
Operational Aging (-/4.2/-)		" "	
Other Age Conditioning (-/4.2/-)		" "	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	Not stated	Not stated	
Normal Ambient Temperature Normal Ambient Radiation Normal Ambient Humidity		N/A	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	D.C. Cook Program		
On-Going Analysis of Failures and Degradation (7.0/-/-)			
Margin (General) (6.0/3.0/3.0)	Not stated		
Margin (NUREG-0588, Cat. I) (-/3.2/-) 1. Temperature (+15°F) 2. Pressure (+10%, 10 psig max) 3. Radiation (not required) 4. Time (+10%, +1 hour + function time minimum)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 49

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
ACCIDENT CONDITIONS			
LOCA/MSLB/HELB/Uncontrolled (4.1, 4.2, 4.3.1, 4.3.3/ 1.1, 1.2, 1.5/1.1, 1.2, 1.5)	LOCA/MSLB	LOCA/MSLB	
Radiation Type	Gamma	Gamma	
Radiation Dose (rd) (4.1.2/1.4/1.4)	28×10^6	150×10^6	
Radiation Dose Rate (rd/hr)	Not stated	0.75×10^6	
Radiation Qual. Method (5.3.1/-/-)	↓		
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	↓	N/A	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	↓	↓	
Radiation Dose (Normal + Accident) (4.1.2/-/-)	↓	↓	
Plateout Dose Considered (-/1.48/1.48)	↓	↓	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)	↓	↓	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 49

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS			
Rate of Temp./Press. Increase			
Peak: °F/psig/RH/Time	See Pages	345/112/-/1 hr	Note 2.
Decrease To: °F/psig/RH/Time	59	250/19/-/115 hrs.	
Decrease To: °F/psig/RH/Time	& 5 h		
Decrease To: °F/psig/RH/Time			
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)		Not stated	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)		Test	
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)	2000 ppm B 1.14 to 1.20 Sp. Grav pH 9-11	2500 ppm Boron Buffered with NaOH for pH 9-10.	
Spray Density (gpm/ft^2)	Not Stated	Not stated	
Spray Duration	"	116 hrs.	
Submergence Duration (4.1.3/2.2.5/2.2.5)		N/A	
In-Leakage Considered (5.2.6, 5.3.2/-/-)			
Time to Submergence			
Dust Environment (-/2.2.11/2.2.11)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 49

NOTES:

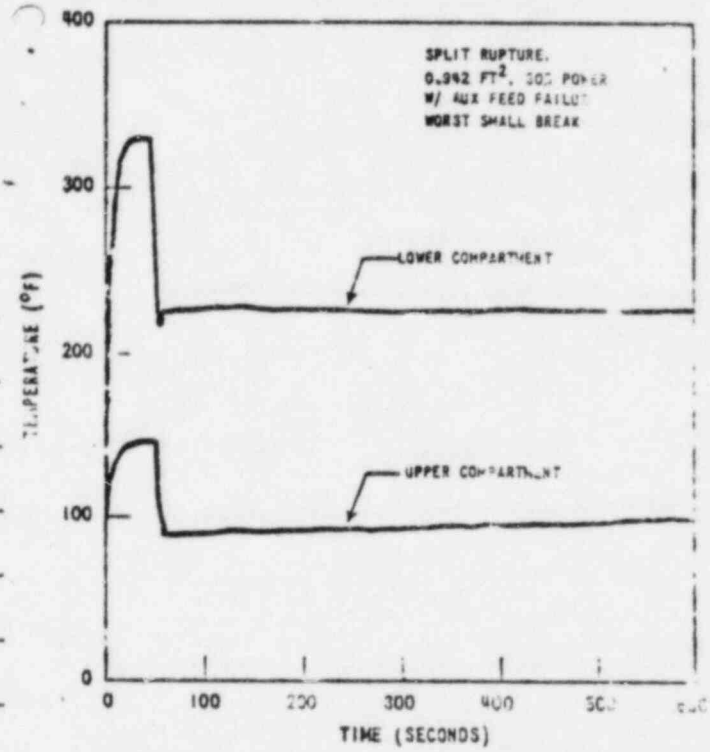
Note 1 - no preaging was performed, no material evaluation for aging was performed and no estimate of qualified life was provided

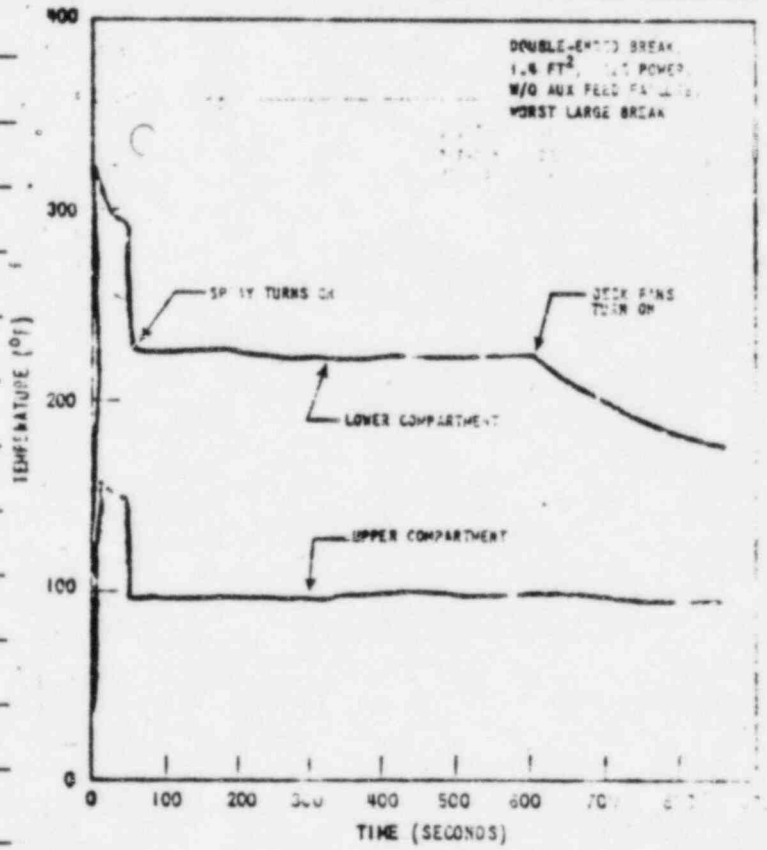
Note 2 - Table 6.1 of the test report [3829] identifies the equipment which passed the test and equipment which did not. This table is reproduced on page 5j.

The test profile envelopes the MSLB curves on p 5g but not the LOCA profile shown on page 5h. The ECRW sheet indicates that the required operating time is 24 hours. Therefore the test envelope the required operating time

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 49

NOTES:





EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 49

NOTES:

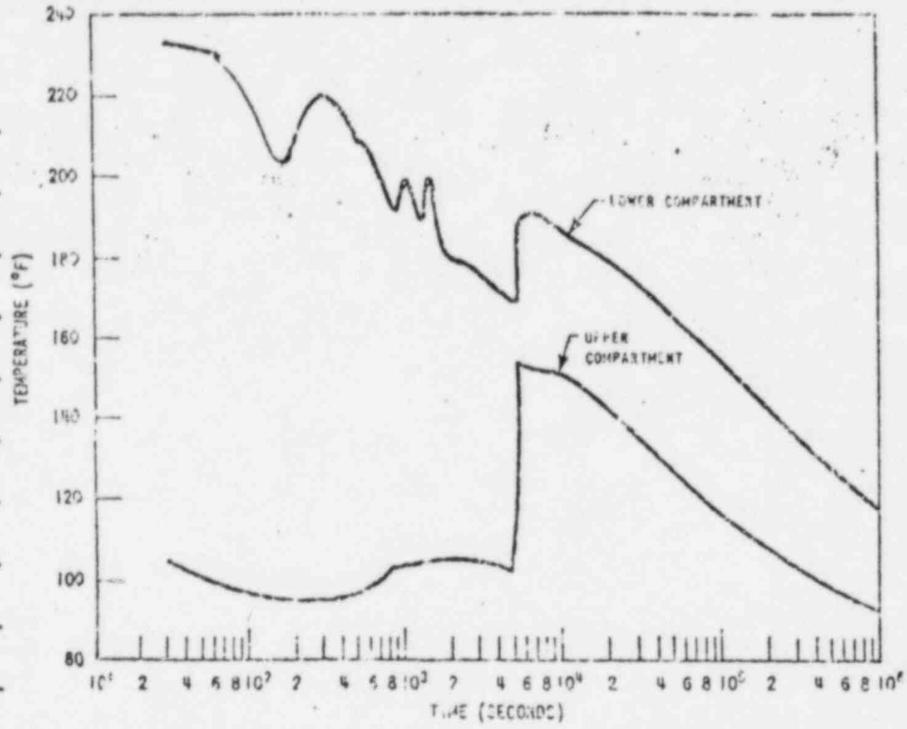
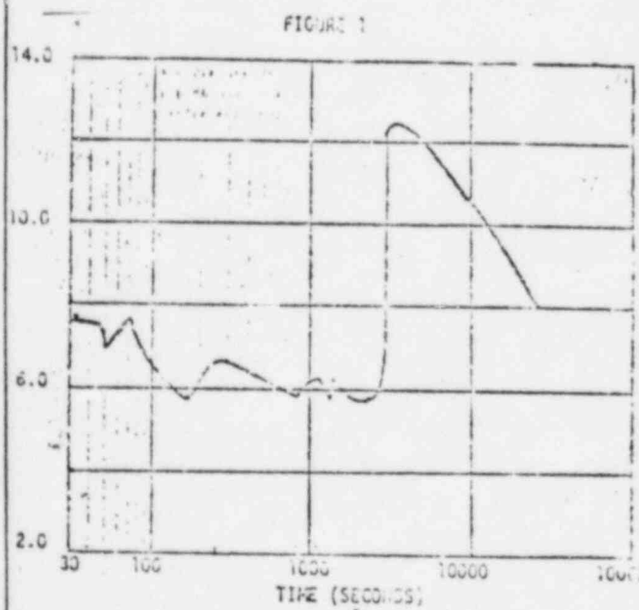
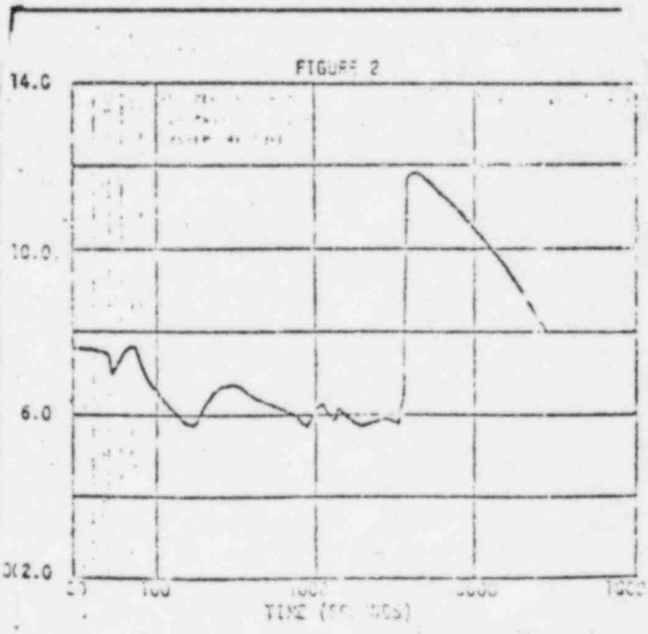


Figure 3 Upper and Lower Compartment Temperature Transients





Ice Mass = 2.07 (10^6) lbs. = 1084... lb/basket

NOTES:

TEST ITEMS

(1) Item B1 Box - 12" x 12" x 6" with hinged cover.

(1) Item B4 Box - 18" x 18" x 6" with hinged cover.

(2) Item 0823 - 12 Point Penn - Union Terminal Blocks Type 6012 - N3 - AEP

100 ft. Item 3123 - 15/C #12 AWG, Solid Copper Control Cable - Continental Wire and Cable

3 ft. Item 422 2" Seal - Tight Flexible Conduit

20 ft. Item 3076 Triax Cable - Boston Insulated Wire

20 ft. Item 3075 #16 AWG, Twisted/Shielded Pair - Boston Insulated Wire

20 ft. Item 3075 #16 AWG, Twisted/Shielded Pair - Continental Wire and Cable

20 ft. Item 3121 7/C #12 AWG Solid Copper Control Cable - General Electric

Acceptance Criteria

8.1 The test items are expected to maintain the current and voltage specified in 5.3 above throughout the total test period. Should the leakage current of any individual test item exceed 1 amp, post test examination shall determine if the cause was external. Final post test criteria shall then be applied to the test item in question to determine if it has passed or failed the test. The post test criterion shall be a leakage current of no greater than 1 amp when the device is subjected to a hi-pot test.

NOTES:

TABLE 6.1

Energized Throughout Test		Removed from Circuitry	
TB-2	1, 7, 9	TB-2	3, 5, 11
TB-4	None	TB-4	1, 3, 5, 7, 9, 11
GE-3	1, 3, 5, 7	GE-4	1, 3, 5, 7
B7P-3		CP-4	1, 2 & Shield
B7P-4		CP-3	1, 2 & Shield
3X3			
3X4			

In view of the fact that the 600 V test source was of limited capacity, (50 ma), a separate 600 V power source (1 KVA) was applied to the test items following their apparent indication of high leakage. This was initiated to confirm the extent of leakage current. Post test examination revealed that this contributed to the severe tracking observed on TB-4.

Post test examination revealed that apparent difficulty with GE-4 and TB-2 was caused by difficulties encountered with the associated test leads used to connect the test items through the test chamber wall. All the test items except TB-4, CP-3, and CP-4 successfully passed a post test hipot test and successfully passed the requirements of this test.

Views of the terminal boxes, terminal blocks and cables after the environmental exposure are shown in Figures 6.2 through 6.5.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 50

EQUIPMENT ITEM NO. 50
E/P TRANSDUCER LOCATED OUTSIDE CONTAINMENT
FISHER CONTROLS MODEL 546
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 50
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): MAIN FEEDWATER FLOW CONTROL/VALVE MODULATION CONTROL (EPT 210, 220, 230, 240)
LICENSEE SUBMITTAL: SCEW(S): S2 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	4a, ~~4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 50

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

X The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
IIa Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 50

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	X
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 50

SYSTEM CONSIDERATION REVIEW

The Licensee has stated that this equipment item does not require environmental qualification and/or should be exempted from qualification. The Licensee's rationale has been evaluated and the reasons for concurrence/ ~~non-concurrence~~ with the technical basis of the Licensee's position are presented below.

Reason for Concurrence

X Equipment does not provide a safety function or mitigate the consequences of a design basis accident. Equipment Environmental Qualification is not required by the DOR Guidelines. (NRC Qualification Evaluation Category IIIa)

___ Equipment is not exposed to a harsh environment by the accident it is intended to mitigate. See note (1) on page 4b. (NRC Qualification Evaluation Category IIIb)

___ Backup (equipment/system) is available which completely performs the safety function. The backup (equipment/system) is environmentally qualified and appears to meet single active failure criterion. See note (1) on page 4b. (NRC Qualification Evaluation Category IIIa)

Reason for Non-Concurrence

___ Backup (equipment/system) is not fully capable of performing the intended safety function or accident mitigating function.

___ Backup (equipment/system) is not environmentally qualified and can be exposed to a hostile environment simultaneously with the primary equipment.

___ Backup (equipment/system) is subject to a potentially disabling single active failure.

___ Failure of the primary equipment can compromise the ability of other safety-related equipment to perform its specified safety function.

___ Failure of the primary equipment can result in erroneous indication which could mislead an operator.

___ Requirement for continued functioning throughout the post-accident period necessitates environmental qualification.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 50

NOTES:

PGR # (4719) is a report prepared by Fisher Controls that addresses the qualification status of Fisher type 546 transducers and type 67FR regulators. Fisher makes the following introductory statement:

"Consequently, Fisher appurtenances such as the Type 546 electro-pneumatic transducer and the Type 67FR supply pressure regulator have not been independently subjected to the complete and rigorous series of tests that would be required to establish qualification in accordance with existing industry standards. It is not Fisher's intention to undertake any such qualification program for the valve appurtenances mentioned because, as stated, they are not directly involved in performance of Safety-Mode capabilities of Fisher's equipment."

The report presents a summary of limited environmental testing performed on the model 546 E/P transducer (a summary of PGR # 715) and provides the following conclusion:

"Throughout the test the 546 remained functional and was still operating and in very good physical condition at the completion of the test. After the test, the span of the unit was unchanged, but there was a zero shift of about 3.3 psig. The test report concludes that the 546 transducer would function both during and after an environmental atmosphere (as described) for up to 13 hours.

Although the unit was still functioning at the conclusion of the 13-hour test period, the report notes that exposure to such extreme conditions for any length of time would necessitate examination and/or replacement of all vulnerable components. The report does not discuss appearance or condition of any of the "vulnerable components" of either the 546 test unit or the 67FR supply pressure regulator which was also inside the test chamber."

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 51

EQUIPMENT ITEM NO. 51
E/P TRANSDUCER LOCATED OUTSIDE CONTAINMENT
FISHER CONTROLS MODEL 546
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 51
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): MAIN STEAM PRESSURE RELIEF/VALVE MODULATION CONTROL (EPT-213, 223, 233, 243)
LICENSEE SUBMITTAL: SCEW(S): S9 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	4a, 4b, ~~4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 51

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/[redacted]) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

X The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 51

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 51

SYSTEM CONSIDERATION REVIEW

The Licensee has stated that this equipment item does not require environmental qualification and/or should be exempted from qualification. The Licensee's rationale has been evaluated and the reasons for ~~concurrence/~~ non-concurrence with the technical basis of the Licensee's position are presented below.

Reason for Concurrence

___ Equipment does not provide a safety function or mitigate the consequences of a design basis accident. Equipment Environmental Qualification is not required by the DOR Guidelines. (NRC Qualification Evaluation Category IIIa)

___ Equipment is not exposed to a harsh environment by the accident it is intended to mitigate. See note (1) on page 4b. (NRC Qualification Evaluation Category IIIb)

___ Backup (equipment/system) is available which completely performs the safety function. The backup (equipment/system) is environmentally qualified and appears to meet single active failure criterion. See note (1) on page 4b. (NRC Qualification Evaluation Category IIIa)

Reason for Non-Concurrence

___ Backup (equipment/system) is not fully capable of performing the intended safety function or accident mitigating function.

___ Backup (equipment/system) is not environmentally qualified and can be exposed to a hostile environment simultaneously with the primary equipment.

___ Backup (equipment/system) is subject to a potentially disabling single active failure.

___ Failure of the primary equipment can compromise the ability of other safety-related equipment to perform its specified safety function.

___ Failure of the primary equipment can result in erroneous indication which could mislead an operator.

___ Requirement for continued functioning throughout the post-accident period necessitates environmental qualification.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 51

Reason for Concurrence

___ The equipment's accident mitigating function is completed prior to the onset of the hostile environment. No subsequent functions are necessary. See note (1) below. (NRC Qualification Evaluation Category IIIb)

___ Other (see page___)

___ Resultant NRC Qualification Evaluation Category (IIIa/IIIb)

___ Note 1: The Licensee (has/has not) stated that failure of the primary equipment will not affect other safety-related equipment or cause an operator to be misled. (See page_____)

Reason for Non-Concurrence

X Although backup equipment is available, it is not technically sound to relinquish defense-in-depth for this function.

___ Backup (equipment/system) is not safety-related.

___ This equipment is necessary for the operator to ensure an ESF system is performing its intended safety function.

___ The rationale presented by the Licensee is not supported by objective technical evidence.

___ Other (see page___)

LICENSEE STATEMENT

See page 3a of this checksheet.

EVALUATION OF LICENSEE STATEMENT

The Licensee has stated that no credit is taken for Main Steam Relief Valves in either LOCA or HELB analyses. Nevertheless, these valves are routinely used for decay heat rejection while in a steam-generator cooldown mode prior to reaching a long-term cooling condition. They should be qualified for their post-accident environment.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 51

NOTES:

PGR # (4719) is a report prepared by Fisher Controls that addresses the qualification status of Fisher type 546 transducers and type 67FR regulators. Fisher makes the following introductory statement:

"Consequently, Fisher appurtenances such as the Type 546 electro-pneumatic transducer and the Type 67FR supply pressure regulator have not been independently subjected to the complete and rigorous series of tests that would be required to establish qualification in accordance with existing industry standards. It is not Fisher's intention to undertake any such qualification program for the valve appurtenances mentioned because, as stated, they are not directly involved in performance of Safety-Mode capabilities of Fisher's equipment."

The report presents a summary of limited environmental testing performed on the model 546 E/P transducer (a summary of PGR # 715) and provides the following conclusion:

"Throughout the test the 546 remained functional and was still operating and in very good physical condition at the completion of the test. After the test, the span of the unit was unchanged, but there was a zero shift of about 3.3 psig. The test report concludes that the 546 transducer would function both during and after an environmental atmosphere (as described) for up to 13 hours.

Although the unit was still functioning at the conclusion of the 13-hour test period, the report notes that exposure to such extreme conditions for any length of time would necessitate examination and/or replacement of all vulnerable components. The report does not discuss appearance or condition of any of the "vulnerable components" of either the 546 test unit or the 67FR supply pressure regulator which was also inside the test chamber."

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 52

EQUIPMENT ITEM NO. 52
ELECTRICAL CONTROL CABLE LOCATED IN CONTAINMENT
CONTINENTAL WIRE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 HOUR
TER CHECKSHEET NO. 52
LICENSEE REFERENCE(S): 639, 3829, 26, 27, 29
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): CC1-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 52

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 52

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	X
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	X
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 52

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

Criteria: DOR Guidelines X; NUREG-0588, Cat. I___; NUREG-0588, Cat. II ___.

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
EQUIPMENT DESCRIPTION			
Equipment Type	Various	Various see page 5b	
Manufacturer's Name (5.2.2/-/-)	see page 1a		
Model Number (5.2.2/-/-)			
Serial Number			
Features/Mounting (5.2.6/-/-)			
Connections/Interfaces (5.2.6/-/-)		cable splice in Antechamber	
Location/Elevation			
Equipment ID No.	See p 1a	Not applicable	
QUALIFICATION REPORT (8.0/5.0/5.0)			
Report ID Number	IPS 348	IPS-348	
Report Date	Not stated	5/17/78	
Issued by	CONAX	CONAX.	
Prepared for	AEP	AEP	
Referenced Reports	N/A	N/A	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)		Test	
QUALIFICATION TEST PROGRAM			
Functional Test Description (5.2.5/2.2.9/2.2.9)		Insulation resistance and Leakage Current	
Operating Conditions (-/2.2.10/2.2.10) Load/Cycles/Voltage/ Current/Freq.		not stated	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 52

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)	N/A	See Section 8.1 on page 5i.	
Accuracy (5.2.5/-/-)		N/A	
Number of Specimens		See Page 5i	
Test Instruments Calibrated		yes	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)	Varies	N/A	
Test Duration (5.2.1/-/-)	N/A	4.8. day (116 hrs)	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	~11.5 days	N/A	
Required Function Time	24 hrs	N/A	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)	N/A		
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)		Radiation Steam/Chemical spray	
1. Representative Sample			
2. Baseline Data			
3. Performance Extremes			
4. Thermal Aging			
5. Radiation Aging			
6. Wear Aging			
7. Vibration/Seismic			
8. DBE Exposure			
9. Post-DBE Exposure			
10. Inspection			
Aging (5.2.4, 7.0/4.0/4.0) Thermal Aging/Basis	Not stated	Not stated	X note 1
Material Aging Evaluation (7.0/-/-)		"	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)		"	
Radiation Aging, Type		"	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 52

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	Not stated	See accident Rad (pg 5d)	
Radiation Aging, Dose Rate	↓		
Radiation Aging, Method		test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)		Not stated	
Operational Aging (-/4.2/-)		" "	
Other Age Conditioning (-/4.2/-)		" "	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	Not stated	Not stated	
Normal Ambient Temperature		N/A	
Normal Ambient Radiation		↓	
Normal Ambient Humidity	↓		
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	D.C. Cook Program		
On-Going Analysis of Failures and Degradation (7.0/-/-)	↓		
Margin (General) (6.0/3.0/3.0)	Not stated		
Margin (NUREG-0588, Cat. I) (-/3.2/-)			
1. Temperature (+15°F)			
2. Pressure (+10%, 10 psig max)			
3. Radiation (not required)			
4. Time (+10%, +1 hour + function time minimum)	↓	↓	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 52

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
ACCIDENT CONDITIONS			
LOCA/MSLB/HELB/Uncontrolled (4.1, 4.2, 4.3.1, 4.3.3/ 1.1, 1.2, 1.5/1.1, 1.2, 1.5)	LOCA/MSLB	LOCA/MSLB	
Radiation Type	Gamma	Gamma	
Radiation Dose (rd) (4.1.2/1.4/1.4)	28×10^6	150×10^6	
Radiation Dose Rate (rd/hr)	Not stated	0.75×10^6	
Radiation Qual. Method (5.3.1/-/-)			
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)		N/A	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)			
Radiation Dose (Normal + Accident) (4.1.2/-/-)			
Plateout Dose Considered (-/1.48/1.48)			
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 52

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS			
Rate of Temp./Press. Increase			
Peak: °F/psig/RH/Time	See Pages	345/112/-/1 hr	X Note 2.
Decrease To: °F/psig/RH/Time	59	250/19/-/115 hrs.	
Decrease To: °F/psig/RH/Time	& 5 h		
Decrease To: °F/psig/RH/Time			
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)		Not stated	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)		Test	
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)	2000 ppm B 1.14 wt% Boric Acid pH 9-11	2500 ppm Boron Buffered with NaOH for pH 9-10	
Spray Density (gpm/ft^2)	Not Stated	Not stated	
Spray Duration	"	116 hrs.	
Submergence Duration (4.1.3/2.2.5/2.2.5)		N/A	
In-Leakage Considered (5.2.6, 5.3.2/-/-)			
Time to Submergence			
Dust Environment (-/2.2.11/2.2.11)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 52

NOTES:

Note 1 - no preaging was performed, no material evaluation for aging was performed and no estimate of qualified life was provided

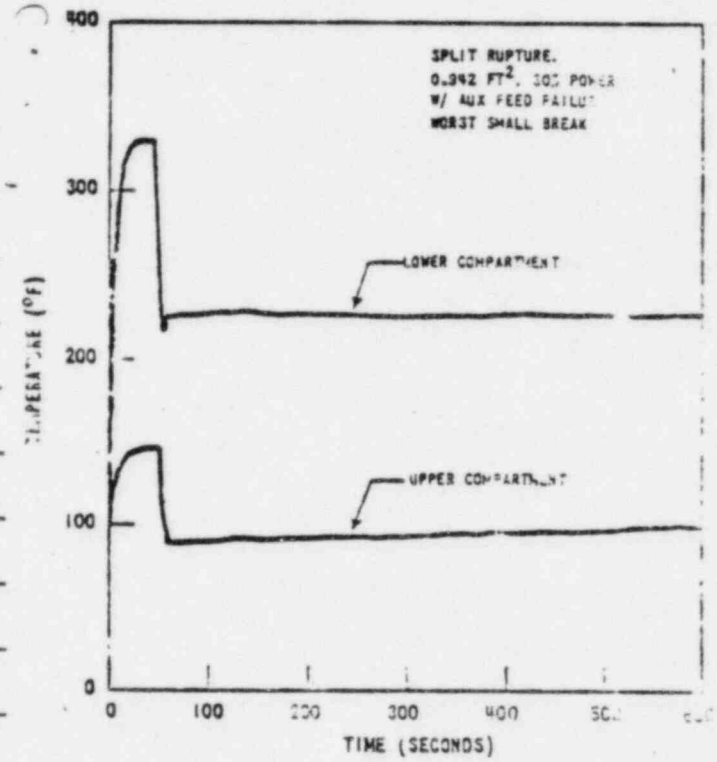
Note 2 - Table 6.1 of the test report [3829] identifies the equipment which passed the test and equipment which did not. This table is reproduced on page 5j.

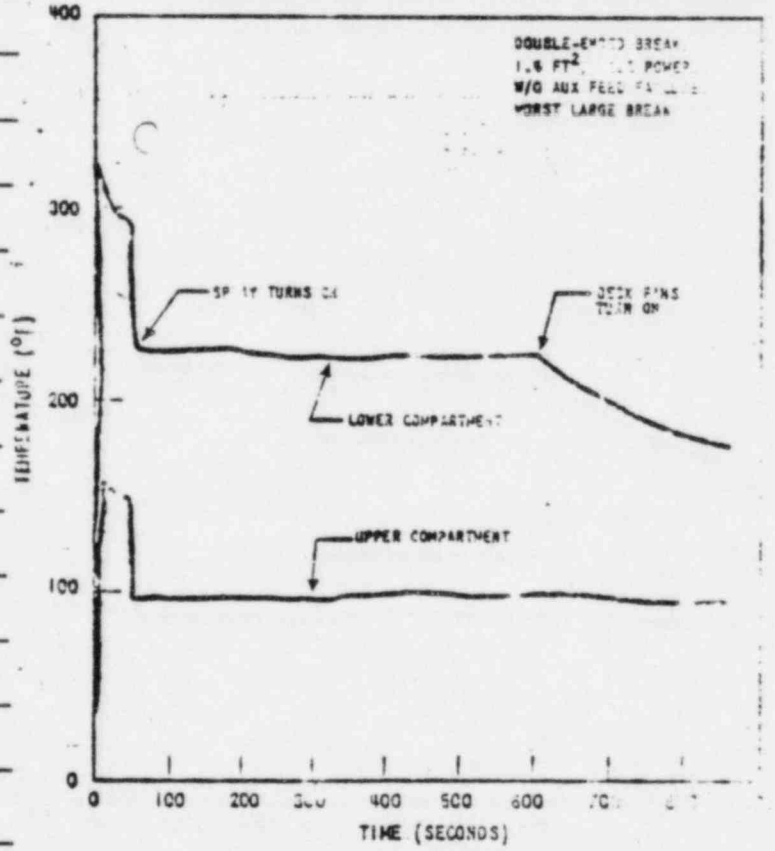
The test profile envelopes the MSLB curves on p 5g but not the LOCA profile shown on page 5h. The licensee SCEW sheet state that the required time is 1 hour. However as indicated on page 5j 3 of 4 samples of Conteneta wire did not pass the test. The DOR Guidelines State

If a component fails at any time during the test, even in a so called "fail safe" mode, the test should be considered inconclusive with regard to demonstrating the ability of the component to function for the entire period prior to the failure.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 52

NOTES:





EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 52

NOTES:

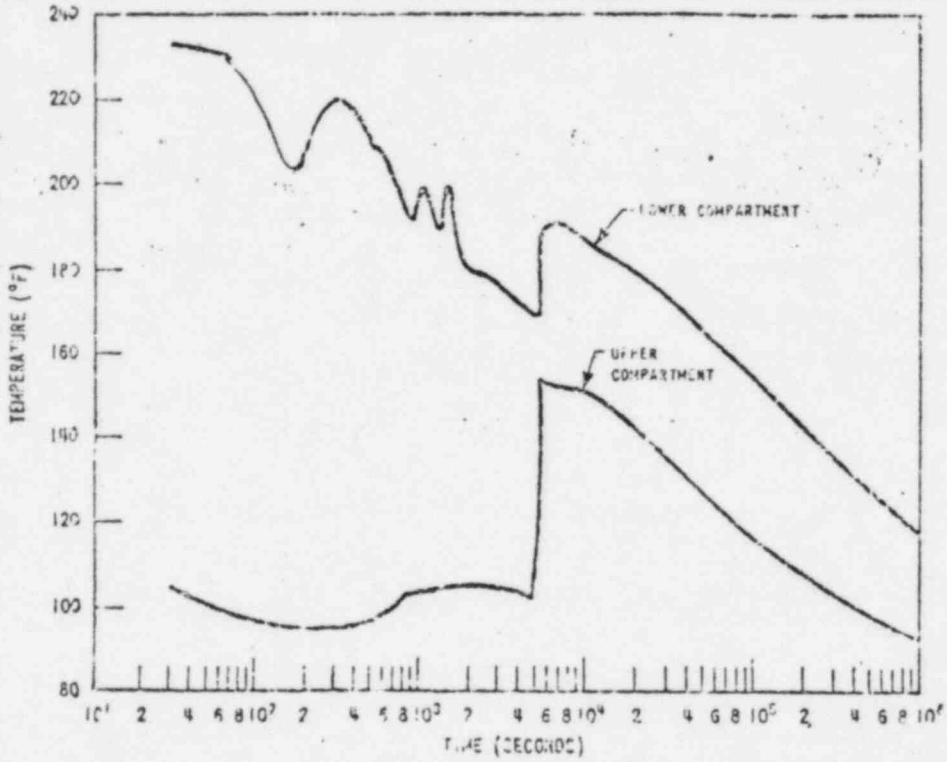
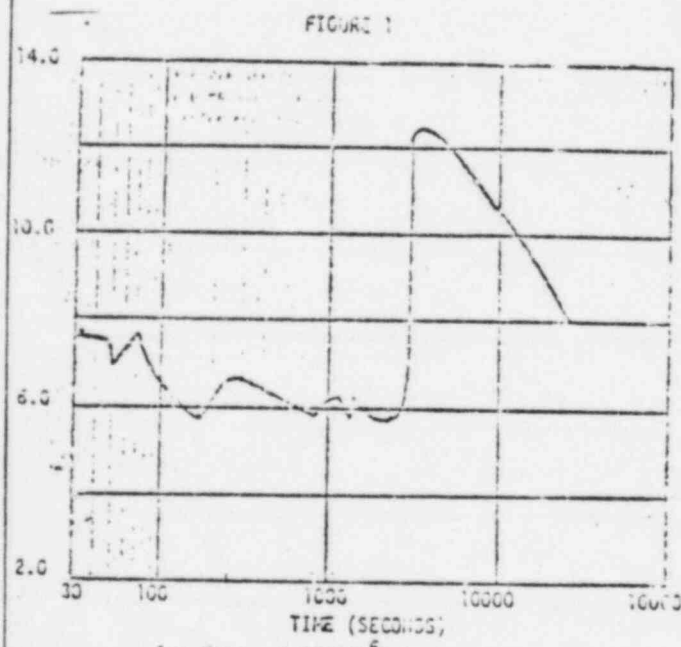
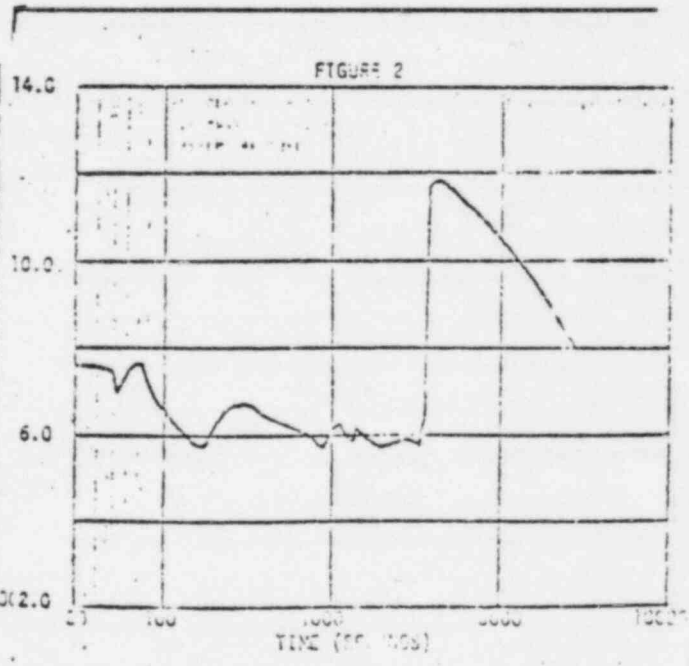


Figure 3 Upper and Lower Compartment Temperature Transients





Ice Mass = 2.07 (10^6) lbs. = 1054.[illegible] lb/basket

NOTES:

TEST ITEMS

(1) Item B1 Box - 12" x 12" x 6" with hinged cover.

(1) Item B4 Box - 18" x 18" x 6" with hinged cover.

(2) Item 0823 - 12 Point Penn - Union Terminal Blocks Type 6012 - N3 - AEP

100 ft. Item 3123 - 15/C #12 AWG, Solid Copper Control Cable - Continental Wire and Cable

3 ft. Item 422 2" Seal - Tight Flexible Conduit

20 ft. Item 3076 Triax Cable - Boston Insulated Wire

20 ft. Item 3075 #16 AWG, Twisted/Shielded Pair - Boston Insulated Wire

20 ft. Item 3075 #16 AWG, Twisted/Shielded Pair - Continental Wire and Cable

20 ft. Item 3121 7/C #12 AWG Solid Copper Control Cable - General Electric

Acceptance Criteria

8.1 The test items are expected to maintain the current and voltage specified in 5.3 above throughout the total test period. Should the leakage current of any individual test item exceed 1 amp, post test examination shall determine if the cause was external. Final post test criteria shall then be applied to the test item in question to determine if it has passed or failed the test. The post test criterion shall be a leakage current of no greater than 1 amp when the device is subjected to a hi-pot test.

NOTES:

TABLE 6.1

Energized Throughout Test		Removed from Circuitry	
TB-2	1, 7, 9	TB-2	3, 5, 11
TB-4	None	TB-4	1, 3, 5, 7, 9, 11
GE-3	1, 3, 5, 7	GE-4	1, 3, 5, 7
B7P-3		CP-4	1, 2 & Shield
B7P-4		CP-3	1, 2 & Shield
3X3			
3X4			

In view of the fact that the 600 V test source was of limited capacity, (50 ma), a separate 600 V power source (1 KVA) was applied to the test items following their apparent indication of high leakage. This was initiated to confirm the extent of leckage current. Post test examination revealed that this contributed to the severe tracking observed on TB-4.

Post test examination revealed that apparent difficulty with GE-4 and TB-2 was caused by difficulties encountered with the associated test leads used to connect the test items through the test chamber wall. All the test items except TB-4, CP-3, and CP-4 successfully passed a post test hipot test and successfully passed the requirements of this test.

Views of the terminal boxes, terminal blocks and cables after the environmental exposure are shown in Figures 6.2 through 6.5.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 53

EQUIPMENT ITEM NO. 53
ELECTRICAL CONTROL CABLE LOCATED OUTSIDE CONTAINMENT
CONTINENTAL WIRE, MODEL NOT STATED
REQUIRED OPERATING TIME: 24 HOURS
TER CHECKSHEET NO. 53
LICENSEE REFERENCE(S): 3829
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): CC9-1, CC2-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 53

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 53

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	X
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	X
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 52

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

Criteria: DOR Guidelines X; NUREG-0588, Cat. I___; NUREG-0588, Cat. II ___.

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
EQUIPMENT DESCRIPTION			
Equipment Type	Various	Various see page 5b	
Manufacturer's Name (5.2.2/-/-)	see page 1a		
Model Number (5.2.2/-/-)			
Serial Number			
Features/Mounting (5.2.6/-/-)			
Connections/Interfaces (5.2.6/-/-)		cable splice	
Location/Elevation		in Auxiliary	
Equipment ID No.	see p 1a	Not applicable	
QUALIFICATION REPORT (8.0/5.0/5.0)			
Report ID Number	IPS 348	IPS-348	
Report Date	Not stated	5/17/78	
Issued by	CONAX	CONAX.	
Prepared for	AEP	AEP	
Referenced Reports	N/A	N/A	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)		Test	
QUALIFICATION TEST PROGRAM			
Functional Test Description (5.2.5/2.2.9/2.2.9)		Insulation resistance and Leakage Current	
Operating Conditions (-/2.2.10/2.2.10) Load/Cycles/Voltage/ Current/Freq.		not stated	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 53

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)	N/A	See Section 8.1 on page 5i.	
Accuracy (5.2.5/-/-)		N/A	
Number of Specimens		See Page 5i	
Test Instruments Calibrated		yes	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)	Varies	N/A	
Test Duration (5.2.1/-/-)	N/A	4.8. day (116 hrs)	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	~11.5 days	N/A	
Required Function Time	24 hrs	N/A	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)	N/A		
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)		Radiation Steam/Chemical Spray	
1. Representative Sample			
2. Baseline Data			
3. Performance Extremes			
4. Thermal Aging			
5. Radiation Aging			
6. Wear Aging			
7. Vibration/Seismic			
8. DBE Exposure			
9. Post-DBE Exposure			
10. Inspection			
Aging (5.2.4, 7.0/4.0/4.0) Thermal Aging/Basis	Not stated	Not stated	X note 1
Material Aging Evaluation (7.0/-/-)		"	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)		"	
Radiation Aging, Type		"	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5~~3~~

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	Not stated	See accident Dose (pg 5d)	
Radiation Aging, Dose Rate			
Radiation Aging, Method		test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)		Not stated	
Operational Aging (-/4.2/-)		" "	
Other Age Conditioning (-/4.2/-)		" "	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	Not stated	Not stated	
Normal Ambient Temperature Normal Ambient Radiation Normal Ambient Humidity		N/A	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	D.C. Cook Program		
On-Going Analysis of Failures and Degradation (7.0/-/-)			
Margin (General) (6.0/3.0/3.0)	Not stated		
Margin (NUREG-0588, Cat. I) (-/3.2/-) 1. Temperature (+15°F) 2. Pressure (+10%, 10 psig max) 3. Radiation (not required) 4. Time (+10%, +1 hour + function time minimum)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 53

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
ACCIDENT CONDITIONS			
LOCA/MSLB/HELB/Uncontrolled (4.1, 4.2, 4.3.1, 4.3.3/ 1.1, 1.2, 1.5/1.1, 1.2, 1.5)	LOCA/MSLB	LOCA/MSLB	
Radiation Type	Gamma	Gamma	
Radiation Dose (rd) (4.1.2/1.4/1.4)		150×10^6	
Radiation Dose Rate (rd/hr)	Not stated	0.75×10^6	
Radiation Qual. Method (5.3.1/-/-)	↓		
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	↓	N/A	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	↓	↓	
Radiation Dose (Normal + Accident) (4.1.2/-/-)	↓	↓	
Plateout Dose Considered (-/1.48/1.48)	↓	↓	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)	↓	↓	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 53

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS			
Rate of Temp./Press. Increase	N/A		
Peak: °F/psig/RH/Time		345/112/-/1 hr	Note 2.
Decrease To: °F/psig/RH/Time		250/19/-/115 hrs.	
Decrease To: °F/psig/RH/Time			
Decrease To: °F/psig/RH/Time			
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)		Not stated	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)		Test	
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)		2500 PPM Boron Buffered with NaOH for pH 9-10.	
Spray Density (gpm/ft^2)		Not stated	
Spray Duration		116 hrs.	
Submergence Duration (4.1.3/2.2.5/2.2.5)		N/A	
In-Leakage Considered (5.2.6, 5.3.2/-/-)			
Time to Submergence			
Dust Environment (-/2.2.11/2.2.11)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 53

NOTES:

Note 1 - no preaging was performed, no material evaluation for aging was performed and no estimate of qualified life was provided

Note 2 - Table 6.1 of the test report [3829] identifies the equipment which passed the test and equipment which did not. This table is reproduced on page 5j.

The test profile envelopes the MSLB curves " " " but not the LOCA profile. " " "

The licensee SCRW sheet indicates that this cable is located outside containment and is required to operate for 24 hrs.

NOTES:

TEST ITEMS

(1) Item B1 Box - 12" x 12" x 6" with hinged cover.

(1) Item B4 Box - 18" x 18" x 6" with hinged cover.

(2) Item 0823 - 12 Point Penn - Union Terminal Blocks Type 6012 - N3 - AEP

100 ft. Item 3123 - 15/C #12 AWG, Solid Copper Control Cable - Continental Wire and Cable

3 ft. Item 422 2" Seal - Tight Flexible Conduit

20 ft. Item 3076 Triax Cable - Boston Insulated Wire

20 ft. Item 3075 #16 AWG, Twisted/Shielded Pair - Boston Insulated Wire

20 ft. Item 3075 #16 AWG, Twisted/Shielded Pair - Continental Wire and Cable

20 ft. Item 3121 7/C #12 AWG Solid Copper Control Cable - General Electric

Acceptance Criteria

8.1 The test items are expected to maintain the current and voltage specified in 5.3 above throughout the total test period. Should the leakage current of any individual test item exceed 1 amp, post test examination shall determine if the cause was external. Final post test criteria shall then be applied to the test item in question to determine if it has passed or failed the test. The post test criterion shall be a leakage current of no greater than 1 amp when the device is subjected to a hi-pot test.

NOTES:

TABLE 6.1

Energized Throughout Test		Removed from Circuitry	
TB-2	1, 7, 9	TB-2	3, 5, 11
TB-4	None	TB-4	1, 3, 5, 7, 9, 11
GE-3	1, 3, 5, 7	GE-4	1, 3, 5, 7
B7P-3		CP-4	1, 2 & Shield
B7P-4		CP-3	1, 2 & Shield
3X3			
3X4			

In view of the fact that the 600 V test source was of limited capacity, (50 ma), a separate 600 V power source (1 KVA) was applied to the test items following their apparent indication of high leakage. This was initiated to confirm the extent of leakage current. Post test examination revealed that this contributed to the severe tracking observed on TB-4.

Post test examination revealed that apparent difficulty with GE-4 and TB-2 was caused by difficulties encountered with the associated test leads used to connect the test items through the test chamber wall. All the test items except TB-4, CP-3, and CP-4 successfully passed a post test hipot test and successfully passed the requirements of this test.

Views of the terminal boxes, terminal blocks and cables after the environmental exposure are shown in Figures 6.2 through 6.5.

Please Send Copy of XA to PDR

TECHNICAL EVALUATION REPORT

REVIEW OF LICENSEES' RESOLUTION OF OUTSTANDING ISSUES FROM NRC EQUIPMENT ENVIRONMENTAL QUALIFICATION SAFETY EVALUATION REPORTS (F-11 and B-60)

INDIANA AND MICHIGAN ELECTRIC COMPANY
DONALD C. COOK NUCLEAR PLANT UNIT 1 VOL. 2 OF 2

NRC DOCKET NO. 50-315

NRC TAC NO. 42460

NRC CONTRACT NO. NRC-03-79-118

FRC PROJECT C5257

FRC ASSIGNMENT 13

FRC TASK 497

Prepared by

Franklin Research Center
20th and Race Streets
Philadelphia, PA 19103

FRC Group Leader: S. Pandey

Prepared for

Nuclear Regulatory Commission
Washington, D.C. 20555

Lead NRC Engineer: N. B. Le
P. Shemanski

October 28, 1982

Please Send Copy of XA to PDR

Franklin Research Center
A Division of The Franklin Institute
The Benjamin Franklin Parkway, Phila., Pa. 19103 (215) 448-1000

TECHNICAL EVALUATION REPORT

REVIEW OF LICENSEES' RESOLUTION OF OUTSTANDING ISSUES FROM NRC EQUIPMENT ENVIRONMENTAL QUALIFICATION SAFETY EVALUATION REPORTS (F-11 and B-60)

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P. Shemanski

October 28, 1982

Reviewed by: S. Pandey
Group Leader

Approved by: J. P. Carfagno
Co-Project Director

Franklin Research Center
A Division of The Franklin Institute
The Benjamin Franklin Parkway, Phila., Pa. 19103 (215) 448-1000

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 54

EQUIPMENT ITEM NO. 54
ELECTRICAL CONTROL CABLE LOCATED INSIDE CONTAINMENT
CONTINENTAL WIRE, MODEL NOT STATED
REQUIRED OPERATING TIME: 24 HOURS
TER CHECKSHEET NO. 54
LICENSEE REFERENCE(S): 639, 3829, 26, 27, 29
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): CC7-1, CC5-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

(R), T, (QT), RT, P, H, (CS), (A), (S), (R), (M), I, (QM), RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 54

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/~~or~~ will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specif.ed by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 54

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	X
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	X
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 54

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

Criteria: DOR Guidelines X; NUREG-0588, Cat. I___; NUREG-0588, Cat. II ___.

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
EQUIPMENT DESCRIPTION			
Equipment Type	Various	Various see page 56	
Manufacturer's Name (5.2.2/-/-)	see page 10		
Model Number (5.2.2/-/-)			
Serial Number			
Features/Mounting (5.2.6/-/-)			
Connections/Interfaces (5.2.6/-/-)		cable splice in Autoclave	
Location/Elevation			
Equipment ID No.	see p 10	Not applicable	
QUALIFICATION REPORT (8.0/5.0/5.0)			
Report ID Number	IPS 348	IPS-348	
Report Date	Not stated	5/17/78	
Issued by	CONAX	CONAX	
Prepared for	AEP	AEP	
Referenced Reports	N/A	N/A	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)		Test	
QUALIFICATION TEST PROGRAM			
Functional Test Description (5.2.5/2.2.9/2.2.9)		Insulation resistance and Leakage Current	
Operating Conditions (-/2.2.10/2.2.10) Load/Cycles/Voltage/ Current/Freq.		not stated	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 54

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)	N/A	See Section 8.1 on page 5i.	
Accuracy (5.2.5/-/-)		N/A	
Number of Specimens		See Page 5i	
Test Instruments Calibrated		yes	
Safety Function (Active/Passive) (-/2.1.3/2.1.3)	varies	N/A	
Test Duration (5.2.1/-/-)	N/A	4.8. day (116 hrs)	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	~11.5 days	N/A	
Required Function Time	24 hrs	N/A	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)	N/A		
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)		Radiation Steam/Chemical Spray	
1. Representative Sample			
2. Baseline Data			
3. Performance Extremes			
4. Thermal Aging			
5. Radiation Aging			
6. Wear Aging			
7. Vibration/Seismic			
8. DBE Exposure			
9. Post-DBE Exposure			
10. Inspection			
Aging (5.2.4, 7.0/4.0/4.0) Thermal Aging/Basis	Not stated	Not stated	X note 1
Material Aging Evaluation (7.0/-/-)		"	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)		"	
Radiation Aging, Type		"	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 54

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	Not stated	See accident Dose (pg 5d)	
Radiation Aging, Dose Rate	↓		
Radiation Aging, Method		test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)		Not stated	
Operational Aging (-/4.2/-)		" "	
Other Age Conditioning (-/4.2/-)		" "	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	Not stated	Not stated	
Normal Ambient Temperature Normal Ambient Radiation Normal Ambient Humidity	↓	N/A ↓	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	D.C. Cook Program	↓	
On-Going Analysis of Failures and Degradation (7.0/-/-)	↓		
Margin (General) (6.0/3.0/3.0)	Not stated		
Margin (NUREG-0588, Cat. I) (-/3.2/-) 1. Temperature (+15°F) 2. Pressure (+10%, 10 psig max) 3. Radiation (not required) 4. Time (+10%, +1 hour + function time minimum)	↓	↓	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 54

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
ACCIDENT CONDITIONS			
LOCA/MSLB/HELB/Uncontrolled (4.1, 4.2, 4.3.1, 4.3.3/ 1.1, 1.2, 1.5/1.1, 1.2, 1.5)	LOCA/MSLB	LOCA/MSLB	
Radiation Type	Gamma	Gamma	
Radiation Dose (rd) (4.1.2/1.4/1.4)	28×10^6	150×10^6	
Radiation Dose Rate (rd/hr)	Not stated	0.75×10^6	
Radiation Qual. Method (5.3.1/-/-)	↓		
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	↓	N/A	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	↓	↓	
Radiation Dose (Normal + Accident) (4.1.2/-/-)	↓	↓	
Plateout Dose Considered (-/1.48/1.48)	↓	↓	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)	↓	↓	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 54

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS			
Rate of Temp./Press. Increase			
Peak: °F/psig/RH/Time	See Pages	345/112/-/1 hr	X Note 2.
Decrease To: °F/psig/RH/Time	59	250/19/-/115 hrs.	
Decrease To: °F/psig/RH/Time	& 5 h		
Decrease To: °F/psig/RH/Time			
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)		Not stated	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)		Test	
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)	2000 ppm B 1.14 wt% Sol. Buff pH 9-11	2500 ppm Boron Buffered with NaOH for pH 9-10.	
Spray Density (gpm/ft^2)	Not Stated	Not stated	
Spray Duration	"	116 hrs.	
Submergence Duration (4.1.3/2.2.5/2.2.5)		N/A	
In-Leakage Considered (5.2.6, 5.3.2/-/-)			
Time to Submergence			
Dust Environment (-/2.2.11/2.2.11)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 54

NOTES:

Note 1 - no preaging was performed, no material evaluation for aging was performed and no estimate of qualified life was provided

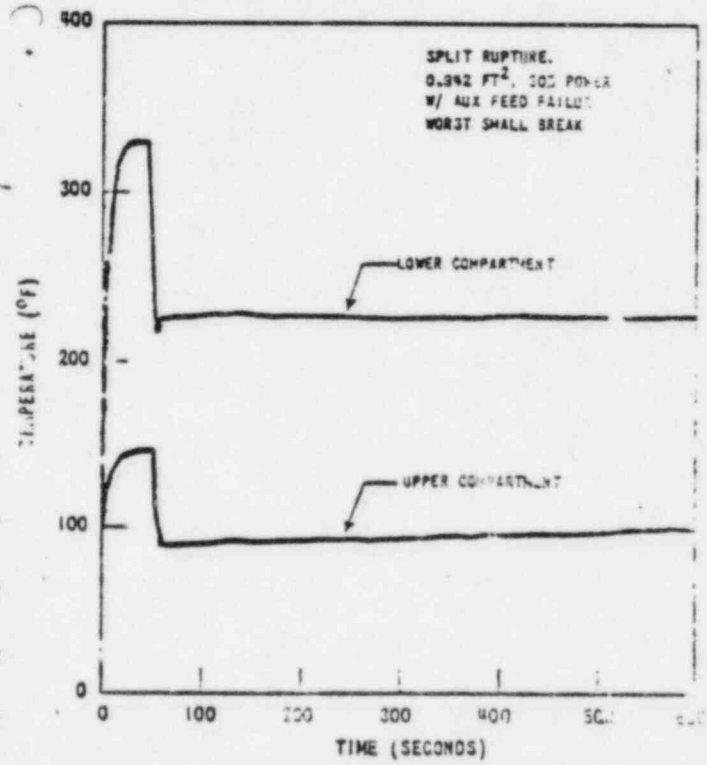
Note 2 - Table 6.1 of the test report [3829] identifies the equipment which passed the test and equipment which did not. This table is reproduced on page 5j.

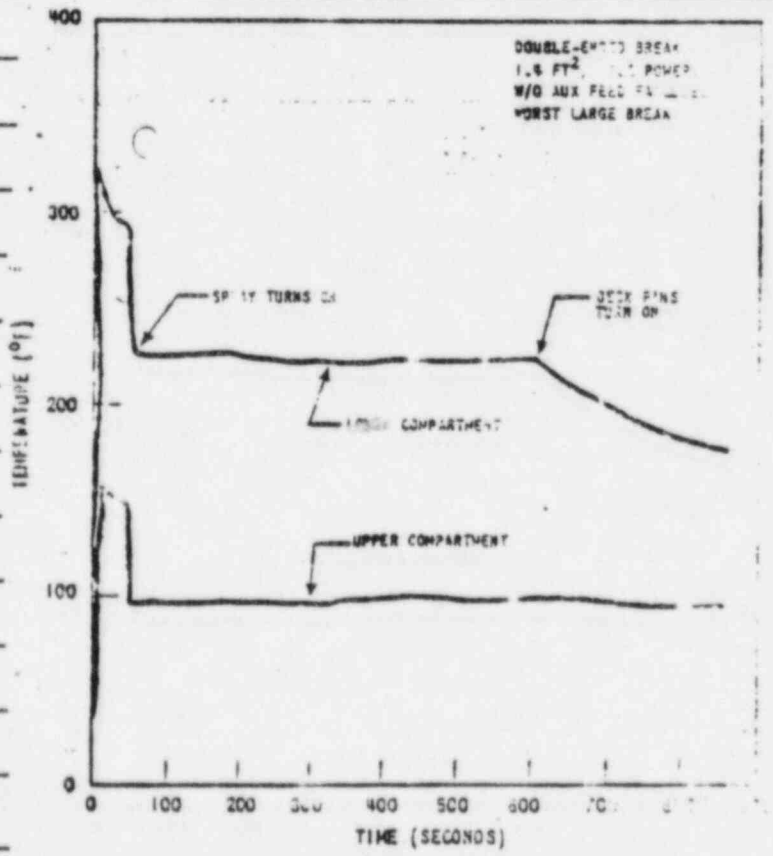
The test profile envelopes the MSLB curves on p 5g but not the LOCA profile shown on page 5h. The licensee indicates that the equipment is required for 24 hrs. However 3 of 4 samples of contineuta core did not pass the test. The DOR Guidelines require.

. If a component fails at any time during the test, even in a so called "fail safe" mode, the test should be considered inconclusive with regard to demonstrating the ability of the component to function for the entire period prior to the failure.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 54

NOTES:





EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 54

NOTES:

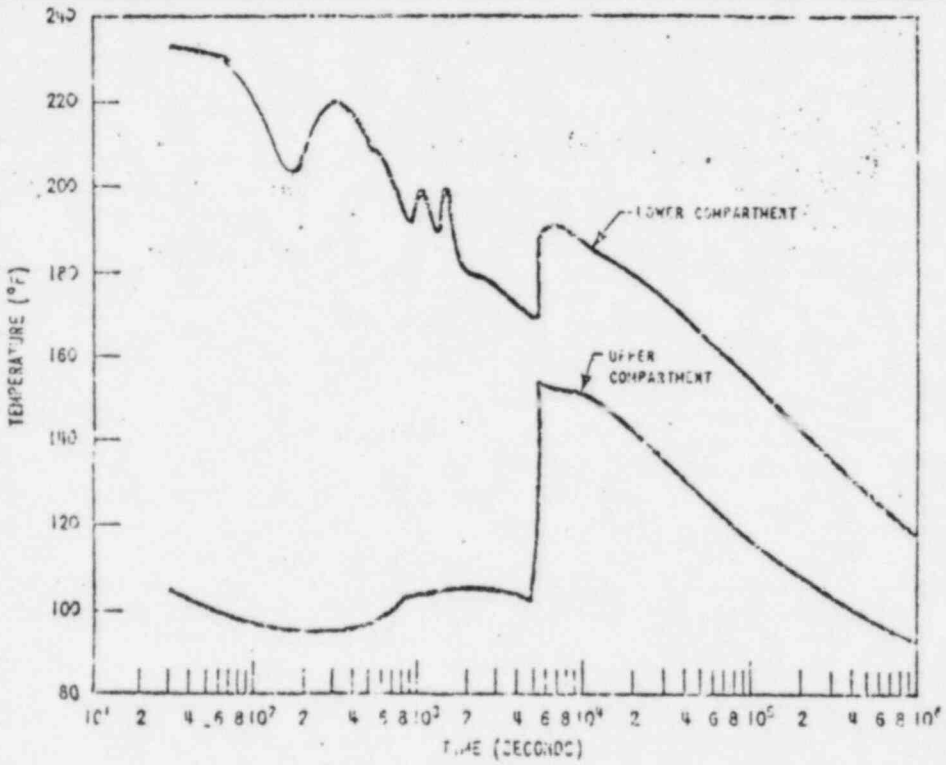
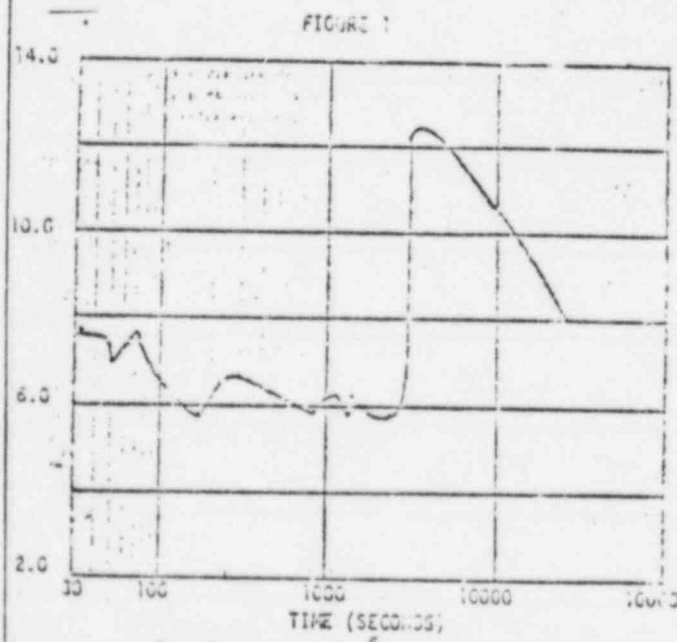
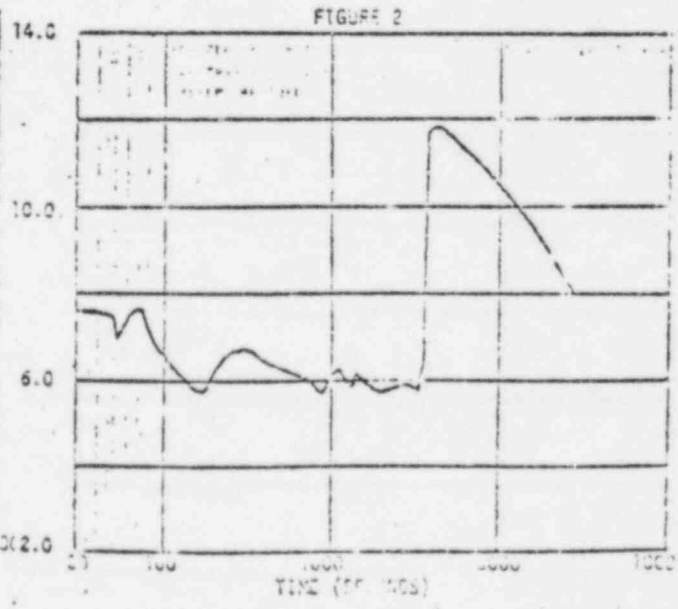


Figure 3 Upper and Lower Compartment Temperature Transients





Ice Mass = 2.07 (10^6) lbs. = 1084.[illegible] lb/basket

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 54

NOTES:

TEST ITEMS

(1) Item B1 Box - 12" x 12" x 6" with hinged cover.

(1) Item B4 Box - 18" x 18" x 6" with hinged cover.

(2) Item 0823 - 12 Point Penn - Union Terminal Blocks Type 6012 - N3 - AEP

100 ft. Item 3123 - 15/C #12 AWG, Solid Copper Control Cable - Continental Wire and Cable

3 ft. Item 422 2" Seal - Tight Flexible Conduit

20 ft. Item 3076 Triax Cable - Boston Insulated Wire

20 ft. Item 3075 #16 AWG, Twisted/Shielded Pair - Boston Insulated Wire

20 ft. Item 3075 #16 AWG, Twisted/Shielded Pair - Continental Wire and Cable

20 ft. Item 3121 7/C #12 AWG Solid Copper Control Cable - General Electric

Acceptance Criteria

8.1 The test items are expected to maintain the current and voltage specified in 5.3 above throughout the total test period. Should the leakage current of any individual test item exceed 1 amp, post test examination shall determine if the cause was external. Final post test criteria shall then be applied to the test item in question to determine if it has passed or failed the test. The post test criterion shall be a leakage current of no greater than 1 amp when the device is subjected to a hi-pot test.

NOTES:

TABLE 6.1

Energized Throughout Test		Removed from Circuitry	
TB-2	1, 7, 9	TB-2	3, 5, 11
TB-4	None	TB-4	1, 3, 5, 7, 9, 11
GE-3	1, 3, 5, 7	GE-4	1, 3, 5, 7
B7P-3		CP-4	1, 2 & Shield
B7P-4		CP-3	1, 2 & Shield
3X3			
3X4			

In view of the fact that the 600 V test source was of limited capacity, (50 ma), a separate 600 V power source (1 KVA) was applied to the test items following their apparent indication of high leakage. This was initiated to confirm the extent of leakage current. Post test examination revealed that this contributed to the severe tracking observed on TB-4.

Post test examination revealed that apparent difficulty with GE-4 and TB-2 was caused by difficulties encountered with the associated test leads used to connect the test items through the test chamber wall. All the test items except TB-4, CP-3, and CP-4 successfully passed a post test hipot test and successfully passed the requirements of this test.

Views of the terminal boxes, terminal blocks and cables after the environmental exposure are shown in Figures 6.2 through 6.5.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 55

EQUIPMENT ITEM NO. 55
ELECTRICAL POWER CABLE LOCATED IN THE CONTAINMENT
OKONITE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 55
LICENSEE REFERENCE(S): 639, 3403, 26, 27, 29
FUNCTION (PLANT ID): VARIOUS (IMD-325, 326)
LICENSEE SUBMITTAL: SCEW(S): CP2-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 55

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 55

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 55

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

Criteria: DOR Guidelines X ; NUREG-0588, Cat. I___; NUREG-0588, Cat. II ___.

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
EQUIPMENT DESCRIPTION			
Equipment Type	Cable	Electrical Cable	
Manufacturer's Name (5.2.2/-/-)	Okonite	Okonite Company	
Model Number (5.2.2/-/-)	See pg 5f	See page 5f (Note A)	X
Serial Number	Not stated	Not Applicable	
Features/Mounting (5.2.6/-/-)	↓	Not Applicable	
Connections/Interfaces (5.2.6/-/-)	↓	Cable Splice	
Location/Elevation	Containment	Not Applicable	
Equipment ID No.	N/A	Not Applicable	
QUALIFICATION REPORT (8.0/5.0/5.0)			
Report ID Number	N-1	N-1	
Report Date	7/3/78	July 3, 1978	
Issued by	Okonite	Okonite	
Prepared for	Not stated	Okonite	
Referenced Reports	↓	Not Stated	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)	↓	Test	
QUALIFICATION TEST PROGRAM			
Functional Test Description (5.2.5/2.2.9/2.2.9)	↓	Maintain electrical Loading @ rated Voltage, Insulation Resistance & Hypot	
Operating Conditions (-/2.2.10/2.2.10)	↓		
Load/Cycles/Voltage/ Current/Freq.	↓	Not Applicable	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 55

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)	N/A	Not Stated	
Accuracy (5.2.5/-/-)		Not Applicable	
Number of Specimens		2 Min.	
Test Instruments Calibrated		Yes	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)	active	Not Applicable	
Test Duration (5.2.1/-/-)	N/A	130+ days	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	1 Wdays	Not Applicable	
Required Function Time	1 day	Not Applicable	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)	N/A	Thermal Aging Irradiation LOCA (PWR Conditions) LOCA (BWR Conditions)	
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)			
1. Representative Sample			
2. Baseline Data			
3. Performance Extremes		Not Applicable	
4. Thermal Aging			
5. Radiation Aging			
6. Wear Aging			
7. Vibration/Seismic			
8. DBE Exposure			
9. Post-DBE Exposure			
10. Inspection			
Aging (5.2.4, 7.0/4.0/4.0)			
Thermal Aging/Basis	Not stated	504 hrs @150 °C Basis Not Stated	
Material Aging Evaluation (7.0/-/-)		Not Stated	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)		Not Stated	
Radiation Aging, Type		Gamma	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 55

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	Not Stated	See Accident Dose	
Radiation Aging, Dose Rate		See Accident Dose	
Radiation Aging, Method		Test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)		Not Stated	
Operational Aging (-/4.2/-)		Not Applicable	
Other Age Conditioning (-/4.2/-)		Not Stated	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	Not Stated	40 years	
Normal Ambient Temperature		Not Applicable	
Normal Ambient Radiation		Not Applicable	
Normal Ambient Humidity		Not Applicable	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	D.C. Cook Program	Not Applicable	
On-Going Analysis of Failures and Degradation (7.0/-/-)		Not Applicable	
Margin (General) (6.0/3.0/3.0)	N/A	Not Applicable	
Margin (NUREG-0588, Cat. I) (-/3.2/-)		Not Applicable	
1. Temperature (+15°F)			
2. Pressure (+10%, 10 psig max)			
3. Radiation (not required)			
4. Time (+10%, +1 hour + function time minimum)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 55

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
ACCIDENT CONDITIONS			
LOCA/MSLB/HELB/Uncontrolled (4.1, 4.2, 4.3.1, 4.3.3/ 1.1, 1.2, 1.5/1.1, 1.2, 1.5)	LOCA/MSLB	LOCA	
Radiation Type	Gamma	Gamma	
Radiation Dose (rd) (4.1.2/1.4/1.4)	1.5×10^8	2×10^8	
Radiation Dose Rate (rd/hr)	Not Stated	$< 10^6$ rd/hr	
Radiation Qual. Method (5.3.1/-/-)		Test	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)		Not Applicable	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)		Not Stated	
Radiation Dose (Normal + Accident) (4.1.2/-/-)		Not Applicable	
Plateout Dose Considered (-/1.48/1.48)		Not Applicable	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)		Not Applicable	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 55

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS			
Rate of Temp./Press. Increase		28°F, 7psi/sec	
Peak: °F/psig/RH/Time	see pages 5i & 5j	346/113/100/6hrs (2 peaks)	test envelopes profile by a wide margin
Decrease To: °F/psig/RH/Time		335/95/100/3hrs 315/69/100/4hrs 265/25/100/3.3 days	
Decrease To: °F/psig/RH/Time		212/0/100/126 days	
Decrease To: °F/psig/RH/Time			
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)	N/A	Not Stated	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)		Test	
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)	2000 ppm B 1.14 wt % Boric Acid pH 9-11	Boric Acid Buffered with Sodium Hydroxide pH 10.5 Demineralized water	
Spray Density (gpm/ft^2)	Not Stated	Not Stated	
Spray Duration		130 days, 30 days with the Boric Acid solution	
Submergence Duration (4.1.3/2.2.5/2.2.5)	*	100 days with demin H_2O	
In-Leakage Considered (5.2.6, 5.3.2/-/-)		Not Applicable	
Time to Submergence		Not Applicable	
Dust Environment (-/2.2.11/2.2.11)		Not Applicable	

* protected by flood up tubes

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 55

NOTES:

A - Test Specimens

1/C #12 7x coated copper, .030" Okonite insulation
1/C #6 7x coated copper, .055" Okonite insulation,
.030" Okolon jacket

The licensee states on the SCEW sheet

Notes: cable tested: 1/C #12 (7X) coated Cu
.030 okonite insulation

cable installed at DCCook plant:
1/C #12 (7X) coated Cu
.030 okonite insulation
.015 okoprene jacket

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 55

NOTES: A - Cont'd

Requirements for establishing similarity between installed cand tested cables are contained in the DOR Guidelines and IEEE 383-74 which are reproduced below for convenience. [DOR]

2. Test Specimen - The test specimen should be the same model as the equipment being qualified. The type test should only be considered valid for equipment identical in design and material construction to the test specimen. Any deviations should be evaluated as part of the qualification documentation (see also Section 8.0 below).

IEEE-383

1.3.1 *Cable Description.* This description or specification should include as a minimum:

1.3.1.1 Conductor — material identification, size, stranding, coating.

1.3.1.2 Insulation — material identification, thickness, method of application.

1.3.1.3 Assembly (multiconductor cables only) — number and arrangement of conductors, fillers, binders.

1.3.1.4 Shielding — tapes, extrusions, braids, or others.

1.3.1.5 Covering — jacket or metallic armor or both, material identification, thickness, method of application.

1.3.1.6 Characteristics — voltage and temperature rating (normal and emergency). For instrumentation cables — capacitance, attenuation, characteristic impedance, microphonics, insulation resistance, as applicable.

1.3.1.7 Identification — manufacturer's trade name, catalog number.

1.3.2 *Field Splice or Connection Description or Both.* This description or specification should include as a minimum:

1.3.2.1 Whether factory or field assembled to cable.

1.3.2.2 Conductor connection — type, material identification, and method of assembly.

1.3.2.3 Items from Sections 1.3.1.2 through 1.3.1.7.

2.2 Type Test Samples. The samples tested should contain the conductor, insulation, fillers, jacket, binder tape, overall jacket, shielding, and field splices which are representative of the cable category being qualified. Table 1 lists sizes which have been considered representative of these categories. The sample lengths should be sufficient to permit reliable test readings and evaluation consistent with good testing practice.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 55

NOTES:

ELECTRIC CABLES, FIELD SPLICES, AND CONNECTIONS

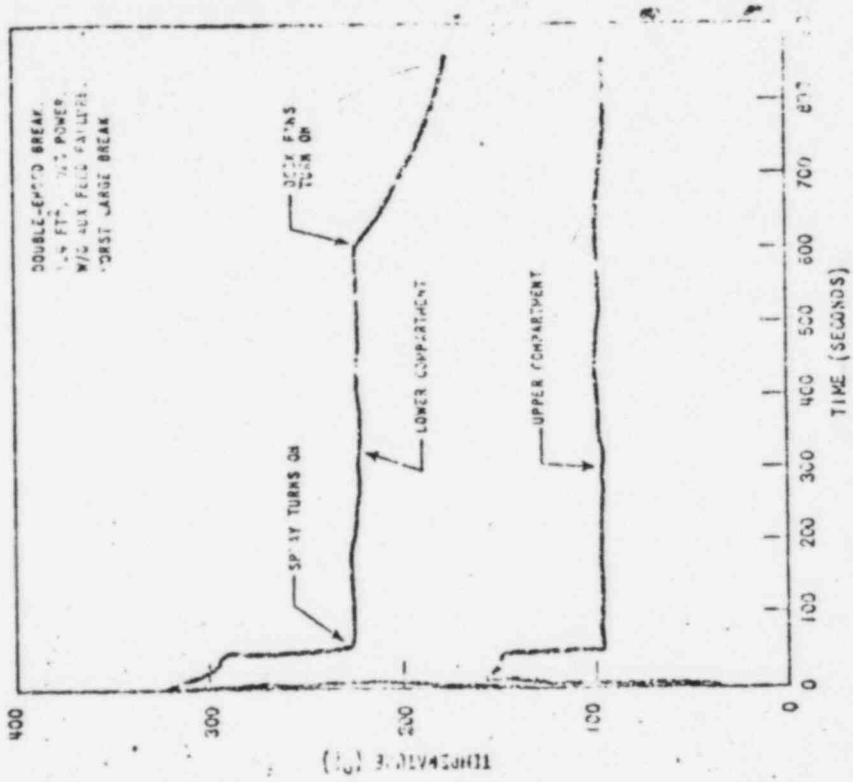
IEEE
Std 383-1974

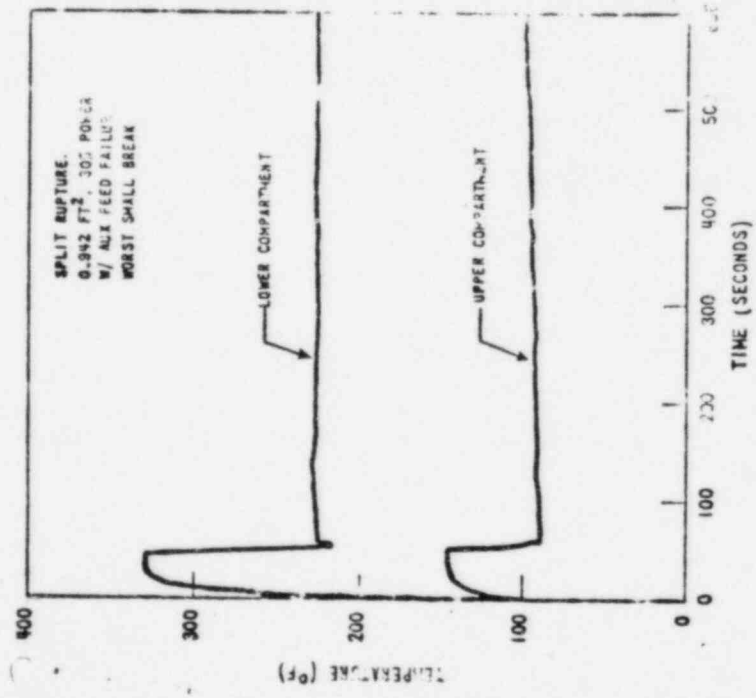
Table 1
Representsentative Cables for Type Tests

Type	Test	Section	Size
Up to 2000 V multiconductor control cable or Shielded multiconductor signal cable (see list below for individual component) or Single conductor power cable	temperature and moisture resistance	2.3.1	1/C — 14 or 12 AWG
	thermal and radiation exposure	2.3.3	1/C or M/C — 14 or 12 AWG
	design basis event simulation	2.4	1/C or M/C — 14 or 12 AWG 1/C — 6, 4 or 2 AWG
	vertical flame test singles from cable assembly	2.5.6	1/C — 14 or 12 AWG
	vertical tray flame test	2.5.4	7/C — 16, 14 or 12 AWG
Shielded pairs, triple or quad from multiconductor signal cable	temperature and moisture resistance	2.3.1	1 pair shielded 16 AWG or actual cable
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test	2.5.6	
Coaxial, triaxial or special instrument cable	temperature and moisture resistance	2.3.1	actual size
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test singles from cable assembly	2.5.6	
Single pair thermocouple extension cable	temperature and moisture resistance	2.3.1	2/C — 20 AWG or actual size if smaller
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical tray flame test	2.5.4	
	vertical flame test singles from cable assembly	2.5.6	
2001—15 000 V power cable 1/C triplexed and multiconductor	vertical tray flame test	2.5.4	6 AWG (2.5kV) 2/O or 4/O or 4/O (2.15kV)

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 55

NOTES:





EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 55

NOTES:

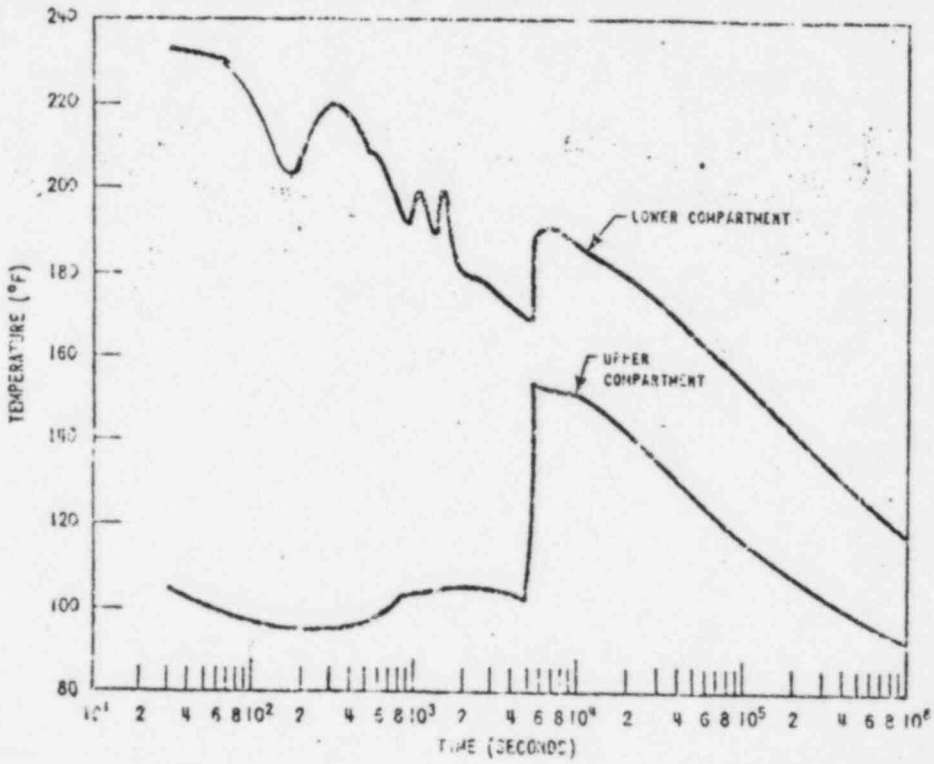
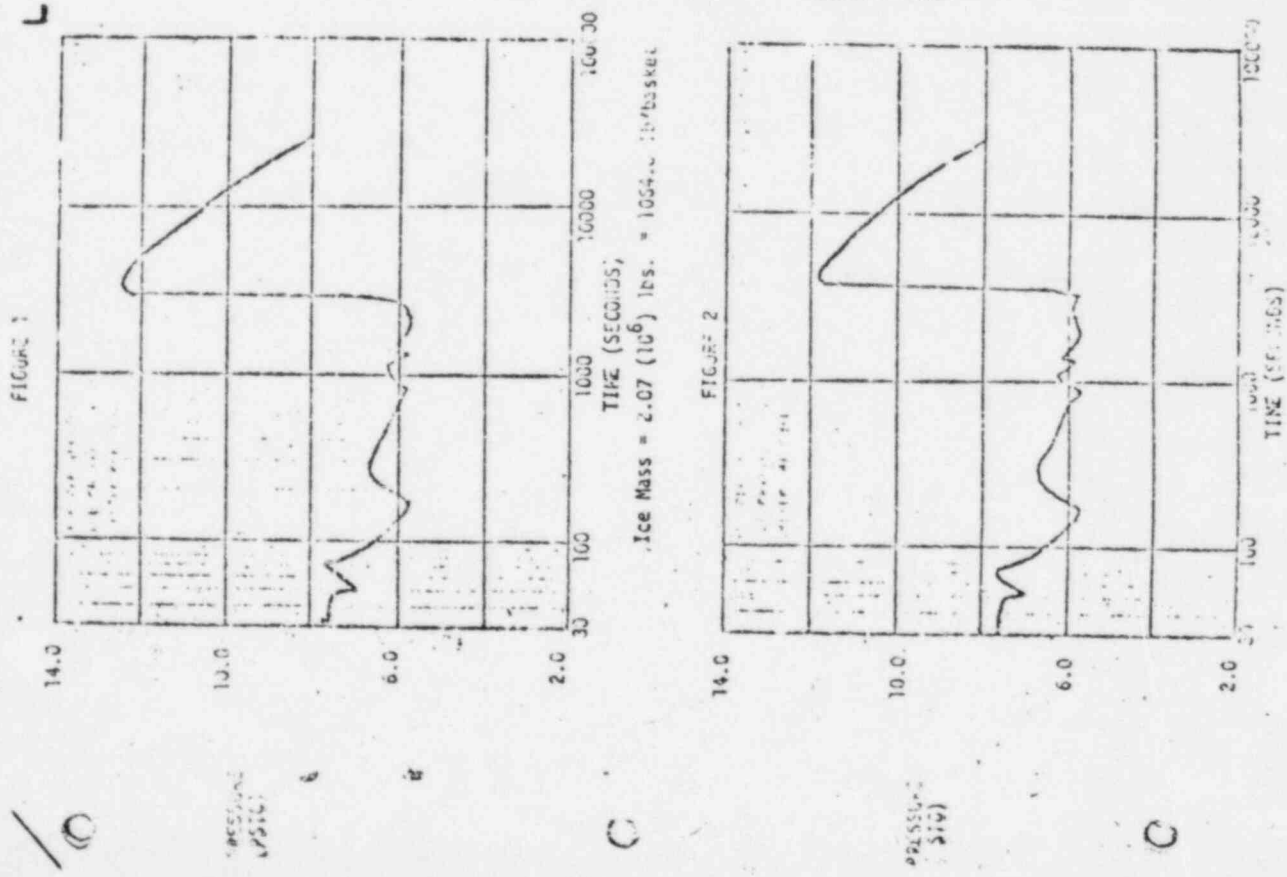


Figure 3 Upper and Lower Compartment Temperature Transients



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 56

EQUIPMENT ITEM NO. 56
PRESSURE TRANSMITTER LOCATED IN THE CONTAINMENT
ITT BARTON MODEL 763
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 56
LICENSEE REFERENCE(S): 3836
FUNCTION (PLANT ID): REACTOR COOLANT PRESSURE/MONITORING (NPS-121, 122)
LICENSEE SUBMITTAL: SCEW(S): I22, I23 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, (QT), RT, (P), H, (CS), (A), S, (R), (M), I, (QM), RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j, 5k, 5l~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 51

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 56

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	X
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	X
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

For detailed evaluation refer to Item 36.
In addition, there is no data on submergence

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 57

EQUIPMENT ITEM NO. 57
SOLENOID VALVE LOCATED OUTSIDE CONTAINMENT
ASCO MODEL HP8300C58RU/HT8300B58RU
REQUIRED OPERATING TIME: 25 SECONDS
TER CHECKSHEET NO. 57
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): MAIN FEEDWATER REGULATING VALVES TRIP VALVES (XSO-291, 292, 293, 294, 295, 296, 297, 298)
LICENSEE SUBMITTAL: SCEW(S): S3 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T QT RT, P H CS, A S, (R), M, I, QM RPN EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 57

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

X The Licensee (has/~~has not~~) proposed a corrective action for this equipment item whose qualification has not been fully established.

X Justification for interim operation (has/~~has not~~) been provided by the Licensee for this equipment item.

X Corrective action specified by the Licensee:

- X Equipment replacement with qualified equipment
- ___ Equipment modification
- ___ Equipment relocation above submergence level
- ___ Relocate or shield equipment from radiation source
- ___ Verify qualification by additional (testing/analysis)
- ___ Equipment relocation to a mild environment
- ___ Qualification testing of equipment in progress
- ___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

X The Licensee (~~has~~/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a	Qualified	II.c	Qualified Life Deficiency
(I.b)	Modification	III.a	Exempt
II.a	Qualification Not Established	III.b	Not in Scope
II.b	Not Qualified	IV	Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 57

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	X
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 58

EQUIPMENT ITEM NO. 58
SOLENOID VALVE LOCATED IN THE CONTAINMENT
ASCO MODEL NP831654V
REQUIRED OPERATING TIME: 5 SECONDS
TER CHECKSHEET NO. 58
LICENSEE REFERENCE(S): 3836, 712
FUNCTION (PLANT ID): CONTAINMENT VENTILATION AND ICE CONDENSER REFRIG. ISOLATION (XSO-12, 21, 121, 122, 123, 124, 125, 126, 127)
LICENSEE SUBMITTAL: SCEW(S): S17-1, -2 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 58

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

(I.a) Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 58

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	____
Adequate Similarity Between Equipment and Test Specimen Established	____
Aging Degradation Evaluated Adequately	____
Qualified Life or Replacement Schedule Established (If Required)	____
Program Established to Identify Aging Degradation	____
Criteria Regarding Aging Simulation Satisfied (If Required)	____
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	____
o Peak Pressure Adequate	____
o Duration Adequate	____
o Required Profile Enveloped Adequately	____
o Steam Exposure (If Required) Adequate	____
Criteria Regarding Spray Satisfied	____
Criteria Regarding Submergence Satisfied	____
Criteria Regarding Radiation Satisfied	____
Criteria Regarding Test Sequence Satisfied	____
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	____
Criteria Regarding Functional Testing Satisfied	____
Criteria Regarding Instrument Accuracy Satisfied	____
Test Duration Margin (1 hour + Function Time) Satisfied	____
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	____

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	X
I.b	Equipment Qualification Pending Modification	____
II.a	Equipment Qualification Not Established	____
II.b	Equipment Not Qualified	____
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	____
III.a	Equipment Exempt From Qualification	____
III.b	Equipment Not in the Scope of the Qualification Review	____
IV	Documentation Not Made Available	____

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 58

Checksheets 5a thru 5f have been removed due to the proprietary nature of information contained therein.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 59

EQUIPMENT ITEM NO. 59
SOLENOID VALVE LOCATED IN THE CONTAINMENT
ASCO MODEL NP831654V
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 59
LICENSEE REFERENCE(S): 3836, 712
FUNCTION (PLANT ID): PRESSURIZER PRESSURE CONTROL/TRIP CONTROL VALVE CLOSED (XSO-503, -505, -507)
LICENSEE SUBMITTAL: SCEW(S): S11-1, -2 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 59

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

(I.a) Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 59

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	____
Adequate Similarity Between Equipment and Test Specimen Established	____
Aging Degradation Evaluated Adequately	____
Qualified Life or Replacement Schedule Established (If Required)	____
Program Established to Identify Aging Degradation	____
Criteria Regarding Aging Simulation Satisfied (If Required)	____
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	____
o Peak Pressure Adequate	____
o Duration Adequate	____
o Required Profile Enveloped Adequately	____
o Steam Exposure (If Required) Adequate	____
Criteria Regarding Spray Satisfied	____
Criteria Regarding Submergence Satisfied	____
Criteria Regarding Radiation Satisfied	____
Criteria Regarding Test Sequence Satisfied	____
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	____
Criteria Regarding Functional Testing Satisfied	____
Criteria Regarding Instrument Accuracy Satisfied	____
Test Duration Margin (1 hour + Function Time) Satisfied	____
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	____

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	X
I.b	Equipment Qualification Pending Modification	____
II.a	Equipment Qualification Not Established	____
II.b	Equipment Not Qualified	____
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	____
III.a	Equipment Exempt From Qualification	____
III.b	Equipment Not in the Scope of the Qualification Review	____
IV	Documentation Not Made Available	____

See equipment item no. 58 for detailed evaluation.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 60

EQUIPMENT ITEM NO. 60
SOLENOID VALVE LOCATED OUTSIDE CONTAINMENT
ASCO MODEL HT8316B17
REQUIRED OPERATING TIME: 5 SECONDS
TER CHECKSHEET NO. 60
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): STEAM GENERATOR STOP VALVE DUMP VALVE/CLOSURE ACTUATION (XSO-211, 212, 221, 222, 231, 232, 241, 242)
LICENSEE SUBMITTAL: SCEW(S): S7 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, (T) (QT) RT, (P) H, CS, (A) S, (R), (M) I, (QM) RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
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Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 60

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 60

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 61

EQUIPMENT ITEM NO. 61
RADIATION MONITOR LOCATED IN THE CONTAINMENT
WESTINGHOUSE MODEL 1101
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 61
LICENSEE REFERENCE(S): 639
FUNCTION (PLANT ID): CONTAINMENT HIGH RADIATION/ACTUATION (VRC-302)
LICENSEE SUBMITTAL: SCEW(S): I31 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 61

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

X The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a	Qualified	II.c	Qualified Life Deficiency
I.b	Modification	III.a	Exempt
(II.a)	Qualification Not Established	III.b	Not in Scope
II.b	Not Qualified	IV	Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 61

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 62

EQUIPMENT ITEM NO. 62
PRESSURE SWITCH LOCATED OUTSIDE CONTAINMENT
MERCOID MODEL DA7031153
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 62
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): ESSENTIAL SERVICE WATER PRESSURE/AUTOMATIC PUMP START (WPS 702, 706)
LICENSEE SUBMITTAL: SCEW(S): I32 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 62

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

X The Licensee (has/~~has not~~) proposed a corrective action for this equipment item whose qualification has not been fully established.

X Justification for interim operation (has/~~has not~~) been provided by the Licensee for this equipment item.

X Corrective action specified by the Licensee:

X Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

X The Licensee (~~has~~/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
(I.b) Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 62

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	X
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 62

Notes: Justification for not having these switches qualified is as follows. The normally closed contact of these switches allows automatic starting of the ESW pump motors. Should the accident disable the switch making its contact go open (and stay open), the motor can be started by manually placing the control switch in the "close" position. We intend to replace these switches with ones that are qualified to survive the HELB environment.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 63

EQUIPMENT ITEM NO. 63
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 HOUR
TER CHECKSHEET NO. 63
LICENSEE REFERENCE(S): 639, 1620, 26, 27, 29
FUNCTION (PLANT ID): AT VALVE LIMIT SWITCH (QCM-250)
LICENSEE SUBMITTAL: SCEW(S): TC1-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, (T) QT, RT, (P) H, CS, (A) S, (R), M, I, (QM) RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 63

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 63

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 63

LICENSEE RESPONSE TO NRC SER

Qualified by Limitorque Corp. Test Laboratory
Project #600193. November 1968

Type of Test: simultaneous, steam
chemical spray
separate seismic test

Type Profile:

328°F, 90 psig for 1 hr
312°F, 70 psig for 2 hrs
287°F, 40 psig for 2 hrs
271°F, 20 psig for 19 hrs
250°F, 15 psig for 6 days

Chemical Spray:

1.5% boric acid buffered with Na OH to a PH of 7.6%.

Seismic Test 8/20/79
Horizontal Force, 5.3 G at 35 Hz
Vertical force 5.3 G at 35 Hz
No resonance freq from 5 to 35 Hz

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 63

NOTES:

This Termination requires qualification for steam/pressure, chemical spray, and radiation exposure in addition to thermal aging.

- The licensee has referenced numerous qualification documents in addition to documents specifically testing equipment at which the terminations were made.

- The licensee has not submitted any documentation that describes the splice materials, testing on the plant specific termination method or provides traceability of the plant specific method and materials to those tested.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 64

EQUIPMENT ITEM NO. 64
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 5 SECONDS
TER CHECKSHEET NO. 64
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): TC15-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 64

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 64

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 64

NOTES:

This Termination requires qualification for steam/pressure, chemical spray, and radiation exposure in addition to thermal aging.

- The licensee has referenced numerous qualification documents in addition to documents specifically testing equipment at which the terminations were made.

- The licensee has not submitted any documentation that describes the splice materials, testing on the plant specific termination method or provides traceability of the plant specific method and materials to those tested.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 65

EQUIPMENT ITEM NO. 65
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 5 SECONDS
TER CHECKSHEET NO. 65
LICENSEE REFERENCE(S): 639, 712
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): TC16-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

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Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 65

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (~~has~~/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has /has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a	Qualified	II.c	Qualified Life Deficiency
I.b	Modification	III.a	Exempt
(II.a)	Qualification Not Established	III.b	Not in Scope
II.b	Not Qualified	IV	Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 65

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	X
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 65

NOTES:

(1) PSR#712, a report covering the results of tests on various ASCO solenoids, is cited by the licensee as the supporting documentation for qualification of this equipment item. However, the licensee did not provide information that would adequately demonstrate that the cable terminations employed in the valve test were the same design and construction as this equipment item. It is to be noted that 4 of the 9 valves tested had low coil insulation resistance after exposure to the 30-day LOCA simulation due to penetration of spray solution into the solenoid enclosure resulting from failure of the Liquatite, type L.T. flexible electric conduit used for wiring through the solenoid enclosure.

(2) The licensee provided no information concerning the aging characteristics and life of this equipment item. Further, the licensee did not provide information regarding inspection/test/maintenance and/or replacement during the installed life.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 66

EQUIPMENT ITEM NO. 66
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 66
LICENSEE REFERENCE(S): 663, 38
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): TC9-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

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Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 66

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 66

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 66

NOTES:

This Termination requires qualification for steam/pressure, chemical spray, and radiation exposure in addition to thermal aging.

- The licensee has referenced numerous qualification documents in addition to documents specifically testing equipment at which the terminations were made.

- The licensee has not submitted any documentation that describes the splice materials, testing on the plant specific termination method or provides traceability of the plant specific method and materials to those tested.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 67

EQUIPMENT ITEM NO. 67
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 67
LICENSEE REFERENCE(S): 1620, 3827, 26, 27, 29
FUNCTION (PLANT ID): CABLE CONNECTION (ICM-305, 306)
LICENSEE SUBMITTAL: SCEW(S): TC14-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, (T), QT, RT, (P), H, CS, (A), S, (R), M, I, (QM), RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 62

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a	Qualified	II.c	Qualified Life Deficiency
I.b	Modification	III.a	Exempt
(II.a)	Qualification Not Established	III.b	Not in Scope
II.b	Not Qualified	IV	Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 62

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 67

LICENSEE RESPONSE TO NRC SER

Qualified by Limitorque Corp. Test Laboratory
Project #600198. November 1968

Type of Test: simultaneous, steam
chemical spray
separate seismic test

Type Profile:

328°F, 90 psig for 1 hr
312°F, 70 psig for 2 hrs
287°F, 40 psig for 2 hrs
271°F, 20 psig for 19 hrs
250°F, 15 psig for 6 days

Chemical Spray:

1.5% boric acid buffered with Na OH to a PH of 7.67.

Seismic Test 8/20/79
Horizontal Force, 5.3 G at 35 Hz
Vertical force 5.3 G at 35 Hz
No resonance freq from 5 to 35 Hz

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 62

NOTES:

This Termination requires qualification for steam/pressure, chemical spray, and radiation exposure in addition to thermal aging.

- The licensee has referenced numerous qualification documents in addition to documents specifically testing equipment at which the terminations were made.

- The licensee has not submitted any documentation that describes the splice materials, testing on the plant specific termination method or provides traceability of the plant specific method and materials to those tested.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 68

EQUIPMENT ITEM NO. 68
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 24 HOURS
TER CHECKSHEET NO. 68
LICENSEE REFERENCE(S): 639, 3829, 815
FUNCTION (PLANT ID): TERMINATION AT TERMINAL BOX AT VALVE ACTUATOR
LICENSEE SUBMITTAL: SCEW(S): TC8-1 [12]
FUNCTION (PLANT ID): TERMINATION AT FLOODUP TERMINAL BOX
LICENSEE SUBMITTAL: SCEW(S): TC7-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, (T), QT, RT, (P), H, CS, (A), S, (R), M, I, (QM), RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 68

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 65

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	X
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 68

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

Criteria: DOR Guidelines X; NUREG-0588, Cat. I___; NUREG-0588, Cat. II ___.

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
EQUIPMENT DESCRIPTION			
Equipment Type	Various	Various see page 5b	
Manufacturer's Name (5.2.2/-/-)	see page 10		X Note 3
Model Number (5.2.2/-/-)			
Serial Number			
Features/Mounting (5.2.6/-/-)			
Connections/Interfaces (5.2.6/-/-)		cable splice	
Location/Elevation		in Auxiliary	
Equipment ID No.	see p 10	Not applicable	
QUALIFICATION REPORT (8.0/5.0/5.0)			
Report ID Number	IPS 348	IPS-348	
Report Date	Not stated	5/17/78	
Issued by	CONAX	CONAX.	
Prepared for	AEP	AEP	
Referenced Reports	N/A	N/A	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)		Test	
QUALIFICATION TEST PROGRAM			
Functional Test Description (5.2.5/2.2.9/2.2.9)		Insulation resistance and Leakage Current	
Operating Conditions (-/2.2.10/2.2.10) Load/Cycles/Voltage/ Current/Freq.		not stated	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 68

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)	N/A	See Section 8.1 on page 5i.	
Accuracy (5.2.5/-/-)		N/A	
Number of Specimens		See Page 5i	
Test Instruments Calibrated		yes	
Safety Function (Active/Passive) (-/2.1.3/2.1.3)	varies	N/A	
Test Duration (5.2.1/-/-)	N/A	4.8. day (116 hrs)	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	~11.5 days	N/A	
Required Function Time	24 hrs	N/A	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)	N/A		
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)		Radiation Steam/Chemical Spray	
1. Representative Sample 2. Baseline Data 3. Performance Extremes 4. Thermal Aging 5. Radiation Aging 6. Wear Aging 7. Vibration/Seismic 8. DBE Exposure 9. Post-DBE Exposure 10. Inspection			
Aging (5.2.4, 7.0/4.0/4.0) Thermal Aging/Basis	Not stated	Not stated	X note 1
Material Aging Evaluation (0/-/-)		"	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)		"	
Radiation Aging, Type		"	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 68

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	Not stated	See accident Dose (pg 5d)	
Radiation Aging, Dose Rate	↓		
Radiation Aging, Method	↓	test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)	↓	Not stated	
Operational Aging (-/4.2/-)	↓	" "	
Other Age Conditioning (-/4.2/-)	↓	" "	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	Not stated	Not stated	
Normal Ambient Temperature Normal Ambient Radiation Normal Ambient Humidity	↓	N/A ↓	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	D.C. Cook Program	↓	
On-Going Analysis of Failures and Degradation (7.0/-/-)	↓	↓	
Margin (General) (6.0/3.0/3.0)	Not stated	↓	
Margin (NUREG-0588, Cat. I) (-/3.2/-) 1. Temperature (+15°F) 2. Pressure (+10%, 10 psig max) 3. Radiation (not required) 4. Time (+10%, +1 hour + function time minimum)	↓	↓	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 68

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
ACCIDENT CONDITIONS			
LOCA/MSLB/HELB/Uncontrolled (4.1, 4.2, 4.3.1, 4.3.3/ 1.1, 1.2, 1.5/1.1, 1.2, 1.5)	LOCA/MSLB	LOCA/MSLB	
Radiation Type	Gamma	Gamma	
Radiation Dose (rd) (4.1.2/1.4/1.4)	28×10^6	150×10^6	
Radiation Dose Rate (rd/hr)	Not stated	0.75×10^6	
Radiation Qual. Method (5.3.1/-/-)	↓		
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)		N/A	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)		↓	
Radiation Dose (Normal + Accident) (4.1.2/-/-)			
Plateout Dose Considered (-/1.48/1.48)			
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 68

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS			
Rate of Temp./Press. Increase			
Peak: °F/psig/RH/Time	See Pages	345/112/-/1 hr	Note 2.
Decrease To: °F/psig/RH/Time	59	250/19/-/115 hrs.	
Decrease To: °F/psig/RH/Time	& 5 h		
Decrease To: °F/psig/RH/Time			
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)		Not stated	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)		Test	
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)	2000 ppm B 1.14 sp. gr. pH 9-11	2500 ppm Boron Buffered with NaOH for pH 9-10.	
Spray Density (gpm/ft^2)	Not Stated	Not stated	
Spray Duration	"	116 hrs.	
Submergence Duration (4.1.3/2.2.5/2.2.5)		N/A	
In-Leakage Considered (5.2.6, 5.3.2/-/-)			
Time to Submergence			
Dust Environment (-/2.2.11/2.2.11)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 68

NOTES:

Note 1 - no preaging was performed, no material evaluation for aging was performed and no estimate of qualified life was provided

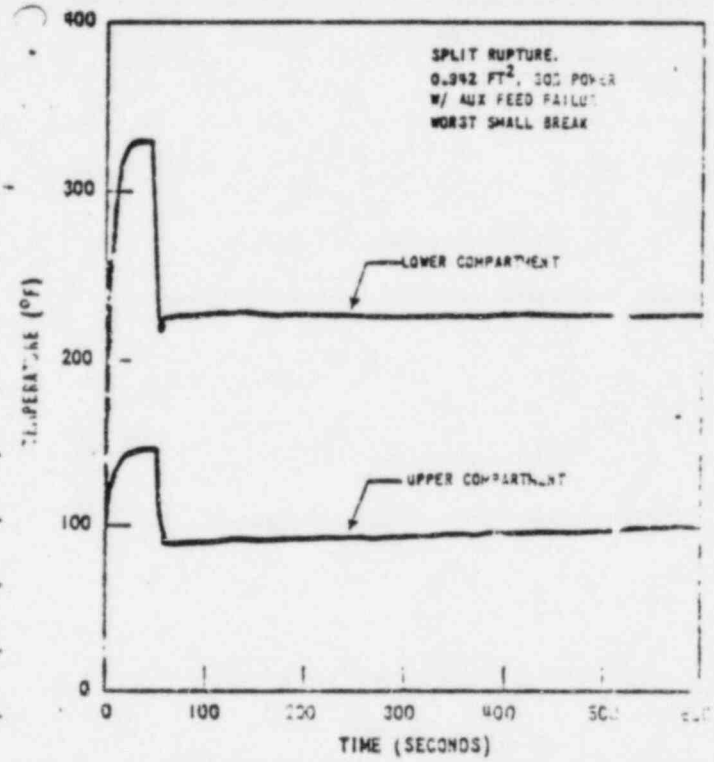
Note 2 - Table 6.1 of the test report [3829] identifies the equipment which passed the test and equipment which did not. This table is reproduced on page 5j.

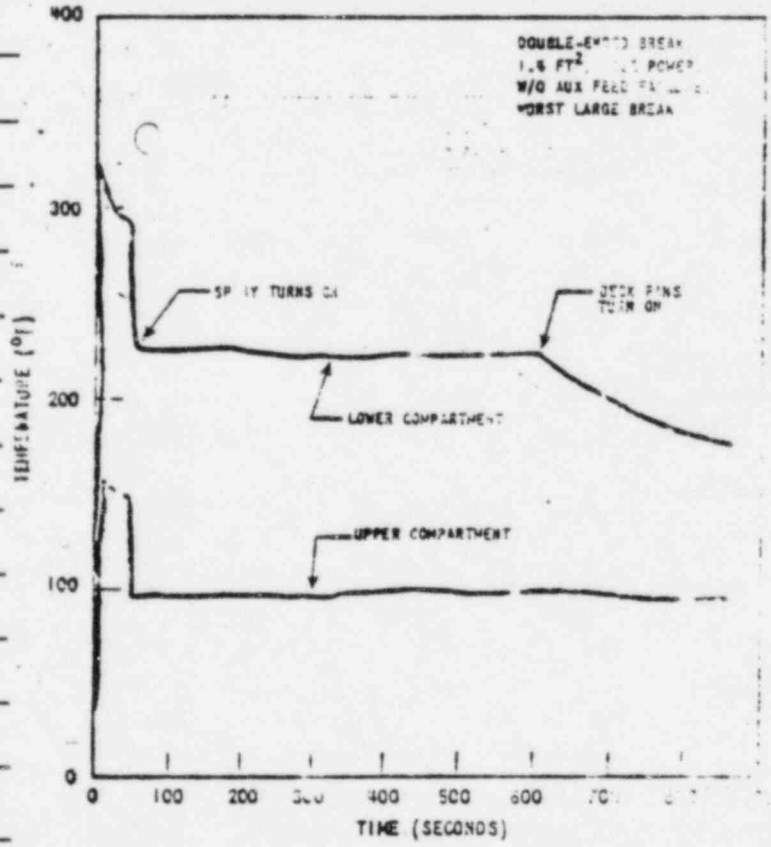
The test profile envelopes the MSLB curves on p 5g but not the LOCA profile shown on page 5h.

Note 3 - The test report describes a test cable splice but there is no information provided which would relate the equipment tested to the equipment on the SCRW sheet.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 68

NOTES:





EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 68

NOTES:

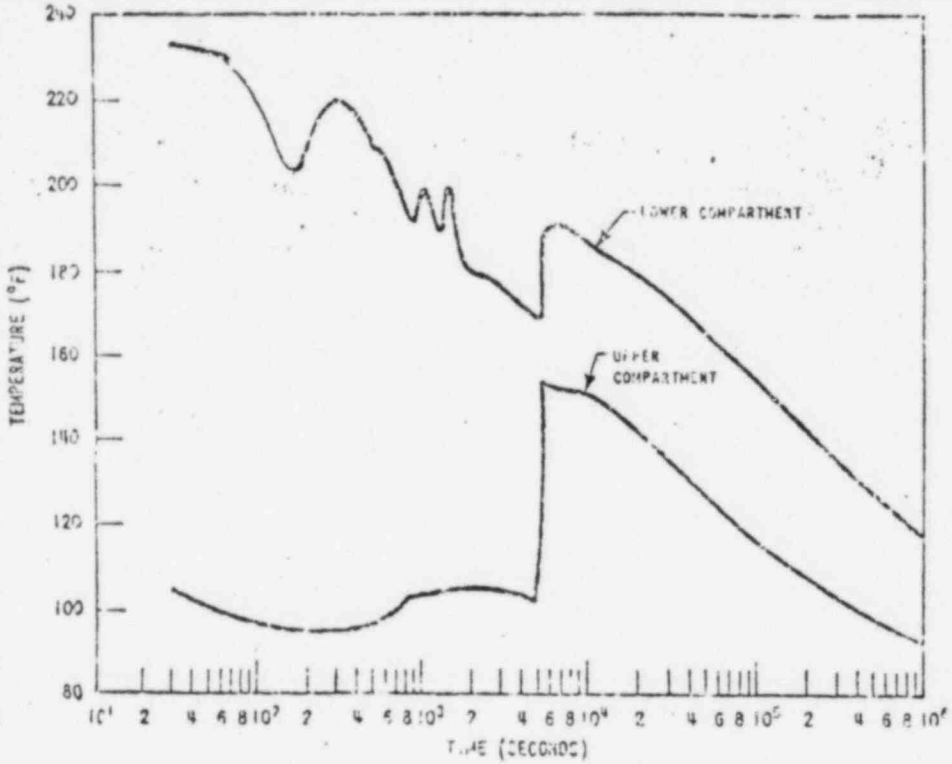
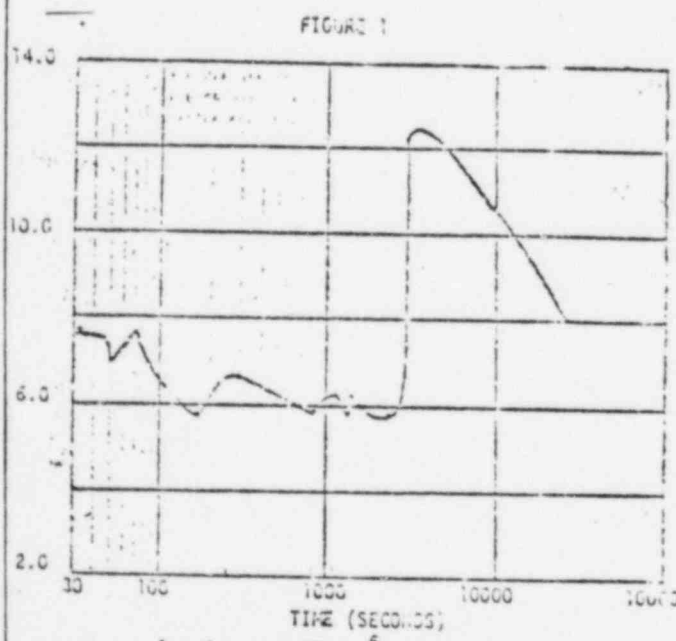
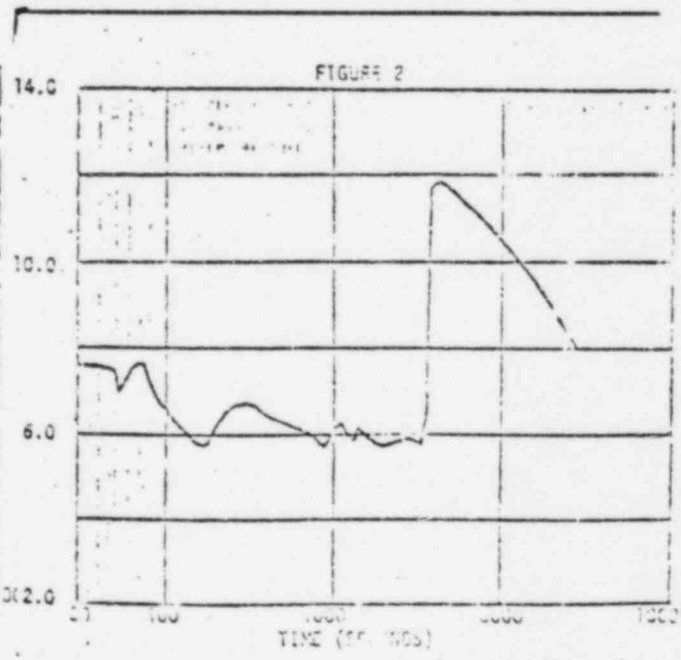


Figure 1 Upper and Lower Compartment Temperature Transients



Ice Mass = 2.07 (10^6) lbs.



NOTES:

TEST ITEMS

(1) Item B1 Box - 12" x 12" x 6" with hinged cover.

(1) Item B4 Box - 18" x 18" x 6" with hinged cover.

(2) Item 0823 - 12 Point Penn - Union Terminal Blocks Type 6012 - N3 - AEP

100 ft. Item 3123 - 15/C #12 AWG, Solid Copper Control Cable - Continental Wire and Cable

3 ft. Item 422 2" Seal - Tight Flexible Conduit

20 ft. Item 3076 Triax Cable - Boston Insulated Wire

20 ft. Item 3075 #16 AWG, Twisted/Shielded Pair - Boston Insulated Wire

20 ft. Item 3075 #16 AWG, Twisted/Shielded Pair - Continental Wire and Cable

20 ft. Item 3121 7/C #12 AWG Solid Copper Control Cable - General Electric

Acceptance Criteria

8.1 The test items are expected to maintain the current and voltage specified in 5.3 above throughout the total test period. Should the leakage current of any individual test item exceed 1 amp, post test examination shall determine if the cause was external. Final post test criteria shall then be applied to the test item in question to determine if it has passed or failed the test. The post test criterion shall be a leakage current of no greater than 1 amp when the device is subjected to a hi-pot test.

NOTES:

TABLE 6.1

Energized Throughout Test		Removed from Circuitry	
TB-2	1, 7, 9	TB-2	3, 5, 11
TB-4	None	TB-4	1, 3, 5, 7, 9, 11
GE-3	1, 3, 5, 7	GE-4	1, 3, 5, 7
B7P-3		CP-4	1, 2 & Shield
B7P-4		CP-3	1, 2 & Shield
3X3			
3X4			

In view of the fact that the 600 V test source was of limited capacity, (50 ma), a separate 600 V power source (1 KVA) was applied to the test items following their apparent indication of high leakage. This was initiated to confirm the extent of leckage current. Post test examination revealed that this contributed to the severe tracking observed on TB-4.

Post test examination revealed that apparent difficulty with GE-4 and TB-2 was caused by difficulties encountered with the associated test leads used to connect the test items through the test chamber wall. All the test items except TB-4, CP-3, and CP-4 successfully passed a post test hipot test and successfully passed the requirements of this test.

Views of the terminal boxes, terminal blocks and cables after the environmental exposure are shown in Figures 6.2 through 6.5.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

EQUIPMENT ITEM NO. 69
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 24 HOURS
TER CHECKSHEET NO. 69
LICENSEE REFERENCE(S): 3840, 3841
FUNCTION (PLANT ID): CABLE CONNECTION
LICENSEE SUBMITTAL: SCEW(S): TC13-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NOTES:

This termination requires qualification for steam pressure and radiation exposure in addition to thermal aging.

- The licensee has referenced PGR 3840, and 3841 as evidence of qualification. Reference 3840 and 3841 discuss testing performed on terminal blocks and terminal block/cable assemblies. Neither of these two documents identify the method of cable termination nor do they discuss any observations of the termination materials after the environmental exposure.

- The licensee has not stated the type or materials used in the terminal block/cable terminations.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 70

EQUIPMENT ITEM NO. 70
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 24 HOURS
TER CHECKSHEET NO. 70
LICENSEE REFERENCE(S): 3831, 26
FUNCTION (PLANT ID): TERMINATION AT PENETRATION INSIDE FLOODUP TUBES
LICENSEE SUBMITTAL: SCEW(S): TC6-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT RT, P, H, CS, A, S, (R), M, I, QM RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 70

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 20

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	X
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 20

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

Criteria: DOR Guidelines X ; NUREG-0588, Cat. I___; NUREG-0588, Cat. II ___.

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
EQUIPMENT DESCRIPTION			
Equipment Type	Cable terminating	Cable termination	X Note 1
Manufacturer's Name (5.2.2/-/-)	not stated	N/A	
Model Number (5.2.2/-/-)	not stated	N/A	
Serial Number	not Applicable	N/A	
Features/Mounting (5.2.6/-/-)	see page 1a for splice description	WCSF-N (Raychem heat shrink tubing), kapton/kapton	X Note 1
Connections/Interfaces (5.2.6/-/-)	cable splice	splice - seamless copper sleeves w/tin coating	
Location/Elevation	see page 1a		
Equipment ID No.	Not stated		
QUALIFICATION REPORT (8.0/5.0/5.0)			
Report ID Number	PGR # (8831)	CWAPD-332	
Report Date		April 10-15 1978	
Issued by		Westinghouse	
Prepared for		D.C. Cook 1+2	
Referenced Reports	none		
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)	test	test	
QUALIFICATION TEST PROGRAM			
Functional Test Description (5.2.5/2.2.9/2.2.9)		IR, Hipot	
Operating Conditions (-/2.2.10/2.2.10) Load/Cycles/Voltage/ Current/Freq.		575V AC, three phase 5 Amp	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 20

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)		main current + voltage throughout test	
Accuracy (5.2.5/-/-)		Leakage current no greater than 1 Amp during post-test Hipot.	
Number of Specimens		various	
Test Instruments Calibrated		yes	
Safety Function (Active/Passive) (-/2.1.3/2.1.3)	Active	Active	
Test Duration (5.2.1/-/-)		~117.5 hrs.	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	278 hrs.		
Required Function Time	continuous		
Test Sequence (General) (5.2.3/2.3.1/2.3.1)		inspect/irradiate/chem spray steam/press. Functional test	
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)			
1. Representative Sample			
2. Baseline Data			
3. Performance Extremes			
4. Thermal Aging			
5. Radiation Aging			
6. Wear Aging			
7. Vibration/Seismic			
8. DBE Exposure			
9. Post-DBE Exposure			
10. Inspection			
Aging (5.2.4, 7.0/4.0/4.0)		not performed	X Note 2
Thermal Aging/Basis	ND		
Material Aging Evaluation (7.0/-/-)	ND	not stated	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)	ND	not stated	
Radiation Aging, Type	γ	γ	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 70

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	28 Mrd	60 Mrd +L.	
Radiation Aging, Dose Rate	N.D	.75 Mrd/hr.	
Radiation Aging, Method	test	test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)	N.D	not stated (WCSF-N)	
Operational Aging (-/4.2/-)			
Other Age Conditioning (-/4.2/-)			
Qualified Life Claimed/ Established (5.2.4/4.10/-)	N.D.	Not stated	
Normal Ambient Temperature Normal Ambient Radiation Normal Ambient Humidity	N.D		
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	yes		
On-Going Analysis of Failures and Degradation (7.0/-/-)	yes		
Margin (General) (6.0/3.0/3.0)			
Margin (NUREG-0588, Cat. I) (-/3.2/-) 1. Temperature (+15°F) 2. Pressure (+10%, 10 psig max) 3. Radiation (not required) 4. Time (+10%, +1 hour + function time minimum)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 20

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
ACCIDENT CONDITIONS			
LOCA/MSLB/HELB/Uncontrolled (4.1, 4.2, 4.3.1, 4.3.3/ 1.1, 1.2, 1.5/1.1, 1.2, 1.5)	LOCA/MSLB	HELB	
Radiation Type	γ	γ	
Radiation Dose (rd) (4.1.2/1.4/1.4)	28 Mrd	see aging (60 Mrd)	
Radiation Dose Rate (rd/hr) Radiation Qual. Method (5.3.1/-/-)	N.D.	test	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	N.D.		
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	N.D	not stated (WCSF-N is susceptible)	
Radiation Dose (Normal + Accident) (4.1.2/-/-)		60 Mrd (γ)	
Plateout Dose Considered (-/1.48/1.48)	N.D.	not stated	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)	28 Mrd	60 Mrd (γ)	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 20

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS			
Rate of Temp./Press. Increase	305°F/10psig/50sec	90°F/100/100%/1.25hr.	
Peak: °F/psig/RH/Time	① 325/10/100/50sec ② 235/8/100/5sec	340°/100/100%/.75hr	
Decrease To: °F/psig/RH/Time	① 225/-/-/10min ② 130/12.5/100/278hr.	255°/~15-20psig/100%/115hrs.	
Decrease To: °F/psig/RH/Time	① 200/-/-/15min		
Decrease To: °F/psig/RH/Time			
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)			
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)	test	test	
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)	2000 ppm Boron pH 9.5	>2200 ppm Boron as H_3BO_3 and NaOH to pH 9.5	
Spray Density (gpm/ft^2)		.15 gpm/ft^2	
Spray Duration		test (115hrs.)	
Submergence Duration (4.1.3/2.2.5/2.2.5)			
In-Leakage Considered (5.2.6, 5.3.2/-/-)			
Time to Submergence			
Dust Environment (-/2.2.11/2.2.11)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 70

NOTES:

Note 1: The licensee did not specifically identify the splice, by either a procedure # or by the cable types, method and materials. Adequate similarity has not been shown between the installed splices and the tested specimens.

Note 2: The licensee did not submit an analysis or report of simulated thermal aging for these splices. A qualified life estimate has not been made for these materials.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 71

EQUIPMENT ITEM NO. 71
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 71
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): TC11-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, (T) QT, RT, (P) H, CS, (A) S, (R), M, I, (QM) RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 71

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 71

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 71

NOTES:

This Termination requires qualification for steam/pressure, chemical spray, and radiation exposure in addition to thermal aging.

- The licensee has referenced numerous qualification documents in addition to documents specifically testing equipment at which the terminations were made.

- The licensee has not submitted any documentation that describes the splice materials, testing on the plant specific termination method or provides traceability of the plant specific method and materials to those tested.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 72

EQUIPMENT ITEM NO. 72
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 72
LICENSEE REFERENCE(S): 639
FUNCTION (PLANT ID): TERMINATION AT PRESSURIZER RELIEF BLOCK VALVES (NMO-151, 152, 153)
LICENSEE SUBMITTAL: SCEW(S): TC12-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, (T) QT, RT, (P) H, CS, (A) S, (R), M, I, (QM) RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
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Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 72

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 72

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 72

NOTES:

This Termination requires qualification for steam/pressure, chemical spray, and radiation exposure in addition to thermal aging.

- The licensee has referenced numerous qualification documents in addition to documents specifically testing equipment at which the terminations were made.

- The licensee has not submitted any documentation that describes the splice materials, testing on the plant specific termination method or provides traceability of the plant specific method and materials to those tested.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 73

EQUIPMENT ITEM NO. 73
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 73
LICENSEE REFERENCE(S): 639
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TC2-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 73

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 73

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 73

NOTES:

This Termination requires qualification for steam/pressure, chemical spray, and radiation exposure in addition to thermal aging.

- The licensee has referenced numerous qualification documents in addition to documents specifically testing equipment at which the terminations were made.

- The licensee has not submitted any documentation that describes the splice materials, testing on the plant specific termination method or provides traceability of the plant specific method and materials to those tested.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 74

EQUIPMENT ITEM NO. 74
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 74
LICENSEE REFERENCE(S): 1620, 1064
FUNCTION (PLANT ID): TERMINATION AT VALVE MOTOR OPERATOR (VARIOUS)
LICENSEE SUBMITTAL: SCEW(S): TC10-1 [i2]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
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Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 79

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 74

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 74

NOTES:

This Termination requires qualification for steam/pressure, chemical spray, and radiation exposure in addition to thermal aging.

- The licensee has referenced numerous qualification documents in addition to documents specifically testing equipment at which the terminations were made.

- The licensee has not submitted any documentation that describes the splice materials, testing on the plant specific termination method or provides traceability of the plant specific method and materials to those tested.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 75

EQUIPMENT ITEM NO. 75
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 75
LICENSEE REFERENCE(S): 639, 26, 27, 29
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TC4-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, (T), QT, RT, (P), H, CS, (A), S, (R), M, I, (QM), RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
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Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 75

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 75

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 25

NOTES:

This Termination requires qualification for steam/pressure, chemical spray, and radiation exposure in addition to thermal aging.

- The licensee has referenced numerous qualification documents in addition to documents specifically testing equipment at which the terminations were made.

- The licensee has not submitted any documentation that describes the splice materials, testing on the plant specific termination method or provides traceability of the plant specific method and materials to those tested.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 76

EQUIPMENT ITEM NO. 76
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 76
LICENSEE REFERENCE(S): 639, 1620, 1064, 26, 27, 29
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TC3-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, (T) QT, RT, (P) H, CS, (A) S, (R), M, I, (QM) RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 26

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 76

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 76

NOTES:

This Termination requires qualification for steam/pressure, chemical spray, and radiation exposure in addition to thermal aging.

- The licensee has referenced numerous qualification documents in addition to documents specifically testing equipment at which the terminations were made.

- The licensee has not submitted any documentation that describes the splice materials, testing on the plant specific termination method or provides traceability of the plant specific method and materials to those tested.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 77

EQUIPMENT ITEM NO. 77
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 77
LICENSEE REFERENCE(S): 639, 3829, 959, 677, 678, 3830, 815, 38
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TI1-1, TI2-1, TI4-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

(R) T, (QT) RT, P, H, (CS) (A), (S) (R), (M) I, (QM) RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
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Equipment Environmental Qualification Summary Forms	2
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System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 77

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 77

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	X
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 77

LICENSEE RESPONSE TO NRC SER

Instrumentation connections for Barton instruments. D. C. Cook Units 1 and 2. Barton instruments are supplied with pigtail connection wires. These wires are enclosed in flexible conduit for a short length and are spliced in a condulet to the instrumentation cable wires using seamless tin-plated copper sleeves and Raychem WCSF heat shrinkable tubing with N Class adhesive for insulation. The splice insulation material is qualified by tests conducted by Raychem Corporation and reported on Franklin Institute Test Report No. F-C4033-3. (See section 3 below for detailed instrument cable qualifications.)

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 77

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

Criteria: DOR Guidelines X ; NUREG-0588, Cat. I___; NUREG-0588, Cat. II ___.

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
EQUIPMENT DESCRIPTION			
Equipment Type	Terminator	Electrical Cable Splice	
Manufacturer's Name (5.2.2/-/-)	Raychem	Raychem Corporation	
Model Number (5.2.2/-/-)	WCSF (N)	Raychem Thermofit WCSF...N	
Serial Number	N/A	Not Applicable	
Features/Mounting (5.2.6/-/-)	N/A	On Mandrel In Autoclave	
Connections/Interfaces (5.2.6/-/-)	Stem to interface	Test Item Is a Cable Splice (Note 1 p $5i_1$&$5i_2$)	
Location/Elevation	Containment	Not Applicable	
Equipment ID No.	N/A	Not Applicable	
QUALIFICATION REPORT (8.0/5.0/5.0)			
Report ID Number	FC4033-3	F-C4033-3	
Report Date	1/75	January 1975	
Issued by	FIRL	Franklin Institute Research Laboratories	
Prepared for	Raychem	Raychem Corporation	
Referenced Reports	2 PS 348 1 FC4033 1 FC3613	Not Applicable	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)	Test	Simultaneous Test	
QUALIFICATION TEST PROGRAM			
Functional Test Description (5.2.5/2.2.9/2.2.9)	N/A	Insulation Resistance/ Current Carrying Capability and HiPot	
Operating Conditions (-/2.2.10/2.2.10) Load/Cycles/Voltage/ Current/Freq.	Various	See Note 1 p $5i_1$ & $5i_2$	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 77

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)	N/A	Not Stated	
Accuracy (5.2.5/-/-)		Not Applicable	
Number of Specimens		30	
Test Instruments Calibrated		Yes	
Safety Function (Active/Passive) (-/2.1.3/2.1.3)	Not stated	Active..Carry current	
Test Duration (5.2.1/-/-)	N/A	30 Days	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	~11.5 days	Not Applicable	
Required Function Time	4 mo	Not Applicable	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)	N/A	Visual Inspection Insulation Resistance	
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-) 1. Representative Sample 2. Baseline Data 3. Performance Extremes 4. Thermal Aging 5. Radiation Aging 6. Wear Aging 7. Vibration/Seismic 8. DBE Exposure 9. Post-DBE Exposure 10. Inspection		Thermal/Radiation Aging Visual Inspection Insulation Resistance LOCA Simulation Visual Inspection/ Insulation Resistance/ HiPot	
Aging (5.2.4, 7.0/4.0/4.0)		7 Days @ 150°C	
Thermal Aging/Basis	Not adequate	Not Stated	X note,
Material Aging Evaluation (7.0/-/-)		Visual Inspection/ Insulation Resistance	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)		Not Stated	
Radiation Aging, Type		Gamma	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 77

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	Not Stated	$5x10^7$	
Radiation Aging, Dose Rate		Not Stated	
Radiation Aging, Method		Test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)		Not Stated	
Operational Aging (-/4.2/-)		Not Stated	
Other Age Conditioning (-/4.2/-)		Not Stated	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	Not stated	Not Stated in Test Report	X note,
Normal Ambient Temperature	not stated	Not Applicable	
Normal Ambient Radiation		Not Applicable	
Normal Ambient Humidity		Not Applicable	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	DC Cook Program	Not Applicable	
On-Going Analysis of Failures and Degradation (7.0/-/-)		Not Applicable	
Margin (General) (6.0/3.0/3.0)	N/A	Not Stated	
Margin (NUREG-0588, Cat. I) (-/3.2/-) 1. Temperature (+15°F) 2. Pressure (+10%, 10 psig max) 3. Radiation (not required) 4. Time (+10%, +1 hour + function time minimum)		Not Stated	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 22

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
ACCIDENT CONDITIONS			
LOCA/MSLB/HELB/Uncontrolled (4.1, 4.2, 4.3.1, 4.3.3/ 1.1, 1.2, 1.5/1.1, 1.2, 1.5)	LOCA MSLB	LOCA/ MSLB	
Radiation Type	Gamma	Gamma	
Radiation Dose (rd) (4.1.2/1.4/1.4)	95×10^6	197.7-209.8 Megarads	
Radiation Dose Rate (rd/hr)	Not Stated	Not Stated	
Radiation Qual. Method (5.3.1/-/-)		Test	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)		Not Applicable	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)		Not Stated	
Radiation Dose (Normal + Accident) (4.1.2/-/-)		Not Applicable	
Plateout Dose Considered (-/1.48/1.48)		Not Applicable	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)		Not Applicable	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 27

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS			
Rate of Temp./Press. Increase		10°F;7Psi/second	
Peak: °F/psig/RH/Time	see page 5gh	357/70/100%/10 hrs	the test envelope the accident profile
Decrease To: °F/psig/RH/Time		357-275/70-31/100%/2hrs	
Decrease To: °F/psig/RH/Time		275/31/100%/4days	
Decrease To: °F/psig/RH/Time		212/10/100%/26 days	
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)	Not stated	Not Applicable	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)	N/A	Test	
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)	2000 ppm B 1.14 wt% Boric Acid pH 9-11	3000 ppm Boron 0.064 Molar $Na_2S_2O_3$ NaOH for pH of 10.5	
Spray Density (gpm/ft^2)	Not stated	0.15	
Spray Duration		30 days	
Submergence Duration (4.1.3/[illegible].2.5/2.2.5)		Not Applicable	Note 2
In-Leakage Considered (5.2.6, 5.3.2/-/-)		Not Applicable	
Time to Submergence		Not Applicable	
Dust Environment (-/2.2.11/2.2.11)		Not Applicable	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 77

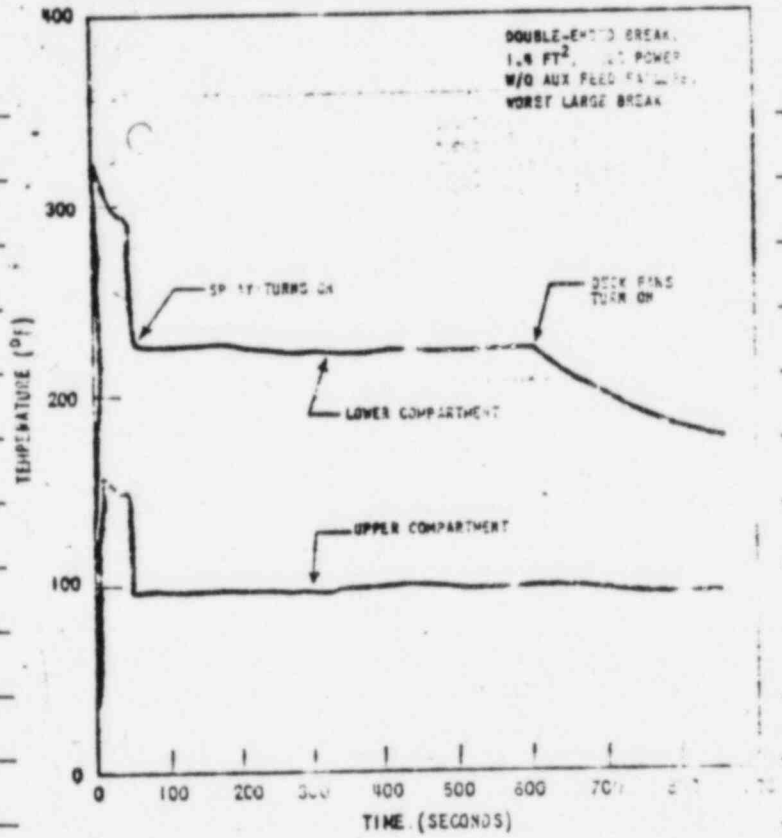
NOTES:

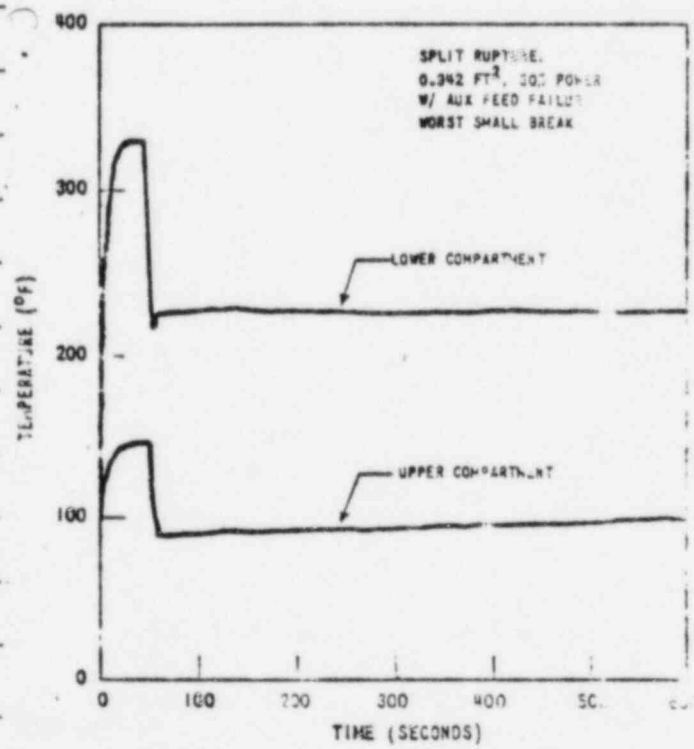
1.) The licensee has not provided an analysis of the preaging data on the cable material (which data are available in the test report) to provide an estimate of qualified life. It should be noted that the manufacturer has such information available.

2.) Although the submergence function is not specified it appears that the test information in EPS 327 is adequate to demonstrate submergence capability.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 77

NOTES:

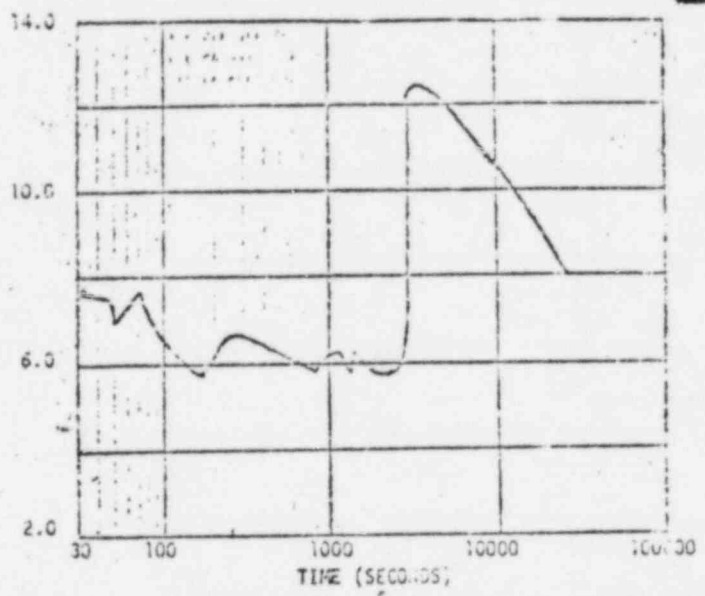




EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 22

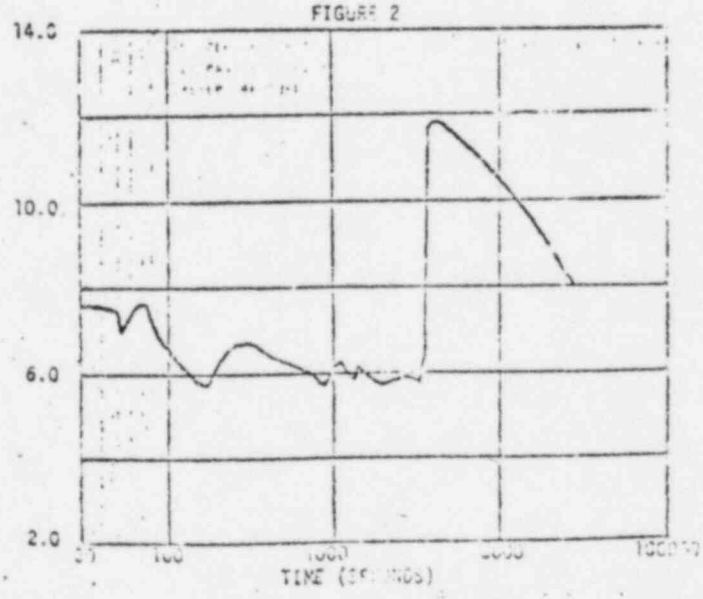
NOTES:

FIGURE 1



Ice Mass = 2.07 (10^6) lbs. = 1064.0 lb/basket

FIGURE 2



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 22

NOTES:

2. TEST SPECIMENS

Table 1 presents a description of the specimens tested and also shows the energizing voltage and currents levels.

Table 1 Test Specimens

Specimen			Electrical Loading	
Description*	Number†	Length (ft)‡	Voltage (Vrms - 60 Hz)	Initial Current (A)#
Raychem Thermofit® In-Containment Field Splice Cable - Raychem Adverse Service Coaxial Cable, AWG 22 conductor 1st insulation layer - 8 mil wall of Alkane-imide polymer 2nd insulation layer - 49 mil wall of Rayolin R™ radiation cross-linked polyolefin Braided Copper Shield Raychem Flamtrol™ Jacket - 34 mil nominal wall Part No. 10483 Run No. J7-5-10-72-6 Splice Components for one splice Raychem Thermofit® WCSF-115-6-N Soldered connection (See Figure 1)	9X	20	600	0
Raychem Thermofit® In-Containment Field Splices Cable AWG 4 insulated with EPR-neoprene (not a Raychem product) Splice Components for six splices (Note 1) Raychem Thermofit® WCSF-200-6-N 2 each of compression connectors: Burndy Hylink YS4C-L T&B 2F-4 3M #4	13	35	2000	70
Raychem Thermofit® In-Containment Field Splices Cable AWG 6 insulated with Raychem Flamtrol™ Splice Components for six splices (Note 1) Raychem WCSF-200-6-N 6 each of compression connectors: Burndy Hylink YS6C-L	14	37	1000	65
Raychem Thermofit® In-Containment Field Splices Cable AWG 12 insulated with EPR neoprene (not a Raychem product) Splice Components for six splices (Note 1) Raychem WCSF-115-6-N 3 each of compression connectors: Burndy Hylink YSV10 T&B 2C-10	15	32	2000	25
Raychem Thermofit® In-Containment Field Splices. Six splices. Same construction as Sample #15 except that Raychem Flamtrol™ wire was used	16	33	1000	25

NOTES:

Table 1 Test Specimens (continued)

Specimen			Electrical Loading	
Description*	Number†	Length (ft)‡	Voltage (Vrms - 60 Hz)	Initial Current (A)#
Raychem Thermofit® In-Containment Transition Splices Cable AWG 6 insulated with Raychem Flamtrol™, spliced to three cables of AWG 12 insulated with Raychem Flamtrol™ and reconnected to an AWG 6 cable insulated with Raychem Flamtrol™ Splice Components for two splices (Note 1) Raychem Thermofit® WCSF-200-6-N Raychem Thermofit® heat-shrinkable 3-finger cable breakout (Part Number 403A112-4/83) used to provide seal at the transition between the AWG 6 and the three AWG 12 cables. 2 each of compression connectors: Burndy Hylink YS6C-L	17	23	1000	65

® and ™ Trademarks of Raychem Corporation

* Description of specimens provided by Raychem

† Specimens 1 thru 8 and 10 thru 12 were other test specimens supplied by Raychem. The test results on these specimens are presented in report numbers F-C4033-1 and -2.

‡ Specimens cut to lengths shown. Approximately 4 ft of the length extended outside of the test vessel (2 ft on each end of the specimen).

\# Initial currents were applied at room temperature, and allowed to drop to a lower level during combined radiation and thermal aging and simultaneous LOCA-simulation testing. See text for discussion.

Note 1 - Each in-line splice or transition was covered with tinned copper wire mesh to aid in providing a close proximity ground plane as shown in Figure 2.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 78

EQUIPMENT ITEM NO. 78
PENETRATION TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 78
LICENSEE REFERENCE(S): 3831, 38, 26, 27, 29
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TI3-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
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Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 28

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 28

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

see pages 5f, g, h.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 78

NOTES:

The referenced test report CWAPD-332 [3831] does not include any pre-aging of the samples tested. The steam chemical spray exposure envelopes the D.C. Cook accident profile. However regarding the penetration termination on SCFWTI-34 the test report indicate the following problems.

2. EQUIPMENT TESTED

The following test items were supplied by American Electric Power Service Corporation (AEPSC) and according to their Quality Assurance Documentation, Form #45IMPCO PO-040-410T, were assembled at the Donald C. Cook Nuclear Plant by qualified personnel in accordance with the prescribed installation practices for that plant and were identical in all respects* to such installations in service at that plant.

All of the test items were exposed to gamma irradiation to a total accumulated dosage of 150 x 10^6 Rads, except Test Items C3 and C4, which were irradiated to 60 x 10^6 Rads. The details of the irradiation are given in Appendix II.

Test Items C3 and C4

Penetration Floodup Splices - one 3-phase No. 10 AWG solid copper conductor Kapton insulated wire joined to one 3-phase No. 10 AWG stranded copper conductor Kapton insulated wire using seamless copper sleeve splicers with tin coating.

* except as noted later for Test Items D3 and D4 which had exposed Kapton insulation.

Splice insulation was installed in accordance with DCC-EE-615-QCN Paragraph 5.3.2.X, Y and Z except Scotch No. 70 silicone tape was not applied over the splice. Heat shrink tubing is Raychem Specification RT-876 radiation crosslinked polyolefin heat shrinkable tubing.

The spliced wires were intended to be typical of the connections made between the penetration wires and their extension wires inside the floodup tubes at the electrical penetrations. Included with the splices were short lengths (approximately five feet) of floodup tubing used on the D. C. Cook penetrations. The Kapton wire samples were obtained from spare penetration components at the D. C. Cook Plant.

Test Items D3 and D4

Floodup Wire - One 3-phase No. 10 AWG stranded copper conductor Kapton insulated wire joined to cable, Item 3116 D. C. Cook Bill of Material, 3-twisted conductor, No. 10 AWG stranded copper conductor, Essex International Reel No. 3116-27, using seamless copper tube splicers with tin coating.

Splice insulation was installed in accordance with DCC-EE-176-QCN using Raychem WCSF-070-N for three inches long applied directly over the Kapton wire adjacent to the splice and Raychem WCSF-115-N for six inches long applied over and centered on the splice.

The test samples were intended to be typical of the splices used to replace terminal blocks in power and control circuits in the floodup terminal boxes located above flood elevation. The Kapton insulated wire samples were obtained from spare penetration components at the D. C. Cook Plant.

1. INTRODUCTION

This report describes the test program conducted in accordance with the test procedure CWTP-002, given in Appendix I, to demonstrate that the various electrical cable connections listed below in 2 were adequate for the environmental qualification requirements of the D. C. Cook Plant, Units 1 and 2.

The test items were subjected to gamma irradiation prior to the steam/chemical spray exposure test. Most of the test items remained energized at 575 volts AC, three phase, throughout the entire exposure test sequence. Post-test examination of the two items that did not remain energized throughout the test period revealed that the splices were intact, however, the exposed Kapton insulated lead wires were damaged. These test items which had the Kapton insulation exposed directly to the chemical spray are not typical of such installations at the D. C. Cook Plant.

The radiation dose on C3-C4 does not envelope the required dose of 95×10^6 rd.

If D3 and D-4 are not representative of the plant installation the test is not valid as evidence of qualification

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 79

EQUIPMENT ITEM NO. 79
ELECTRICAL TERMINATION LOCATED INSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 79
LICENSEE REFERENCE(S): 639, 919, 38, 26, 27, 29
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TI5-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 79

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 79

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 79

NOTES:

These terminations require qualification for steam/pressure chemical spray and radiation exposure in addition to thermal aging.

• Reference 31 states:

1. Instrumentation connections for Foxboro Instruments. D. C. Cook Units 1 and 2. Connections to the terminal block in the termination enclosure of the instrument are made using ring tongue compression connectors to connect the individual instrumentation cable wires to their respective terminals.

• The licensee has not stated the type (preinsulated?) or manufacturer of the ring tongue terminals so that similarity could be established between the tested terminations and those actually installed in the plant.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 80

EQUIPMENT ITEM NO. 80
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 80
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TI-7 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 8c

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified. ~~and/or will function when exposed to the applicable DBE environmental service conditions.~~

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
(IV) Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 80

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	____
Adequate Similarity Between Equipment and Test Specimen Established	____
Aging Degradation Evaluated Adequately	____
Qualified Life or Replacement Schedule Established (If Required)	____
Program Established to Identify Aging Degradation	____
Criteria Regarding Aging Simulation Satisfied (If Required)	____
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	____
o Peak Pressure Adequate	____
o Duration Adequate	____
o Required Profile Enveloped Adequately	____
o Steam Exposure (If Required) Adequate	____
Criteria Regarding Spray Satisfied	____
Criteria Regarding Submergence Satisfied	____
Criteria Regarding Radiation Satisfied	____
Criteria Regarding Test Sequence Satisfied	____
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	____
Criteria Regarding Functional Testing Satisfied	____
Criteria Regarding Instrument Accuracy Satisfied	____
Test Duration Margin (1 hour + Function Time) Satisfied	____
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	____

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	____
I.b	Equipment Qualification Pending Modification	____
II.a	Equipment Qualification Not Established	____
II.b	Equipment Not Qualified	____
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	____
III.a	Equipment Exempt From Qualification	____
III.b	Equipment Not in the Scope of the Qualification Review	____
IV	Documentation Not Made Available	X

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 80

Qual. Test Program for Utility Transmitters. Equipment passed the Test. Test report not yet completed

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 81

EQUIPMENT ITEM NO. 81
ELECTRICAL TERMINATION LOCATED INSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 81
LICENSEE REFERENCE(S): 639, 3831, 38
FUNCTION (PLANT ID): CABLE CONNECTION
LICENSEE SUBMITTAL: SCEW(S): TP3-1, TP2-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

(R), T, (QT), RT, P, H, (CS) (A), (S) (R), (M) I, (QM), RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 81

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a	Qualified	II.c	Qualified Life Deficiency
I.b	Modification	III.a	Exempt
II.a	Qualification Not Established	III.b	Not in Scope
II.b	Not Qualified	IV	Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 81

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	X
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	X
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 81

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

Criteria: DOR Guidelines X ; NUREG-0588, Cat. I___; NUREG-0588, Cat. II ___.

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
EQUIPMENT DESCRIPTION			
Equipment Type	Cable terminating	Cable termination	X Note 1
Manufacturer's Name (5.2.2/-/-)	Not stated	N/A	
Model Number (5.2.2/-/-)	Not stated	N/A	
Serial Number	not Applicable	N/A	
Features/Mounting (5.2.6/-/-)	see page 1a for splice description	WCSF-N (Raychem heatshrink tubing), kapton/kapton	X Note 1
Connections/Interfaces (5.2.6/-/-)	cable splice	splice - seamless copper sleeves w/tin coating	
Location/Elevation	See page 1a		
Equipment ID No.	Not stated		
QUALIFICATION REPORT (8.0/5.0/5.0)			
Report ID Number	P&R # (8831)	CWAPD-332	
Report Date		April 10-15 1978	
Issued by		Westinghouse	
Prepared for		D.C. Cook 1+2	
Referenced Reports	none		
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)	test	test	
QUALIFICATION TEST PROGRAM			
Functional Test Description (5.2.5/2.2.9/2.2.9)		IR, Hipot	
Operating Conditions (-/2.2.10/2.2.10) Load/Cycles/Voltage/ Current/Freq.		575V AC, three phase 5 Amp	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 81

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)		main current + voltage throughout test	
Accuracy (5.2.5/-/-)		Leakage current no greater than 1 Amp during post-test Hipot.	
Number of Specimens		various	
Test Instruments Calibrated		yes	
Safety Function (Active/Passive) (-/2.1.3/2.1.3)	Active	Active	
Test Duration (5.2.1/-/-)		~117.5 hrs.	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	278 hrs.		
Required Function Time	continuous		
Test Sequence (General) (5.2.3/2.3.1/2.3.1)		inspect/irradiate/chem spray steam/pres. Functional test	
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)			
1. Representative Sample			
2. Baseline Data			
3. Performance Extremes			
4. Thermal Aging			
5. Radiation Aging			
6. Wear Aging			
7. Vibration/Seismic			
8. DBE Exposure			
9. Post-DBE Exposure			
10. Inspection			
Aging (5.2.4, 7.0/4.0/4.0) Thermal Aging/Basis	NO	not performed	X Note 2
Material Aging Evaluation (7.0/-/-)	NO	not stated	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)	NO	not stated	
Radiation Aging, Type	γ	γ	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 21

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	150 Mrd	60 Mrd +L.	X Note 3
Radiation Aging, Dose Rate	N.D	.75 Mrd/hr.	
Radiation Aging, Method	test	test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)	N.D	not stated (WCSF-N)	
Operational Aging (-/4.2/-)			
Other Age Conditioning (-/4.2/-)			
Qualified Life Claimed/ Established (5.2.4/4.10/-)	N.D.	not stated	
Normal Ambient Temperature Normal Ambient Radiation Normal Ambient Humidity	N.D		
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	yes		
On-Going Analysis of Failures and Degradation (7.0/-/-)	yes		
Margin (General) (6.0/3.0/3.0)			
Margin (NUREG-0588, Cat. I) (-/3.2/-) 1. Temperature (+15°F) 2. Pressure (+10%, 10 psig max) 3. Radiation (not required) 4. Time (+10%, +1 hour + function time minimum)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 81

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
ACCIDENT CONDITIONS			
LOCA/MSLB/HELB/Uncontrolled (4.1, 4.2, 4.3.1, 4.3.3/ 1.1, 1.2, 1.5/1.1, 1.2, 1.5)	LOCA/MSLB	HELB	
Radiation Type	γ	γ	
Radiation Dose (rd) (4.1.2/1.4/1.4)	150 Mrd	see aging (60 Mrd)	X Note 3
Radiation Dose Rate (rd/hr) Radiation Qual. Method (5.3.1/-/-)	N.D.	test	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	N.D.		
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	N.D	not stated (WCSF-N is susceptible)	
Radiation Dose (Normal + Accident) (4.1.2/-/-)		60 Mrd (γ)	
Plateout Dose Considered (-/1.48/1.48)	N.D.	not stated	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)	150 Mrd	60 Mrd (γ)	X Note 3

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 81

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS			
Rate of Temp./Press. Increase	205°F/10psig/50sec.	90°F/100/100%/1.25hr.	
Peak: °F/psig/RH/Time	① 325/10/100/50sec ② 235/8/100/5sec	340°/100/100%/.75hr	
Decrease To: °F/psig/RH/Time	① 225/-/-/10min ② 130/12.5/100/278hr.	255°/~15-20psig/100%/115hrs.	
Decrease To: °F/psig/RH/Time	① 200/-/-/15min		
Decrease To: °F/psig/RH/Time			
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)			
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)	test	test	
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)	2000 ppm Boron pH 9.5	>2200 ppm Boron as H_3BO_3 and NaOH to pH 9.5	
Spray Density (gpm/ft^2)		.15 gpm/ft^2	
Spray Duration		test (115hrs.)	
Submergence Duration (4.1.3/2.2.5/2.2.5)			
In-Leakage Considere (5.2.6, 5.3.2/-/-)			
Time to Submergence			
Dust Environment (-/2.2.11/2.2.11)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 81

NOTES:

Note 1: The licensee did not specifically identify the splice, by either a procedure # or by the cable types, method and materials. Adequate similarity has not been shown between the installed splices and the tested specimens.

Note 2: The licensee did not submit an analysis or report of simulated thermal aging for these splices. A qualified life estimate has not been made for these materials.

Note 3: This does not envelope the plant specific profile

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 82

EQUIPMENT ITEM NO. 82
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 82
LICENSEE REFERENCE(S): 3831, 38, 26, 27, 29
FUNCTION (PLANT ID): CABLE CONNECTION
LICENSEE SUBMITTAL: SCEW(S): TP1-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

(R) T, (QT) RT, P, H, CS, (A), (S) (R), (M), I, (QM) RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 82

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
(II.a) Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 8d

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	X
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 82

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

Criteria: DOR Guidelines X ; NUREG-0588, Cat. I___; NUREG-0588, Cat. II ___.

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
EQUIPMENT DESCRIPTION			
Equipment Type	Cable termination	Cable termination	X Note 1
Manufacturer's Name (5.2.2/-/-)	Not stated	N/A	
Model Number (5.2.2/-/-)	not stated	N/A	
Serial Number	not Applicable	N/A	
Features/Mounting (5.2.6/-/-)	see page 1a for splice description	WCSF-N (Raychem heat shrink tubing), kapton/kapton	X Note 1
Connections/Interfaces (5.2.6/-/-)	cable splice	splice - seamless copper sleeves w/tin coating	
Location/Elevation	see page 1a		
Equipment ID No.	Not stated		
QUALIFICATION REPORT (8.0/5.0/5.0)			
Report ID Number	P6R# (8831)	CWAPD-332	
Report Date		April 10-15 1978	
Issued by		Westinghouse	
Prepared for		D.C. Cook 1+2	
Referenced Reports	none		
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)	test	test	
QUALIFICATION TEST PROGRAM			
Functional Test Description (5.2.5/2.2.9/2.2.9)		IR, Hipot	
Operating Conditions (-/2.2.10/2.2.10) Load/Cycles/Voltage/ Current/Freq.		575V AC, three phase 5 Amp	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 82

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)		main current + voltage throughout test	
Accuracy (5.2.5/-/-)		Leakage current no greater than 1 Amp during post-test Hipot.	
Number of Specimens		various	
Test Instruments Calibrated		yes	
Safety Function (Active/Passive) (-/2.1.3/2.1.3)	Active	Active	
Test Duration (5.2.1/-/-)		~117.5 hrs.	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	278 hrs.		
Required Function Time	continuous		
Test Sequence (General) (5.2.3/2.3.1/2.3.1)		inspect/irradiate/chem spray/steam/press. Functional test	
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)			
1. Representative Sample			
2. Baseline Data			
3. Performance Extremes			
4. Thermal Aging			
5. Radiation Aging			
6. Wear Aging			
7. Vibration/Seismic			
8. DBE Exposure			
9. Post-DBE Exposure			
10. Inspection			
Aging (5.2.4, 7.0/4.0/4.0) Thermal Aging/Basis	ND	not performed	X Note 2
Material Aging Evaluation (7.0/-/-)	ND	not stated	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)	ND	not stated	
Radiation Aging, Type	γ	γ	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 82

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	60 Mrd (L)	60 Mrd tL.	
Radiation Aging, Dose Rate	N.D	.75 Mrd/hr.	
Radiation Aging, Method	test	test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)	N.D	not stated (WCSF-N)	
Operational Aging (-/4.2/-)			
Other Age Conditioning (-/4.2/-)			
Qualified Life Claimed/ Established (5.2.4/4.10/-)	N.D.	not stated	
Normal Ambient Temperature Normal Ambient Radiation Normal Ambient Humidity	N.D		
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	yes		
On-Going Analysis of Failures and Degradation (7.0/-/-)	yes		
Margin (General) (6.0/3.0/3.0)			
Margin (NUREG-0588, Cat. I) (-/3.2/-) 1. Temperature (+15°F) 2. Pressure (+10%, 10 psig max) 3. Radiation (not required) 4. Time (+10%, +1 hour + function time minimum)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 8a

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
ACCIDENT CONDITIONS			
LOCA/MSLB/HELB/Uncontrolled (4.1, 4.2, 4.3.1, 4.3.3/ 1.1, 1.2, 1.5/1.1, 1.2, 1.5)	LOCA/MSLB	HELB	
Radiation Type	γ	γ	
Radiation Dose (rd) (4.1.2/1.4/1.4)	6×10^7 R	see aging (60 Mrd)	
Radiation Dose Rate (rd/hr) Radiation Qual. Method (5.3.1/-/-)	N.D.	test	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	N.D.		
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	N.D	not stated (WCSF-N is susceptible)	
Radiation Dose (Normal + Accident) (4.1.2/-/-)		60 Mrd (γ)	
Plateout Dose Considered (-/1.48/1.48)	N.D.	not stated	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)	60 Mrd (γ)	60 Mrd (γ)	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 82

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS			
Rate of Temp./Press. Increase	205°F/10psig/50sec.	90°F/100/100%/1.25hr.	
Peak: °F/psig/RH/Time	① 325/10/100/50sec ② 235/8/100/55sec	340°/100/100%/.75hr	
Decrease To: °F/psig/RH/Time	① 225/-/-/10min ② 130/12.5/100/278hr.	255°/~15-20psig/100%/115hrs.	
Decrease To: °F/psig/RH/Time	① 200/-/-/15min		
Decrease To: °F/psig/RH/Time			
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)			
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)	test	test	
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)	2000 ppm Boron pH 9.5	>2200 ppm Boron as H_3BO_3 and NaOH to pH 9.5	
Spray Density (gpm/ft^2)		.15 gpm/ft^2	
Spray Duration		test (115hrs.)	
Submergence Duration (4.1.3/2.2.5/2.2.5)			
In-Leakage Considered (5.2.6, 5.3.2/-/-)			
Time to Submergence			
Dust Environment (-/2.2.11/2.2.11)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 82

NOTES:

Note 1: The licensee did not specifically identify the splice, by either a procedure # or by the cable types, method and materials. Adequate similarity has not been shown between the installed splices and the tested specimens.

Note 2: The licensee did not submit an analysis or report of simulated thermal aging for these splices. a qualified life estimate has not been made for these materials.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 83

EQUIPMENT ITEM NO. 83
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 83
LICENSEE REFERENCE(S): 3831, 38
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TP4-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 83

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a	Qualified	II.c	Qualified Life Deficiency
I.b	Modification	III.a	Exempt
(II.a)	Qualification Not Established	III.b	Not in Scope
II.b	Not Qualified	IV	Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 83

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	X
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 83

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

Criteria: DOR Guidelines X ; NUREG-0588, Cat. I___; NUREG-0588, Cat. II ___.

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
EQUIPMENT DESCRIPTION			
Equipment Type	Cable termination	Cable termination	X Note 1
Manufacturer's Name (5.2.2/-/-)	Not stated	N/A	
Model Number (5.2.2/-/-)	Not stated	N/A	
Serial Number	not Applicable	N/A	
Features/Mounting (5.2.6/-/-)	see page 1a for splice description	WCSF-N (Raychem heatshrink tubing), kapton/kapton	X Note 1
Connections/Interfaces (5.2.6/-/-)	cable splice	splice - seamless copper sleeves w/tin coating	
Location/Elevation	See page 1a		
Equipment ID No.	Not stated		
QUALIFICATION REPORT (8.0/5.0/5.0)			
Report ID Number	PGR# (8831)	CWAPD-332	
Report Date		April 10-15 1978	
Issued by		Westinghouse	
Prepared for		D.C. Cook 1+2	
Referenced Reports	none		
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)	test	test	
QUALIFICATION TEST PROGRAM			
Functional Test Description (5.2.5/2.2.9/2.2.9)		IR, Hipot	
Operating Conditions (-/2.2.10/2.2.10) Load/Cycles/Voltage/ Current/Freq.		575 V AC, three phase 5 Amp	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 83

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)		main current + voltage throughout test	
Accuracy (5.2.5/-/-)		Leakage current no greater than 1 Amp during post-test Hipot.	
Number of Specimens		various	
Test Instruments Calibrated		yes	
Safety Function (Active/Passive) (-/2.1.3/2.1.3)	Active	Active	
Test Duration (5.2.1/-/-)		~117.5 hrs.	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	278 hrs.		
Required Function Time	continuous		
Test Sequence (General) (5.2.3/2.3.1/2.3.1)		inspect/irradiate/chem spray steam/press. Functional test	
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)			
1. Representative Sample			
2. Baseline Data			
3. Performance Extremes			
4. Thermal Aging			
5. Radiation Aging			
6. Wear Aging			
7. Vibration/Seismic			
8. DBE Exposure			
9. Post-DBE Exposure			
10. Inspection			
Aging (5.2.4, 7.0/4.0/4.0) Thermal Aging/Basis	NO	not performed	X Note 2
Material Aging Evaluation (7.0/-/-)	NO	not stated	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)	NO	not stated	
Radiation Aging, Type	γ	γ	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 83

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	16.6 Mrd (+L)	60 Mrd +L.	
Radiation Aging, Dose Rate	N.D	.75 Mrd/hr.	
Radiation Aging, Method	test	test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)	N.D	not stated (WCSF-N)	
Operational Aging (-/4.2/-)			
Other Age Conditioning (-/4.2/-)			
Qualified Life Claimed/ Established (5.2.4/4.10/-)	N.D.	not stated	
Normal Ambient Temperature Normal Ambient Radiation Normal Ambient Humidity	N.D		
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	yes		
On-Going Analysis of Failures and Degradation (7.0/-/-)	yes		
Margin (General) (6.0/3.0/3.0)			
Margin (NUREG-0588, Cat. I) (-/3.2/-) 1. Temperature (+15°F) 2. Pressure (+10%, 10 psig max) 3. Radiation (not required) 4. Time (+10%, +1 hour + function time minimum)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 83

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
ACCIDENT CONDITIONS			
LOCA/MSLB/HELB/Uncontrolled (4.1, 4.2, 4.3.1, 4.3.3/ 1.1, 1.2, 1.5/1.1, 1.2, 1.5)	LOCA/MSLB	HELB	
Radiation Type	γ	γ	
Radiation Dose (rd) (4.1.2/1.4/1.4)	16.6 Mrd(TL)	see aging (60 Mrd)	
Radiation Dose Rate (rd/hr) Radiation Qual. Method (5.3.1/-/-)	N.O.	test	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	N.O.		
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	N.O	not stated (WCSF-N is susceptible)	
Radiation Dose (Normal + Accident) (4.1.2/-/-)		60 Mrd (γ)	
Plateout Dose Considered (-/1.48/1.48)	N.O.	not stated	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)	16.6 Mrd	60 Mrd (γ)	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 83

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS			
Rate of Temp./Press. Increase	205°F/10psig/50sec.	90°F/100/100%/1.25hr.	
Peak: °F/psig/RH/Time	① 225/10/100/50sec ② 235/8/100/5sec	340°/100/100%/.75hr	
Decrease To: °F/psig/RH/Time	① 225/-/-/10min ② 120/12.5/100/278hr.	255°/~15-20psig/100%/115hrs.	
Decrease To: °F/psig/RH/Time	① 200/-/-/15min		
Decrease To: °F/psig/RH/Time			
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)			
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)	test	test	
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)	2000 ppm Boron pH 9.5	>2200 ppm Boron as H_3BO_3 and NaOH to pH 9.5	
Spray Density (gpm/ft^2)		.15 gpm/ft^2	
Spray Duration		test (115hrs.)	
Submergence Duration (4.1.3/2.2.5/2.2.5)			
In-Leakage Considered (5.2.6, 5.3.2/-/-)			
Time to Submergence			
Dust Environment (-/2.2.11/2.2.11)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. B3

NOTES:

Note 1: The licensee did not specifically identify the splice, by either a procedure # or by the cable types, method and materials. Adequate similarity has not been shown between the installed splices and the tested specimens.

Note 2: The licensee did not submit an analysis or report of simulated thermal aging for these splices. A qualified life estimate has not been made for these materials.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 84

EQUIPMENT ITEM NO. 84
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 84
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TI6-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. E4

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

___ The Licensee (has/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

X The Licensee (has/~~has not~~) proposed a corrective action for this equipment item whose qualification has not been fully established.

X Justification for interim operation (~~has~~/has not) been provided by the Licensee for this equipment item.

X Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
X Other (TO BE QUALIFIED WITH INSTRUMENT (MERCOID SWITCH))

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

X The Licensee (~~has~~/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
(I.b) Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 84

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	X
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	X
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 84

INCLUDED IN FIRST 79-01B SUBMITTAL DUE TO POSSIBLE SOURCE/TARGET INTERACTION. SUBSEQUENT REVIEW USING ACCEPTANCE CRITERIA OF FSAR APPENDIX O FOR PROTECTION OF ELECTRICAL EQUIPMENT SHOWS NO SOURCE/TARGET INTERACTION.

Mercoid switch to be replaced.
Termination to be qualified with Instr.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 85

EQUIPMENT ITEM NO. 85
ELECTRICAL POWER CABLE LOCATED INSIDE CONTAINMENT
ANACONDA WIRE AND CABLE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 85
LICENSEE REFERENCE(S): 639, 2819, 26, 27, 29
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP7-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 65

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 85

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 85

from Ref. 5. Qualified by Franklin Institute Research Laboratory (FIRL) Test Report #F-C3341, Jan. 1973.

Type of Test: Simultaneous, gamma radiation
steam
chemical spray

Test Profile:

.51 Mrads/hr, 200 Mrads
340°F, 105 psig for 3 hrs
320°F, 75 psig for 3 hrs
250°F, 15 psig for 4 days
210°F, 5 psig for 9 days

Chemical Spray: Solution of boric acid and Na OH , PH = 9.5

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 85

NOTES:

The licensee has not provided sufficient information to establish that the Equipment described on the SCEW sheet is the same as the Equipment described in the referenced report.

(letters from Anaconda dated 9/29/81 & 10/23/81 appear to be for items 3102 & 3103)

EQUIPMENT DESCRIPTION

SYSTEM: VARIOUS

PLANT ID NO: VARIOUS

COMPONENT: POWER CABLE

MANUFACTURER: ANACONDA WIRE + CABLE

MODEL NUMBER: ~~NOT ON~~ NO SITE

FUNCTION: VARIOUS

2. SAMPLE DESCRIPTION

A. Control Cable (Flame-Guard®)*

Sample 1: 7/C No. 12 Awg, 7/W, tinned copper conductor, 30-mil ethylene propylene rubber insulation, 15-mil Hypalon jacket, cabled, asbestos tape, 60-mil Hypalon jacket, rated 600 volts.

B. Low Voltage Power Cable (Durasheath® EP)*

Sample 2: 1/C No. 2 Awg, 7/W, tinned copper conductor, 45-mil ethylene propylene rubber insulation, 30-mil Hypalon jacket, rated 600 volts.

Sample 3+, 4 and 5:

1/C No. 12 Awg, 7/W tinned copper conductor, 30-mil ethylene propylene rubber insulation, 15-mil Hypalon jacket.

C. Medium Voltage Power Cable (UniShield® EP)*

Sample 6: 1/C No. 2 Awg, 7/W, tinned copper conductor, extruded semi-conducting strand shield, 90-mil ethylene propylene rubber insulation, six corrugated copper drain wires embedded in a 75-mil semi-conducting chlorinated polyethylene jacket.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 85

NOTES:

Requirements for establishing similarity between installed and tested cables are contained in the DOR Guidelines and IEEE 383-74 which are reproduced below for convenience.

2. Test Specimen - The test specimen should be the same model as the equipment being qualified. The type test should only be considered valid for equipment identical in design and material construction to the test specimen. Any deviations should be evaluated as part of the qualification documentation (see also Section 8.0 below).

[DOR]

IEEE-383

1.3.1 *Cable Description.* This description or specification should include as a minimum:

1.3.1.1 Conductor — material identification, size, stranding, coating.

1.3.1.2 Insulation — material identification, thickness, method of application.

1.3.1.3 Assembly (multiconductor cables only) — number and arrangement of conductors, fillers, binders.

1.3.1.4 Shielding — tapes, extrusions, braids, or others.

1.3.1.5 Covering — jacket or metallic armor or both, material identification, thickness, method of application.

1.3.1.6 Characteristics — voltage and temperature rating (normal and emergency). For instrumentation cables — capacitance, attenuation, characteristic impedance, microphonics, insulation resistance, as applicable.

1.3.1.7 Identification — manufacturer's trade name, catalog number.

1.3.2 *Field Splice or Connection Description or Both.* This description or specification should include as a minimum:

1.3.2.1 Whether factory or field assembled to cable.

1.3.2.2 Conductor connection — type, material identification, and method of assembly.

1.3.2.3 Items from Sections 1.3.1.2 through 1.3.1.7.

2.2 Type Test Samples. The samples tested should contain the conductor, insulation, fillers, jacket, binder tape, overall jacket, shielding, and field splices which are representative of the cable category being qualified. Table 1 lists sizes which have been considered representative of these categories. The sample lengths should be sufficient to permit reliable test readings and evaluation consistent with good testing practice.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 85

NOTES:

Table 1
Representsentative Cables for Type Tests

Type	Test	Section	Size
Up to 2000 V multiconductor control cable or Shielded multiconductor signal cable (see list below for individual component) or Single conductor power cable	temperature and moisture resistance	2.3.1	1/C — 14 or 12 AWG
	thermal and radiation exposure	2.3.3	1/C or M/C — 14 or 12 AWG
	design basis event simulation	2.4	1/C or M/C — 14 or 12 AWG 1/C — 6, 4 or 2 AWG
	vertical flame test singles from cable assembly	2.5.6	1/C — 14 or 12 AWG
	vertical tray flame test	2.5.4	7/C — 16, 14 or 12 AWG
Shielded pairs, triple or quad from multiconductor signal cable	temperature and moisture resistance	2.3.1	1 pair shielded 16 AWG or actual cable
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test	2.5.6	
Coaxial, triaxial or special instrument cable	temperature and moisture resistance	2.3.1	actual size
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test singles from cable assembly	2.5.6	
Single pair thermocouple extension cable	temperature and moisture resistance	2.3.1	2/C — 20 AWG or actual size if smaller
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical tray flame test	2.5.4	
	vertical flame test singles from cable assembly	2.5.6	
2001—15 000 V power cable 1/C triplexed and multiconductor	vertical tray flame test	2.5.4	6 AWG (2-5kV) 2/O or 4/O or 4/O (2-15kV)

In Lieu of the detailed description discussed above it would be acceptable for the licensee to obtain certification from the maunfacturer identifying what test report(s) apply to the cables furnished for installation.

If the licensee can establish identity then an estimate of qualified life should be made from the data in the test report, to establish qualification

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 86

EQUIPMENT ITEM NO. 86
ELECTRICAL POWER CABLE LOCATED IN CONTAINMENT
ANACONDA WIRE AND CABLE, MODEL NOT STATED
REQUIRED OPERATING TIME: 3 MONTHS
TER CHECKSHEET NO. 86
LICENSEE REFERENCE(S): 639, 2819, 38, 26, 27, 29
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP13-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 86

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 86

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

For Evaluation Refer to Item 85

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 86

5. Qualified by Franklin Institute Research Laboratory (FIRL) Test Report #F-C3341, Jan. 1973.

Type of Test: Simultaneous, gamma radiation
steam
chemical spray

Test Profile:

.51 Mrads/hr, 200 Mrads
340°F, 105 psig for 3 hrs
320°F, 75 psig for 3 hrs
250°F, 15 psig for 4 days
210°F, 5 psig for 9 days

Chemical Spray: Solution of boric acid and Na OH , PH = 9.5

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 87

EQUIPMENT ITEM NO. 87
ELECTRICAL POWER CABLE LOCATED OUTSIDE CONTAINMENT
ANACONDA WIRE AND CABLE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 87
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP10-1, CP5-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, (T), (QT), RT, (P), H, CS, (A), S, (R), M, I, (QM), RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, ~~5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 8

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 67

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	X
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 87

DONALD C. COOK NUCLEAR PLANT UNIT NO. 1 DOCKET NO. 50-315 LICENSE NO. DPR-58

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.*		QUALIFICATION METHOD	OUTSTANDING ITEMS
	PARAMETER	SPEC.	QUAL.	SPEC.	QUAL.		
SYSTEM: VARIOUS	Operating Time	1 YEAR	~~See~~ NOTE 2 ~~below~~				
PLANT ID NO: Various	Temperature (°F)	Fig 0-27	See Note 2	FSAR App ~~C~~	Note 2 below	Engineering review ~~See note 2 below~~	NOTE 2
COMPONENT: Rear Cooler	Pressure (PSIA)	Fig 0-27	See Note 2	FSAR App ~~C~~	Note 2 below	Engineering review ~~See note 2 below~~	NOTE 2
MANUFACTURER: Anaconda	Relative Humidity (%)	NA	NA	NA	NA		
MODEL NUMBER: ~~See 209~~ ND	Chemical Spray	NA	NA	NA	NA		
FUNCTION: Various							
ACCURACY: SPEC: NA DEMON: NA	Radiation (10^6 rads)	1.6/SI group 3.6/RHR group	See Note 1	~~See~~ under ~~SI~~	See note 1 below	Engineering review ~~See Note 1 below~~	NOTE 1
SERVICE: Various							
LOCATION: Outside containment	Aging (years)		See Notes 1 & 2 below		1 & 2 below	Engineering review ~~Note 1 & 2 below~~	NOTE 1, 2
FLOOD LEVEL ELEV: NA ABOVE FLOOD LEVEL: NA	Submergence	NA	NA	NA	NA		

*Documentation References: cf Enclosure 4

Notes:

Note 1) As per Table C-1 App C, to NRC IE Bulletin 79-01B, cable insulation material (EPR-Hypalon) is good for 10 MRADS) and 2 10 yrs AGING

2) Cable temp rating equals 90°C (194°F). 270°F for 10 secs and 11.5 psig for 1 sec does not represent a challenge to the cable mechanical or electrical quality.

3) AEPSC NS&L Calculation SC-N-6420-2, will accounting (i.e. distance from source.

1. From Appendix C

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO.

NOTES:

A service rating for a cable does not provide evidence of qualification for steam exposure. The DOR Guidelines state

As a minimum, the qualification for severe temperature, pressure, and steam service conditions for Class IE equipment should be based on type testing. Qualification for other service conditions such as radiation and chemical sprays may be by analysis (evaluation) supported by test data (see Section 5.3 below). Exceptions to these general guidelines must be justified on a case by case basis.

The radiation evaluation provided by the licensee satisfies the DOR requirements. The licensee statement in note 2 of the SCEW sheet (see p-3a) does not in itself provide justification and evidence of qualification for steam exposure.

However, letters from Anaconda dated 9/24/81 and 10/23/81 appear to be for steam 3102 and 3103, which cites Report FC-4850-3 as qualification. This report establishes qualification except for a qualified life

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 88

EQUIPMENT ITEM NO. 88
ELECTRICAL POWER CABLE LOCATED OUTSIDE CONTAINMENT
OKONITE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 88
LICENSEE REFERENCE(S): 3403
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP1-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, (OT), (RT,) P, H, CS, (A,) S, (R), (M,) I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
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Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 88

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 88

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	X
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

The licensee has provided sufficient information on similarity to tested cable in note 1 of the SCEW sheet for the outside containment environment. However no evaluation of aging data is provided for the application

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 88

Notes:

1. Cable Tested: 1/c #12 7(x) coated Cable
.030 Okonite Insulation

Cable Installed at DC Cook Plant:
1/c #12 (7x) coated Cable
.030 Okonite Insulation
.015 Okoprene Jacket

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 89

EQUIPMENT ITEM NO. 89
ELECTRICAL POWER CABLE LOCATED IN CONTAINMENT
OKONITE, MODEL NOT STATED
REQUIRED OPERATING TIME: 3 MONTHS
TER CHECKSHEET NO. 89
LICENSEE REFERENCE(S): 639, 1340, 26, 27, 29
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP4-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 89

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 89

NOTES:

The licensee has not provided sufficient information to establish that the Equipment described on the SCEW sheet is the same as the Equipment described in the referenced report.

The SCEW states

EQUIPMENT DESCRIPTION

SYSTEM: VARIOUS

PLANT ID NO: VARIOUS

COMPONENT: POWER CABLE

MANUFACTURER: OKONITE

MODEL NUMBER: ~~1T&PT~~ ~~999~~ ND

FUNCTION: VARIOUS

2. IDENTIFICATION OF TEST SPECIMENS

CABLE NO.*	DESCRIPTION
Group I Cables - Ethylene-Propylene (EPR) Base Product Line	
1B	7/C #12 AWG (7X) coated copper, 0.047" Okonite plus 0.015" Okolon, cabled, no fillers, 11 mil asbestos - Mylar tape, 0.060" Okolon Jacket, pre-aged 336 hours at 121°C in an air oven.**
1C	Same as 1B except without pre-aging.
2B	7/C #12 AWG (7X) coated copper, 0.030" Okonite plus 0.015" Okoprene, cabled, 6 mil asbestos - Mylar tape, 0.060" experimental thermoset jacket, pre-aged 336 hours at 121°C in an air oven.**
2C	Same as 2B except without pre-aging.
9B	1/C #12 AWG (7X) coated copper, 0.045" Okonite pre-aged 336 hours at 121°C in an air oven.**
9C	Same as 9B except without pre-aging.
11B	1/C #6 AWG (7X) bare copper, Semicon tape, 0.090" Okoguard, Semicon tape, 0.003" bare copper tape, pre-aged 336 hours at 121°C in an air oven.**

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 89

NOTES:

Requirements for establishing similarity between installed and tested cables are contained in the DOR Guidelines and IEEE 383-74 which are reproduced below for convenience.

2. Test Specimen - The test specimen should be the same model as the equipment being qualified. The type test should only be considered valid for equipment identical in design and material construction to the test specimen. Any deviations should be evaluated as part of the qualification documentation (see also Section 8.0 below).

[DOR]

IEEE-383

1.3.1 *Cable Description.* This description or specification should include as a minimum:

1.3.1.1 Conductor — material identification, size, stranding, coating.

1.3.1.2 Insulation — material identification, thickness, method of application.

1.3.1.3 Assembly (multiconductor cables only) — number and arrangement of conductors, fillers, binders.

1.3.1.4 Shielding — tapes, extrusions, braids, or others.

1.3.1.5 Covering — jacket or metallic armor or both, material identification, thickness, method of application.

1.3.1.6 Characteristics — voltage and temperature rating (normal and emergency). For instrumentation cables — capacitance, attenuation, characteristic impedance, microphonics, insulation resistance, as applicable.

1.3.1.7 Identification — manufacturer's trade name, catalog number.

1.3.2 *Field Splice or Connection Description or Both.* This description or specification should include as a minimum:

1.3.2.1 Whether factory or field assembled to cable.

1.3.2.2 Conductor connection — type, material identification, and method of assembly.

1.3.2.3 Items from Sections 1.3.1.2 through 1.3.1.7.

2.2 Type Test Samples. The samples tested should contain the conductor, insulation, fillers, jacket, binder tape, overall jacket, shielding, and field splices which are representative of the cable category being qualified. Table 1 lists sizes which have been considered representative of these categories. The sample lengths should be sufficient to permit reliable test readings and evaluation consistent with good testing practice.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 89

NOTES:

ELECTRIC CABLES, FIELD SPLICES, AND CONNECTIONS — IEEE Std 383-1974

Table 1
Represensentative Cables for Type Tests

Type	Test	Section	Size
Up to 2000 V multiconductor control cable or Shielded multiconductor signal cable (see list below for individual component) or Single conductor power cable	temperature and moisture resistance	2.3.1	1/C — 14 or 12 AWG
	thermal and radiation exposure	2.3.3	1/C or M/C — 14 or 12 AWG
	design basis event simulation	2.4	1/C or M/C — 14 or 12 AWG 1/C — 6, 4 or 2 AWG
	vertical flame test singles from cable assembly	2.5.6	1/C — 14 or 12 AWG
	vertical tray flame test	2.5.4	7/C — 16, 14 or 12 AWG
Shielded pairs, triple or quad from multiconductor signal cable	temperature and moisture resistance	2.3.1	1 pair shielded 16 AWG or actual cable
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test	2.5.6	
Coaxial, triaxial or special instrument cable	temperature and moisture resistance	2.3.1	actual size
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test singles from cable assembly	2.5.6	
Single pair thermocouple extension cable	temperature and moisture resistance	2.3.1	2/C — 20 AWG or actual size if smaller
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical tray flame test	2.5.4	
	vertical flame test singles from cable assembly	2.5.6	
2001–15 000 V power cable 1/C triplexed and multiconductor	vertical tray flame test	2.5.4	6 AWG (2-5kV) 2/O or 4/O or 4/O (2-15kV)

In Lieu of the detailed description discussed above it would be acceptable for the licensee to obtain certification from the maunfacturer identifying what test report(s) apply to the cables furnished for installation.

When similarity is established then the preaging data should be evaluated to establish a qualified life.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 90

EQUIPMENT ITEM NO. 90
ELECTRICAL INSTRUMENT CABLE LOCATED OUTSIDE CONTAINMENT
OKONITE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 90
LICENSEE REFERENCE(S): 1858, 38
FUNCTION (PLANT ID): INSTRUMENT CABLE
LICENSEE SUBMITTAL: SCEW(S): CP6-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 90

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
~~II.b Not Qualified~~
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 20

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 90

NOTES:

The licensee has not provided sufficient information to establish that the Equipment described on the SCEW sheet is the same as the Equipment described in the referenced report. The SCEW sheet states,

EQUIPMENT DESCRIPTION

SYSTEM: VARIOUS

PLANT ID NO: VARIOUS

COMPONENT: Instrument Cable

MANUFACTURER: OKONITE

MODEL NUMBER: ~~[illegible]~~ NP

FUNCTION: VARIOUS

The test report states

QUALIFICATION OF
OKOGUARD ETHYLENE-PROPYLENE RUBBER
INSULATION
FOR
NUCLEAR PLANT SERVICE (5 kV CABLE & FIELD SPLICE)

Samples of single conductor 5 kV, #6 AWG, .090" Okoguard insulation, with a field splice were thermally aged to simulate 40 year design life condition. The aging was performed at 150 C for three weeks, a point actually above the Arrhenius curve of .030" Okoguard insulation shown in Figure I. As pointed out above, use of the Arrhenius technique on thin wall, newer insulations compared with the same analysis on those of well established insulations which have excellent service records is a reliable method of demonstrating the desired 40 year life expectancy.

The field splice was made via standard accepted industry splicing techniques using Okoguard T-95 tape and Okonite #35 jacketing tape.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 90

NOTES:

Requirements for establishing similarity between installed and tested cables are contained in the DOR Guidelines and IEEE 383-74 which are reproduced below for convenience.

2. Test Specimen - The test specimen should be the same model as the equipment being qualified. The type test should only be considered valid for equipment identical in design and material construction to the test specimen. Any deviations should be evaluated as part of the qualification documentation (see also Section 8.0 below).

[DOR]

IEEE-383

1.3.1 *Cable Description.* This description or specification should include as a minimum:

1.3.1.1 Conductor — material identification, size, stranding, coating.

1.3.1.2 Insulation — material identification, thickness, method of application.

1.3.1.3 Assembly (multiconductor cables only) — number and arrangement of conductors, fillers, binders.

1.3.1.4 Shielding — tapes, extrusions, braids, or others.

1.3.1.5 Covering — jacket or metallic armor or both, material identification, thickness, method of application.

1.3.1.6 Characteristics — voltage and temperature rating (normal and emergency). For instrumentation cables — capacitance, attenuation, characteristic impedance, microphonics, insulation resistance, as applicable.

1.3.1.7 Identification — manufacturer's trade name, catalog number.

1.3.2 *Field Splice or Connection Description or Both.* This description or specification should include as a minimum:

1.3.2.1 Whether factory or field assembled to cable.

1.3.2.2 Conductor connection — type, material identification, and method of assembly.

1.3.2.3 Items from Sections 1.3.1.2 through 1.3.1.7.

2.2 Type Test Samples. The samples tested should contain the conductor, insulation, fillers, jacket, binder tape, overall jacket, shielding, and field splices which are representative of the cable category being qualified. Table 1 lists sizes which have been considered representative of these categories. The sample lengths should be sufficient to permit reliable test readings and evaluation consistent with good testing practice.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 20

NOTES:

ELECTRIC CABLES, FIELD SPLICES, AND CONNECTIONS — IEEE Std 383-1974

Table 1
Represensentative Cables for Type Tests

Type	Test	Section	Size
Up to 2000 V multiconductor control cable or Shielded multiconductor signal cable (see list below for individual component) or Single conductor power cable	temperature and moisture resistance	2.3.1	1/C — 14 or 12 AWG
	thermal and radiation exposure	2.3.3	1/C or M/C — 14 or 12 AWG
	design basis event simulation	2.4	1/C or M/C — 14 or 12 AWG 1/C — 6, 4 or 2 AWG
	vertical flame test singles from cable assembly	2.5.6	1/C — 14 or 12 AWG
	vertical tray flame test	2.5.4	7/C — 16, 14 or 12 AWG
Shielded pairs, triple or quad from multiconductor signal cable	temperature and moisture resistance	2.3.1	1 pair shielded 16 AWG or actual cable
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test	2.5.6	
Coaxial, triaxial or special instrument cable	temperature and moisture resistance	2.3.1	actual size
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test singles from cable assembly	2.5.6	
Single pair thermocouple extension cable	temperature and moisture resistance	2.3.1	2/C — 20 AWG or actual size if smaller
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical tray flame test	2.5.4	
	vertical flame test singles from cable assembly	2.5.6	
2001—15 000 V power cable 1/C triplexed and multiconductor	vertical tray flame test	2.5.4	6 AWG (2-5kV) 2/O or 4/O or 4/O (2-15kV)

In Lieu of the detailed description discussed above it would be acceptable for the licensee to obtain certification from the maunfacturer identifying what test report(s) apply to the cables furnished for installation.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 91

EQUIPMENT ITEM NO. 91
ELECTRICAL POWER CABLE LOCATED IN CONTAINMENT
ESSEX INTERNATIONAL, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 91
LICENSEE REFERENCE(S): 639, 2587, 26, 27, 29
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP8-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
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System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 91

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 91

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	____
Adequate Similarity Between Equipment and Test Specimen Established	____
Aging Degradation Evaluated Adequately	____
Qualified Life or Replacement Schedule Established (If Required)	____
Program Established to Identify Aging Degradation	____
Criteria Regarding Aging Simulation Satisfied (If Required)	____
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	____
o Peak Pressure Adequate	____
o Duration Adequate	____
o Required Profile Enveloped Adequately	____
o Steam Exposure (If Required) Adequate	____
Criteria Regarding Spray Satisfied	____
Criteria Regarding Submergence Satisfied	____
Criteria Regarding Radiation Satisfied	____
Criteria Regarding Test Sequence Satisfied	____
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	____
Criteria Regarding Functional Testing Satisfied	____
Criteria Regarding Instrument Accuracy Satisfied	____
Test Duration Margin (1 hour + Function Time) Satisfied	____
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	____

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	____
I.b	Equipment Qualification Pending Modification	____
II.a	Equipment Qualification Not Established	____
II.b	Equipment Not Qualified	____
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	____
III.a	Equipment Exempt From Qualification	____
III.b	Equipment Not in the Scope of the Qualification Review	____
IV	Documentation Not Made Available	X

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 21

5. Qualified by Isomedix Corp. Test Report of November 1975

Type of Test: Simultaneous, gamma radiation
steam
chemical spray

Test Profile:

.2 - .3 Mrads/hr, 200 Mrads
346°F, 113 psig for 5 hrs
265°F, 28 psig for 4 days
215°F, 2 psig for 26 days

Chemical Spray: 3000 ppm boron as boric acid in solution with .06½ molar sodium thiosulfate buffered with sodium hydroxide to a PH of 9 to 11.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 92

EQUIPMENT ITEM NO. 92
ELECTRICAL POWER CABLE LOCATED OUTSIDE CONTAINMENT
ESSEX INTERNATIONAL, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAYS
TER CHECKSHEET NO. 92
LICENSEE REFERENCE(S): 60
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP3-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, 5g, ~~5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 92

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
~~II.c Qualified Life Deficiency~~
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 92

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	X
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

LICENSEE RESPONSE TO NRC SER

PSR 45 Document Ref # 65

October 19, 1981

Subject: Class IE Cable for Outside Containment Service Environmental Qualification

From: L. F. Caso

To: NRC IE Bulletin 79-01B Central File

The cable herein discussed is installed outside containment and is used to serve plant equipment as described in the attached table 1. Table 1 describes the cable involved, the equipment served by the cable, the equipment qualification sheet number used in the bulletin 79-01B submittal, the cable insulation and jacket material, and same generic type insulation and jacket material qualification information.

In its location outside containment, the cable may see a steam environment and a radiation environment. The steam environment (230°F and decreasing for about 10 seconds) does not represent a challenge for the electrical cable insulation. See Figure 0-27 attached. Cable insulation material standard AEIC-CS6-~~S-56~~ 79 gives a cable emergency rating of 130°C (266°F) for up to 36 hours per year for three consecutive years. We do not claim that this cable meets the AEIC standards. The standard is mentioned here as an example of electrical cable capabilities as compared with the accident environment being discussed here.

The total accumulated radiation dose at the surface of the recirculation line, one year after the accident may be 16.6×10^6 rads. Two feet away from the surface of the recirculation line, the total accumulated dose after one year will be approximately 3.4×10^6 rads.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 22

NOTES:

October 8, 1981

American Electric Power
2 Broadway
New York, N.Y. 10004

Attn: Mr. T. J. Massar-EE Div.

Subj: Cable Radiation & Thermal Resistance

Ref: Cook Nuclear Plant
AEP Ord. 03594-821-3, item 324
Ersex Ord. 114-2548

Dear Mr. Massar:

We are in receipt of your letter of 9-16-81 requesting radiation and thermal resistance data on the 3 x 1/C #12 EP insulated/neoprene jacketed subject cable.

Attached to and made a part of this letter are data generated on the insulation material and the jacketing material used on this cable. These data show suitability for use after 100 Megarads (gamma) radiation plus 7d at 136C (276F) for the EP insulation and 50 Megarads (gamma) radiation plus 7 days at 121C (250F) for the neoprene. These test levels readily envelope the requirements of 20 Mrads and 10 seconds at 121C(250F).

We trust this material will be adequate for your present needs.

Very truly yours,

Joseph L. Steiner
Chief Engineer

TEST DATA

ESSEX GROUP INC

DC Cook Plant
AEP/EP-Neoprene (non-containment)

EP (TO35)

Unaged	
Tensile Strength (psi)	1200
Elongation (%)	350
Aged 7d at 136C	
Tensile Strength (psi)	1000
Elongation (%)	350
Aged 100 M Rads	
Tensile Strength (psi)	900
Elongation (%)	30
Aged 7d at 136C and 100 M Rads	
Tensile Strength (psi)	1100
Elongation (%)	24

Actual data typical values

J. L. Steiner

TEST DATA

ESSEX GROUP INC

DC Cook Plant
AEP/EP-Neoprene (non-containment)

Neoprene (T 450)

Unaged	
Tensile Strength (psi)	1800
Elongation (%)	450
Aged 7d at 121C	
Tensile Strength (psi)	1500
Elongation (%)	110
Aged 50 M Rads	
Tensile Strength (psi)	1300
Elongation (%)	120
Aged 7d at 136C and 50 M Rads	
Tensile Strength (psi)	2000
Elongation (%)	35

Actual data typical values

J. L. Steiner

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 92

NOTES:

although the information presented is for an air oven ageing test, the duration of the steam transient is so short that the licensee judgement (which is reproduced on page 3a) is considered adequate for the harsh environment evaluation.

However the data on accelerated ageing was not evaluated to establish an estimate of qualified life

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 93

EQUIPMENT ITEM NO. 93
ELECTRICAL POWER CABLE LOCATED IN THE CONTAINMENT
KERITE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 93
LICENSEE REFERENCE(S): 38, 26, 27, 29
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP11-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
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Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 23

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 23

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	____
Adequate Similarity Between Equipment and Test Specimen Established	____
Aging Degradation Evaluated Adequately	____
Qualified Life or Replacement Schedule Established (If Required)	____
Program Established to Identify Aging Degradation	____
Criteria Regarding Aging Simulation Satisfied (If Required)	____
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	____
o Peak Pressure Adequate	____
o Duration Adequate	____
o Required Profile Enveloped Adequately	____
o Steam Exposure (If Required) Adequate	____
Criteria Regarding Spray Satisfied	____
Criteria Regarding Submergence Satisfied	____
Criteria Regarding Radiation Satisfied	____
Criteria Regarding Test Sequence Satisfied	____
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	____
Criteria Regarding Functional Testing Satisfied	____
Criteria Regarding Instrument Accuracy Satisfied	____
Test Duration Margin (1 hour + Function Time) Satisfied	____
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	____

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	____
I.b	Equipment Qualification Pending Modification	____
II.a	Equipment Qualification Not Established	____
II.b	Equipment Not Qualified	____
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	____
III.a	Equipment Exempt From Qualification	____
III.b	Equipment Not in the Scope of the Qualification Review	____
IV	Documentation Not Made Available	X

The licensee referenced a document titled "Kerite Co. Report on the Effects of Gamma Rad. and Autoclaving on Kerite Power & Control Cable." However the report was not available for review

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 93

7. Qualified by Kerite Co. Report on the effects of Gamma Radiation and Autoclaving on Kerite Power and Control Cable
April 30, 1970.

Type of Test: Sequential, gamma radiation
steam
chemical spray

Test Profile:

.8 Mrads/hr, 120 Mrads
325°F, 82 psig for 13 hrs
228°F, 5 psig for 7 days

Chemical Spray: Borated water, 1-1/2% solution of boric acid and distilled water buffered at a PH of 9.5

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 94

EQUIPMENT ITEM NO. 94
ELECTRICAL POWER CABLE LOCATED IN CONTAINMENT
KERITE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 94
LICENSEE REFERENCE(S): 639, 26, 27, 29
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP9-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

(R), T, (QT), RT, P, H, (CS), (A), (S), (R), (M), I, (QM), RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 94

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

___ The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 94

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	____
Adequate Similarity Between Equipment and Test Specimen Established	____
Aging Degradation Evaluated Adequately	____
Qualified Life or Replacement Schedule Established (If Required)	____
Program Established to Identify Aging Degradation	____
Criteria Regarding Aging Simulation Satisfied (If Required)	____
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	____
o Peak Pressure Adequate	____
o Duration Adequate	____
o Required Profile Enveloped Adequately	____
o Steam Exposure (If Required) Adequate	____
Criteria Regarding Spray Satisfied	____
Criteria Regarding Submergence Satisfied	____
Criteria Regarding Radiation Satisfied	____
Criteria Regarding Test Sequence Satisfied	____
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	____
Criteria Regarding Functional Testing Satisfied	____
Criteria Regarding Instrument Accuracy Satisfied	____
Test Duration Margin (1 hour + Function Time) Satisfied	____
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	____

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	____
I.b	Equipment Qualification Pending Modification	____
II.a	Equipment Qualification Not Established	____
II.b	Equipment Not Qualified	____
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	____
III.a	Equipment Exempt From Qualification	____
III.b	Equipment Not in the Scope of the Qualification Review	____
IV	Documentation Not Made Available	X

The licensee cited the following document

"X K.G.Eire Co. Report on the Effects of Gamma RAD. and Autoclaving on Kerite Power + Control CABLE."

This document was not available for review

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 94

7. Qualified by Kerite Co. Report on the effects of Gamma Radiation and Outgassing on Kerite Power Control Cables
April 30, 1970.

Type of Test: Sequential, gamma radiation
steam
chemical spray

Test Profile:

.8 Mrads/hr, 120 Mrads
325°F, 82 psig for 13 hrs
228°F, 5 psig for 7 days

Chemical Spray: Borated water, 1-1/2% solution of boric acid and distilled water buffered at a PH of 9.5

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 95

EQUIPMENT ITEM NO. 95
ELECTRICAL POWER CABLE LOCATED IN CONTAINMENT
CYPRUS, MODEL NOT STATED
REQUIRED OPERATING TIME: 3 MONTHS
TER CHECKSHEET NO. 95
LICENSEE REFERENCE(S): 639, 1355, 38, 26, 27, 29
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP12-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 25

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
III.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 95

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 95

NOTES:

The licensee has not provided sufficient information to establish that the Equipment described on the SCEW sheet is the same as the Equipment described in the referenced report.

EQUIPMENT DESCRIPTION

SYSTEM: VARIOUS

PLANT ID NO: VARIOUS

DESCRIPTION 3/C Triplexed-#2-7/.0974 EC-H 19 Alum., condr, shielding, .090" EPR, Polyhe..., .080" Hypalon Jacketed shielding, power cable 5kv

DESCRIPTION 3/c Triplexed, 12-7/.0305 Tin Copper, .030" EPR, .015" Neoprene Jacketed Power Cable 600 Volt

2. SAMPLE IDENTIFICATION

The seven cable samples tested consisted of 2 seven-conductor cables and 5 single-conductor cables as follows:

Sample No. A
7/C 12 AWG 7 Str., .030" EPR Insul. (C312), .060" Neoprene Jkt. Overall (C414).

Sample No. B
7/C 12 AWG 7 Str., .030" EPR Insul. (C312), .060" Neoprene Jkt. Overall (C414) - Aged 7 days at 100°C.

Sample No. C
1/C 12 AWG 7 Str., .030" EPR Insul. (C312), .020" Neoprene Jkt. (C417).

Sample No. D
1/C 12 AWG 7 Str., .030" EPR Insul. (C312), .020" Hypalon Jkt. (C181).

Sample No. E
1/C 12 AWG 7 Str., .030" EPR Insul. (C313), .020" Neoprene Jkt. (C424).

Sample No. F
1/C 12 AWG 7 Str., .030" EPR Insul. (C312), .020" Hypalon Jkt. (C181) Aged 7 days at 100°C.

Sample No. G
1/C 12 AWG 7 Str., .030" EPR Insul. (C312), .020" Neoprene Jkt. (C417) Aged 7 days at 100°C.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 95

NOTES:

Requirements for establishing similarity between installed and tested cables are contained in the DOR Guidelines and IEEE 383-74 which are reproduced below for convenience.

2. Test Specimen - The test specimen should be the same model as the equipment being qualified. The type test should only be considered valid for equipment identical in design and material construction to the test specimen. Any deviations should be evaluated as part of the qualification documentation (see also Section 8.0 below).

[DOR]

IEEE-383

1.3.1 *Cable Description.* This description or specification should include as a minimum:

1.3.1.1 Conductor — material identification, size, stranding, coating.

1.3.1.2 Insulation — material identification, thickness, method of application.

1.3.1.3 Assembly (multiconductor cables only) — number and arrangement of conductors, fillers, binders.

1.3.1.4 Shielding — tapes, extrusions, braids, or others.

1.3.1.5 Covering — jacket or metallic armor or both, material identification, thickness, method of application.

1.3.1.6 Characteristics — voltage and temperature rating (normal and emergency). For instrumentation cables — capacitance, attenuation, characteristic impedance, microphonics, insulation resistance, as applicable.

1.3.1.7 Identification — manufacturer's trade name, catalog number.

1.3.2 *Field Splice or Connection Description or Both.* This description or specification should include as a minimum:

1.3.2.1 Whether factory or field assembled to cable.

1.3.2.2 Conductor connection — type, material identification, and method of assembly.

1.3.2.3 Items from Sections 1.3.1.2 through 1.3.1.7.

2.2 Type Test Samples. The samples tested should contain the conductor, insulation, fillers, jacket, binder tape, overall jacket, shielding, and field splices which are representative of the cable category being qualified. Table 1 lists sizes which have been considered representative of these categories. The sample lengths should be sufficient to permit reliable test readings and evaluation consistent with good testing practice.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 95

NOTES:

Table 1
Represensentative Cables for Type Tests

Type	Test	Section	Size
Up to 2000 V multiconductor control cable or Shielded multiconductor signal cable (see list below for individual component) or Single conductor power cable	temperature and moisture resistance	2.3.1	1/C — 14 or 12 AWG
	thermal and radiation exposure	2.3.3	1/C or M/C — 14 or 12 AWG
	design basis event simulation	2.4	1/C or M/C — 14 or 12 AWG 1/C — 6, 4 or 2 AWG
	vertical flame test singles from cable assembly	2.5.6	1/C — 14 or 12 AWG
	vertical tray flame test	2.5.4	7/C — 16, 14 or 12 AWG
Shielded pairs, triple or quad from multiconductor signal cable	temperature and moisture resistance	2.3.1	1 pair shielded 16 AWG or actual cable
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test	2.5.6	
Coaxial, triaxial or special instrument cable	temperature and moisture resistance	2.3.1	actual size
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test singles from cable assembly	2.5.6	
Single pair thermocouple extension cable	temperature and moisture resistance	2.3.1	2/C — 20 AWG or actual size if smaller
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical tray flame test	2.5.4	
	vertical flame test singles from cable assembly	2.5.6	
2001—15 000 V power cable 1/C triplexed and multiconductor	vertical tray flame test	2.5.4	6 AWG (2-5kV) 2/O or 4/O or 4/O (2-15kV)

In Lieu of the detailed description discussed above it would be acceptable for the licensee to obtain certification from the maunfacturer identifying what test report(s) apply to the cables furnished for installation.

In addition an evaluation of the packaging should be performed to establish a qualified life, if identity is established.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 96

EQUIPMENT ITEM NO. 96
ELECTRICAL INSTRUMENT CABLE LOCATED OUTSIDE CONTAINMENT
CONTINENTAL WIRE, MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 96
LICENSEE REFERENCE(S): 2818, 38
FUNCTION (PLANT ID): INSTRUMENT CABLE
LICENSEE SUBMITTAL: SCEW(S): CI10-1, CI4-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, ~~3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 96

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 26

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 96

from Ref. 33. FIRL TEST REPORT F-C 2935, EXCERPT FROM

Type of test: Sequential
Gamma Radiation
Steam/

.45 MRAD/hr ; 10 MRAD
340°F, 100 psig, 2 hrs
160°F, , 20 hrs

Item # 3075, 3077 CONTINENTAL WIRE + CABLE Co.

In reference to Table I in the original document, we have contacted the cable manufacturers therein listed (Anaconda, Continental, and Essex); our request for information and their responses are attached to this addendum.

In summary, Anaconda advised that their cable was qualified under FIRL test report F-C4350-3 (200 Mrads); Essex advised that their cable was qualified for 100 Mrads; Continental answered that they did not have radiation data on the subject cable.

The Cyprus Company cable listed in Table II is used for applications outside the reactor containment. It has been qualified for radiation to the extent of 200 Mrads and it has passed an air oven test of 250°F for seven days and an immersion test for seven days. The arguments developed in the original issue of this reference #65 fully applies as well to the Cyprus Company cable. Therefore, we conclude that this cable is fully qualified for its application outside the reactor containment.

LFC/jal
APPROVED J. M. Intrabartola
J. M. INTRABARTOLA

L. F. Caso
L. F. Caso

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 26

NOTES:

The licensee has not provided sufficient information to establish that the Equipment described on the SCEW sheet is the same as the Equipment described in the referenced report.

EQUIPMENT DESCRIPTION
SYSTEM: Various
PLANT ID NO: Various
COMPONENT: Instrument Cable
MANUFACTURER: Continental
MODEL NUMBER: Item #3022

2. SAMPLES

The samples tested were identified as follows:

A. 7 Conductor #12 (7) copper, CC-2115 silicone rubber insulation, glass braid over silicone, glass finished with a flame and abrasion resistant finish CC-1233, 7 conductors cabled, mylar binder tape, overall asbestos braid, asbestos finished with CC-1120 flame and abrasion resistant finish.

B. 2 Conductor #16 (7) copper, CC-2115 silicone rubber insulation, glass braid over silicone, glass braid finished with a flame and abrasion resistant finish CC-1233, 2 conductors cabled with impregnated asbestos fillers, mylar binder tape, overall asbestos braid, asbestos finished with CC-1120 flame and heat resistant finish.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 96

NOTES:

Requirements for establishing similarity between installed and tested cables are contained in the DOR Guidelines and IEEE 383-74 which are reproduced below for convenience.

2. Test Specimen - The test specimen should be the same model as the equipment being qualified. The type test should only be considered valid for equipment identical in design and material construction to the test specimen. Any deviations should be evaluated as part of the qualification documentation (see also Section 8.0 below).

[DOR]

IEEE-383

1.3.1 *Cable Description.* This description or specification should include as a minimum:

1.3.1.1 Conductor — material identification, size, stranding, coating.

1.3.1.2 Insulation — material identification, thickness, method of application.

1.3.1.3 Assembly (multiconductor cables only) — number and arrangement of conductors, fillers, binders.

1.3.1.4 Shielding — tapes, extrusions, braids, or others.

1.3.1.5 Covering — jacket or metallic armor or both, material identification, thickness, method of application.

1.3.1.6 Characteristics — voltage and temperature rating (normal and emergency). For instrumentation cables — capacitance, attenuation, characteristic impedance, microphonics, insulation resistance, as applicable.

1.3.1.7 Identification — manufacturer's trade name, catalog number.

1.3.2 *Field Splice or Connection Description or Both.* This description or specification should include as a minimum:

1.3.2.1 Whether factory or field assembled to cable.

1.3.2.2 Conductor connection — type, material identification, and method of assembly.

1.3.2.3 Items from Sections 1.3.1.2 through 1.3.1.7.

2.2 Type Test Samples. The samples tested should contain the conductor, insulation, fillers, jacket, binder tape, overall jacket, shielding, and field splices which are representative of the cable category being qualified. Table 1 lists sizes which have been considered representative of these categories. The sample lengths should be sufficient to permit reliable test readings and evaluation consistent with good testing practice.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 96

NOTES:

ELECTRIC CABLES, FIELD SPLICES, AND CONNECTIONS — IEEE Std 383-1974

Table 1
Represensentative Cables for Type Tests

Type	Test	Section	Size
Up to 2000 V multiconductor control cable or Shielded multiconductor signal cable (see list below for individual component) or Single conductor power cable	temperature and moisture resistance	2.3.1	1/C – 14 or 12 AWG
	thermal and radiation exposure	2.3.3	1/C or M/C – 14 or 12 AWG
	design basis event simulation	2.4	1/C or M/C – 14 or 12 AWG 1/C – 6, 4 or 2 AWG
	vertical flame test singles from cable assembly	2.5.6	1/C – 14 or 12 AWG
	vertical tray flame test	2.5.4	7/C – 16, 14 or 12 AWG
Shielded pairs, triple or quad from multiconductor signal cable	temperature and moisture resistance	2.3.1	1 pair shielded 16 AWG or actual cable
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test	2.5.6	
Coaxial, triaxial or special instrument cable	temperature and moisture resistance	2.3.1	actual size
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test singles from cable assembly	2.5.6	
Single pair thermocouple extension cable	temperature and moisture resistance	2.3.1	2/C – 20 AWG or actual size if smaller
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical tray flame test	2.5.4	
	vertical flame test singles from cable assembly	2.5.6	
2001–15 000 V power cable 1/C triplexed and multiconductor	vertical tray flame test	2.5.4	6 AWG (2-5kV) 2/O or 4/O or 4/O (2-15kV)

In Lieu of the detailed description discussed above it would be acceptable for the licensee to obtain certification from the maunfacturer identifying what test report(s) apply to the cables furnished for installation.

Aging should be evaluated if identity to the test report is established.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 97

EQUIPMENT ITEM NO. 97
ELECTRICAL INSTRUMENT CABLE LOCATED IN CONTAINMENT
SAMUEL MOORE, MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 97
LICENSEE REFERENCE(S): 639, 677, 678, 38, 26, 27, 29
FUNCTION (PLANT ID): INSTRUMENT CABLE
LICENSEE SUBMITTAL: SCEW(S): CI9-1, CI3-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e~~, 5f, 5g, 5h, 5i, 5j, 5k
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 97

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 97

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 97

NOTES:

The licensee has not provided sufficient information to establish that the Equipment described on the SCEW sheet is the same as the Equipment described in the referenced report.

EQUIPMENT DESCRIPTION
SYSTEM: VARIOUS
PLANT ID NO: VARIOUS
COMPONENT: INSTRUMENT CABLE
MANUFACTURER: SAMUEL MOORE + CO.
MODEL NUMBER: ~~TYPE~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 97

NOTES:

Requirements for establishing similarity between installed and tested cables are contained in the DOR Guidelines and IEEE 383-74 which are reproduced below for convenience.

2. Test Specimen - The test specimen should be the same model as the equipment being qualified. The type test should only be considered valid for equipment identical in design and material construction to the test specimen. Any deviations should be evaluated as part of the qualification documentation (see also Section 8.0 below).

[DOR]

IEEE-383

1.3.1 *Cable Description.* This description or specification should include as a minimum:

1.3.1.1 Conductor — material identification, size, stranding, coating.

1.3.1.2 Insulation — material identification, thickness, method of application.

1.3.1.3 Assembly (multiconductor cables only) — number and arrangement of conductors, fillers, binders.

1.3.1.4 Shielding — tapes, extrusions, braids, or others.

1.3.1.5 Covering — jacket or metallic armor or both, material identification, thickness, method of application.

1.3.1.6 Characteristics — voltage and temperature rating (normal and emergency). For instrumentation cables — capacitance, attenuation, characteristic impedance, microphonics, insulation resistance, as applicable.

1.3.1.7 Identification — manufacturer's trade name, catalog number.

1.3.2 *Field Splice or Connection Description or Both.* This description or specification should include as a minimum:

1.3.2.1 Whether factory or field assembled to cable.

1.3.2.2 Conductor connection — type, material identification, and method of assembly.

1.3.2.3 Items from Sections 1.3.1.2 through 1.3.1.7.

2.2 Type Test Samples. The samples tested should contain the conductor, insulation, fillers, jacket, binder tape, overall jacket, shielding, and field splices which are representative of the cable category being qualified. Table 1 lists sizes which have been considered representative of these categories. The sample lengths should be sufficient to permit reliable test readings and evaluation consistent with good testing practice.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 97

NOTES:

Table 1
Representative Cables for Type Tests

Type	Test	Section	Size
Up to 2000 V multiconductor control cable or Shielded multiconductor signal cable (see list below for individual component) or Single conductor power cable	temperature and moisture resistance	2.3.1	1/C — 14 or 12 AWG
	thermal and radiation exposure	2.3.3	1/C or M/C — 14 or 12 AWG
	design basis event simulation	2.4	1/C or M/C — 14 or 12 AWG 1/C — 6, 4 or 2 AWG
	vertical flame test singles from cable assembly	2.5.6	1/C — 14 or 12 AWG
	vertical tray flame test	2.5.4	7/C — 16, 14 or 12 AWG
Shielded pairs, triple or quad from multiconductor signal cable	temperature and moisture resistance	2.3.1	1 pair shielded 16 AWG or actual cable
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test	2.5.6	
Coaxial, triaxial or special instrument cable	temperature and moisture resistance	2.3.1	actual size
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test singles from cable assembly	2.5.6	
Single pair thermocouple extension cable	temperature and moisture resistance	2.3.1	2/C — 20 AWG or actual size if smaller
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical tray flame test	2.5.4	
	vertical flame test singles from cable assembly	2.5.6	
2001—15 000 V power cable 1/C triplexed and multiconductor	vertical tray flame test	2.5.4	6 AWG (2-5kV) 2/O or 4/O or 4/O (2-15kV)

In Lieu of the detailed description discussed above it would be acceptable for the licensee to obtain certification from the maunfacturer identifying what test report(s) apply to the cables furnished for installation.

2. SAMPLE IDENTIFICATION

Sample Number	Description
1	Samuel Moore and Company Type 1902 16 gauge solid thermocouple wire 30-mil EPDM I insulation, 15-mil Hypalon I conductor jacket 45-mil Hypalon I overall jacket
2	Samuel Moore and Company Type 1952 16 gauge 7-strand tinned copper conductors 30-mil EPDM I insulation, 15-mil Hypalon I conductor jacket 45-mil Hypalon I overall jacket
3	Samuel Moore and Company Type 1952 16 gauge 7-strand tinned copper conductors 20-mil EPDM I insulation, 10-mil Hypalon I conductor jacket 45-mil Hypalon I overall jacket
4	Samuel Moore and Company Type 1952 16 gauge 7-strand tinned copper conductors 30-mil EPDM II insulation, 15-mil Hypalon II conductor jacket 45-mil Hypalon II overall jacket
5	Samuel Moore and Company Field Splice Evaluation Cable Samuel Moore and Company Type 1952 16 gauge 7-strand tinned copper conductors 30-mil EPDM II insulation, 15-mil Hypalon II conductor jacket 45-mil Hypalon II overall jacket

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 97

F-C3683

Sample Number		Description
5		A. Single Splice No. I - Part No. 0103-027
		B. Single Splice No. II - Part No. 0103-028
		C. Overall Jacket Repair - Part No. 0103-029
6		Combination 4 pair special bundle. Asbestos-glass fire barrier tape. 20-mil Hypalon I pair jacket. 60-mil Hypalon I overall jacket.
		Individual Pairs:
	1 and 2	15-mil EPDM I, 10-mil Hypalon I on 20 gauge, JX thermocouple wire
	3 and 4	20-mil EPDM I, 10-mil Hypalon I on 16 gauge, 7 strand tinned copper conductors
	5 and 6	20-mil EPDM I, 15-mil Hypalon I on 18 gauge, 7 strand tinned copper conductors
	7 and 8	30-mil EPDM I, 15-mil Hypalon I on 16 gauge, 7 strand tinned copper conductors.

TABLE 1

DESCRIPTION OF CABLE SAMPLES

Sample Number	Aging Temp/ Duration (°C/Days)	Radiation Dose (Mrads)	Energizing Voltage (Vac) And Current (Amps)	Sample Description
1-2	121/7	50	600/0.5	2/c, 16 AWG, 7 strand, tinned copper 20 mils EPDM primary insulation with 10 mils Hypalon primary jacket, 2.0 mil Al-Mylar shield with 16 AWG, 7 strand tinned copper drain, 45 mil Hypalon jacket overall.
1-5	No Aging	50	600/0.5	Same as above
2-2	121/7	50	300/0.5	Same as above but with 20 AWG conductors

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 98

EQUIPMENT ITEM NO. 98
ELECTRICAL INSTRUMENT CABLE LOCATED IN CONTAINMENT
BOSTON INSULATED WIRE, MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 98
LICENSEE REFERENCE(S): 639, 3829, 38, 26, 27, 29
FUNCTION (PLANT ID): INSTRUMENT CABLE
LICENSEE SUBMITTAL: SCEW(S): CI5-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 98

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/~~or~~ will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 98

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	X
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	X
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 98

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

Criteria: DOR Guidelines X; NUREG-0588, Cat. I___; NUREG-0588, Cat. II ___.

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
EQUIPMENT DESCRIPTION			
Equipment Type	Various	Various see page 5b	
Manufacturer's Name (5.2.2/-/-)	see page 1a		
Model Number (5.2.2/-/-)			
Serial Number			
Features/Mounting (5.2.6/-/-)			
Connections/Interfaces (5.2.6/-/-)		cable splice	
Location/Elevation		in Antechamber	
Equipment ID No.	see p 1a	Not applicable	
QUALIFICATION REPORT (8.0/5.0/5.0)			
Report ID Number	IPS 348	IPS-348	
Report Date	Not stated	5/17/78	
Issued by	CONAX	CONAX.	
Prepared for	AEP	AEP	
Referenced Reports	N/A	N/A	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)		Test	
QUALIFICATION TEST PROGRAM			
Functional Test Description (5.2.5/2.2.9/2.2.9)		Insulation resistance and Leakage Current	
Operating Conditions (-/2.2.10/2.2.10) Load/Cycles/Voltage/ Current/Freq.		not stated	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 98

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)	N/A	See Section 8.1 on page 5i.	
Accuracy (5.2.5/-/-)		N/A	
Number of Specimens		See Page 5i	
Test Instruments Calibrated		yes	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)	Varies	N/A	
Test Duration (5.2.1/-/-)	N/A	4.8. day (116 hrs)	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	~11.5 days	N/A	
Required Function Time	24 hrs	N/A	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)	N/A		
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)		Radiation Steam/Chemical Spray	
1. Representative Sample			
2. Baseline Data			
3. Performance Extremes			
4. Thermal Aging			
5. Radiation Aging			
6. Wear Aging			
7. Vibration/Seismic			
8. DBE Exposure			
9. Post-DBE Exposure			
10. Inspection			
Aging (5.2.4, 7.0/4.0/4.0) Thermal Aging/Basis	Not stated	Not stated	X note 1
Material Aging Evaluation (7.0/-/-)		"	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)		"	
Radiation Aging, Type		"	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 98

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	Not stated	See accident Dose (pg 5d)	
Radiation Aging, Dose Rate	↓		
Radiation Aging, Method		test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)		Not stated	
Operational Aging (-/4.2/-)		" "	
Other Age Conditioning (-/4.2/-)		" "	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	Not stated	Not stated	
Normal Ambient Temperature Normal Ambient Radiation Normal Ambient Humidity	↓	N/A ↓	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	D.C. Cook Program	↓	
On-Going Analysis of Failures and Degradation (7.0/-/-)	↓		
Margin (General) (6.0/3.0/3.0)	Not stated		
Margin (NUREG-0588, Cat. I) (-/3.2/-) 1. Temperature (+15°F) 2. Pressure (+10%, 10 psig max) 3. Radiation (not required) 4. Time (+10%, +1 hour + function time minimum)	↓	↓	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 98

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
ACCIDENT CONDITIONS			
LOCA/MSLB/HELB/Uncontrolled (4.1, 4.2, 4.3.1, 4.3.3/ 1.1, 1.2, 1.5/1.1, 1.2, 1.5)	LOCA/MSLB	LOCA/MSLB	
Radiation Type	Gamma	Gamma	
Radiation Dose (rd) (4.1.2/1.4/1.4)	28×10^6	150×10^6	
Radiation Dose Rate (rd/hr) Radiation Qual. Method (5.3.1/-/-)	Not stated	0.75×10^6	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)		N/A	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)			
Radiation Dose (Normal + Accident) (4.1.2/-/-)			
Plateout Dose Considered (-/1.48/1.48)			
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 98

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS			
Rate of Temp./Press. Increase			
Peak: °F/psig/RH/Time	See Pages	345/112/-/1 hr	X Note 2.
Decrease To: °F/psig/RH/Time	59	250/19/-/115 hrs.	
Decrease To: °F/psig/RH/Time	Δ 5 h		
Decrease To: °F/psig/RH/Time			
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)		Not stated	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)		Test	
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)	2000 ppm B 1.14-5% Sol. Buff pH 9-11	2500 ppm Boron Buffered with NaOH for pH 9-10.	
Spray Density (gpm/ft^2)	Not Stated	Not stated	
Spray Duration	"	116 hrs.	
Submergence Duration (4.1.3/2.2.5/2.2.5)		N/A	
In-Leakage Considered (5.2.6, 5.3.2/-/-)			
Time to Submergence			
Dust Environment (-/2.2.11/2.2.11)			

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 98

NOTES:

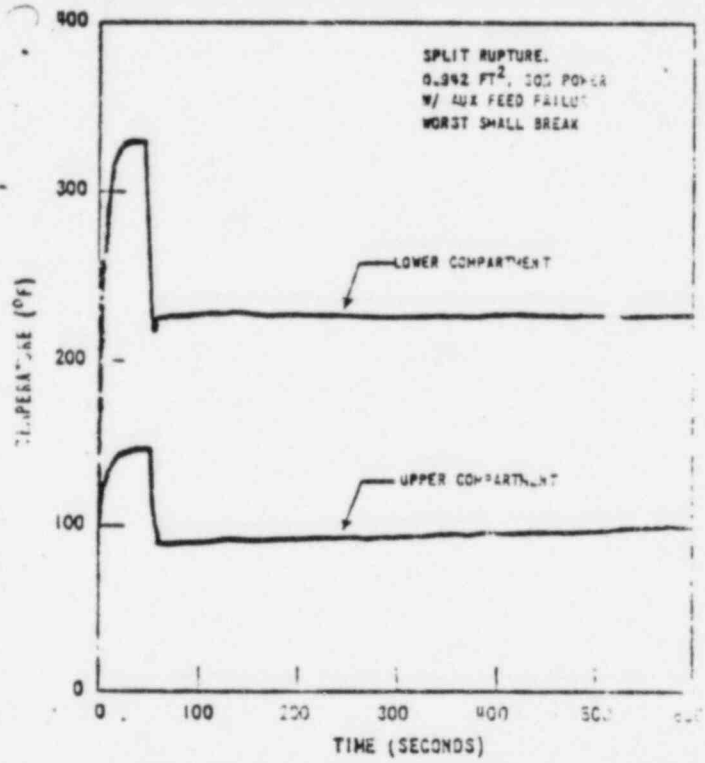
Note 1 - no preaging was performed, no material evaluation for aging was performed and no estimate of qualified life was provided

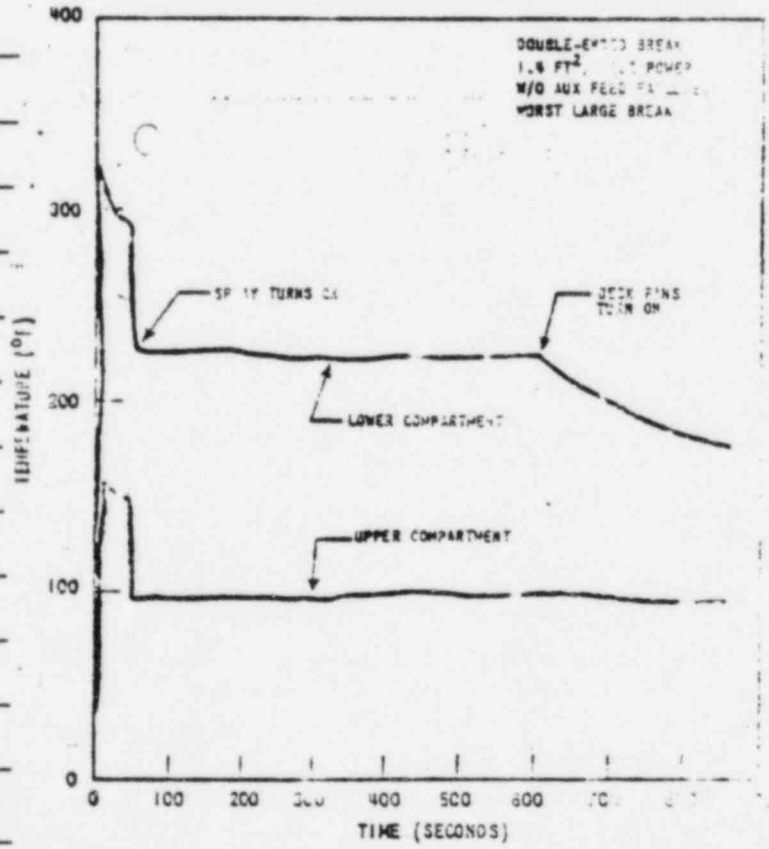
Note 2 - Table 6.1 of the test report [3829] identifies the equipment which passed the test and equipment which did not. This table is reproduced on page 5j.

The test profile envelopes the MSLB curves on p 5g but not the LOCA profile shown on page 5h. The SCEW sheet states that the equipment is required for 4 months and the referenced analysis applies to another test report (not ZPS348)

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 98

NOTES:





EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 98

NOTES:

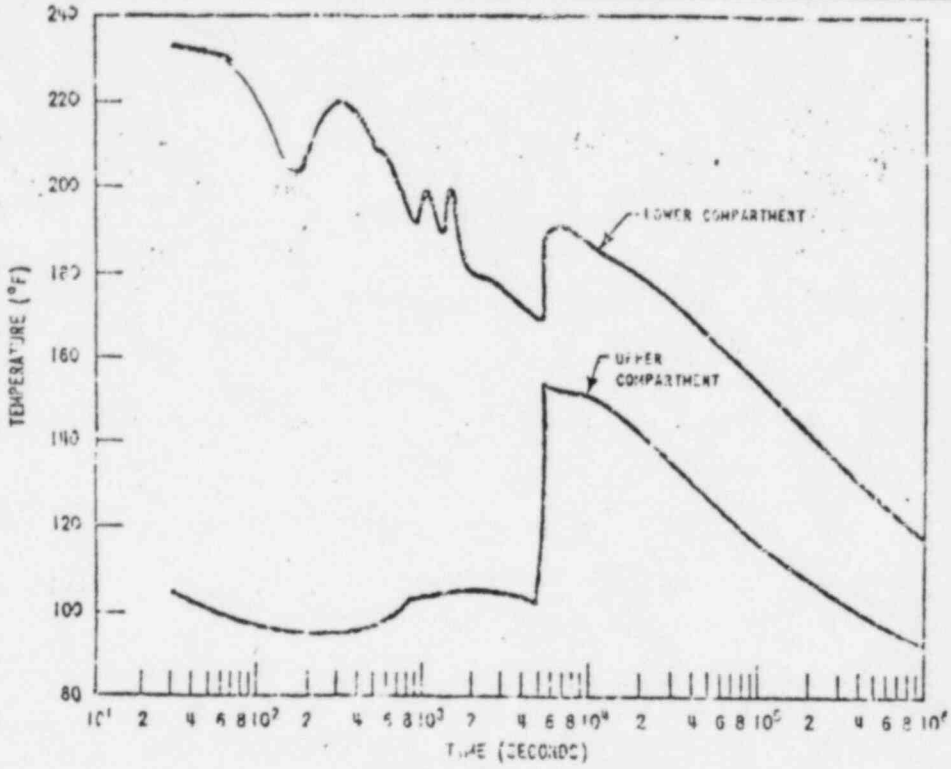
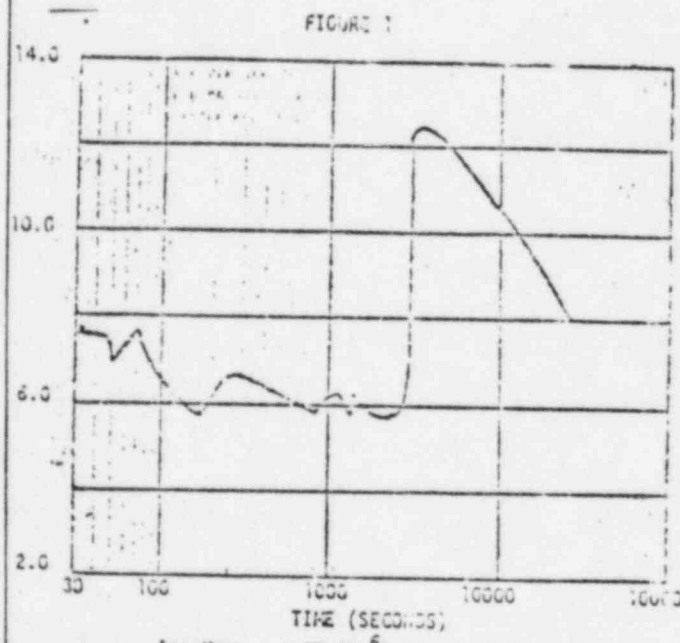
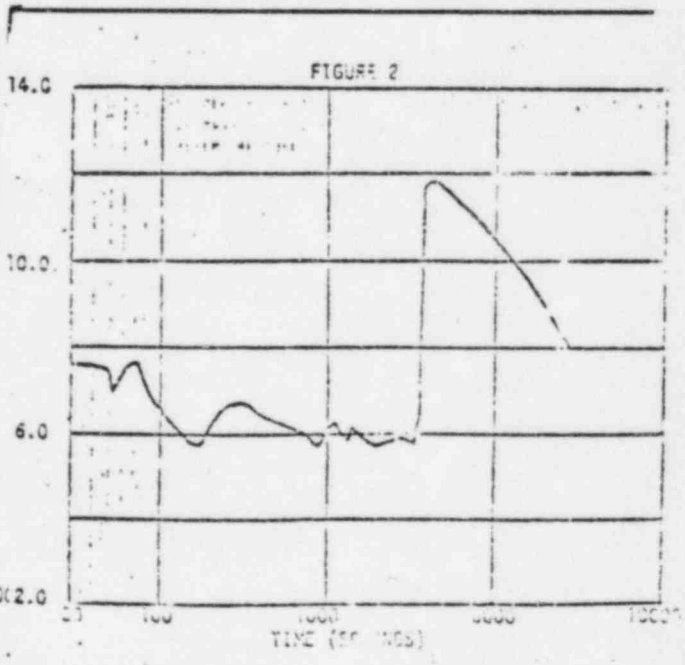


Figure 3 Upper and Lower Compartment Temperature Transients





Ice Mass = 2.07 (10^6) lbs. = 1054.[illegible] lb/basket

NOTES:

TEST ITEMS

(1) Item B1 Box - 12" x 12" x 6" with hinged cover.

(1) Item B4 Box - 18" x 18" x 6" with hinged cover.

(2) Item 0823 - 12 Point Penn - Union Terminal Blocks Type 6012 - N3 - AEP

100 ft. Item 3123 - 15/C #12 AWG, Solid Copper Control Cable - Continental Wire and Cable

3 ft. Item 422 2" Seal - Tight Flexible Conduit

20 ft. Item 3076 Triax Cable - Boston Insulated Wire

20 ft. Item 3075 #16 AWG, Twisted/Shielded Pair - Boston Insulated Wire

20 ft. Item 3075 #16 AWG, Twisted/Shielded Pair - Continental Wire and Cable

20 ft. Item 3121 7/C #12 AWG Solid Copper Control Cable - General Electric

Acceptance Criteria

8.1 The test items are expected to maintain the current and voltage specified in 5.3 above throughout the total test period. Should the leakage current of any individual test item exceed 1 amp, post test examination shall determine if the cause was external. Final post test criteria shall then be applied to the test item in question to determine if it has passed or failed the test. The post test criterion shall be a leakage current of no greater than 1 amp when the device is subjected to a hi-pot test.

NOTES:

TABLE 6.1

Energized Throughout Test	Removed from Circuitry
TB-2 1, 7, 9	TB-2 3, 5, 11
TB-4 None	TB-4 1, 3, 5, 7, 9, 11
GE-3 1, 3, 5, 7	GE-4 1, 3, 5, 7
B7P-3	CP-4 1, 2 & Shield
B7P-4	CP-3 1, 2 & Shield
3X3	
3X4	

In view of the fact that the 600 V test source was of limited capacity, (50 ma), a separate 600 V power source (1 KVA) was applied to the test items following their apparent indication of high leakage. This was initiated to confirm the extent of leakage current. Post test examination revealed that this contributed to the severe tracking observed on TB-4.

Post test examination revealed that apparent difficulty with GE-4 and TB-2 was caused by difficulties encountered with the associated test leads used to connect the test items through the test chamber wall. All the test items except TB-4, CP-3, and CP-4 successfully passed a post test hipot test and successfully passed the requirements of this test.

Views of the terminal boxes, terminal blocks and cables after the environmental exposure are shown in Figures 6.2 through 6.5.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 99

EQUIPMENT ITEM NO. 99
ELECTRICAL INSTRUMENT CABLE LOCATED IN CONTAINMENT
BOSTON INSULATED WIRE, MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 99
LICENSEE REFERENCE(S): 639, 3850, 3851, 38, 26, 27, 29
FUNCTION (PLANT ID): INSTRUMENT CABLE
LICENSEE SUBMITTAL: SCEW(S): CI1-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

(R), T, (QT), RT, P, H, (CS), (A), S, (R), (M), I, (QM), RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 99

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 99

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 89

NOTES:

The licensee has not provided sufficient information to establish that the Equipment described on the SCEW sheet is the same as the Equipment described in the referenced report.

EQUIPMENT DESCRIPTION

SYSTEM: VARIOUS

PLANT ID NO: VARIOUS

COMPONENT: INSTRUMENT CABLE

MANUFACTURER: BOSTON INSULATED WIRE CO.

MODEL NUMBER: ~~IW-E-9064~~ (SCEW)

+ test reports

CABLE CONSTRUCTION

2/C #16 AWG TC
XLP INSULATION
ALUM./MYLAR SHIELD + DRAIN WIRE
FLAME BARRIER TAPES
NEOPRENE JACKET

9550-C-C80 CABLE CONSTRUCTION

Conductor -- #20 AWG 10/32 tinned copper
Insulation -- Crosslinked polyethylene
Inner Shield -- #33 AWG tinned copper braid, 90% min coverage
Insulation between shields -- Crosslinked polyethylene
Outer Shield -- #33 AWG tinned copper braid, 90% min coverage
Jacket -- Postred 7 CSPE chlorosulfonated polyethylene
OD -- .460"

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 29

NOTES:

Requirements for establishing similarity between installed and tested cables are contained in the DOR Guidelines and IEEE 383-74 which are reproduced below for convenience.

2. Test Specimen - The test specimen should be the same model as the equipment being qualified. The type test should only be considered valid for equipment identical in design and material construction to the test specimen. Any deviations should be evaluated as part of the qualification documentation (see also Section 8.0 below).

[DOR]

IEEE-383

1.3.1 *Cable Description.* This description or specification should include as a minimum:

1.3.1.1 Conductor — material identification, size, stranding, coating.

1.3.1.2 Insulation — material identification, thickness, method of application.

1.3.1.3 Assembly (multiconductor cables only) — number and arrangement of conductors, fillers, binders.

1.3.1.4 Shielding — tapes, extrusions, braids, or others.

1.3.1.5 Covering — jacket or metallic armor or both, material identification, thickness, method of application.

1.3.1.6 Characteristics — voltage and temperature rating (normal and emergency). For instrumentation cables — capacitance, attenuation, characteristic impedance, microphonics, insulation resistance, as applicable.

1.3.1.7 Identification — manufacturer's trade name, catalog number.

1.3.2 *Field Splice or Connection Description or Both.* This description or specification should include as a minimum:

1.3.2.1 Whether factory or field assembled to cable.

1.3.2.2 Conductor connection — type, material identification, and method of assembly.

1.3.2.3 Items from Sections 1.3.1.2 through 1.3.1.7.

2.2 Type Test Samples. The samples tested should contain the conductor, insulation, fillers, jacket, binder tape, overall jacket, shielding, and field splices which are representative of the cable category being qualified. Table 1 lists sizes which have been considered representative of these categories. The sample lengths should be sufficient to permit reliable test readings and evaluation consistent with good testing practice.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 99

NOTES:

ELECTRIC CABLES, FIELD SPLICES, AND CONNECTIONS — IEEE Std 383-1974

Table 1
Representsentative Cables for Type Tests

Type	Test	Section	Size
Up to 2000 V multiconductor control cable or Shielded multiconductor signal cable (see list below for individual component) or Single conductor power cable	temperature and moisture resistance	2.3.1	1/C — 14 or 12 AWG
	thermal and radiation exposure	2.3.3	1/C or M/C — 14 or 12 AWG
	design basis event simulation	2.4	1/C or M/C — 14 or 12 AWG 1/C — 6, 4 or 2 AWG
	vertical flame test singles from cable assembly	2.5.6	1/C — 14 or 12 AWG
	vertical tray flame test	2.5.4	7/C — 16, 14 or 12 AWG
Shielded pairs, triple or quad from multiconductor signal cable	temperature and moisture resistance	2.3.1	1 pair shielded 16 AWG or actual cable
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test	2.5.6	
Coaxial, triaxial or special instrument cable	temperature and moisture resistance	2.3.1	actual size
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test singles from cable assembly	2.5.6	
Single pair thermocouple extension cable	temperature and moisture resistance	2.3.1	2/C — 20 AWG or actual size if smaller
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical tray flame test	2.5.4	
	vertical flame test singles from cable assembly	2.5.6	
2001—15 000 V power cable 1/C triplexed and multiconductor	vertical tray flame test	2.5.4	6 AWG (2-5kV) 2/O or 4/O or 4/O (2-15kV)

In Lieu of the detailed description discussed above it would be acceptable for the licensee to obtain certification from the maunfacturer identifying what test report(s) apply to the cables furnished for installation.

The Q-A. stamps on the reports indicate that they apply to some P.C Cont Cable. However identity is not established to the item described on the SCEW. If identity is established the packaging should be evaluated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 100

EQUIPMENT ITEM NO. 100
ELECTRICAL INSTRUMENT CABLE LOCATED IN CONTAINMENT
CERRO WIRE AND CABLE, MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 100
LICENSEE REFERENCE(S): 639, 3830, 38, 26, 27, 29
FUNCTION (PLANT ID): INSTRUMENT CABLE
LICENSEE SUBMITTAL: SCEW(S): CI8-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e,~~ 5f, 5g, 5h, ~~5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 10

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 20

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 100

NOTES:

The licensee has not provided sufficient information to establish that the Equipment described on the SCEW sheet is the same as the Equipment described in the referenced report.

EQUIPMENT DESCRIPTION

SYSTEM: VARIOUS

PLANT ID NO: VARIOUS

COMPONENT: INSTRUMENT CABLE

MANUFACTURER: CERRO WIRE & CABLE CO.

MODEL NUMBER: ~~[illegible]~~ ND 3077

(SCEW)

TEST SAMPLE DESCRIPTION

Single Conductor #12 AWG, 600 Volt, 30 mils of Flame Retardant XLPE insulation identified as Rockbestos Firewall® III.

(Test Report)

It is clear from the report that it applies to FIREWALL III cable furnished for D.C. Cook However the SCEW does not have adequate data

Enclosed information is type testing for the same insulation as being furnished on American Electric Power purchase order 02435-021-6 dated 4/29/76. AEP specification DCCEE-126-QCN Rev. 5 dated 11/3/75, Instrumentation Cable for D.C. Cook Nuclear Plant Cerro Shop Order No. 61858

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 10

NOTES:

Requirements for establishing similarity between installed and tested cables are contained in the DOR Guidelines and IEEE 383-74 which are reproduced below for convenience.

2. Test Specimen - The test specimen should be the same model as the equipment being qualified. The type test should only be considered valid for equipment identical in design and material construction to the test specimen. Any deviations should be evaluated as part of the qualification documentation (see also Section 8.0 below).

[DOR]

IEEE-383

1.3.1 *Cable Description.* This description or specification should include as a minimum:

1.3.1.1 Conductor — material identification, size, stranding, coating.

1.3.1.2 Insulation — material identification, thickness, method of application.

1.3.1.3 Assembly (multiconductor cables only) — number and arrangement of conductors, fillers, binders.

1.3.1.4 Shielding — tapes, extrusions, braids, or others.

1.3.1.5 Covering — jacket or metallic armor or both, material identification, thickness, method of application.

1.3.1.6 Characteristics — voltage and temperature rating (normal and emergency). For instrumentation cables — capacitance, attenuation, characteristic impedance, microphonics, insulation resistance, as applicable.

1.3.1.7 Identification — manufacturer's trade name, catalog number.

1.3.2 *Field Splice or Connection Description or Both.* This description or specification should include as a minimum:

1.3.2.1 Whether factory or field assembled to cable.

1.3.2.2 Conductor connection — type, material identification, and method of assembly.

1.3.2.3 Items from Sections 1.3.1.2 through 1.3.1.7.

2.2 Type Test Samples. The samples tested should contain the conductor, insulation, fillers, jacket, binder tape, overall jacket, shielding, and field splices which are representative of the cable category being qualified. Table 1 lists sizes which have been considered representative of these categories. The sample lengths should be sufficient to permit reliable test readings and evaluation consistent with good testing practice.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 100

NOTES:

Table 1
Represensentative Cables for Type Tests

Type	Test	Section	Size
Up to 2000 V multiconductor control cable or Shielded multiconductor signal cable (see list below for individual component) or Single conductor power cable	temperature and moisture resistance	2.3.1	1/C – 14 or 12 AWG
	thermal and radiation exposure	2.3.3	1/C or M/C – 14 or 12 AWG
	design basis event simulation	2.4	1/C or M/C – 14 or 12 AWG 1/C – 6, 4 or 2 AWG
	vertical flame test singles from cable assembly	2.5.6	1/C – 14 or 12 AWG
	vertical tray flame test	2.5.4	7/C – 16, 14 or 12 AWG
Shielded pairs, triple or quad from multiconductor signal cable	temperature and moisture resistance	2.3.1	1 pair shielded 16 AWG or actual cable
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test	2.5.6	
Coaxial, triaxial or special instrument cable	temperature and moisture resistance	2.3.1	actual size
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical flame test singles from cable assembly	2.5.6	
Single pair thermocouple extension cable	temperature and moisture resistance	2.3.1	2/C – 20 AWG or actual size if smaller
	thermal and radiation exposure	2.3.3	
	design basis event simulation	2.4	
	vertical tray flame test	2.5.4	
	vertical flame test singles from cable assembly	2.5.6	
2001–15 000 V power cable 1/C triplexed and multiconductor	vertical tray flame test	2.5.4	6 AWG (2-5kV) 2/O or 4/O or 4/O (2-15kV)

In Lieu of the detailed description discussed above it would be acceptable for the licensee to obtain certification from the maunfacturer identifying what test report(s) apply to the cables furnished for installation.

Where identity has been established aging should be evaluated.

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 101

EQUIPMENT ITEM NO. 101
ELECTRICAL INSTRUMENT CABLE LOCATED IN CONTAINMENT
ROCKBESTOS, MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 101
LICENSEE REFERENCE(S): 639, 3830, 38, 26, 27, 29
FUNCTION (PLANT ID): INSTRUMENT CABLE
LICENSEE SUBMITTAL: SCEW(S): CI2-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 101

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 101

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

For Evaluation refer to item 100

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 102

EQUIPMENT ITEM NO. 102
ELECTRICAL POWER CABLE LOCATED OUTSIDE CONTAINMENT
ANACONDA WIRE AND CABLE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 102
LICENSEE REFERENCE(S): 2819
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CC4-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 102

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 102

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	X
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	X
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

For evaluation refer to item 85

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 103

EQUIPMENT ITEM NO. 103
ELECTRICAL CONTROL CABLE LOCATED IN THE OUTSIDE CONTAINMENT
GENERAL ELECTRIC, MODEL NOT STATED
REQUIRED OPERATING TIME: 24 HOURS
TER CHECKSHEET NO. 103
LICENSEE REFERENCE(S): 3829
FUNCTION (PLANT ID): CONTROL CABLE
LICENSEE SUBMITTAL: SCEW(S): CC10-1, CC3-1 [12]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, T, QT, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

Contents	Checksheet Page No.
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	~~3a, 3b, 3c, 3d~~
System Consideration Review	~~4a, 4b, 4c, 4d, 4e, 4f~~
Equipment Environmental Qualification Review	~~5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j~~
Installed TMI Lessons Learned Implementation Equipment Summary	~~6a, 6b~~
Maintenance and Replacement Schedule Summary	~~7a, 7b, 7c~~

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 103

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

X The Licensee (has/~~has not~~) provided a response to the SER concerns.

X The Licensee (has/~~has not~~) specifically stated that the equipment is qualified and/~~or~~ will function when exposed to the applicable DBE environmental service conditions.

X The Licensee has presented information which shows there are no outstanding qualification deficiencies.

___ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.

___ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.

___ Corrective action specified by the Licensee:

___ Equipment replacement with qualified equipment
___ Equipment modification
___ Equipment relocation above submergence level
___ Relocate or shield equipment from radiation source
___ Verify qualification by additional (testing/analysis)
___ Equipment relocation to a mild environment
___ Qualification testing of equipment in progress
___ Other (_____)

___ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.

___ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)

___ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

I.a Qualified
I.b Modification
II.a Qualification Not Established
II.b Not Qualified
II.c Qualified Life Deficiency
III.a Exempt
III.b Not in Scope
IV Documentation Not Available

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 103

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS	DESIGNATION: X = DEFICIENCY
Documented Evidence of Qualification Adequate	
Adequate Similarity Between Equipment and Test Specimen Established	
Aging Degradation Evaluated Adequately	X
Qualified Life or Replacement Schedule Established (If Required)	X
Program Established to Identify Aging Degradation	
Criteria Regarding Aging Simulation Satisfied (If Required)	X
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	
o Peak Pressure Adequate	
o Duration Adequate	
o Required Profile Enveloped Adequately	
o Steam Exposure (If Required) Adequate	
Criteria Regarding Spray Satisfied	
Criteria Regarding Submergence Satisfied	
Criteria Regarding Radiation Satisfied	
Criteria Regarding Test Sequence Satisfied	
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	
Criteria Regarding Functional Testing Satisfied	
Criteria Regarding Instrument Accuracy Satisfied	
Test Duration Margin (1 hour + Function Time) Satisfied	
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	

NRC QUALIFICATION CATEGORY		DESIGNATION: X = CATEGORY
I.a	Equipment Qualified	
I.b	Equipment Qualification Pending Modification	
II.a	Equipment Qualification Not Established	
II.b	Equipment Not Qualified	
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	X
III.a	Equipment Exempt From Qualification	
III.b	Equipment Not in the Scope of the Qualification Review	
IV	Documentation Not Made Available	

For Evaluation Report to Item 53

5. CONCLUSIONS

The tabulations in Section 4.2 represent a summary of the results of the equipment environmental qualification (EEQ) assessment conducted 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 qualification deficiencies that have been identified and the results of the evaluation are shown in the Equipment Environmental Qualification Summary Forms (Tables 4-1, 4-2, 4-3, and 4-4).

Although Sections 4.3, 4.4, and Appendix C of this report present a detailed evaluation of (1) the Licensee's qualification methodology, (2) the equipment environmental qualification of each equipment item, and (3) the Licensee's response to the NRC SER, it is appropriate to highlight for the Licensee and the NRC certain conclusions and concerns reached as a result of the review which require special attention. These concerns are summarized below.

1. The Licensee has identified the location of many equipment items as "Inside Containment"; however, this does not pinpoint the location well enough for an evaluation of the environmental qualification of many equipment items. Due to the nature of this containment design and the differences in temperature and pressure profiles within containment, the Licensee should designate whether each equipment item is located in the upper or lower compartment and/or provide the installed equipment elevation. For the purposes of this review, the worst-case temperature and pressure profiles were used.

2. The Licensee has submitted qualification information for the lubricants used in this facility; however, the applications have not been specified or the lubricants correlated to specific equipment items. A more technically justifiable method of approach would be to address the lubricants with respect to the intended or actual application (i.e., address the grease as part of a motor qualification analysis). The basis for this position is that the qualification of the lubricant is a function of the application. The following example illustrates this point:

A motorized valve actuator (MVA) and a limit switch are installed in the same environment, are required to be operable for the same amount of time, and are exposed to the same level of radiation. The degradation of the lubricant causes it to become sticky. The limit switch may not be able to function, but the MVA will have no problems overcoming the sticky lubricant because of the high motor torque.

3. The Licensee has identified numerous "instrument terminations" on the System Component Evaluation Worksheets (SCEWs), but has not stated a manufacturer or model number for these equipment items, or has stated the instrument manufacturer and no model number. In some of the additional documentation (also see point 4) the manufacturer and model number of an electrical cable splice has been provided (in most cases - Raychem, Thermofit Heat Shrink Tubing, WCSF-N). This practice is extremely confusing and makes an accurate assessment of the environmental qualification very difficult.

4. The overall quality of the Licensee's submittal was poor. From a technical standpoint, there was no correlation between the SCEWs and the supporting documentation submitted by the Licensee. In most cases, it was left to the reviewer to sift through the myriad references to find any applicable documents. In addition, the SCEWs were virtually illegible due to the quality of the copy submitted. The handwritten data was often difficult to read and there was no consistency to any of the notes or references.

   The Licensee stated the following in the cover letter which accompanied the 90-day response to the SER [12]:

   > "This letter and its attachments constitute a partial response to the SER on Environmental Qualification of Safety-Related Electrical Equipment transmitted in a letter dated May 26, 1981 from Steven A. Varga to John E. Dolan. We are continuing our review of the information contained in the attachments to this letter and will amend and revise their content in a followup letter, if necessary.
   >
   > It should be noted that due to the complex nature of the issues addressed, combined with the fact that the scope of the submittal was changed and broadened as a result of the July 7-10 meetings with the NRC in Washington, we had requested a 45-day extension of the due date on August 26, 1981 (AEP:NRC:00578A). That request for an extension was denied and in a subsequent discussion, we were required by the Staff to submit our response by about September 15, 1981. In order to meet the request of the NRC to provide this response as soon as possible we have, for this submittal only, bypassed some of our procedural requirements normally followed for NRC submittals."

It is expected that many of these problems will be resolved in future revisions.

5. With respect to thermal aging and qualified life, the Licensee has provided various analyses and a computer program which use the Arrhenius model to calculate qualified life estimates or extend test durations. The Licensee has not provided the technical justification for extrapolating test data from a saturated steam test, via the Arrhenius technique, to analytically extend a test duration or calculate a qualified life.

   The Arrhenius methodology is a theoretical relationship which attempts to predict how reaction rates vary with respect to increases in temperature. This relationship does not take into account variations in the reaction rates due to increases in pressure (as experienced in a LOCA or HELB test), nor does it account for possible anomalies due to the presence of a saturated atmosphere. The application of the Arrhenius methodology is limited to air-oven thermal aging tests (minimum of 3 tests at different times and temperatures), where the only parameter affecting the reaction rates is temperature. Any application of this technique to thermodynamically different systems must be technically justified with valid analytical techniques.

   The basis for the requirement of pre-aging a test specimen is to provide assurance that at the end of its installed life (40 years assumed in most cases) the device has sufficient reserve capacity to be able to remain functional after exposure to a postulated accident. In other words, the device has not suffered degradation sufficient to impair its functional capabilities during an accident. In taking credit for the thermal aging which takes place during an accident temperature transient, the effective reserve capacity is depleted and the demonstrated functional operability is no longer assured.

   An additional point that should be mentioned is that the Licensee has not provided a materials analysis for most equipment items. The Licensee's computer analysis depends on the input from the manufacturer, presumably for the materials. The Licensee should also perform a literature search for the appropriate activation energies and ensure that the qualified life is calculated conservatively.

With respect to TMI Action Plan items, the Licensee provided the following information on April 7, 1982 [25]:

"1. <u>Response to Mr. S. Varga's letter of February 19, 1982 on TMI equipment</u>

In our conversation of March 8, 1982 with Mr. R. Krapf of the Franklin Research Center, we were informed that the information and format of our

letter AEP:NRC:0356D dated February 3, 1981 were acceptable and that the response to your letter should only address items installed after January 1, 1981. Furthermore, we were told that the scope of the submittal as defined in AEP:NRC:0356D was adequate.

The table attached to this is the information requested by Items 1.a, b and c [see Table 5-1 of this TER]. The response to items 1.d, 2., and 3. are given below.

Item 1.d: The appropriate qualification criteria for the D.C. Cook Plant are the DOR Guidelines. The May 27, 1980 Memorandum and Order (CLI-80-21) only requires that by June 30, 1982 equipment be qualified by DOR or NUREG 0588. Since NUREG 0588 states that 'All reactors with Operating Licenses as of May 23, 1980 will be evaluated by the staff against the DOR guidelines....,' the D. C. Cook Plant will be evaluated using the DOR guidelines.

Item 2.: The appropriate primary device System Component Evaluation Worksheets are shown on the attached table for the equipment which has approved qualification test reports. The qualification documents which have not been already submitted, will be included in our forthcoming letter No. AEP:NRC:0578B to be submitted prior to May 15, 1982.

The items marked 'later' will have the System Component Evaluation Worksheets provided following review and approval of the test reports. This plan was chosen since providing a worksheet with only the specification portion completed would not be meaningful.

Item 3.: Requests for extensions were submitted via our letter No. AEP:NRC:0652 dated December 23, 1981 on items II.B.3.2, II.F.1.1, II.F.1.3, II.F.1.6 and II.F.2.3. For items II.K.3.1 and II.K.3.5, we are part of the Westinghouse Owners Group investigation."

Table 5-1. Licensee Table 1 [25]

ENCLOSURE TO AEP:NRC:0578D

TABLE 1

NUREG-0737	SYS.EQPT. NAME	PLT. ID	EQ.REQ	SYS.COMP. EVAL.WORKSHEET REF.FROM AEP NRC:00578B (NOTE 1)
I.D.2	Plt.Sfty Parameter Display	QR-131	No	Not Required
II.B.1	RCS Vents	NSO-21 to 24 NSO-61 to 64	Yes	Later
II.B.3	Post Accident Sampling	None Assigned	No	Not Required
II.D.3	Valve Position Indication	QR-107 Lmt. Swtchs. On NRV-151, 152, 153	Yes Yes	Later LS-1 for Limit Switches
II.E.1.2	AFW Flow Ind.	FFI-210,220, 230, 240	Yes	Later
II.E.4.2.2	Cont.Isol. Dependapility	QCR-301 (Note 2)	Yes	Later
II.F.1.1	Noble Gas Monit.	ERS-1300,1400 2300 & 2400 VRS-1500 & 2500	No	Not Required
II.F.1.2	Iodine Monitor	QR-108	No	Not Required
II.F.1.3	Post Accident CT High Range Area Monitor	VRA-1310,1510 2310 & 2510	Yes	Later
	Upper CT Area Monitor	VRS-1101,1201 2101, 2201	Yes	Later
II.F.1.4	CT Pressure	PPP-300 to 303 PPA-310 to 313	Yes No	I29 & I30 (NOTE 3) Not Required
II.F.1.5	CT Wtr.Level	NLA-310 NLI-311, 320 321	Yes	Later
II.F.1.6	CT Hydrogen Monitor	None Assigned	No	Not Applicable

Table 5-1 (Cont.)

TABLE 1 (Continued)

NUREG-0737	SYS.EQPT. NAME	PLT. ID	EQ.REQ	SYS.COMP. EVAL.WORKSHEET REF.FROM AEP NRC:005783 (NOTE 1)
II.F.2.1	Subcooling Mtr. (Pressure & Temp. Inputs)	NTR-110 to 140 NTR-210 to 240 NPS-121, 122	Yes	I28 (NTR's) I22 & I23 (NPS Unit 1) I23 & I24 (NPS Unit 2) (NOTE 3)
II.F.2.3	Level Inst.	NLI-110 to 130 111 to 131	Yes	Later
II.G.1	Power Supplies to PZR Relief Valves Block Valves, and Level Indications	NRV-151 to 153 NMO-151 to 153 NLP-151 to 153	Yes	S11-1 (NRV's) V9-1 (NMO's) and I18 (Unit 1) NLP's I19 (Unit 2 NLP's) (NOTE 3)
II.K.3.1	Auto PORV Isol.	NMO-151,152,153	Yes	V9-1 (NOTE 3)
II.K.3.5	Auto Trip of RCS Pumps	Not Applicable	To Be Established	Later
II.K.3.12	Anticipated Trip On Turbine Trip	P-7	No	Not Required

Note 1 Only the primary device System Component Evaluation Worksheet is listed since the cross-reference listing included in AEP:NRC:0578B provides the correlation of associated items such as cable and termination.

Note 2 Containment Isolation Valves for:

a) Item II.B.3: ECR-416, 417, 496, 497, 535 & 536, NCR-105, 106, 109 & 110
b) Item II.F.1.1: ECR-31, 32, 33, 35 & 36
c) Item II.F.1.6: ECR-10 through-29 inclusive

Note 3 Page numbers corresponding to our forthcoming submittal No. AEP:NRC:0578B

6. REFERENCES

The references listed in this section of the report were used to develop the Equipment Environmental Qualification evaluation for this plant. The references have been separated into two lists: (1) Plant-Specific References and (2) Plant Generic References. All non-generic documents are listed on the "Plant-Specific References" list. All qualification documents that could be applicable to equipment installed in several plants were listed on the "Plant Generic References" list. These documents include topical reports, test reports, component and material analyses, etc. cited by the Licensee as evidence of qualification in accordance with the documentation reference instructions established by IE Bulletin 79-01B. Since these documents were compiled by a computer data base, the citation numbering was computer generated and the same document has the same generic reference number in all Technical Evaluation Reports prepared under this equipment qualification program.

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9-85-010

3846. Mobil Product Data Sheet. Subject: Mobil D. T. E. Oil, Named Series, Circulation Oils
Mobil Oil Corp., 01-Jul-78
7-85-019

3847. Mobil Product Data Sheet. Subject: Mobil D. T. E. 797 Oil
Mobil Oil Corp., 01-Apr-77
JGW9-85-034

3848. Mobil Product Data Sheet. Subject: Mobilux 1,2
Mobil Oil Corp., 01-Oct-78
7-85-084

3849. Mobil Vaprotec Light
Mobil Oil Corp
File: 12-31

3850. W. Barnes
Post Accident Environmental Test
Boston Insulated Wire, 30-Apr-73
73C212

3851. W. Barnes
LOCA Simulation Special Test for Westinghouse Reactor
Boston Insulated Wire, 13-Jun-75
75C008

4635. Long-Time Aging Data
Rome Cable Corp.

4642. G. Y. Chinn and W. C. Federick
Design Qualification Material Test Report for Materials Used in Conax Electric Penetration Assemblies and Electric Conductor Seal Assemblies
Conax Corp., 14-May-81
IPS-325, Rev. D, Proprietary

4647. F. Cook
Summary Report: Nuclear Power Motor Systems, Type Test Support Analysis, Form Wound Motors
Reliance Electric Co., 15-Sep-78
NUC-12

4648. T. Kluk
Materials and Laboratory Test Report: 40 Year Life, Enduraseal, Class B, Type RBI Insulation
Reliance Electric Co., 18-Aug-78
Proj. S-63-RD

4649. T. M. Kluk
Supplementary Report: Nuclear Power Motor Systems Type Test Support Analysis - Form Wound Motors
Reliance Electric Co., 29-May-80
NUC-12, Supp.

4719. Seismic and Environmental Testing Type 546 Transducer and Type 67FR Regulator
Fisher Controls, 16-Feb-81
NA-23, Rev. A

APPENDIX A - ENVIRONMENTAL SERVICE CONDITIONS

The specific environmental service conditions corresponding to different plant locations that were used in this technical evaluation are stated in this appendix, based upon the information presented in References 11 and 12.

The temperature and pressure profiles contained herein form the basis for the temperature and pressure noted by the Licensee in the "Environment Required" column on the Licensee's Equipment Qualification Report Evaluation sheets.

This appendix contains the following tables and curves:

Table A-1. Calculated Maximum Peak Pressures in Lower Compartment (Licensee Table 14.3.4-4) [11]

Figure A-1. Plan View at Ice Condenser Elevation - Ice Condenser Compartments (Licensee Figure 14.3.4-8) [11]

Figure A-2. Upper and Lower Compartment Temperature Transients (Licensee Figure 3) [11]

Figure A-3. Compartment Temperature - LOCA (Licensee Figure 13.13-1) [11]

Figure A-4. Compartment Pressure - LOCA (Licensee Figures 1 and 2) [11]

Figure A-5. Compartment Temperature - Main Steam Line Break, Worst Large Break (Licensee Figure 022.9-1) [11]

Figure A-6. Compartment Temperature - Main Steam Line Break, Worst Small Break (Licensee Figure 022.9-2) [11]

Figure A-7. AEP Long-Term Steamline Break - Break Compartment (Licensee Figure 13.6-1) [11]

Figure A-8. AEP Long-Term Steamline Break - Upper Containment (Licensee Figure 13.6-2) [11]

Figure A-9. Integrated Gamma Dose Level Inside Containment as a Function of Time After Release (Licensee Figure 4) [11].

Based on these considerations, each equipment item was evaluated with respect to the environmental service conditions presented in this appendix.

Accident Conditions Inside Primary Containment

For PWR plants, the DOR Guidelines state that the environmental service conditions inside containment for the loss-of-coolant accident (LOCA) should be established by the Licensee based on the FSAR analysis.

With regard to submergence, the Licensee stated [12]:

"We have determined that the reference made to the flood-up tubes in the Cook SER can be ascribed to the fact that the NRC reviewer did not have enough information on the function of a flood-up tube. In order to enable the NRC to make a more appropriate evaluation, we are providing a generic description of the flood-up tubes and their functions.

The function of the electrical penetration flood-up tubing is to provide additional protection to the Kapton insulated conductors of selected instrumentation, control and power circuits. This protection is afforded by providing a barrier around the conductors which prevents mechanical damage and immersion of the conductors in buffered boric acid solution following a postulated LOCA.

The flood-up tubing installed in Cook Units 1 and 2 was qualified by analysis performed by EDS Nuclear, Inc. Results of the work were documented in a report dated January 25, 1980, Report No. 02-0120-1022, Rev. 1. It was concluded in the report that the mounting attachments of the flood-up tubes were found to be adequate to support the tubing under both the OBE and DBE conditions.

The electrical flood-up tubing is made of corrugated type 321 stainless steel supplied by Flexonics Division of UOP, Inc. and is identified as Type 400 M, 1" nominal inside diameter and medium wall thickness. The recommended working pressures for the tubing are:

43 psi @ 70°F, 41.7 psi @ 150°F, 40.4 psi @ 200°F.

The maximum pressure differential the flood-up tube would experience during containment flooding, subsequent to a design basis event is estimated to be about 8 psi. This pressure is a result of the static pressure head from the highest flood-up elevation (elev. 614 feet) to the lowest penetration (elev. 596 feet). On the basis of our evaluation of the performance of flood-up tubes, we believe that they will maintain their structural integrity and serve their intended function subsequent to a LOCA or a Steam Line Break Accident."

With regard to chemical spray, the Licensee stated [12]:

"As noted in Section 3/4 6.2.2 of the Cook Plant Technical Specification bases, limits are imposed on the volume and concentration of sodium hydroxide (NaOH) in the spray additive tank. This ensures a pH value between 8.5 and 11.0 for the solution recirculated within containment following a design basis LOCA. Parametric studies performed varying NaOH addition rate, ECCS flow rate, ice inventory, ice melt, and auxiliary feedwater flow (applicable only to the MSLB) have verified that these limits will be maintained following a HELB inside containment. A summary of this study is provided in Table 1. As noted in the Technical Specification bases, this pH band minimizes the evolution of iodine and the effects of chloride and caustic stress corrosion on mechanical systems and components. The pH used for environmental qualification testing of safety-related components inside containment falls within this pH range except for the components noted below.

The Limitorque motor operators for the following valves were subjected to an environment with a pH of 7.67 during qualification testing:

Unit No. 1	Unit No. 2
IMO-51, 52, 53, 54	IMO-51, 52, 53, 54
IMO-128	IMO-128
ICM-129, 111	ICM-129, 111
QCM-250	QCM-250
ICM-305, 306	ICM-305, 306

Valves IMO-51, 52, 53, and 54 are in the boron injection lines to each respective RCS loop. These valves are normally open during power operation and receive a signal to open following a Safety Injection. Cook safety analysis does not assume that any safety-related function is performed by these valves. Although the motor operators for these valves would reasonably be expected to remain operational when subjected to an environment with a pH between 8.5 and 11.0, their failure to do so in such an environment does not adversely impact any safety analysis conclusions.

IMO-128 and ICM-129 are the two in-series valves in the normal RHR letdown line and ICM-111 is in the normal RHR cooldown return line. These valves are not part of the ECCS and serve no safety function other than to maintain RCS isolation when pressure is above the RHR design pressure. These valves are normally closed during operation. Although the motor operators for these valves would reasonably be expected to remain operational when subjected to an environment with a pH between 8.5 and 11.0, their failure to do so in such an environment does not adversely impact any safety analysis conclusions.

Valve QCM-250 is the inboard containment isolation valve on the reactor coolant pump seal water return line. (Redundant isolation of the seal water return line is provided by valve QCM-350 in-series with QCM-250 and located outside containment.) Both of these valves are automatically closed as part of the Phase A Containment Isolation initiated by the RPS/ESFAS and neither is required to change position following a design basis accident. Although the motor operator for valve QCM-250 would reasonably be expected to remain operational when subjected to an adverse environment with a pH between 8.5 and 11.0, failure to do so does not adversely impact any safety analysis conclusions.

Valves ICM-305 and 306 are the sump recirculation line isolation valves. These valves are located outside containment and are not subjected to a post accident environment.

The cable between the terminal block and the solenoid on valve VCR-21 in Unit No. 1 (a containment isolation valve in the ice condenser glycol refrigeration system) was subjected to a pH between 8.0 and 8.5 during environmental qualification testing. Although the cable would reasonably be expected to remain operational when subjected to an adverse environment with a pH between 8.5 and 11.0, failure of the cable would result in deenergizing the solenoid and closure of VCR-21. In any case, VCR-21 would be automatically closed on a Phase A Containment Isolation signal and the hypothetical cable failure discussed above would be meaningless and would not adversely impact any safety analysis conclusions.

Note: The pH range 9.0 to 11.0 specified on the applicable qualification summary sheets should be 8.5 to 11.0 to correspond with Technical Specification bases B 3/4 6.2.2 (Unit 2 reference).

Acronyms

HELB - high energy line break
RCS - reactor coolant system
BIT - boron injection tank
RWST - refueling water storage tank
SA - spray additive (NaOH tank)

Table 1

Long-Term sump pH for various HELBs inside containment

HELB	Major Assumptions	Long Term Sump pH
Large LOCA	- 50% ice melt - RCS initially at 500 ppm boron - BIT, RWST, SA tank, and Accumulators injected	9.0
Large LOCA	- 100% ice melt - RCS initially at 500 ppm boron - BIT, RWST, SA tank, and Accumulators injected	8.8
Large LOCA	- 100% ice melt - RCS initially at 0 ppm boron - BIT, RWST, SA tank, and Accumulators injected	9.4
Large LOCA	- 100% ice melt - RCS initially at 1400 ppm boron - BIT, RWST, SA tank, and Accumulators injected	9.2
Small LOCA	- Time dependent ice melt - RCS initially at 0 ppm boron - BIT, RWST, SA tank injected	9.6
Small LOCA	- Time dependent ice melt - RCS initially at 1400 ppm boron - BIT, RWST, SA tank injected	9.4
MSLB	- 75% ice melted instantaneously and 25% over 60 min - spray flow rate 3,200 gpm and NaOH addition rate 20 gpm	9.48 (at 200 Min)
MSLB	- 75% ice melted instantaneously and 25% over 60 min - spray flow rate 6,400 gpm and NaOH addition rate 100 gpm	9.48 (at 60 Min)"

With respect to radiation values inside primary containment, the Licensee stated [11]:

"Radiation

Inside Containment Integrated Doses - 1 Year

submerged: 60 MRads (core meltdown source)

not submerged: 150 MRads (core meltdown source)

(taken from Westinghouse letter No. AEW-729; rather conservative values)"

Table A-1. Calculated Maximum Peak Pressures in Lower Compartment (Licensee Table 14.3.4-4) [11]

TABLE 14.3.4-4

CALCULATED MAXIMUM PEAK PRESSURES IN LOWER COMPARTMENT ELEMENTS ASSUMING UNAUGMENTED FLOW

Element	1	2	3	4	5	6	
Peak Pressure (psig)	13.6	11.6	10.5	10.6	11.5	13.0	DECL - 100% Ent.
Peak Pressure (psig)	14.4	11.0	9.2	9.1	10.8	14.4	DEHL - 100% Ent.

LOCA

(short term)

FIGURE SUPPLIED BY THE LICENSEE

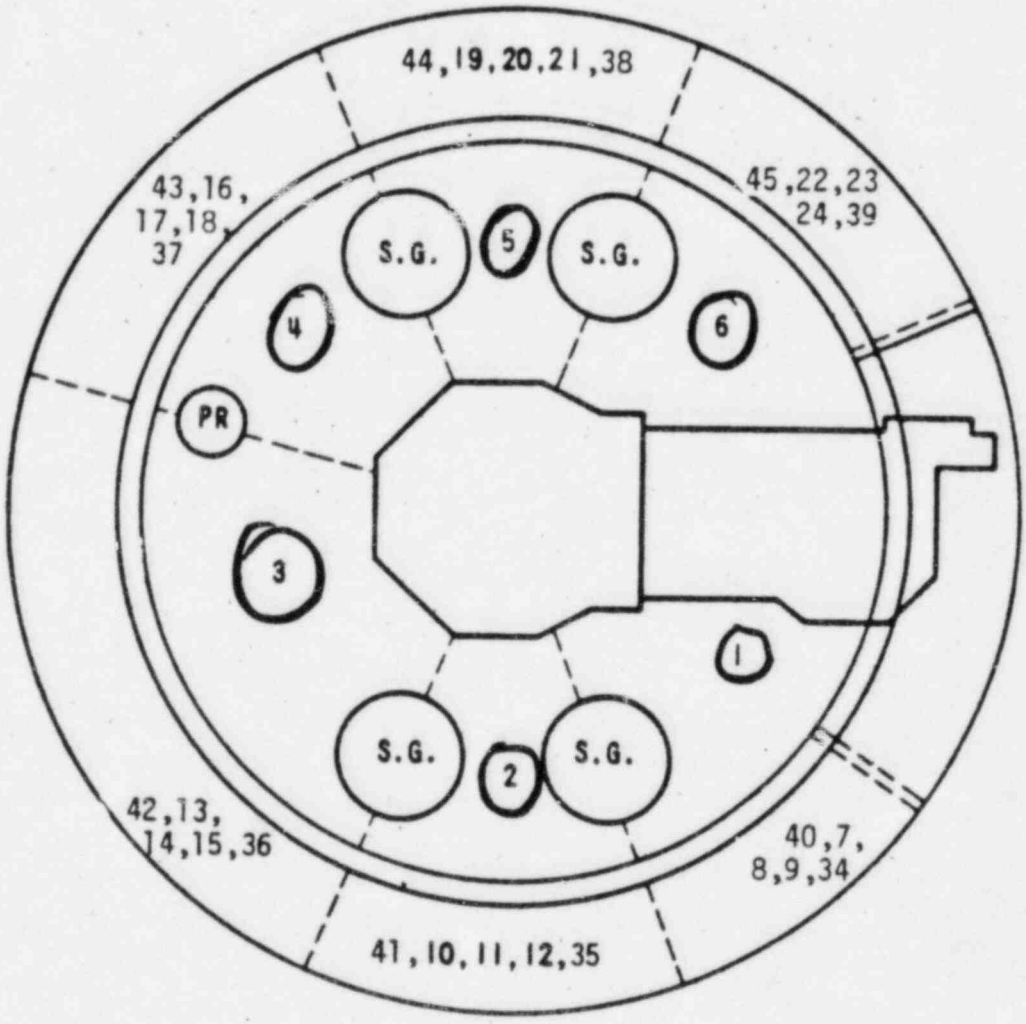

Figure 14.3.4-8 Plan View at Ice Condenser Elevation-Ice Condenser Compartments

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FIGURE SUPPLIED BY THE LICENSEE

Figure A-1. Plan View at Ice Condenser Elevation - Ice Condenser Compartments (Licensee Figure 14.3.4-8) [11]

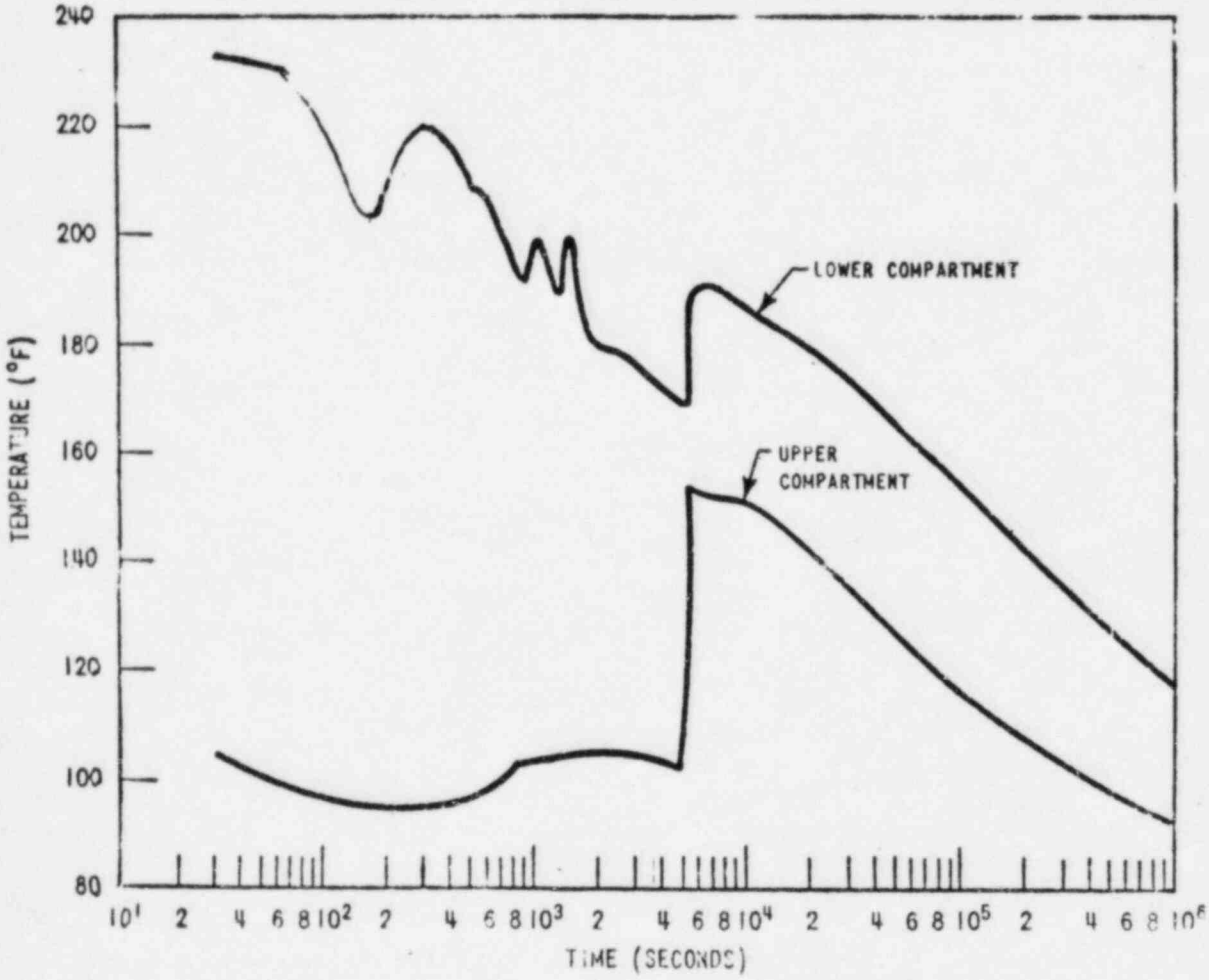


Figure 4 Upper and Lower Compartment Temperature Transients

FIGURE SUPPLIED BY THE LICENSEE

Figure A-2. Upper and Lower Compartment Temperature Transients (Licensee Figure 3) [11]

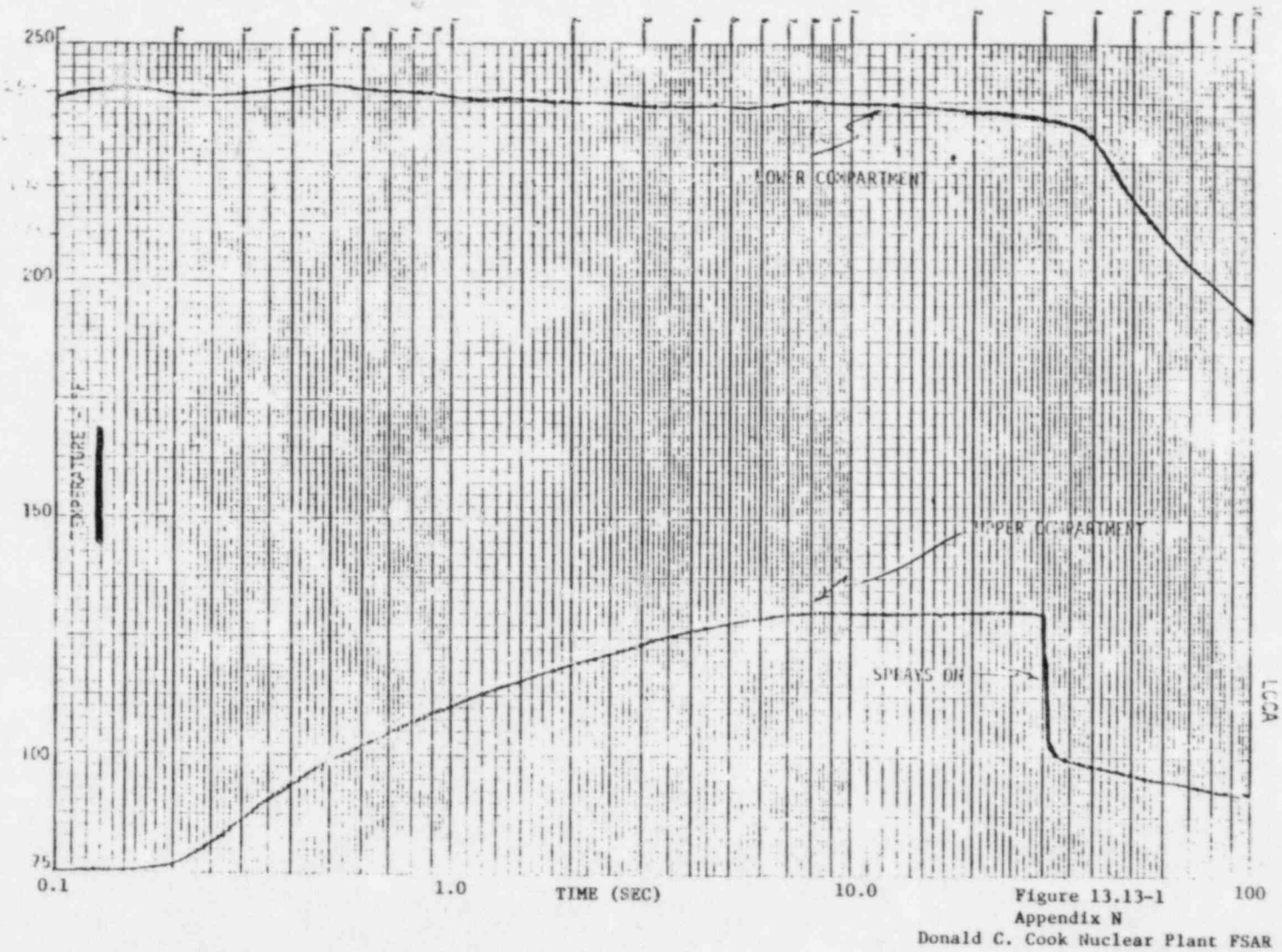


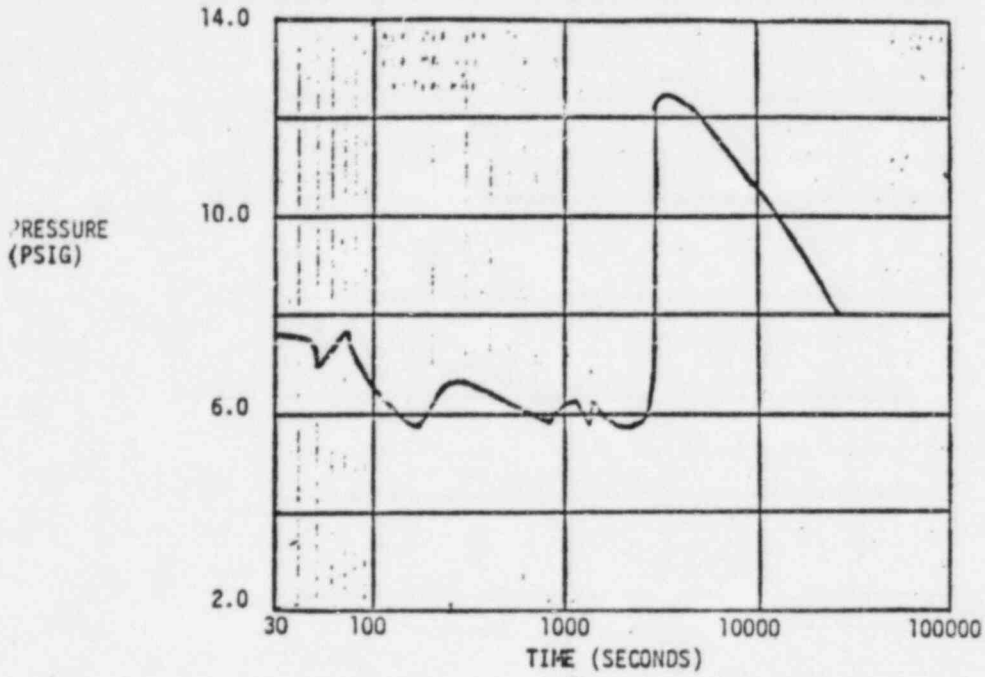
Figure A-3. Compartment Temperature - LOCA (Licensee Figure 13.13-1) [11]

FIGURE SUPPLIED BY THE LICENSEE

ATTACHMENT TO
AEW-6504
2a

FIGURE 1

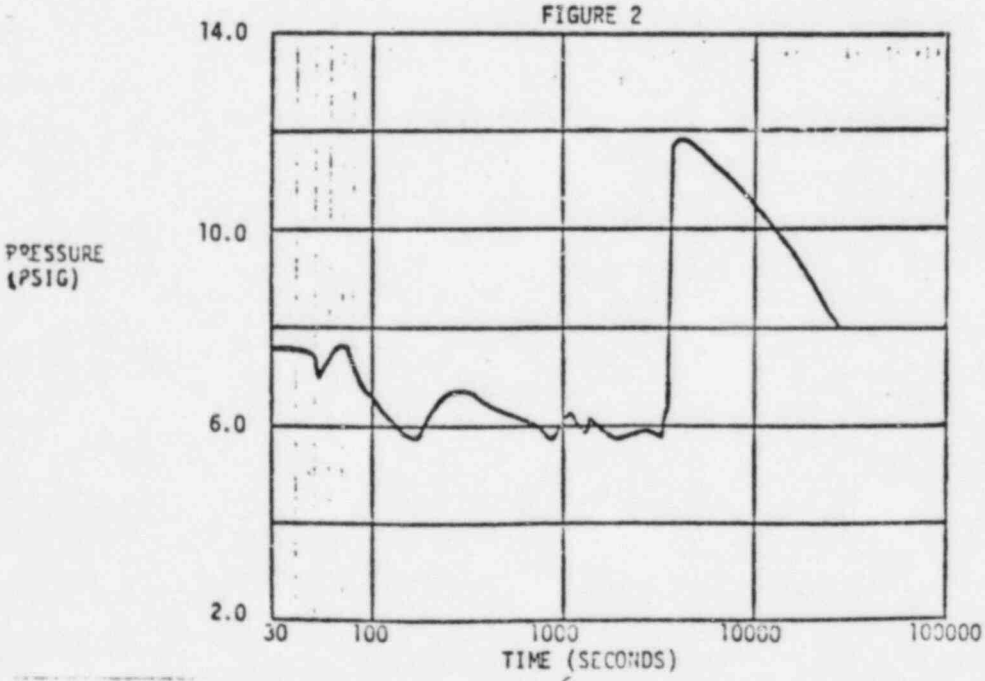
LOCA



Ice Mass = 2.07 (10^6) lbs. = 1064.8 lb/basket

FIGURE 2

LOCA



Ice Mass = 2.19 (10^6) lbs. = 1126.5 lb/basket

Figure A-4. Compartment Pressure - LOCA (Licensee Figures 1 and 2) [11]

FIGURE SUPPLIED
BY THE LICENSEE

MAIN STEAM LINE BREAK

DONALD C. COOK NUCLEAR PLANT FSAR

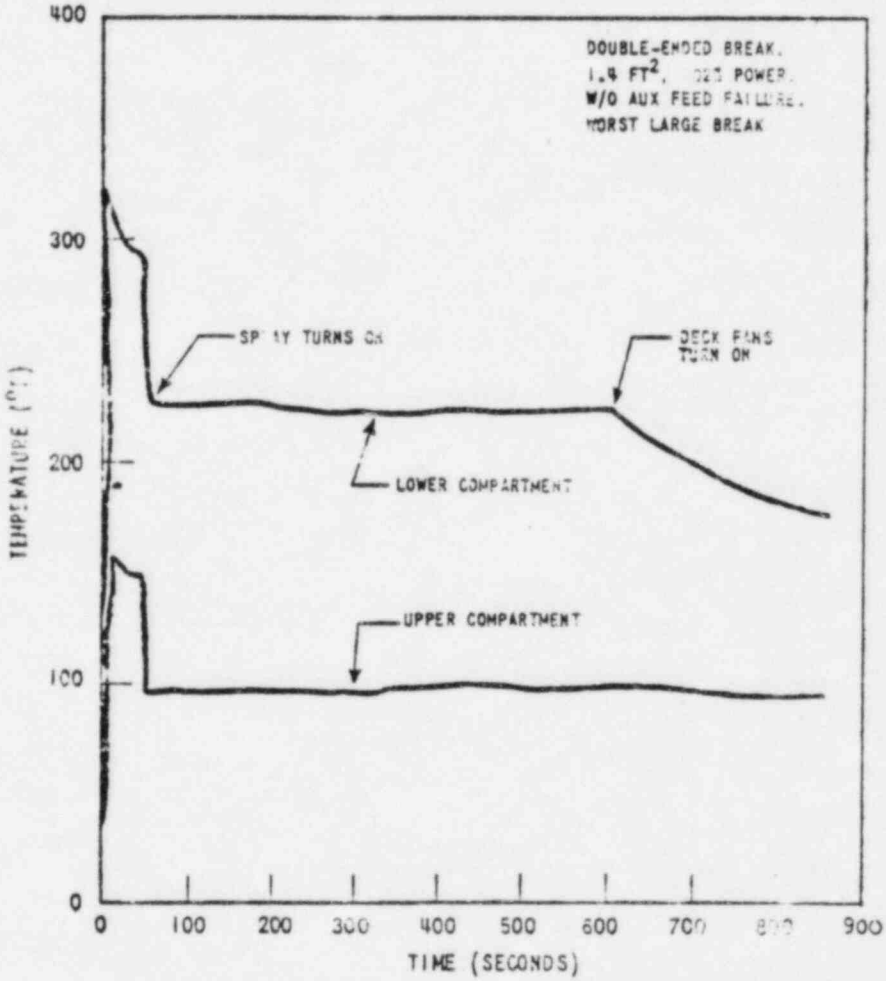


FIGURE SUPPLIED BY THE LICENSEE

Figure 022.9-1 Compartment Temperature

Figure A-5. Compartment Temperature - Main Steam Line Break, Worst Large Break (Licensee Figure 022.9-1) [11]

MAIN STEAM LINE BREAK
DONALD C. COOK NUCLEAR PLANT F

13570-2

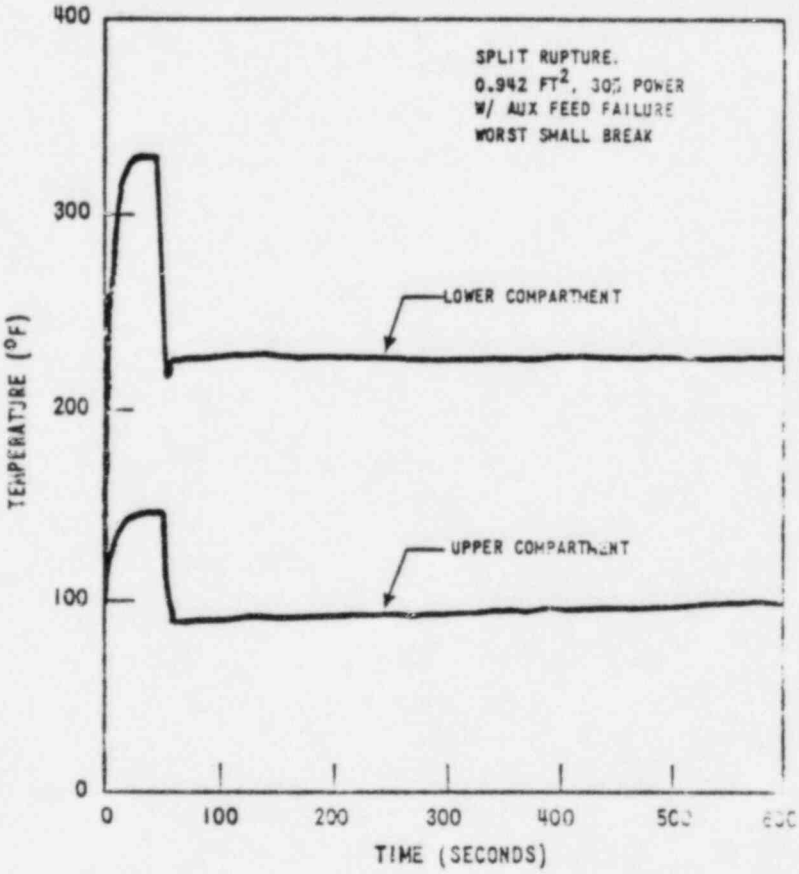


FIGURE SUPPLIED BY THE LICENSEE

Figure 022.9-2 Compartment Temperature

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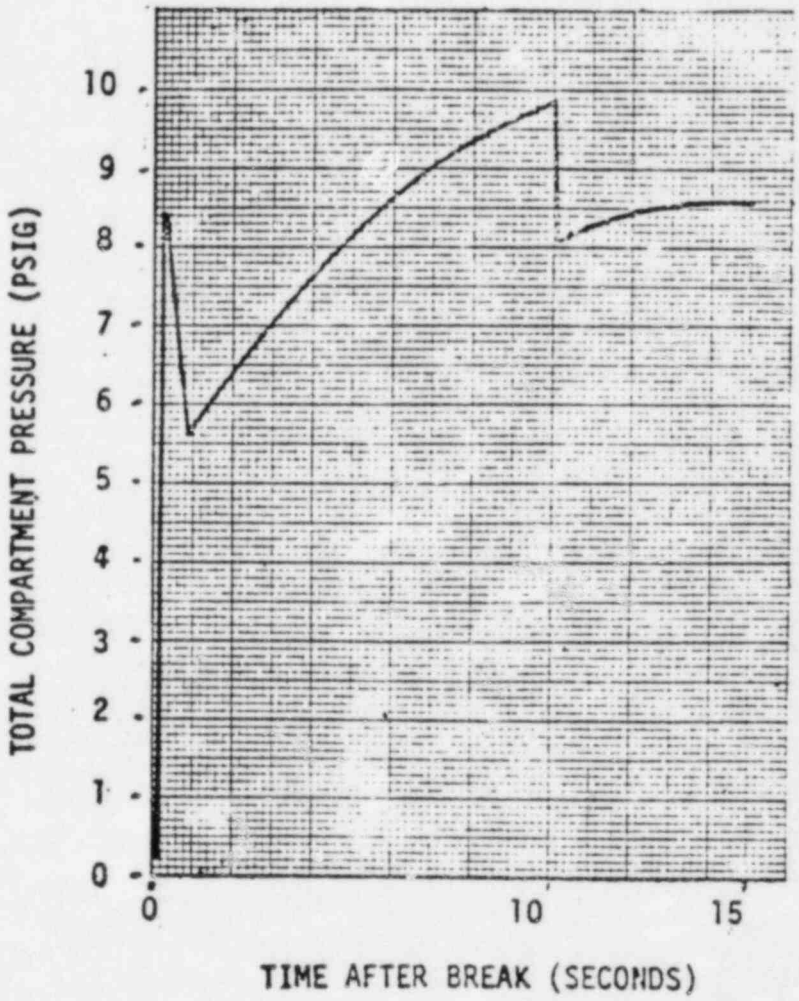
Figure A-6. Compartment Temperature - Main Steam Line Break, Worst Small Break (Licensee Figure 022.9-2) [11]

MSLB



AEP LONGTERM STEAMLINE BREAK

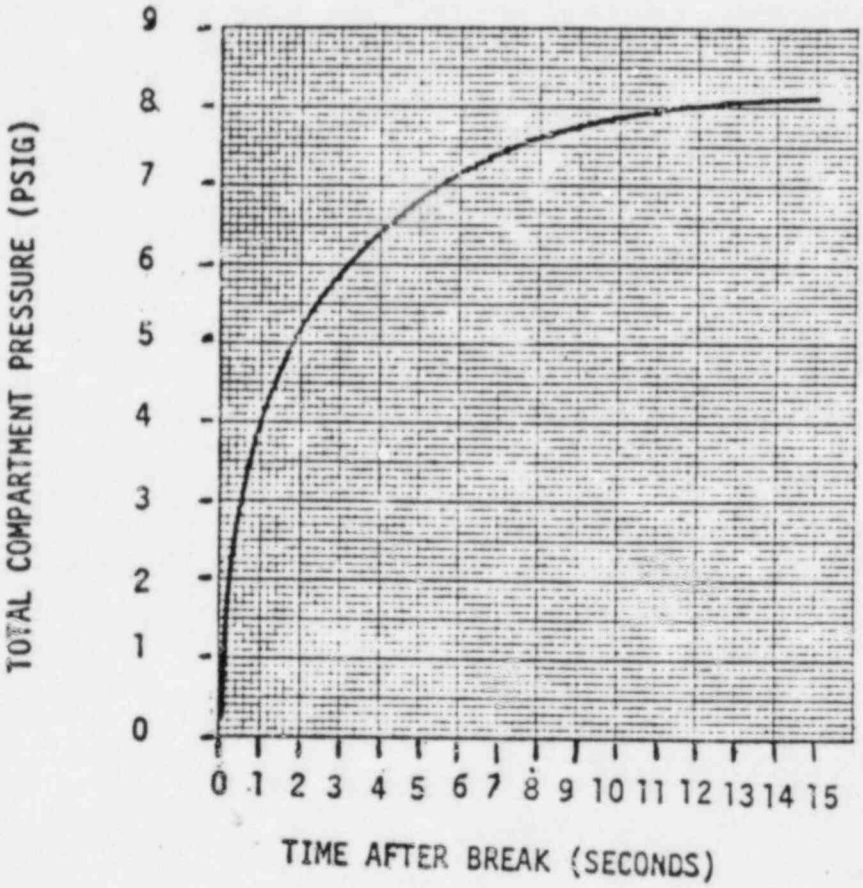
BREAK COMPARTMENT
(NO-LOAD INITIAL CONDITION)

Figure 13.6-1

Figure A-7. AEP Long-Term Steamline Break - Break Compartment (Licensee Figure 13.6-1) [11]

FIGURE SUPPLIED BY THE LICENSEE

MSLB



AEP LONGTERM STEAMLINE BREAK

UPPER CONTAINMENT

(NO-LOAD INITIAL CONDITION)

Figure 13.6-2

FIGURE SUPPLIED BY THE LICENSEE

Figure A-8. AEP Long-Term Steamline Break - Upper Containment (Licensee Figure 13.6-2) [11]

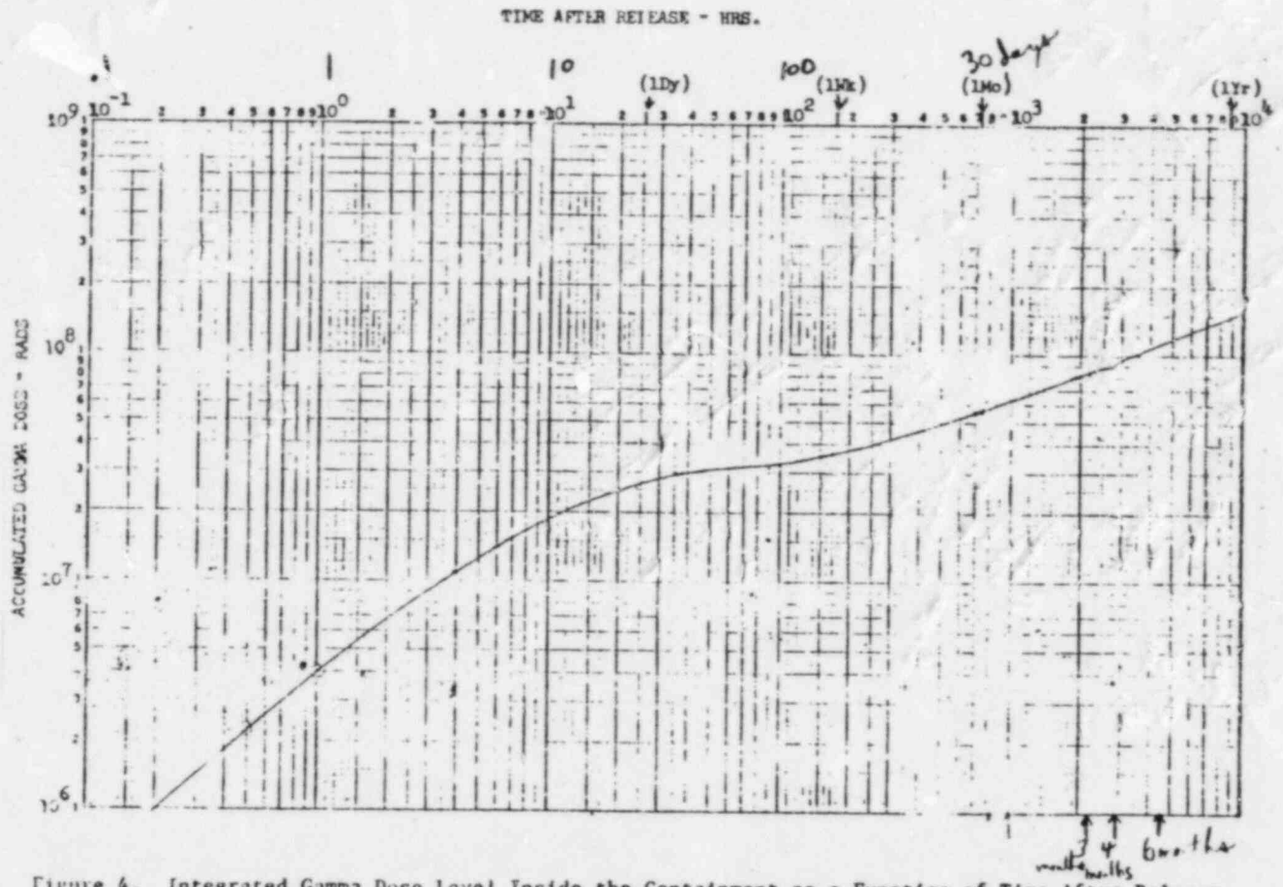


Figure 4. Integrated Gamma Dose Level Inside the Containment as a Function of Time After Release

Figure A-9. Integrated Gamma Dose Level Inside Containment as a Function of Time After Release (Licensee Figure 4) [11]

FIGURE SUPPLIED BY THE LICENSEE

APPENDIX B - LISTING OF SAFETY-RELATED ELECTRICAL EQUIPMENT

The following table lists the groupings of safety-related electrical equipment items for the D. C. Cook Nuclear Plant Unit 1. Equipment items provided in the table are used in the detailed equipment environmental qualification evaluation presented in Section 4.4 and summarized in Section 4.2. This table was generated from the lists of equipment provided by the Licensee [12].

The Licensee identified an extensive list of safety-related electrical equipment in various locations of the plant. The equipment listed by the Licensee was analyzed, and all identical equipment located within plant areas that are exposed to the same environmental service conditions was grouped together and designated an "equipment item." 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 equipment in a plant area exposed to the same environmental service conditions (e.g., Flow Transmitter, Fischer & Porter, Model 10B2496, located within containment). This analysis resulted in a reduced listing of equipment (equipment items) that formed the basis for the review. This appendix contains the tabulation of the equipment items, locations, function, plant identification numbers, required operating time, and applicable qualification documentation references.

EQUIPMENT ITEM NO. 1
MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT
LIMITORQUE MODEL SMB000
REQUIRED OPERATING TIME: 1 HOUR
TER CHECKSHEET NO. 1
LICENSEE REFERENCE(S): 662, 639
FUNCTION (PLANT ID): CONTAINMENT AIR RECIRCULATION BACKDRAFT DAMPERS (VMO-101, -102)
LICENSEE SUBMITTAL: SCEW(S): V4-1 [12]

EQUIPMENT ITEM NO. 2
MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT
LIMITORQUE MODEL SMB00
REQUIRED OPERATING TIME: 1 HOUR
TER CHECKSHEET NO. 2
LICENSEE REFERENCE(S): 1620
FUNCTION (PLANT ID): RCP SEAL WATER CONTAINMENT ISOLATION (QCM-250)
LICENSEE SUBMITTAL: SCEW(S): V5-1 [12]

EQUIPMENT ITEM NO. 3
MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT
LIMITORQUE MODEL SMB; SIZES 1, 00, 2
REQUIRED OPERATING TIME: 1 HOUR
TER CHECKSHEET NO. 3
LICENSEE REFERENCE(S): 1620, 1064, 639
FUNCTION (PLANT ID): ECCS INJECTION AND RHR NORMAL COOLING VALVES (IMO-51, -52, -53, -54, -128; ICM-111, -129)
LICENSEE SUBMITTAL: SCEW(S): V1-1 [12]

EQUIPMENT ITEM NO. 4
MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT
LIMITORQUE MODEL SMB1
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 4
LICENSEE REFERENCE(S): 706, 639
FUNCTION (PLANT ID): SWITCHOVER TO HOT LEG INJECTION (IMO-315, -316, -325, -326)
LICENSEE SUBMITTAL: SCEW(S): V2-1 [12]

EQUIPMENT ITEM NO. 5
MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT
LIMITORQUE MODEL SMB00
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 5
LICENSEE REFERENCE(S): 662, 639
FUNCTION (PLANT ID): PRESSURIZER PORV BLOCK VALVES (NMO-151, -152, -153)
LICENSEE SUBMITTAL: SCEW(S): V9-1 [12]

EQUIPMENT ITEM NO. 6
MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT EXTENSION
LIMITORQUE MODEL SMB2
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 6
LICENSEE REFERENCE(S): 1620
FUNCTION (PLANT ID): RHR SUCTION FROM CONTAINMENT SUMP (ICM-305, -306)
LICENSEE SUBMITTAL: SCEW(S): V10-1 [12]

EQUIPMENT ITEM NO. 7
MOTORIZED VALVE ACTUATOR LOCATED OUTSIDE CONTAINMENT
LIMITORQUE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 7
LICENSEE REFERENCE(S): 662
FUNCTION (PLANT ID): VARIOUS (VARIOUS)
LICENSEE SUBMITTAL: SCEW(S): V6-1 [12]

EQUIPMENT ITEM NO. 8
MOTORIZED VALVE ACTUATOR LOCATED OUTSIDE CONTAINMENT
LIMITORQUE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 8
LICENSEE REFERENCE(S): 1620, 1064
FUNCTION (PLANT ID): VARIOUS (VARIOUS)
LICENSEE SUBMITTAL: SCEW(S): V7-1 [12]

EQUIPMENT ITEM NO. 9
MOTORIZED VALVE ACTUATOR LOCATED OUTSIDE CONTAINMENT
LIMITORQUE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 9
LICENSEE REFERENCE(S): 663, 38
FUNCTION (PLANT ID): VARIOUS (VARIOUS)
LICENSEE SUBMITTAL: SCEW(S): V8-1 [12]

EQUIPMENT ITEM NO. 10
ELECTRIC MOTOR LOCATED OUTSIDE CONTAINMENT
WESTINGHOUSE MODEL 5009P24
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 10
LICENSEE REFERENCE(S): 606
FUNCTION (PLANT ID): RESIDUAL HEAT REMOVAL PUMP MOTOR (PP-035)
LICENSEE SUBMITTAL: SCEW(S): M1-1 [12]

EQUIPMENT ITEM NO. 11
ELECTRIC MOTOR LOCATED OUTSIDE CONTAINMENT
WESTINGHOUSE MODEL 5009H
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 11
LICENSEE REFERENCE(S): 606
FUNCTION (PLANT ID): SAFETY INJECTION PUMP MOTOR (PP-026)
LICENSEE SUBMITTAL: SCEW(S): M1-1 [12]

EQUIPMENT ITEM NO. 12
ELECTRIC MOTOR LOCATED OUTSIDE CONTAINMENT
WESTINGHOUSE MODEL 5808 Z
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 12
LICENSEE REFERENCE(S): 606
FUNCTION (PLANT ID): CENTRIFUGAL CHARGING PUMP MOTOR (PP-050)
LICENSEE SUBMITTAL: SCEW(S): M1-1 [12]

EQUIPMENT ITEM NO. 13
ELECTRIC MOTOR LOCATED IN THE CONTAINMENT
WESTINGHOUSE MODEL TBDP
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 13
LICENSEE REFERENCE(S): 606, 639, 38
FUNCTION (PLANT ID): FAN MOTOR (HV-CEQ-1, -2)
LICENSEE SUBMITTAL: SCEW(S): F1-1 [12]

EQUIPMENT ITEM NO. 14
ELECTRIC MOTOR LOCATED OUTSIDE CONTAINMENT
RELIANCE ELECTRIC MODEL FRAME # 5810P
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 14
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): CONTAINMENT SPRAY PUMP MOTOR (PP-009)
LICENSEE SUBMITTAL: SCEW(S): M2 [12]

EQUIPMENT ITEM NO. 15
HYDROGEN RECOMBINER LOCATED IN THE CONTAINMENT
WESTINGHOUSE, MODEL NOT STATED
REQUIRED OPERATING TIME: 3 MONTHS
TER CHECKSHEET NO. 15
LICENSEE REFERENCE(S): 1573, 639, 38
FUNCTION (PLANT ID): HYDROGEN RECOMBINER (HR-1, -2)
LICENSEE SUBMITTAL: SCEW(S): H1-1 [12]

EQUIPMENT ITEM NO. 16
ELECTRICAL PENETRATION LOCATED IN THE CONTAINMENT
CONAX MODEL EA2 THRU EP14
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 16
LICENSEE REFERENCE(S): 3827, 3828, 3837, 3838
FUNCTION (PLANT ID): ELECTRICAL CONTINUITY THROUGH CONTAINMENT WALL
LICENSEE SUBMITTAL: SCEW(S): EP02-1 [12]

EQUIPMENT ITEM NO. 17
ELECTRICAL PENETRATION LOCATED IN THE CONTAINMENT
CONAX MODEL EP1
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 17
LICENSEE REFERENCE(S): 3828, 3837, 3838
FUNCTION (PLANT ID): ELECTRICAL CONTINUITY THROUGH CONTAINMENT WALL
LICENSEE SUBMITTAL: SCEW(S): EP01-1 [12]

EQUIPMENT ITEM NO. 18
RTD LOCATED IN THE CONTAINMENT
SOSTMAN MODEL 11901B
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 18
LICENSEE REFERENCE(S): 687
FUNCTION (PLANT ID): REACTOR COOLANT TEMPERATURE NORMAL AND ACCIDENT MONITORING (NTR-110, 120, 130, 140, 210, 220, 230, 240)
LICENSEE SUBMITTAL: SCEW(S): I-28 [12]

EQUIPMENT ITEM NO. 19
RTD LOCATED IN THE CONTAINMENT
ROSEMOUNT MODEL 176KS
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 19
LICENSEE REFERENCE(S): 687
FUNCTION (PLANT ID): REACTOR COOLANT TEMPERATURE NORMAL AND ACCIDENT MONITORING (NTR-110, 120, 130, 140, 210, 220, 230, 240)
LICENSEE SUBMITTAL: SCEW(S): I-28 [12]

EQUIPMENT ITEM NO. 20
RTD LOCATED IN THE CONTAINMENT
SOSTMAN MODEL 11834B
REQUIRED OPERATING TIME: 10 SECONDS
TER CHECKSHEET NO. 20
LICENSEE REFERENCE(S): 687, 639
FUNCTION (PLANT ID): REACTOR COOLANT TEMPERATURE ACTUATION AND NORMAL MONITOR (NTP-111, 121, 131, 141, 211, 221, 231, 241)
LICENSEE SUBMITTAL: SCEW(S): I26 [12]

EQUIPMENT ITEM NO. 21
RTD LOCATED IN THE CONTAINMENT
ROSEMOUNT MODEL 176KF
REQUIRED OPERATING TIME: 10 SECONDS
TER CHECKSHEET NO. 21
LICENSEE REFERENCE(S): 687, 639
FUNCTION (PLANT ID): REACTOR COOLANT TEMPERATURE ACTUATION AND NORMAL MONITOR (NTP-111, 121, 131, 141, 211, 221, 231, 241)
LICENSEE SUBMITTAL: SCEW(S): I25 [12]

EQUIPMENT ITEM NO. 22
RTD LOCATED IN THE CONTAINMENT
SOSTMAN MODEL 11834B
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 22
LICENSEE REFERENCE(S): 687
FUNCTION (PLANT ID): REACTOR COOLANT TEMPERATURE/IN PLACE SPARES (NTP-110, 120, 130, 140, 210, 220, 230, 240)
LICENSEE SUBMITTAL: SCEW(S): I-27 [12]

EQUIPMENT ITEM NO. 23
RTD LOCATED IN THE CONTAINMENT
ROSEMOUNT MODEL 176KF
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 23
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): REACTOR COOLANT TEMPERATURE/IN PLACE SPARES (NTP-110, 120, 130, 140, 210, 220, 230, 240)
LICENSEE SUBMITTAL: SCEW(S): I-27 [12]

EQUIPMENT ITEM NO. 24
LUBRICANT LOCATED INSIDE AND OUTSIDE CONTAINMENT
MOBIL MODEL MOBILUX EP2
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 24
LICENSEE REFERENCE(S): 639, 18, 19
FUNCTION (PLANT ID): VALVE OPERATOR MOTORS LUBRICANT
LICENSEE SUBMITTAL: SCEW(S): G1-1 [12]

EQUIPMENT ITEM NO. 25
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 571'0"
MOBIL MODEL MOBILUX 2
REQUIRED OPERATING TIME: 500 HOURS
TER CHECKSHEET NO. 25
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): ESSENTIAL SERVICE WATER PUMP/LUBRICATION (PP-007)
LICENSEE SUBMITTAL: SCEW(S): G2 [12]

EQUIPMENT ITEM NO. 26
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 573'0"
MOBIL MODEL DTE OIL MEDIUM
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 26
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): CONTAINMENT SPRAY PUMP MOTOR/LUBRICATION (PP-009)
LICENSEE SUBMITTAL: SCEW(S): G3 [12]

EQUIPMENT ITEM NO. 27
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 587'0"
MOBIL MODEL DTE OIL HEAVY MEDIUM
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 27
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): SAFETY INJECTION PUMP MOTOR/LUBRICATION (PP-026)
LICENSEE SUBMITTAL: SCEW(S): G8 [12]

EQUIPMENT ITEM NO. 28
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 573'0"
MOBIL MODEL MOBILUX 2
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 28
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): CONTAINMENT SPRAY PUMP MOTOR/LUBRICATION (PP-009)
LICENSEE SUBMITTAL: SCEW(S): G4 [12]

EQUIPMENT ITEM NO. 29
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 609'6"
MOBIL MODEL DTE 797 OIL
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 29
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): COMPONENT COOLING WATER PUMP/LUBRICATION (PP-010)
LICENSEE SUBMITTAL: SCEW(S): G5 [12]

EQUIPMENT ITEM NO. 30
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 587'0"
MOBIL MODEL DTE 797
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 30
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): SAFETY INJECTION PUMP/LUBRICATION (PP-026)
LICENSEE SUBMITTAL: SCEW(S): G7 [12]

EQUIPMENT ITEM NO. 31
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 573'0"
MOBIL MODEL MOBILUX 2
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 31
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): RHR PUMP MOTOR/LUBRICATION (PP-035)
LICENSEE SUBMITTAL: SCEW(S): G9 [12]

EQUIPMENT ITEM NO. 32
LUBRICANT LOCATED IN THE AUXILIARY BUILDING, ELEV. 587'0"
MOBIL MODEL DTE OIL HEAVY MEDIUM
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 32
LICENSEE REFERENCE(S): 19
FUNCTION (PLANT ID): CCW PUMP/LUBRICATION (PP-050)
LICENSEE SUBMITTAL: SCEW(S): G10 [12]

EQUIPMENT ITEM NO. 33
PRESSURE TRANSMITTER LOCATED OUTSIDE CONTAINMENT
FOXBORO MODEL E11GMHSHD1
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 33
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): FIRST STAGE TURBINE PRESSURE (MPC 253, 254)
LICENSEE SUBMITTAL: SCEW(S): I13, I14 [12]

EQUIPMENT ITEM NO. 34
PRESSURE TRANSMITTER LOCATED OUTSIDE CONTAINMENT
FOXBORO MODEL E11GMHSAE1 MCA
REQUIRED OPERATING TIME: 5 SECONDS/4 MONTHS
TER CHECKSHEET NO. 34
LICENSEE REFERENCE(S): 3832
FUNCTION (PLANT ID): MAIN STEAM PRESSURE/POST ACCIDENT AND NORMAL MONITOR AND ACTUATION (MPP210, 211, 220, 221, 230, 240, 241)
LICENSEE SUBMITTAL: SCEW(S): I15, I14 [12]

EQUIPMENT ITEM NO. 35
PRESSURE TRANSMITTER LOCATED OUTSIDE CONTAINMENT
FOXBORO MODEL E11GMHSAE1
REQUIRED OPERATING TIME: 5 SECONDS/4 MONTHS
TER CHECKSHEET NO. 35
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): MAIN STEAM PRESSURE/POST ACCIDENT AND NORMAL MONITOR AND ACTUATION (MPP-212, 222, 232, 242)
LICENSEE SUBMITTAL: SCEW(S): I16, I15 [12]

EQUIPMENT ITEM NO. 36
PRESSURE TRANSMITTER LOCATED IN THE CONTAINMENT
ITT BARTON MODEL 763
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 36
LICENSEE REFERENCE(S): 639, 3836
FUNCTION (PLANT ID): PRESSURIZER PRESSURE/POST ACCIDENT AND NORMAL MONITOR AND ACTUATION (NPP-151, 152, 153)
LICENSEE SUBMITTAL: SCEW(S): I19, I20, I21 [12]

EQUIPMENT ITEM NO. 37
PRESSURE TRANSMITTER LOCATED IN THE CONTAINMENT
ITT BARTON MODEL 763
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 37
LICENSEE REFERENCE(S): 38
FUNCTION (PLANT ID): PRESSURIZER PRESSURE/LONG TERM MONITORING (NPS-153)
LICENSEE SUBMITTAL: SCEW(S): I24, I25 [12]

EQUIPMENT ITEM NO. 38
D/P TRANSMITTER LOCATED IN THE CONTAINMENT
ITT BARTON MODEL 764
REQUIRED OPERATING TIME: 5 SECONDS
TER CHECKSHEET NO. 38
LICENSEE REFERENCE(S): 3836
FUNCTION (PLANT ID): MAIN STEAM FLOW/ACTUATION AND NORMAL MONITORING (MFC-110, 111, 120, 121, 130, 131, 140, 141)
LICENSEE SUBMITTAL: SCEW(S): I12 [12]

EQUIPMENT ITEM NO. 39
D/P TRANSMITTER LOCATED IN THE CONTAINMENT
ITT BARTON MODEL 764
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 39
LICENSEE REFERENCE(S): 3836
FUNCTION (PLANT ID): PRESSURIZER LEVEL/POST ACCIDENT AND NORMAL MONITORING (NLP-151, NLP-152, NLP-153)
LICENSEE SUBMITTAL: SCEW(S): I18 [12]

EQUIPMENT ITEM NO. 40
D/P TRANSMITTER LOCATED IN THE CONTAINMENT
ITT BARTON MODEL 764
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 40
LICENSEE REFERENCE(S): 3836
FUNCTION (PLANT ID): STEAM GENERATOR LEVEL/POST ACCIDENT AND NORMAL MONITORING (BLP-110, 111, 112, 120, 121, 122, 130, 131, 132, 140, 141, 142)
LICENSEE SUBMITTAL: SCEW(S): I1 [12]

EQUIPMENT ITEM NO. 41
D/P TRANSMITTER LOCATED OUTSIDE CONTAINMENT
FOXBORO MODEL E13DMHSAM1
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 41
LICENSEE REFERENCE(S): 710
FUNCTION (PLANT ID): RHR FLOW HEAT EXCHANGER OUTLET/MONITORING (IFI-310, 320)
LICENSEE SUBMITTAL: SCEW(S): I11, I10 [12]

EQUIPMENT ITEM NO. 42
D/P TRANSMITTER LOCATED OUTSIDE CONTAINMENT
ITT BARTON MODEL 332
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 42
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): RHR FLOW HEAT EXCHANGER OUTLET/MONITORING (IFI-311, 321)
LICENSEE SUBMITTAL: SCEW(S): I12 [12]
FUNCTION (PLANT ID): SIS PUMP DISCHARGE FLOW/MONITORING (IFI-260, 266)
LICENSEE SUBMITTAL: SCEW(S): I9, I10 [12]

EQUIPMENT ITEM NO. 43
D/P TRANSMITTER LOCATED OUTSIDE CONTAINMENT
FOXBORO MODEL E13DMHIMID
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 43
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): AUXILIARY FEEDWATER FLOW/MONITORING (FFI-210, 220, 230, 240)
LICENSEE SUBMITTAL: SCEW(S): I5, I4 [12]

EQUIPMENT ITEM NO. 44
D/P TRANSMITTER LOCATED OUTSIDE CONTAINMENT
FOXBORO MODEL E13DMHSAH1 (MCA)
REQUIRED OPERATING TIME: 25 SECONDS
TER CHECKSHEET NO. 44
LICENSEE REFERENCE(S): 710
FUNCTION (PLANT ID): MAIN FEEDWATER FLOW/NORMAL MONITOR AND ACTUATION (FCC-210, 211, 220, 221, 230, 231, 240, 241)
LICENSEE SUBMITTAL: SCEW(S): I4, I3 [12]

EQUIPMENT ITEM NO. 45
D/P TRANSMITTER LOCATED IN THE CONTAINMENT
FOXBORO MODEL E13DHHSAH1MCA
REQUIRED OPERATING TIME: 60 MINUTES
TER CHECKSHEET NO. 45
LICENSEE REFERENCE(S): 639, 710
FUNCTION (PLANT ID): BORON INJECTION TANK DISCHARGE FLOW/MONITORING (IFI-51, 52, 53, 54)
LICENSEE SUBMITTAL: SCEW(S): I6, I7, I8 [12]

EQUIPMENT ITEM NO. 46
D/P TRANSMITTER LOCATED OUTSIDE CONTAINMENT
TAYLOR MODEL 304TD00212
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 46
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): CONDENSATE STORAGE TANK LEVEL/MONITORING (CLR-110, 111)
LICENSEE SUBMITTAL: SCEW(S): I3, I2 [12]

EQUIPMENT ITEM NO. 47
D/P SWITCH LOCATED OUTSIDE CONTAINMENT
ITT BARTON MODEL 289A/199
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 47
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): RHR PUMP MINIMUM FLOW CONTROLLER/PUMP PROTECTION (IFC-315, -325)
LICENSEE SUBMITTAL: SCEW(S): I5 [12]

EQUIPMENT ITEM NO. 48
LIMIT SWITCH LOCATED IN THE CONTAINMENT
NAMCO MODEL EA180
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 48
LICENSEE REFERENCE(S): 639, 898
FUNCTION (PLANT ID): PRESSURIZER PORV'S NRV-151, 152, 153/VALVE POSITION INDICATION
LICENSEE SUBMITTAL: SCEW(S): LS1-1 [12]

EQUIPMENT ITEM NO. 49
ELECTRICAL CONTROL CABLE LOCATED INSIDE CONTAINMENT
GENERAL ELECTRIC, MODEL NOT STATED
REQUIRED OPERATING TIME: 24 HOURS
TER CHECKSHEET NO. 49
LICENSEE REFERENCE(S): 639, 3829, 26, 27, 29
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): CC8-1, CC6-1 [12]

EQUIPMENT ITEM NO. 50
E/P TRANSDUCER LOCATED OUTSIDE CONTAINMENT
FISHER CONTROLS MODEL 546
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 50
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): MAIN FEEDWATER FLOW CONTROL/VALVE MODULATION CONTROL (EPT 210, 220, 230, 240)
LICENSEE SUBMITTAL: SCEW(S): S2 [12]

EQUIPMENT ITEM NO. 51
E/P TRANSDUCER LOCATED OUTSIDE CONTAINMENT
FISHER CONTROLS MODEL 546
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 51
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): MAIN STEAM PRESSURE RELIEF/VALVE MODULATION CONTROL (EPT-213, 223, 233, 243)
LICENSEE SUBMITTAL: SCEW(S): S9 [12]

EQUIPMENT ITEM NO. 52
ELECTRICAL CONTROL CABLE LOCATED IN CONTAINMENT
CONTINENTAL WIRE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 HOUR
TER CHECKSHEET NO. 52
LICENSEE REFERENCE(S): 639, 3829, 26, 27, 29
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): CC1-1 [12]

EQUIPMENT ITEM NO. 53
ELECTRICAL CONTROL CABLE LOCATED OUTSIDE CONTAINMENT
CONTINENTAL WIRE, MODEL NOT STATED
REQUIRED OPERATING TIME: 24 HOURS
TER CHECKSHEET NO. 53
LICENSEE REFERENCE(S): 3829
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): CC9-1, CC2-1 [12]

EQUIPMENT ITEM NO. 54
ELECTRICAL CONTROL CABLE LOCATED INSIDE CONTAINMENT
CONTINENTAL WIRE, MODEL NOT STATED
REQUIRED OPERATING TIME: 24 HOURS
TER CHECKSHEET NO. 54
LICENSEE REFERENCE(S): 639, 3829, 26, 27, 29
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): CC7-1, CC5-1 [12]

EQUIPMENT ITEM NO. 55
ELECTRICAL POWER CABLE LOCATED IN THE CONTAINMENT
OKONITE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 55
LICENSEE REFERENCE(S): 639, 3403, 26, 27, 29
FUNCTION (PLANT ID): VARIOUS (IMD-325, 326)
LICENSEE SUBMITTAL: SCEW(S): CP2-1 [12]

EQUIPMENT ITEM NO. 56
PRESSURE TRANSMITTER LOCATED IN THE CONTAINMENT
ITT BARTON MODEL 763
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 56
LICENSEE REFERENCE(S): 3826
FUNCTION (PLANT ID): REACTOR COOLANT PRESSURE/MONITORING (NPS-121, 122)
LICENSEE SUBMITTAL: SCEW(S): I22, I23 [12]

EQUIPMENT ITEM NO. 57
SOLENOID VALVE LOCATED OUTSIDE CONTAINMENT
ASCO MODEL HP8300C58RU/HT8300B58RU
REQUIRED OPERATING TIME: 25 SECONDS
TER CHECKSHEET NO. 57
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): MAIN FEEDWATER REGULATING VALVES TRIP VALVES (XSO-291, 292, 293, 294, 295, 296, 297, 298)
LICENSEE SUBMITTAL: SCEW(S): S3 [12]

EQUIPMENT ITEM NO. 58
SOLENOID VALVE LOCATED IN THE CONTAINMENT
ASCO MODEL NP831654V
REQUIRED OPERATING TIME: 5 SECONDS
TER CHECKSHEET NO. 58
LICENSEE REFERENCE(S): 3836, 712
FUNCTION (PLANT ID): CONTAINMENT VENTILATION AND ICE CONDENSER REFRIG. ISOLATION (XSO-12, 21, 121, 122, 123, 124, 125, 126, 127)
LICENSEE SUBMITTAL: SCEW(S): S17-1, -2 [12]

EQUIPMENT ITEM NO. 59
SOLENOID VALVE LOCATED IN THE CONTAINMENT
ASCO MODEL NP831654V
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 59
LICENSEE REFERENCE(S): 3836, 712
FUNCTION (PLANT ID): PRESSURIZER PRESSURE CONTROL/TRIP CONTROL VALVE CLOSED (XSO-503, -505, -507)
LICENSEE SUBMITTAL: SCEW(S): S11-1, -2 [12]

EQUIPMENT ITEM NO. 60
SOLENOID VALVE LOCATED OUTSIDE CONTAINMENT
ASCO MODEL HT8316B17
REQUIRED OPERATING TIME: 5 SECONDS
TER CHECKSHEET NO. 60
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): STEAM GENERATOR STOP VALVE DUMP VALVE/CLOSURE ACTUATION (XSO-211, 212, 221, 222, 231, 232, 241, 242)
LICENSEE SUBMITTAL: SCEW(S): S7 [12]

EQUIPMENT ITEM NO. 61
RADIATION MONITOR LOCATED IN THE CONTAINMENT
WESTINGHOUSE MODEL 1101
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 61
LICENSEE REFERENCE(S): 639
FUNCTION (PLANT ID): CONTAINMENT HIGH RADIATION/ACTUATION (VRC-302)
LICENSEE SUBMITTAL: SCEW(S): I31 [12]

EQUIPMENT ITEM NO. 62
PRESSURE SWITCH LOCATED OUTSIDE CONTAINMENT
MERCOID MODEL DA7031153
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 62
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): ESSENTIAL SERVICE WATER PRESSURE/AUTOMATIC PUMP START (WPS 702, 706)
LICENSEE SUBMITTAL: SCEW(S): I32 [12]

EQUIPMENT ITEM NO. 63
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 HOUR
TER CHECKSHEET NO. 63
LICENSEE REFERENCE(S): 639, 1620, 26, 27, 29
FUNCTION (PLANT ID): AT VALVE LIMIT SWITCH (QCM-250)
LICENSEE SUBMITTAL: SCEW(S): TC1-1 [12]

EQUIPMENT ITEM NO. 64
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 5 SECONDS
TER CHECKSHEET NO. 64
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): TC15-1 [12]

EQUIPMENT ITEM NO. 65
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 5 SECONDS
TER CHECKSHEET NO. 65
LICENSEE REFERENCE(S): 639, 712
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): TC16-1 [12]

EQUIPMENT ITEM NO. 66
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 66
LICENSEE REFERENCE(S): 663, 38
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): TC9-1 [12]

EQUIPMENT ITEM NO. 67
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 67
LICENSEE REFERENCE(S): 1620, 3827, 26, 27, 29
FUNCTION (PLANT ID): CABLE CONNECTION (ICM-305, 306)
LICENSEE SUBMITTAL: SCEW(S): TC14-1 [12]

EQUIPMENT ITEM NO. 68
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 24 HOURS
TER CHECKSHEET NO. 68
LICENSEE REFERENCE(S): 639, 3829, 815
FUNCTION (PLANT ID): TERMINATION AT TERMINAL BOX AT VALVE ACTUATOR
LICENSEE SUBMITTAL: SCEW(S): TC8-1 [12]
FUNCTION (PLANT ID): TERMINATION AT FLOODUP TERMINAL BOX
LICENSEE SUBMITTAL: SCEW(S): TC7-1 [12]

EQUIPMENT ITEM NO. 69
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 24 HOURS
TER CHECKSHEET NO. 69
LICENSEE REFERENCE(S): 3840, 3841
FUNCTION (PLANT ID): CABLE CONNECTION
LICENSEE SUBMITTAL: SCEW(S): TC13-1 [12]

EQUIPMENT ITEM NO. 70
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 24 HOURS
TER CHECKSHEET NO. 70
LICENSEE REFERENCE(S): 3831, 26
FUNCTION (PLANT ID): TERMINATION AT PENETRATION INSIDE FLOODUP TUBES
LICENSEE SUBMITTAL: SCEW(S): TC6-1 [12]

EQUIPMENT ITEM NO. 71
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 71
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VARIOUS
LICENSEE SUBMITTAL: SCEW(S): TC11-1 [12]

EQUIPMENT ITEM NO. 72
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 72
LICENSEE REFERENCE(S): 639
FUNCTION (PLANT ID): TERMINATION AT PRESSURIZER RELIEF BLOCK VALVES (NMO-151, 152, 153)
LICENSEE SUBMITTAL: SCEW(S): TC12-1 [12]

EQUIPMENT ITEM NO. 73
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 73
LICENSEE REFERENCE(S): 639
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TC2-1 [12]

EQUIPMENT ITEM NO. 74
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 74
LICENSEE REFERENCE(S): 1620, 1064
FUNCTION (PLANT ID): TERMINATION AT VALVE MOTOR OPERATOR (VARIOUS)
LICENSEE SUBMITTAL: SCEW(S): TC10-1 [12]

EQUIPMENT ITEM NO. 75
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 75
LICENSEE REFERENCE(S): 639, 26, 27, 29
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TC4-1 [12]

EQUIPMENT ITEM NO. 76
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 76
LICENSEE REFERENCE(S): 639, 1620, 1064, 26, 27, 29
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TC3-1 [12]

EQUIPMENT ITEM NO. 77
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 77
LICENSEE REFERENCE(S): 639, 3829, 959, 677, 678, 3830, 815, 38
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TI1-1, TI2-1, TI4-1 [12]

EQUIPMENT ITEM NO. 78
PENETRATION TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 78
LICENSEE REFERENCE(S): 3831, 38, 26, 27, 29
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TI3-1 [12]

EQUIPMENT ITEM NO. 79
ELECTRICAL TERMINATION LOCATED INSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 79
LICENSEE REFERENCE(S): 639, 919, 38, 26, 27, 29
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TI5-1 [12]

EQUIPMENT ITEM NO. 80
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 80
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TI-7 [12]

EQUIPMENT ITEM NO. 81
ELECTRICAL TERMINATION LOCATED INSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 81
LICENSEE REFERENCE(S): 639, 3831, 38
FUNCTION (PLANT ID): CABLE CONNECTION
LICENSEE SUBMITTAL: SCEW(S): TP3-1, TP2-1 [12]

EQUIPMENT ITEM NO. 82
ELECTRICAL TERMINATION LOCATED IN THE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 82
LICENSEE REFERENCE(S): 3831, 38, 26, 27, 29
FUNCTION (PLANT ID): CABLE CONNECTION
LICENSEE SUBMITTAL: SCEW(S): TP1-1 [12]

EQUIPMENT ITEM NO. 83
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 83
LICENSEE REFERENCE(S): 3831, 38
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TP4-1 [12]

EQUIPMENT ITEM NO. 84
ELECTRICAL TERMINATION LOCATED OUTSIDE CONTAINMENT
MANUFACTURER AND MODEL NOT STATED
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 84
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): CABLE TERMINATION
LICENSEE SUBMITTAL: SCEW(S): TI6-1 [12]

EQUIPMENT ITEM NO. 85
ELECTRICAL POWER CABLE LOCATED INSIDE CONTAINMENT
ANACONDA WIRE AND CABLE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 85
LICENSEE REFERENCE(S): 639, 2819, 26, 27, 29
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP7-1 [12]

EQUIPMENT ITEM NO. 86
ELECTRICAL POWER CABLE LOCATED IN CONTAINMENT
ANACONDA WIRE AND CABLE, MODEL NOT STATED
REQUIRED OPERATING TIME: 3 MONTHS
TER CHECKSHEET NO. 86
LICENSEE REFERENCE(S): 639, 2819, 38, 26, 27, 29
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP13-1 [12]

EQUIPMENT ITEM NO. 87
ELECTRICAL POWER CABLE LOCATED OUTSIDE CONTAINMENT
ANACONDA WIRE AND CABLE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 87
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP10-1, CP5-1 [12]

EQUIPMENT ITEM NO. 88
ELECTRICAL POWER CABLE LOCATED OUTSIDE CONTAINMENT
OKONITE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 88
LICENSEE REFERENCE(S): 3403
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP1-1 [12]

EQUIPMENT ITEM NO. 89
ELECTRICAL POWER CABLE LOCATED IN CONTAINMENT
OKONITE, MODEL NOT STATED
REQUIRED OPERATING TIME: 3 MONTHS
TER CHECKSHEET NO. 89
LICENSEE REFERENCE(S): 639, 1340, 26, 27, 29
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP4-1 [12]

EQUIPMENT ITEM NO. 90
ELECTRICAL INSTRUMENT CABLE LOCATED OUTSIDE CONTAINMENT
OKONITE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 90
LICENSEE REFERENCE(S): 1858, 38
FUNCTION (PLANT ID): INSTRUMENT CABLE
LICENSEE SUBMITTAL: SCEW(S): CP6-1 [12]

EQUIPMENT ITEM NO. 91
ELECTRICAL POWER CABLE LOCATED IN CONTAINMENT
ESSEX INTERNATIONAL, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 91
LICENSEE REFERENCE(S): 639, 2587, 26, 27, 29
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP8-1 [12]

EQUIPMENT ITEM NO. 92
ELECTRICAL POWER CABLE LOCATED OUTSIDE CONTAINMENT
ESSEX INTERNATIONAL, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAYS
TER CHECKSHEET NO. 92
LICENSEE REFERENCE(S): 60
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP3-1 [12]

EQUIPMENT ITEM NO. 93
ELECTRICAL POWER CABLE LOCATED IN THE CONTAINMENT
KERITE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 YEAR
TER CHECKSHEET NO. 93
LICENSEE REFERENCE(S): 38, 26, 27, 29
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP11-1 [12]

EQUIPMENT ITEM NO. 94
ELECTRICAL POWER CABLE LOCATED IN CONTAINMENT
KERITE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 94
LICENSEE REFERENCE(S): 639, 26, 27, 29
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP9-1 [12]

EQUIPMENT ITEM NO. 95
ELECTRICAL POWER CABLE LOCATED IN CONTAINMENT
CYPRUS, MODEL NOT STATED
REQUIRED OPERATING TIME: 3 MONTHS
TER CHECKSHEET NO. 95
LICENSEE REFERENCE(S): 639, 1355, 38, 26, 27, 29
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CP12-1 [12]

EQUIPMENT ITEM NO. 96
ELECTRICAL INSTRUMENT CABLE LOCATED OUTSIDE CONTAINMENT
CONTINENTAL WIRE, MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 96
LICENSEE REFERENCE(S): 2818, 38
FUNCTION (PLANT ID): INSTRUMENT CABLE
LICENSEE SUBMITTAL: SCEW(S): CI10-1, CI4-1 [12]

EQUIPMENT ITEM NO. 97
ELECTRICAL INSTRUMENT CABLE LOCATED IN CONTAINMENT
SAMUEL MOORE, MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 97
LICENSEE REFERENCE(S): 639, 677, 678, 38, 26, 27, 29
FUNCTION (PLANT ID): INSTRUMENT CABLE
LICENSEE SUBMITTAL: SCEW(S): CI9-1, CI3-1 [12]

EQUIPMENT ITEM NO. 98
ELECTRICAL INSTRUMENT CABLE LOCATED IN CONTAINMENT
BOSTON INSULATED WIRE, MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 98
LICENSEE REFERENCE(S): 639, 3829, 38, 26, 27, 29
FUNCTION (PLANT ID): INSTRUMENT CABLE
LICENSEE SUBMITTAL: SCEW(S): CI5-1 [12]

EQUIPMENT ITEM NO. 99
ELECTRICAL INSTRUMENT CABLE LOCATED IN CONTAINMENT
BOSTON INSULATED WIRE, MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 99
LICENSEE REFERENCE(S): 639, 3850, 3851, 38, 26, 27, 29
FUNCTION (PLANT ID): INSTRUMENT CABLE
LICENSEE SUBMITTAL: SCEW(S): CI1-1 [12]

EQUIPMENT ITEM NO. 100
ELECTRICAL INSTRUMENT CABLE LOCATED IN CONTAINMENT
CERRO WIRE AND CABLE, MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 100
LICENSEE REFERENCE(S): 639, 3830, 38, 26, 27, 29
FUNCTION (PLANT ID): INSTRUMENT CABLE
LICENSEE SUBMITTAL: SCEW(S): CI8-1 [12]

EQUIPMENT ITEM NO. 101
ELECTRICAL INSTRUMENT CABLE LOCATED IN CONTAINMENT
ROCKBESTOS, MODEL NOT STATED
REQUIRED OPERATING TIME: 4 MONTHS
TER CHECKSHEET NO. 101
LICENSEE REFERENCE(S): 639, 3830, 38, 26, 27, 29
FUNCTION (PLANT ID): INSTRUMENT CABLE
LICENSEE SUBMITTAL: SCEW(S): CI2-1 [12]

EQUIPMENT ITEM NO. 102
ELECTRICAL POWER CABLE LOCATED OUTSIDE CONTAINMENT
ANACONDA WIRE AND CABLE, MODEL NOT STATED
REQUIRED OPERATING TIME: 1 DAY
TER CHECKSHEET NO. 102
LICENSEE REFERENCE(S): 2819
FUNCTION (PLANT ID): POWER CABLE
LICENSEE SUBMITTAL: SCEW(S): CC4-1 [12]

EQUIPMENT ITEM NO. 103
ELECTRICAL CONTROL CABLE LOCATED IN THE OUTSIDE CONTAINMENT
GENERAL ELECTRIC, MODEL NOT STATED
REQUIRED OPERATING TIME: 24 HOURS
TER CHECKSHEET NO. 103
LICENSEE REFERENCE(S): 3829
FUNCTION (PLANT ID): CONTROL CABLE
LICENSEE SUBMITTAL: SCEW(S): CC10-1, CC3-1 [12]

APPENDIX C - PLANT SAFETY-RELATED SYSTEMS AND DISPLAY INSTRUMENTATION

C.1 LIST OF SAFETY-RELATED SYSTEMS

In accordance with IE Bulletin 79-01B or NUREG-0588, the Licensee was required to (1) establish a list of systems and equipment required to mitigate the consequences of a loss-of-coolant accident (LOCA) and a high energy line break (HELB) and (2) identify components needed to perform the functions of safety-related display information, post-accident sampling and monitoring, and radiation monitoring.

The list of safety-related systems provided by the Licensee was reviewed by the NRC staff against a staff-developed master list. The NRC staff had developed a generic master list based upon a review of plant safety analyses and emergency procedures. The systems list was established on the basis of the functions that must be performed for accident mitigation (without regard to location of equipment relative to hostile environments). The instrumentation selected included that needed to monitor overall plant performance as well as to monitor the performance of systems on the list.

Based upon information in the Licensee's submittal, the equipment location references, and in some cases conversations with the Licensee, the NRC staff verified that the systems included in the Licensee's submittal were those required to achieve or support: (1) emergency reactor shutdown, (2) containment isolation, (3) reactor core cooling, (4) containment heat removal, (5) core residual heat removal, and (6) prevention of significant release of radioactive material to the surrounding environment. With the exception of items deferred for later review (cold-shutdown equipment and TMI Lessons-Learned modifications), the staff concluded that the systems identified by the Licensee were acceptable. The list of systems identified by the Licensee and accepted by the NRC staff is as follows:

Function	System[1]
Emergency Reactor Shutdown	Reactor Coolant
	Reactor Protection
	Safeguards Actuation
	Chemical and Volume Control
Containment Isolation	Main Steam
	Main Feedwater
	Chemical and Volume Control
	Residual Heat Removal
	Reactor Coolant Pump Seal Water
	Ice Condenser Refrigerant Supply
	Containment Purge
	Emergency Core Cooling
	Auxiliary Feedwater
Reactor Core Cooling	High Pressure Injection
	Intermediate Pressure Injection
	Low Pressure Injection
	Accumulators
Containment Heat Removal	Containment Spray
	Containment Ventilation
	Containment Sump Recirculation

1. The NRC staff recognizes that there are differences in nomenclature of systems because of plant vintage and engineering design; consequently, some systems performing identical or similar functions may have different names. In those instances it was necessary to verify the system(s) function with the responsible IE regional reviewer and/or the licensee.

Function	System
Core Residual Heat Removal	Residual Heat Removal
	Power Operated Relief Valves
	Main Feedwater
	Auxiliary Feedwater
	Main Steam
	Component Cooling Water
	Essential Service Water
Prevention of Significant Release of Radioactive Material to Environment	Containment Spray (Iodine Removal)
	Hydrogen Control
	Post Accident Monitoring
	Containment Radiation Sampling
Supporting Systems	Emergency Power
	Control Room Habitability
	Remote Shutdown Monitoring

C.2 SAFETY-RELATED INSTRUMENTATION

In Section 3.1 of the NRC SER [10], the NRC made the following statement:

"Display instrumentation which provides information for the reactor operators to aid them in the safe handling of the plant was not specifically identified by the licensee. A complete list of all display instrumentation mentioned in the LOCA and HELB emergency procedures must be provided. Equipment qualification information in the form of summary sheets should be provided for all components of the display instrumentation exposed to harsh environments. Instrumentation which is not considered to be safety related but which is mentioned in the emergency procedure should appear on the list. For these instruments, (1) justification should be provided for not considering the instrument safety related and (2) assurance should be provided that its subsequent failure will not mislead the operator or adversely affect the mitigation of the consequences of the accident. The environmental qualification of post-accident sampling and monitoring and radiation monitoring equipment is closely related to the review of the TMI Lessons-Learned modifications and will be performed in conjunction with that review.

In Reference 12, the Licensee provided the following response:

"Section 3.1 of the SER required that '... a complete list of all display instrumentation mentioned in the LOCA and HELB emergency procedures ...' be included in this submittal. The attached lists provide the requested information.

In a number of instances, the procedure(s) call for verification of functions automatically performed through the Reactor Protection System/ Engineered Safety Features Actuation System (RPS/ESFAS) logic without making reference to specific display instrumentation. It should be pointed out that the procedure(s) which call for verification of these automatic functions also call for manual actions to effect completion of the functions if there is any doubt that they are not performed automatically. This instrumentation is summarized in Table 1 [Table C-1 in this TER]. In performing these verifications, operators are instructed to consult multiple plant parameters.

The remaining display instrumentation referenced in the LOCA and (or) MSLB procedures is contained in Table 2 [Table C-2 in this TER] with three exceptions, as noted below:

(1) The MSLB procedure makes reference to trends in indicated wide-range steam generator water level. The wide-range level channels perform no safeguards or reactor trip function and serve as backup indication to the narrow range level channels. As noted in our response to FSAR question 7.29, the narrow-range level channels perform the same function as the wide-range devices which are excluded from the Table.

(2) Reference is made in the LOCA procedure to monitoring the Auxiliary Building Radiation Monitors to detect potential ECCS leakage during the recirculation mode. The monitors could be subjected to an adverse environment following a HELB outside containment but serve no safety related function for such an event.

(3) The LOCA procedure calls for verification that power is available to the pressurizer PORV block valves. Instrumentation is provided in 600V safety buses from which the block valves are powered. In addition, valve position indication lights effectively provide an indication of power availability."

Evaluation

The Licensee has responded to the NRC's concern in the SER. This item is considered resolved.

Table C-1. Licensee Table 1 [12]

TABLE 1

Function	Display Instrumentation	Purpose of Display	Safety Related	Potentially Exposed to Adverse Environment	Potential for providing Misleading Information
Reactor Trip	Reactor Trip Breaker Position Indication Lights	Verification of Reactor Trip Initiated By the RPS/ESFAS	No	No	No
	Rod Bottom Lights		No	Yes	See Note (1)
	Control Rod Drive Motor Circuit Set Breaker Position Lights		No	No	
Turbine Trip	Turbine Stop Valves' Closure Alarm	Verification of Turbine Trip Initiated By the RPS/ESFAS	No	No	No
	Loss of Load Indicator		No	No	See Note (2)
	Turbine Trip System Pressure Indicator		No	Yes	
Feedwater Isolation	Position Indication Lights on FRV-210, 220, 230, and 240 and FMO-201, 202, 203, and 204	Verification of Feedwater Isolation Initiated By the RPS/ESFAS	No	Yes	No See Note (3)

FIGURE SUPPLIED BY THE LICENSEE

Table C-1 (Cont.)

TABLE 1 (cont'd.)

Function	Display Instrumentation	Purpose of Display	Safety Related	Potentially Exposed to Adverse Environment	Potential for Providing Misleading Information
Containment Isolation (Phase 'A' and/or Phase 'B')	Position Indication Lights on Each Power Operated Containment Isolation Valve	Verification of Containment Isolation Initiated By the RPS/ESFAS	No	Yes (for valves/ Cabling in LOCA/HELB Areas)	No See Note (4)

FIGURE SUPPLIED BY THE LICENSEE

Table C-1 (Cont.)

Notes for Table 1

(1) Reactor Trip signals are generated by qualified safety-related devices used in the Reactor Protection System/Engineered Safety Features Actuation System (RPS/ESFAS) for all design basis accidents involving high energy line ruptures. The display instrumentation available to verify Reactor Trip is not safety related and failure of such instrumentation would not provide misleading information to the extent that the operators would take actions adverse to safety. For example, in the event that the Reactor Trip Breaker position lights did not indicate a trip subsequent to a trip initiated by the RPS/ESFAS, the emergency operating procedures (EOPs) would require that the operator manually trip the reactor.

(2) A turbine trip is automatically achieved through the balance-of-plant (BOP) channels. In the event that any or all of the display instrumentation were to provide false information subsequent to a turbine trip, the operator would manually initiate a trip, as required by the EOPs. Such actions are obviously not adverse to safety. The high-energy line break (HELB) which could conceivably have an adverse effect on the display instrumentation channels noted in Table 1 is a Main Steam Line Break (MSLB) in the Turbine Building.

(3) Feedwater isolation is achieved automatically through the RPS/ESFAS subsequent to the receipt of a safety injection (SI) signal.

Although an adverse environment outside containment could conceivably affect the channels used to indicate feedwater isolation, the automatic isolation would not be impaired.

(4) Containment isolation is achieved automatically through the RPS/ESFAS. Position indication lights are provided for all power operated containment isolation valves (CIVs). These lights are provided as aids to the operators and are not safety-related.

In addition, it is not possible for a single HELB to simultaneously subject all CIVs to an adverse environment.

FIGURE SUPPLIED BY THE LICENSEE

Table C-2. Licensee Table 2 [12]

TABLE 2

Function	Display Instrumentation	Purpose of Display	Safety Related	Potentially Exposed to Adverse Environment	Potential for providing Misleading Information
Containment Conditions	Containment Pressure Monitor	- Diagnostic - PAM - RPS/ESFAS - Use in Actuation of RHR Sprays	Yes	Yes (see Note 1)	No (see Note 1)
	Containment Radiation Monitor	- Diagnostic - PAM	TMI Item	No (note 11)	No
	Containment Humidity Monitor	- Diagnostic	No	Yes	No
	Containment Temperature	- Diagnostic	No	Yes	No
Auxiliary Feedwater System Status	Motor Driven Pumps-Breaker Position Indication Lights	Verify Power Available to Pump	No	No	No
	Motor Driven Pumps-Motor Ammeters	Verify Pump Operation	No	No	No

FIGURE SUPPLIED BY THE LICENSEE

Table C-2 (Cont.)

TABLE 2 (cont'd.)

Function	Display Instrumentation	Purpose of Display	Safety Related	Potentially Exposed to Adverse Environment	Potential for providing Misleading Information
Auxiliary Feedwater System Status (cont'd.)	Auxiliary Feedwater Flow Indication	- Verify System Performance - Used for isolation of faulted loop during MSLB	Yes	Yes	No (see Note 2)
	Steam Generator Narrow Range Level Indication	- RPS/ESFAS - PAM - Verify AFS Performance	Yes	Yes	No (see Note 2)
	Condensate Storage Tank Level Indication and "Lo-Lo" Level Alarm	- Operator information for use in Transfer of AFS Suction to ESW	No	No	No (see Note 2)
Secondary System Status	Main Steam Pressure Indication	- RPS/ESFAS - PAM - Diagnostic	Yes	Yes	No (see Note 3)

FIGURE SUPPLIED BY THE LICENSEE

Table C-2 (Cont.)

TABLE 2 (cont'd.)

Function	Display Instrumentation	Purpose of Display	Safety Related	Potentially Exposed to Adverse Environment	Potential for providing Misleading Information
Secondary System Status (cont'd.)	Main Steam Isolation Valve Position Indication Lights	Verify Steamline Isolation Initiated by RPS/ESFAS	No	Yes	No (see Note 3)
	Main Steam PORV Position Indication Lights	Verify Valve Position for Plant Cooldown	No	Yes	No (see Note 3)
	MSIV Dump and Bleed-Off Valves' Position Indication Lights	Verify Steamline Isolation Initiated by RPS/ESFAS	No	Yes	No (see Note 3)
	Main Steam Flow Indication	- RPS/ESFAS - Diagnostic - Verify Steam-line Isolation	Yes	Yes	No (see Note 3)
Emergency Core Cooling Systems' Status	Centrifugal Charging Pumps - Breaker Position Indication Lights	Verify Power Available to Pump	No	Yes	No (see Note 4)

FIGURE SUPPLIED BY THE LICENSEE

Table C-2 (Cont.)

TABLE 2 (cont'd.)

Function	Display Instrumentation	Purpose of Display	Safety Related	Potentially Exposed to Adverse Environment	Potential for providing Misleading Information
Emergency Core Cooling Systems' Status (cont'd.)	Centrifugal Charging Pumps - Motor Ammeters	Verify Pump Operations	No	Yes	No (see Note 4)
	Safety Injection Pumps-Breaker Position Indication Lights	Verify Power Available to Pump	No	No	No (see Note 4)
	Safety Injection Pumps - Motor Ammeters	Verify Pump Operation	No	No	No (see Note 4)
	Residual Heat Removal Pumps - Breaker Position Indication Lights	Verify Power Available to Pump	No	No	No (see Note 4)
	Residual Heat Removal Pumps - Motor Ammeters	Verify Pump Operation	No	No	No (see Note 4)

FIGURE SUPPLIED BY THE LICENSEE

Table C-2 (Cont.)

TABLE 2 (cont'd.)

Function	Display Instrumentation	Purpose of Display	Safety Related	Potentially Exposed to Adverse Environment	Potential for providing Misleading Information
Emergency Core Cooling Systems' Status (cont'd.)	Boron Injection Flow Indicators	Verify Charging Pump Operation	Yes	Yes	Yes (see Note 4)
	Letdown Line Flow Indication	Verify Letdown Isolation	No	No	No (see Note 5)
	Safety Injection Flow Indicators	Verify Safety Injection Pump Operation	Yes	No	Yes (see Note 4)
	Residual Heat Removal Flow Indication	Verify RHR Pump Operation	Yes	No	Yes (see Note 4)
	RHR Spray Flow Indicators	Verify RHR Spray Flow	Yes	No	Yes (see Note 6)
	Position Indicator Lights on Valves IMO-340, 350, 360 361, and 362, and ICM 305 and 306	Verify ECCS Realignment to Sump Recirculation	No	No	No (see Note 6)

FIGURE SUPPLIED BY THE LICENSEE

Table C-2 (Cont.)

TABLE 2 (cont'd.)

Function	Display Instrumentation	Purpose of Display	Safety Related	Potentially Exposed to Adverse Environment	Potential for providing Misleading Information
Emergency Core Cooling Systems' Status (cont'd.)	RWST Level Indication and "Lo" and "Lo-Lo" Level Alarms	Used for Alignment of ECCS to Sump Recirculation	Yes	No	No (see Note 7)
	Containment Water Level Indication	- Used for Alignment of ECCS to Sump Recirculation Mode - PAM	Yes	Yes	No (see Note 7)
Containment Spray System Status	Containment Spray Pumps - Breaker Position Indication Lights	Verify Power Available	No	No	No (see Note 8)
	Containment Spray Pumps - Motor Ammeters	Verify Pump Operation	No	No	No (see Note 8)
	Containment Spray Pumps - Discharge Pressure Indication	Verify System Operation	Yes	No	No (see Note 8)

FIGURE SUPPLIED BY THE LICENSEE

Table C-2 (Cont.)

TABLE 2 (cont'd.)

Function	Display Instrumentation	Purpose of Display	Safety Related	Potentially Exposed to Adverse Environment	Potential for providing Misleading Information
Service Water Systems Status	Component Cooling Water Pumps - Breaker Position Indication Lights	Verify Power Available to Pump	No	No	No
	Component Cooling Water Pumps - Motor Ammeters	Verify Pump Operation	No	No	No
	Essential Service Water Pumps - Breaker Position Indication Lights	Verify Power Available to Pump	No	No	No
	Essential Service Water Pumps - Motor Ammeters	Verify Pump Operation	No	No	No
Reactor Coolant System Status	Pressurizer Pressure Indication	RPS/ESFAS Diagnostic PAM	Yes	Yes	Yes (see note 12)
	Pressurizer Level Indication	Diagnostic PAM	Yes	Yes	No (see note 13)
	RCS Wide Range Pressure Indication	PAM Input to Subcooling Meter	Yes	Yes	Yes (see note 12)

FIGURE SUPPLIED BY THE LICENSEE

Table C-2 (Cont.)

TABLE 2 (Cont'd.)

Function	Display Instrumentation	Purpose of Display	Safety Related	Potentially Exposed to Adverse Environment	Potential for providing Misleading Information
Reactor Coolant System Status	RCS Wide Range Temperature Indication (Hot & Cold Leg RTDs)	PAM Input to Subcooling Meter	Yes	Yes	Yes (see note 12)
	RCS Narrow Range Temperature Indication	RPS/ESFAS Diagnostic	Yes	Yes	No
	Pressurizer PORV Position Indication Lights (Limit Switches & Acoustic Monitor on Header)	Verify Valve Position and RCS Isolation	TMI Item	Yes	No
	Pressurizer PORV Block Valve Position Indication Lights	Verify Valve Position and RCS Isolation	TMI Item	Yes	No
	Reactor Coolant Pumps - Breaker Position Indication Lights	Verify Power Available to Pump	No	Yes	No (See Note 9)
	Reactor Coolant Pumps - Motor Ammeters	Verify Pump Operation	No	Yes	No (See Note 9)
Emergency Power	Emergency Diesel Generators - Output Watt Meter	Verify Proper EDG Operation	Yes	No	No (See Note 10)
	Emergency Diesel Generators - Load Meter	Verify Proper EDG Operation	Yes	No	No (See Note 10)

FIGURE SUPPLIED BY THE LICENSEE

Table C-2 (Cont.)

NOTES FOR TABLE 2

(1) The transmitters used in containment pressure monitoring channels are located outside containment and are not adversely affected by the environment associated with the hypothetical events during which they are needed to function; namely a LOCA or MSLB inside containment.

(2) The auxiliary feedwater flow monitors and their associated indication channels may be subjected to an adverse environment due to a MSLB outside containment. At most, two monitors/indication channels can be affected by a single HELB. For such events, the safety grade narrow-range steam generator water level monitors (located inside containment) provide redundant indication of proper auxiliary feedwater system performance. The redundant condensate storage tank (CST) level indication and alarms serve to alert the operators of the need to transfer auxiliary feedwater pump's suction from the CST to the essential service water system. Failure of the CST level indication and (or) level alarms would not compromise the auxiliary feedwater system as each pump is automatically tripped on low suction pressure.

(3) Steamline isolation is achieved automatically through the RPS/ESFAS. A hypothetical HELB in the vicinity of the main steam isolation valves(MSIVs)(the east or west main steam enclosures) could, at most, adversely affect the indication channels for the MSIVs, their associated dump and bleed-off valves, and the control channels for the PORVs on two secondary loops. For such events, steamline isolation can be verified by use of the safety-grade main steam flow transmitters located inside containment. For postulated HELBs inside containment redundant verification of steamline isolation is provided by the steam flow, steam generator narrow range level, and main steam pressure indication channels.

(4) Indication of pump breaker position and motor amperage is provided in the control room for each emergency core cooling pump. These indications are useful as operator aids subsequent to automatic starting of the pumps on the appropriate safeguards signal. These indication channels also serve to provide the operator with information concerning pump motor status during the long-term recirculation mode.

FIGURE SUPPLIED BY THE LICENSEE

Table C-2 (Cont.)

The indication channels on the centrifugal charging pumps are potentially subjected to the environment associated with a letdown line break (see Appendix 'O' to the Cook Plant FSAR for further details). All other ECCS pumps are not in HELB areas. Safety grade indication of ECCS flow is provided by flow meters on the boron injection paths, the safety injection paths, and the residual heat removal paths. The boron injection flow meters are located inside containment and safety injection flow meters and the residual heat removal flow indicators are located in the auxiliary building.

(5) Letdown isolation is achieved automatically through the RPS/ESFAS. Verification of isolation is provided by the letdown flow indicator.

(6) ECCS realignment to the sump recirculation mode involves manual repositioning of the indicated valves. Although position indication lights are provided for these valves the safety grade indication of proper valve alignment is provided by the flow indicators mentioned in Note (4) above. In addition, flow meters are provided to provide verification of proper systems operation in the event RHR sprays are initiated.

(7) Refueling Water Storage Tank (RWST) level indication and level alarms are used in conjunction with containment water level indication to facilitate ECCS switchover from the injection to the sump recirculation mode. The containment water level indication and RWST level indication can not both be subjected to an adverse environment from a single HELB. In fact, the RWST level indication instrumentation is not located in a HELB area.

(8) Indication of pump breaker position and motor amperage is provided in the control room for each containment spray pump. These indications are useful as operator aids subsequent to automatic starting of the pumps on the appropriate safeguards signal. These indications also serve to provide the operator with information concerning pump status during the long-term recirculation mode. Positive indication of proper spray system operation is provided by pressure indicators on the discharge of each pump.

FIGURE SUPPLIED BY THE LICENSEE

Table C-2 (Cont.)

(9) Indication is provided for reactor coolant pump's breaker position and motor amperage. As the pumps themselves are not considered to be safety related per se, indication of pump status is not classified as safety-related either. These indications do provide verification of pump trip subsequent to manual actions based on decreasing primary system pressure.

(10) Indication of output wattage and load are provided for each emergency diesel generator (EDS). Further verification of proper EDG operation is effectively provided by the motor ammeters provided for the safety-related pumps loaded on the diesel.

(11) The existing containment radiation monitoring system (RMS) does not utilize devices exposed to an adverse environment. The RMS is being modified pursuant to the requirements of NUREG-0578. The modified system will utilize devices exposed to an adverse environment.

(12) The hypothetical errors associated with exposure of those channels has been factored into the subcooling margin specified in the applicable procedure(s).

(13) The LOCA procedure explicitly requires that pressurizer level indication be used in conjunction with other available indications. Pressurizer level is not used by itself to initate any actions following a LOCA or MSLB inside containment.

FIGURE SUPPLIED BY THE LICENSEE

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

1. BACKGROUND

The NRC Safety Evaluation Report (SER) concerning equipment environmental qualification (EEQ) states [10]:

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

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

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

> "The FRC review will consist of:
>
> - Review the licensee's justification of interim operation and provide FRC independent analysis which shows whether or not licensee provided technically sound rationale as a basis for justification for continued plant operation.

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

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

2. GENERAL DISCUSSION

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

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

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

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

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

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

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

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

3. PLANT-SPECIFIC REVIEW

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

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

SUMMARY OF REVIEW
OF LICENSEE 90-DAY RESPONSE

Utility: Indiana & Michigan Electric Company
Plant Name: D. C. Cook Unit 1
NRC Docket No. 50-315
NRC TAC No. 42460
NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 497

References:

a. G. P. Maloney
Letter to H. R. Denton, NRC. Subject: Donald C. Cook Nuclear Plant Unit Nos. 1 and 2; Response to SER on Environmental Qualification of Safety-Related Electrical Equipment
Indiana & Michigan Electric, 23-Sep-81
AEP:NRC:00578

b. Office of Nuclear Reactor Regulation
Safety Evaluation Report for D. C. Cook Unit 1
Environmental Qualification of Safety-Related
Electrical Equipment
NRC, 26-May-81

The Licensee has submitted technical information in Reference a in response to the NRC SER [b] on environmental qualification. FRC has reviewed these documents [a, b]. As a result of this review, FRC concludes that the Licensee has stated that the equipment items are environmentally qualified.

In general, the Licensee's response to the SER addressed and provided resolution of deficiencies identified in the SER. It should be noted that Appendices B and C of the SER identify 86 equipment items with qualification deficiencies (Appendix B, 72; Appendix C, 14). The Licensee's response indicates all of these items are effectively qualified. FRC's review revealed that the Licensee does not intend to replace any item."

APPENDIX E - REQUEST FOR ADDITIONAL INFORMATION

This appendix contains the Request for Additional Information (RAI) that was developed during the course of the review and issued to the NRC for forwarding to the Licensee. The RAI was revised throughout the review to reflect the Licensee's response(s) to the initial RAI.

The reader is cautioned that the numbers in brackets refer to citations found in the list of references at the end of this appendix and not to the citations listed in Section 6, References, of the TER.

REQUEST FOR ADDITIONAL INFORMATION

EQUIPMENT ENVIRONMENTAL QUALIFICATION (EEQ)
REVIEW OF LICENSEES' RESOLUTION OF OUTSTANDING ISSUES
FROM NRC EQUIPMENT ENVIRONMENTAL QUALIFICATION SAFETY
EVALUATION REPORTS (SER) AND TMI ACTION PLAN INSTALLED EQUIPMENT

Indiana & Michigan Electric Company

D. C. Cook Unit 1

NRC Docket No. 50-315

NRC TAC No. 42460

December 18, 1981

Rev. 1, January 27, 1982
Rev. 2, April 8, 1982
Rev. 3, May 20, 1982
Rev. 4, June 28, 1982

BACKGROUND

Franklin Research Center (FRC) of Philadelphia, Pa. is providing assistance to the U.S. Nuclear Regulatory Commission (NRC) for the equipment environmental qualification (EEQ) review of operating reactors. FRC will perform an EEQ review of the Licensee's 90-day response to outstanding issues from the NRC Equipment Environmental Qualification Safety Evaluation Report (SER) and the installed TMI Action Plan equipment. The review will be limited to safety-related equipment potentially exposed to a harsh environment. The results will be presented in the form of a technical evaluation report for each plant.

This request for additional information (RAI) is the result of an evaluation of the information provided by letters dated September 23, 1981 [1], May 28, 1981 [2], February 3, 1981 [3], and October 31, 1980 [4]*. FRC previously requested TMI Action Plan information by a telephone memorandum dated August 11, 1981 [5].

In response, American Electric Power (AEP) transmitted the following information on August 17, 1981 [6].

1. Several figures and tables which depict pressure, temperature, and radiation of the containment as a function of time for both LOCA and MSLB events.

2. Copies of the general notes referenced in the February 3, 1981 submittal.

By letter dated February 26, 1982 [9], the Licensee transmitted the requested documents except A.1.p, A.1.q, A.1.r, A.1.t, and A.1.v, which have not yet been established as qualification documents and therefore are not incorporated into the central file, and item A.1.s, which will be supplanted by a new reference. The Licensee also stated that a new submittal including a revised master list would be submitted by March 31, 1982.(2)**

*Numbers in brackets refer to citations found in the list of references.
**Throughout the text, superscript numbers in parentheses indicate the revision in which the underlined material preceding the superscript was added.

On April 11, 1982, FRC received a supplemental response to the RAI dated April 7, 1982 [11]. The Licensee submitted the remaining qualification documents requested in the RAI which include the following items: A.1.p, A.1.q, A.1.r, A.1.t, A.1.v, and A.1.s. In addition, the Licensee provided the necessary information for items B.1.a, B.1.b, B.1.c, B.1.d, and B.3.(3)

FRC also received a letter dated April 6, 1982 [10] in which the Licensee requested a time extension for the transmittal of the complete revision of their EQ submittal until May 15, 1982. This revision will supersede all previous submittals. The Licensee had previously committed to submit this document by March 31, 1982.(3)

On June 11, 1982, Indiana and Michigan Electric Company submitted copies of qualification documentation previously received in References 9 and 11. In addition, the Licensee stated in the cover letter that a completely revised response to the SER had been submitted to the NRC [12].(4)

A. FRC REVIEW OF THE LICENSEE'S 90-DAY RESPONSE TO THE NRC EEQ SER

INFORMATION REQUESTED	DATE RECEIVED BY FRC***
1. In reference to the Licensee's 90-day response [1] to the NRC SER [7], a legible single copy of each of the following qualification documents is requested in order that the FRC evaluation may proceed:	
a. Conax Test Report IPS-234	3/4/82 [9](2)
b. Conax Corp. Test Report IPS-137	3/4/82 [9](2)
c. Conax Corp. Test Report IPS-348	3/4/82 [9](2)
d. Cerro Wire and Cable Test Report of May 1976	3/4/82 [9](2)
e. Westinghouse - Canada Test Report CWAPD-332	3/4/82 [9](2)
f. Limitorque Test Report 600461	3/4/82 [9](2)

***This column will be completed by FRC as the requested information is received.

		DATE RECEIVED BY FRC***
g.	Westinghouse Corp. communication NS-PLC-5023 dated 4/26/78 from T. M. Anderson, Westinghouse, to E. G. Case, NRC	3/4/82 [9](2)
h.	Westinghouse Electric Corp. Communications: NS-TMA-1950	3/4/82 [9](2)
i.	BIW Test Report 73C212(2)	3/4/82 [9](2)
j.	BIW Test Report 75C008	3/4/82 [9](2)
k.	Rockbestos Qualification of Firewall III Class IE Electrical Cable, May 1976 Same as d(2)	
l.	Conax Test Report IPS-339	3/4/82 [9](2)
m.	Conax Test Report IPS-349	3/4/82 [9](2)
n.	Qual. by letter of 6-2-71 from: W. F. Hergreuter - Customer Service Lab, Brooklyn, NY to: A. H. Statton - Boston Edison Co.	3/4/82 [9](2)
o.	Letter of 4-17-80 from J. M. Allen (Mobil Oil Corp.) to Allen Feibelman (AEP)	3/4/82 [9](2)
p.	Floodup Tube Qual. Packet (on SCEW CI1-1, CI2-1, etc. of Reference 1) Not yet in central file [9](2)	4/11/82 [11](3)
q.	Instr. Cable Term. Packet (on SCEW TI1-1 of Reference 1) Not yet in central file [9](2)	4/11/82 [11](3)
r.	Required Time Qual. Analysis (on SCEW CI1-1; CI2-1, etc. of Reference 1) Not yet in central file [9](2)	4/11/82 [11](3)
s.	Letter of 4/28/80 from P. K. Eapin to AEP-NRC-003440	4/11/82 [11](3)
t.	E. Q. for outside containment cable (on SCEW CP3-1 of Reference 1) Not yet in central file [9](2)	4/11/82 [11](3)

DATE RECEIVED BY FRC***

u. Westinghouse Electric Corp. Correspondence with as noted identity NS-PLC-5023 (on SCEW I-14 of Reference 1) Same as g(2)

v. Electrical Penetration and Analysis (on SCEW EP01-1 of Reference 1) Not yet in central file [9](2) — 4/11/82 [11](3)

w. A copy of the master list of safety-related electrical equipment for D.C. Cook Unit 1 as required by IE Bulletin 79-01B(1) — [2, 4](2)

x. Identification of plant ID numbers applicable to the safety-related electrical equipment for D. C. Cook Unit 2 if not contained in the master list requested in x above(1) — [2, 4](2)

B. FRC REVIEW OF INSTALLED TMI ACTION PLAN ITEMS

INFORMATION REQUESTED — DATE RECEIVED BY FRC***

1. References 1, 2, and 3 do not provide adequate detail with respect to identification of TMI Action Plan equipment installed after 1/1/81.

   a. Identification of TMI Action Plan equipment installed with implementation dates after 1/1/81 is requested. — 4/11/82 [11](3)

   b. The correlation of these equipment items with the specific sections of NUREG-0737 [8] (as applicable) is requested. — 4/11/82 [11](3)

      [The correlation is needed to ensure that all items are included in the review, e.g., if a transmitter is identified as a TMI Action Plan item, are the cable and terminal blocks associated with the device also identified?]

	DATE RECEIVED BY FRC***
c. For all installed TMI Action Plan equipment identified, a System Component Evaluation Worksheet (SCEW) (in accordance with 79-01B format) is requested.	4/11/82 [11](3)
d. The approximate installation date for the TMI Action Plan equipment items is requested so that the appropriate qualification criteria (NUREG-0588 or DOR Guidelines) can be used in the EEQ evaluation.	4/11/82 [11](3)
2. The qualification documents, e.g., the actual test reports and associated correspondence cited as evidence of qualification listed on the SCEW sheets, for all identified TMI Action Plan equipment are requested. [The identification of those reports considered to be proprietary is requested so that proper control of documents can be maintained.]	3/4/82 [9](2)
3. Where the Licensee has a standard Owners' Group position with respect to a NUREG-0737 technical area or has requested extensions of implementation dates, this information is requested in order to incorporate it into the review.	4/11/82 [11](3)

C. INSTRUCTIONS FOR TRANSMITTING INFORMATION REQUESTED

1. The schedule for completion of the FRC assignment requires that the Licensee provide the requested information within 3 weeks of the date of the RAI.

2. The Licensee may transmit the requested information as follows:

   o complete package directly to the NRC project manager

   or

   o copy of cover letter to NRC project manager and complete package to FRC.

REFERENCES

1. G. P. Maloney
Letter to H. R. Denton, NRC. Subject: Donald C. Cook Nuclear Plant Unit Nos. 1 and 2; Response to SER on Environmental Qualification of Safety-Related Electrical Equipment
Indiana & Michigan Electric, 23-Sep-81
AEP:NRC:00578

2. R. S. Hunter
Letter to J. G. Keppler, NRC. Subject: Transmittal of corrected and additional pages to Attachments 2 and 5 of response to IE Bulletin 79-01B dated May 7, 1980
Indiana & Michigan Electric, 28-May-81
AEP:NRC:0356E

3. G. P. Maloney
Letter to J. G. Keppler, NRC. Subject: Response to IE Bulletin 79-01B
Indiana & Michigan Electric, 03-Feb-81
AEP:NRC:0356D

4. G. P. Maloney
Letter to J. G. Keppler, NRC. Subject: Revisions to Response to IE Bulletin 79-01B.
Indiana & Michigan Electric, 31-Oct-80
AEP:NRC:00356C

5. Telephone Memorandum
C. J. Crane, J. Murphy (FRC), Conversation with S. Miner (NRC-PM), J. I. Castresana, J. Delpersico, R. Shelberg, C. Shu (D. C. Cook representatives), Subject: Request for TMI Information, D. C. Cook Units 1 and 2, Dated 11-Aug-81.

6. J. I. Castresana
Letter to C. Crane, FRC. Subject: Transmittal of figures and tables to facilitate TMI Action Plan item review
American Electric Power Service, 14-Aug-81

7. Office of Nuclear Reactor Regulation
Safety Evaluation Report for D. C. Cook Unit 1
Environmental Qualification of Safety-Related Electrical Equipment
NRC, 26-May-81

8. NUREG-0737, "Clarification of TMI Action Plan Requirements"
NRC, November 1980

9. K. S. Hunter
Letter to S. A. Varga, NRC. Subject: Donald C. Cook Nuclear Plant Unit Nos. 1 and 2: Request for Additional Information on Environmental Qualification of Safety-Related Equipment
Indiana & Michigan Electric, 26-Feb-82
AEP: NRC0578C(2)

10. R. W. Jurgensen
Letter to H. R. Denton, NRC. Subject: Donald C. Cook Nuclear Plant Unit Nos. 1 and 2; Response to SER on Environmental Qualification of Safety-Related Electrical Equipment
American Electric Power, 06-Apr-1982
AEP: NRC0578F(3)

11. R. F. Hering
Letter to S. A. Varga, NRC. Subject: Donald C. Cook Nuclear Plant Unit Nos. 1 and 2; Environmental Qualification of Safety-Related Electrical Equipment
Indiana & Michigan Electric, 07-Apr-82
AEP: NRC0578D(3)

12. R. S. Hunter
Letter to H. R. Denton, NRC. Subject: Donald C. Cook Nuclear Plant Unit Nos. 1 and 2; Response to SER on Environmental Qualification of Safety-Related Electrical Equipment
Indiana and Michigan Electric, 11-Jun-82
AEP: NRC 0578B(4)